Appendix C (3 of 3)
Predesign Investigation

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.89	46.69	91.	24.	0.013	74.61	0.680s
TH-227	199.70	50.14	198.	13.	0.007	151.62	0.938s
AM-241	237.25	59.54	266.	-8.	-0.005	273.26	0.946s
BA-133	323.00	80.99	382.	-25.	-0.014	88.30	0.966
Np-237	344.99	86.49	343.	19.	0.011	139.26	0.971s
Sn-126	346.79	86.94	365.	0.	0.000	1000.00	0.971s
Sn-126	349.31	87.57	476.	16.	0.009	192.15	0.972s
Cd-109	351.19	88.04	492.	16.	0.009	195.25	0.972s
Nd-147	363.42	91.10	508.	16.	0.009	197.84	0.975s
TH-234	371.21	93.05	76.	27.	0.015	57.77	0.505s
AC-228	372.41	93.35	626.	-19.	-0.010	191.72	0.977s
Gd-153	389.00	97.50	607.	-19.	-0.010	188.16	0.981s
Np-239	396.99	99.50	588.	-19.	-0.010	184.95	0.982s
Gd-153	411.78	103.20	570.	-17.	-0.009	203.81	0.986s
Np-239	413.78	103.70	553.	0.	0.000	1000.00	0.986s
Np-239	423.49	106.13	564.	-16.	-0.009	218.26	0.988s
EU-152	486.04	121.78	100.	16.	0.009	94.27	1.002s
CO-57	487.18	122.06	108.	-15.	-0.008	103.99	1.003s
EU-154	491.33	123.10	100.	6.	0.003	239.21	1.004s
PA-234	524.09	131.29	363.	-18.	-0.010	155.30	1.011s
CE-144	533.06	133.54	318.	17.	0.009	151.46	1.013s
HF-181	544.09	136.30	304.	9.	0.005	282.70	1.015s
U-235	574.02	143.79	194.	-24.	-0.013	67.92	1.022s
CE-141	580.63	145.44	129.	7.	0.004	221.84	1.024s
Ba-140	649.47	162.66	152.	3.	0.002	584.05	1.039s
CE-139	662.23	165.85	178.	-20.	-0.011	97.79	1.042s
Cf-251	705.19	176.60	73.	8.	0.004	212.07	1.051s
U-235	741.65	185.72	79.	32.	0.018	52.87	1.060s
TH-229	772.79	193.51	103.	-20.	-0.011	99.29	1.066s
U-235	820.06	205.33	89.	-17.	-0.010	99.23	1.077s
TH-229	842.11	210.85	78.	-7.	-0.004	255.25	1.082s
Cf-251	906.68	227.00	73.	-17.	-0.009	97.15	1.096s
PB-212	952.48	238.46	42.	90.	0.050	17.48	0.852
PB-214	966.63	242.00	252.	-11.	-0.006	203.32	1.109
EU-152	977.41	244.69	201.	14.	0.008	146.61	1.111s
TH-227	1023.58	256.24	51.	-8.	-0.005	164.54	1.122
Cd-113m	1053.40	263.70	70.	-4.	-0.002	300.00	1.128s
BI-210M	1061.92	265.83	50.	12.	0.007	90.17	1.130s
TL-208	1107.82	277.31	17.	9.	0.005	78.57	0.243s
Hg-203	1115.37	279.20	47.	11.	0.006	91.16	1.141s
I-131	1135.76	284.30	32.	3.	0.002	373.67	1.146
PB-214	1178.90	295.09	186.	12.	0.007	162.74	1.155s
TL-210	1182.54	296.00	198.	12.	0.007	167.64	1.156s
PB-212	1198.65	300.03	210.	12.	0.007	177.59	1.159s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1198.81	300.07	222.	12.	0.007	176.75	1.159s
PA-233	1199.25	300.18	234.	12.	0.007	181.37	1.159s
PA-231	1209.13	302.65	246.	12.	0.007	185.54	1.162
BA-133	1209.93	302.85	258.	6.	0.003	413.01	1.162
BI-210M	1218.11	304.90	264.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	264.	0.	0.000	1000.00	1.167s
Ir-192	1264.46	316.49	54.	4.	0.002	264.58	1.173s
CR-51	1278.83	320.08	43.	10.	0.005	101.71	1.177s
La-140	1313.52	328.76	169.	-11.	-0.006	174.89	1.184s
Cf-249	1332.23	333.44	179.	0.	0.000	1000.00	1.188s
AC-228	1351.74	338.32	179.	0.	0.000	1000.00	1.192s
Cs-136	1360.74	340.57	179.	0.	0.000	1000.00	1.194s
EU-152	1375.60	344.29	218.	-16.	-0.009	136.57	1.197s
HF-181	1381.77	345.83	195.	14.	0.008	145.40	1.199
PB-214	1405.69	351.81	7.	100.	0.055	11.61	0.780
BA-133	1422.43	356.00	143.	-12.	-0.007	145.49	1.207s
I-131	1456.35	364.48	49.	-15.	-0.008	65.14	1.215s
BA-133	1533.76	383.84	39.	9.	0.005	109.14	1.231
Cf-249	1550.19	387.95	51.	10.	0.005	110.17	1.235s
SN-113	1565.14	391.69	82.	-11.	-0.006	116.58	1.238s
SB-125	1709.84	427.88	20.	-1.	-0.001	881.29	1.268s
AG-108M	1734.08	433.94	32.	-8.	-0.004	142.89	1.273s
pm-146	1813.83	453.88	20.	3.	0.001	346.26	1.290s
SB-125	1851.76	463.37	62.	-13.	-0.007	69.64	1.298s
Ir-192	1870.53	468.06	64.	1.	0.001	798.34	1.302s
BE-7	1908.66	477.60	42.	9.	0.005	105.98	1.310s
HF-181	1926.26	482.00	51.	9.	0.005	115.58	1.313
La-140	1946.35	487.02	60.	9.	0.005	129.68	1.317s
RU-103	1986.48	497.05	42.	-14.	-0.008	68.53	1.326s
RH-106	2045.71	511.86	20.	79.	0.044	18.30	2.588
Nd-147	2122.23	531.00	17.	7.	0.004	133.23	1.354s
Ba-140	2147.27	537.26	0.	15.	0.008	26.95	1.359s
CS-134	2251.16	563.24	13.	8.	0.005	95.13	1.380s
CS-134	2275.49	569.32	22.	7.	0.004	97.06	1.385s
BI-207	2277.02	569.70	36.	-4.	-0.002	246.61	1.385s
TL-208	2331.84	583.41	6.	29.	0.016	24.36	1.542
SB-125	2400.20	600.50	213.	-14.	-0.008	28.85	1.410
SB-124	2409.12	602.73	164.	4.	0.002	417.19	1.412s
CS-134	2417.03	604.71	168.	0.	0.000	1000.00	1.414s
BI-214	2435.79	609.40	17.	68.	0.038	16.67	1.380
RU-103	2439.39	610.30	168.	0.	0.000	1000.00	1.418s
AG-108M	2455.31	614.28	168.	0.	0.000	1000.00	1.421s
RH-106	2485.86	621.92	31.	-4.	-0.002	282.84	1.427s
SB-125	2541.74	635.89	14.	3.	0.002	190.17	1.439s
I-131	2546.08	636.97	24.	-4.	-0.002	136.08	1.440s
AG-110M	2629.23	657.76	28.	-1.	-0.001	754.98	1.456s
CS-137	2644.82	661.66	43.	-12.	-0.007	82.50	1.459s
PM-144	2784.35	696.54	14.	7.	0.004	119.52	1.487s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	2808.70	702.63	9.	7.	0.004	95.77	1.492s
SB-124	2889.33	722.79	66.	-16.	-0.009	77.31	1.507s
AG-108M	2889.93	722.94	82.	-12.	-0.007	107.96	1.507s
EU-154	2891.61	723.36	94.	0.	0.000	1000.00	1.508s
ZR-95	2894.98	724.20	94.	0.	0.000	1000.00	1.508s
BI-212	2906.86	727.17	74.	13.	0.007	98.58	1.511s
pm-146	2941.07	735.72	23.	-3.	-0.002	312.25	1.518s
pm-146	2986.83	747.16	14.	5.	0.003	172.30	1.526s
ZR-95	3025.11	756.73	14.	0.	0.000	1000.00	1.534s
AG-110M	3053.97	763.94	37.	-7.	-0.004	128.57	1.539s
NB-95	3061.35	765.79	44.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	32.	11.	0.006	81.01	1.541s
EU-152	3113.88	778.92	9.	8.	0.004	92.37	1.551s
BI-212	3139.88	785.42	10.	7.	0.004	97.23	1.556s
CS-134	3181.68	795.87	27.	2.	0.001	374.17	1.564s
TL-210	3196.61	799.60	29.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	19.	8.	0.004	88.29	1.569s
CO-58	3241.32	810.78	50.	-12.	-0.007	57.15	1.575s
La-140	3261.30	815.77	62.	-11.	-0.006	66.09	1.579s
Cs-136	3272.22	818.50	52.	10.	0.005	112.37	1.581s
MN-54	3337.63	834.85	10.	7.	0.004	97.20	1.594s
Co-56	3385.32	846.77	19.	-5.	-0.003	150.31	1.603s
TL-208	3440.51	860.56	28.	-9.	-0.005	45.37	1.614s
NB-94	3482.65	871.10	25.	-8.	-0.005	92.17	1.621s
EU-154	3491.19	873.23	38.	-5.	-0.003	193.25	1.623s
PA-234	3520.39	880.53	43.	-11.	-0.006	91.86	1.628s
PA-234	3531.23	883.24	53.	0.	0.000	1000.00	1.630s
AG-110M	3537.01	884.68	53.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	32.	8.	0.004	106.05	1.635s
y-88	3590.45	898.04	5.	2.	0.001	255.77	1.642s
AC-228	3642.58	911.07	10.	8.	0.005	92.51	1.651s
AG-110M	3748.30	937.49	25.	-10.	-0.006	114.38	1.671s
PA-234	3782.42	946.02	25.	-12.	-0.007	96.04	1.677s
EU-152	3854.81	964.11	70.	-20.	-0.011	64.62	1.691
AC-228	3874.26	968.97	44.	10.	0.006	97.10	1.694s
EU-154	3983.73	996.33	21.	8.	0.005	84.22	1.714s
PA-234M	4002.41	1001.00	30.	4.	0.002	196.07	1.718s
EU-154	4017.53	1004.77	45.	-9.	-0.005	110.55	1.721s
Co-56	4149.84	1037.84	10.	1.	0.001	702.38	1.745s
Cs-136	4190.78	1048.07	32.	-14.	-0.008	64.38	1.752s
RH-106	4199.94	1050.36	46.	-3.	-0.002	339.30	1.754s
BI-207	4253.17	1063.66	10.	1.	0.001	702.38	1.763s
Ga-68	4308.15	1077.40	20.	-3.	-0.002	332.78	1.773s
FE-59	4395.60	1099.25	22.	-3.	-0.001	315.42	1.789s
EU-152	4446.92	1112.07	55.	-7.	-0.004	146.34	1.798s
ZN-65	4460.81	1115.55	48.	0.	0.000	1000.00	1.800s
BI-214	4479.78	1120.29	41.	10.	0.006	96.31	1.803s
Sc-46	4480.84	1120.55	36.	11.	0.006	84.21	1.804s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4483.84	1121.30	37.	9.	0.005	102.94	1.804s
CO-60	4691.70	1173.24	27.	-2.	-0.001	708.52	1.841s
Ta-182	4754.99	1189.05	32.	-7.	-0.004	136.20	1.852
Ta-182	4884.51	1221.41	22.	-3.	-0.002	136.88	1.874s
Co-56	4952.04	1238.28	11.	7.	0.004	109.49	1.886s
NA-22	5097.14	1274.53	5.	5.	0.003	83.91	1.910s
EU-154	5097.19	1274.54	10.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	16.	-5.	-0.003	187.26	1.922s
CO-60	5329.19	1332.50	11.	-3.	-0.002	243.10	1.949s
AG-110M	5536.55	1384.30	0.	7.	0.004	37.80	1.984s
EU-152	5631.44	1408.00	6.	2.	0.001	248.05	1.999s
K-40	5842.39	1460.69	8.	207.	0.115	7.23	1.955
La-140	6385.01	1596.21	24.	-15.	-0.008	100.23	2.119s
BI-214	7058.94	1764.49	3.	9.	0.005	46.09	2.219s
Co-56	7086.41	1771.35	22.	-8.	-0.004	96.61	2.223s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.4321E+00				5.31E+01	
			477.60	3.432E+00	?(	1.241E+01 1.06E+02 1.05E+01	G
NA-22	C	3.8745E-01				9.50E+02	
			1274.53	3.874E-01	?(	1.118E+00 8.39E+01 9.99E+01	G
K-40	N	1.7942E+02				4.66E+11	
			1460.83	1.794E+02	(P	1.385E+01 7.23E+00 1.07E+01	G
Sc-46	F	6.6268E-01				8.38E+01	
			889.28	5.086E-01	?(	1.847E+00 1.06E+02 1.00E+02	G
			1120.55	8.168E-01	?(	2.318E+00 8.42E+01 1.00E+02	G
CR-51	F	2.8094E+00				2.77E+01	
			320.08	2.809E+00	?(P	9.709E+00 1.02E+02 9.94E+00	G
MN-54	C	4.4131E-01				3.12E+02	
			834.85	4.413E-01	?(P	1.047E+00 9.72E+01 1.00E+02	G
FE-59	F	-3.3442E-01				4.45E+01	
			1099.25	-3.344E-01	?(P	3.191E+00 3.15E+02 5.65E+01	G
			1291.60	-9.704E-01	+	4.144E+00 1.87E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 2.0431E-01					7.73E+01	
		846.77	-2.896E-01	?(P	1.397E+00	1.50E+02	9.99E+01 G
		1238.28	8.877E-01	&(P	2.211E+00	1.09E+02	6.61E+01 G
		1037.84	5.020E-01	?(	8.758E+00	7.02E+02	1.41E+01 G
		1771.35	-5.283E+00	+	1.748E+01	9.66E+01	1.55E+01 A
CO-57	C -2.7823E-01					2.72E+02	
		122.06	-2.782E-01	?(	9.744E-01	1.04E+02	8.56E+01 G
		136.47	-4.494E-07	%	1.338E+01	8.75E+08	1.07E+01 G
CO-58	C -7.4068E-01					7.09E+01	
		810.78	-7.407E-01	?(P	2.122E+00	5.72E+01	9.95E+01 G
CO-60	F -2.8649E-01					1.93E+03	
		1332.50	-2.865E-01	?(	1.581E+00	2.43E+02	1.00E+02 G
		1173.24	-1.298E-01	+	2.086E+00	7.09E+02	9.99E+01 G
NB-94	I 3.9807E-01					7.41E+06	
		702.63	3.981E-01	?(	9.198E-01	9.58E+01	9.79E+01 G
		871.10	-5.196E-01	&	1.631E+00	9.22E+01	9.99E+01 G
RU-103	I -6.1421E-01					3.93E+01	
		497.05	-6.142E-01	?(P	1.475E+00	6.85E+01	9.09E+01 G
		610.30	0.000E+00	+	5.250E+01	1.00E+03	5.75E+00 GA
RH-106	I -1.9968E+00					3.74E+02	
		621.92	-1.997E+00	?(P	1.402E+01	2.83E+02	9.93E+00 G
		1050.36	-1.319E+01	+	1.576E+02	3.39E+02	1.56E+00 G
		511.86	1.653E+01		4.927E+00	1.83E+01	2.00E+01 GA
AG-108M	C -3.2533E-01					1.53E+05	
		433.94	-3.253E-01	?(	1.182E+00	1.43E+02	9.05E+01 G
		722.94	-7.336E-01	+	2.679E+00	1.08E+02	9.08E+01 G
		614.28	0.000E+00	&	3.376E+00	1.00E+03	8.98E+01 G
AG-110M	F 6.3945E-01					2.50E+02	
		884.68	0.000E+00	?(	3.185E+00	1.00E+03	7.27E+01 G
		657.76	-5.346E-02	&	1.463E+00	7.55E+02	9.46E+01 G
		937.49	-1.914E+00	+	4.978E+00	1.14E+02	3.44E+01 G
		1384.30	2.553E+00	?(	2.688E+00	3.78E+01	2.43E+01 G
		763.94	-1.776E+00	&	7.880E+00	1.29E+02	2.23E+01 G
SN-113	F -6.0346E-01					1.15E+02	
		391.69	-6.035E-01	?(	2.386E+00	1.17E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	2.1050E-01					6.02E+01	
			602.73	2.105E-01	?(	3.005E+00	4.17E+02	9.83E+01 G
			1690.98	-2.307E-01	% P	3.105E+00	1.42E+03	4.78E+01 G
			722.79	-7.892E+00	+	2.037E+01	7.73E+01	1.08E+01 G
SB-125	I	2.6538E-01					1.01E+03	
			427.88	-1.229E-01	?(	2.895E+00	8.81E+02	2.96E+01 G
			600.50	-3.706E+00	+ P	1.872E+01	2.89E+01	1.79E+01 G
			635.89	1.282E+00	&(P	8.803E+00	1.90E+02	1.13E+01 G
			463.37	-4.785E+00	& P	1.452E+01	6.96E+01	1.05E+01 G
I-131	I	-5.9660E-01					8.02E+00	
			364.48	-5.966E-01	?(P	1.381E+00	6.51E+01	8.17E+01 G
			284.30	1.286E+00	+	1.246E+01	3.74E+02	6.14E+00 G
			636.97	-2.857E+00	+ P	1.764E+01	1.36E+02	7.17E+00 G
Gd-153	F	-1.0160E+00					2.42E+02	
			97.50	-1.016E+00	?(	6.399E+00	1.88E+02	3.00E+01 G
			103.20	-1.241E+00	+	8.479E+00	2.04E+02	2.18E+01 G
Ga-68	C	-7.7404E+00					4.71E-02	
			1077.40	-7.740E+00	?(	6.076E+01	3.33E+02	3.30E+00 G
Tc-99m	I	1.8630E-08					2.51E-01	
			140.51	1.863E-08	%(	1.663E+00	2.62E+09	8.93E+01 G
BA-133	F	-2.7393E-01					3.85E+03	
			356.00	-6.016E-01	?(	2.963E+00	1.45E+02	6.20E+01 G
			302.85	8.351E-01	&(	1.171E+01	4.13E+02	1.83E+01 G
			383.84	3.197E+00	?	1.193E+01	1.09E+02	8.94E+00 GA
			80.99	-1.291E+00	+ P	4.754E+00	8.83E+01	3.41E+01 GA
CS-134	I	5.9163E-01					7.54E+02	
			604.71	0.000E+00	?(	3.071E+00	1.00E+03	9.76E+01 G
			795.87	1.363E-01	?(	1.834E+00	3.74E+02	8.55E+01 G
			569.32	2.164E+00	?(	7.200E+00	9.71E+01	1.54E+01 G
			801.95	5.202E+00	?(	1.564E+01	8.83E+01	8.69E+00 G
			563.24	4.479E+00	?(	1.052E+01	9.51E+01	8.35E+00 G
CS-137	I	-7.1563E-01					1.10E+04	
			661.66	-7.156E-01	?(	1.984E+00	8.25E+01	8.52E+01 G
CE-139	F	-4.5153E-01					1.38E+02	
			165.85	-4.515E-01	?(	1.478E+00	9.78E+01	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	2.6041E+00					1.28E+01	
			537.26	2.604E+00	?(P	1.312E+00	2.70E+01	2.44E+01 G
			162.66	8.691E-01	-	1.743E+01	5.84E+02	6.22E+00 G
			304.85	-4.945E-06	%	5.083E+01	3.01E+08	4.29E+00 G
La-140	I	-1.5607E+00					1.28E+01	
			1596.21	-1.561E+00	?(P	2.677E+00	1.00E+02	9.54E+01 G
			487.02	7.757E-01	+	3.440E+00	1.30E+02	4.55E+01 G
			328.76	-1.551E+00	+	9.196E+00	1.75E+02	2.03E+01 G
			815.77	-2.759E+00	& P	1.007E+01	6.61E+01	2.33E+01 G
CE-141	I	2.6091E-01					3.25E+01	
			145.44	2.609E-01	&(	1.977E+00	2.22E+02	4.82E+01 G
CE-144	I	2.5370E+00					2.85E+02	
			133.54	2.537E+00	?(	1.290E+01	1.51E+02	1.11E+01 G
PM-144	C	3.7331E-01					3.63E+02	
			696.54	3.733E-01	?(	1.074E+00	1.20E+02	9.90E+01 G
			618.06	-4.504E-02	% P	3.083E+00	1.24E+03	9.91E+01 G
EU-152	F	6.1045E-01					4.94E+03	
			344.29	-1.800E+00	?(	8.271E+00	1.37E+02	2.65E+01 G
			1112.07	-4.070E+00	&	2.048E+01	1.46E+02	1.36E+01 G
			121.78	8.902E-01	+	2.818E+00	9.43E+01	2.86E+01 G
			778.92	3.380E+00	?(	7.511E+00	9.24E+01	1.29E+01 G
			964.11	-8.965E+00	+	1.913E+01	6.46E+01	1.46E+01 G
			244.69	4.308E+00	?(	2.130E+01	1.47E+02	7.58E+00 G
			1408.00	9.975E-01	?	5.901E+00	2.48E+02	2.10E+01 GA
EU-154	I	1.2636E+00					3.14E+03	
			873.23	-2.373E+00	?(	1.605E+01	1.93E+02	1.23E+01 G
			123.10	2.407E-01	+	1.978E+00	2.39E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.114E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.286E+01	1.00E+03	2.02E+01 G
			1004.77	-3.460E+00	+	1.306E+01	1.11E+02	1.80E+01 G
			996.33	5.473E+00	?(	1.562E+01	8.42E+01	1.06E+01 G
EU-155	I	-7.1125E-02					1.81E+03	
			105.31	-7.113E-02	%(P	8.589E+00	1.67E+03	2.12E+01 G
			86.54	1.420E-01	&	5.012E+00	1.04E+03	3.07E+01 G
HF-181	F	9.2356E-01					4.24E+01	
			482.00	4.529E-01	?(	1.787E+00	1.16E+02	8.05E+01 G
			133.02	7.930E-02	%	3.264E+00	1.21E+03	4.33E+01 G
			345.83	2.818E+00	&(	1.382E+01	1.45E+02	1.51E+01 G
			136.30	2.519E+00	?(	2.408E+01	2.83E+02	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	1.9121E+00					1.14E+02	
			1121.30	1.912E+00	?(	6.715E+00	1.03E+02	3.49E+01 G
			1221.41	-8.129E-01	& P	7.265E+00	1.37E+02	2.70E+01 G
			1189.05	-3.419E+00	+ P	1.412E+01	1.36E+02	1.62E+01 G
Hg-203	F	3.5730E-01					4.66E+01	
			279.20	3.573E-01	&(	1.100E+00	9.12E+01	8.15E+01 G
TL-208	N	1.6041E+00					6.98E+02	
			583.02	1.604E+00	(	7.548E-01	2.44E+01	8.45E+01 G
			277.28	3.817E+00	+	8.890E+00	7.86E+01	6.31E+00 G
			860.56	-4.637E+00	- P	1.367E+01	4.54E+01	1.24E+01 G
pm-146	C	7.8473E-01					2.02E+03	
			747.16	7.847E-01	?(P	3.316E+00	1.72E+02	3.40E+01 G
			735.72	-8.146E-01	&	6.163E+00	3.12E+02	2.25E+01 G
			453.88	1.517E-01	- P	1.393E+00	3.46E+02	6.50E+01 G
y-88	F	1.3597E-01					1.07E+02	
			898.04	1.360E-01	?(	8.927E-01	2.56E+02	9.37E+01 G
			1836.06	-2.289E-02	% P	8.367E-01	2.00E+03	9.92E+01 G
Cd-113m		-1.6550E+03					5.33E+03	
			263.70	-1.655E+03	?(	1.725E+04	3.00E+02	6.00E-03 K
Cd-109	F	7.1515E+00					4.53E+02	
			88.04	7.152E+00	?(	4.683E+01	1.95E+02	3.79E+00 G
Cf-251	T	8.4921E-01					3.28E+05	
			176.60	8.492E-01	&(	4.720E+00	2.12E+02	1.70E+01 G
			227.00	-5.999E+00	+	1.501E+01	9.71E+01	6.30E+00 GA
Cf-249	T	4.8955E-01					1.28E+05	
			387.95	4.895E-01	?(	1.837E+00	1.10E+02	6.60E+01 G
			333.44	0.000E+00	&	1.253E+01	1.00E+03	1.55E+01 G
Sn-126		3.1508E-01					3.65E+07	
			87.57	7.237E-01	*	4.665E+00	1.92E+02	3.75E+01 GA
			64.28	3.151E-01	&(	1.248E+01	1.45E+03	9.70E+00 G
			86.94	0.000E+00	-	1.705E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.8147E+01					8.14E+03	
			46.54	1.815E+01	(P	3.613E+01	7.46E+01	4.25E+00 G
PB-212	N	4.7731E+00					6.98E+02	
			238.63	4.773E+00	(P	1.754E+00	1.75E+01	4.33E+01 G
			300.03	9.807E+00	+ P	5.886E+01	1.78E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	8.2615E+00					5.84E+05	
			351.93	8.262E+00	(	1.271E+00	1.16E+01	3.76E+01 G
			295.09	1.691E+00	(	9.304E+00	1.63E+02	1.93E+01 G
			242.00	-3.496E+00	+	2.401E+01	2.03E+02	7.43E+00 GA
BI-207	C	-5.0319E-02					1.18E+04	
			569.70	-1.626E-01	?(	1.416E+00	2.47E+02	9.77E+01 G
			1063.66	9.698E-02	?(	1.692E+00	7.02E+02	7.45E+01 G
BI-212	N	9.2894E+00					6.98E+02	
			727.17	9.289E+00	&(	3.090E+01	9.86E+01	7.55E+00 G
			785.42	3.283E+01	? P	7.765E+01	9.72E+01	1.28E+00 GA
U-235	N	-3.7053E+00					2.57E+11	
			143.79	-3.705E+00	?(P	1.053E+01	6.79E+01	1.10E+01 G
			205.33	-7.129E+00	+ P	1.930E+01	9.92E+01	5.01E+00 G
			163.38	-4.215E-01	& P	2.167E+01	1.37E+03	5.08E+00 G
			185.72	1.157E+00	+ P	1.583E+00	5.29E+01	5.40E+01 GA
BI-214	N	6.8242E+00					5.84E+05	
			609.31	7.077E+00	(P	2.256E+00	1.67E+01	4.61E+01 G
			1120.29	4.950E+00	- P	1.617E+01	9.63E+01	1.51E+01 G
			1764.49	6.068E+00	?(P	7.976E+00	4.61E+01	1.54E+01 G
BI-210M	T	5.8837E-01					1.10E+09	
			265.83	5.884E-01	?(	1.790E+00	9.02E+01	5.00E+01 G
			304.90	0.000E+00	-	7.789E+00	1.00E+03	2.80E+01 G
AC-228	N	2.6059E+00					2.10E+03	
			911.07	1.803E+00	?(	3.873E+00	9.25E+01	2.90E+01 G
			968.97	3.939E+00	?(	1.298E+01	9.71E+01	1.75E+01 G
			338.32	0.000E+00	-	1.638E+01	1.00E+03	1.20E+01 G
			93.35	-5.506E+00	+	3.533E+01	1.92E+02	5.56E+00 XA
TH-227	N	4.5189E+00					7.95E+03	
			50.14	4.519E+00	?(	2.312E+01	1.52E+02	8.00E+00 G
			256.24	-2.891E+00	+	1.252E+01	1.65E+02	7.00E+00 G
TH-229	N	-8.8681E+00					2.68E+06	
			193.51	-8.868E+00	&(	2.258E+01	9.93E+01	4.40E+00 G
			210.85	-4.746E+00	+ P	3.086E+01	2.55E+02	2.99E+00 G
TH-234	N	4.7830E+00					1.63E+12	
			63.29	1.813E-01	%(P	4.030E+01	6.53E+03	3.81E+00 G
			92.59	7.923E+00	(P	1.282E+01	5.78E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	1.2485E+01					1.20E+07	
			302.65	1.162E+01	&(	7.281E+01	1.86E+02	2.88E+00 G
			300.07	1.349E+01	?(	8.056E+01	1.77E+02	2.46E+00 G
PA-233	C	7.7473E-01					7.82E+08	
			312.01	-1.407E-02	%(P	6.172E+00	1.16E+04	3.60E+01 G
			300.18	5.355E+00	?(	3.280E+01	1.81E+02	6.20E+00 G
PA-234	N	-1.6190E+00					1.63E+12	
			131.29	-1.619E+00	&(	8.436E+00	1.55E+02	1.80E+01 G
			946.02	-5.929E+00	+	1.285E+01	9.60E+01	1.34E+01 G
			569.47	9.226E-02	%	1.559E+01	4.64E+03	8.20E+00 G
			883.24	0.000E+00	+	2.408E+01	1.00E+03	9.60E+00 G
			880.53	-1.116E+01	+	3.469E+01	9.19E+01	6.00E+00 GA
PA-234M	N	7.8631E+01					1.63E+12	
			1001.00	3.368E+01	&(P	2.326E+02	1.96E+02	8.37E-01 G
			766.41	2.066E+02	?(	5.630E+02	8.10E+01	2.94E-01 G
AM-241	T	-5.0335E-01					1.58E+05	
			59.54	-5.034E-01	?(	4.657E+00	2.73E+02	3.59E+01 G
Np-237	F	2.4512E+00					2.14E+06	
			86.49	2.451E+00	&(	1.144E+01	1.39E+02	1.31E+01 G
Ir-192	F	1.2266E-01					7.40E+01	
			316.49	1.316E-01	?(	1.216E+00	2.65E+02	8.70E+01 G
			468.06	1.076E-01	?(	3.019E+00	7.98E+02	5.18E+01 G
			308.44	0.000E+00	-	6.932E+00	1.00E+03	3.18E+01 G
Cs-136	F	5.6657E-01					1.30E+01	
			818.50	5.666E-01	?(	2.170E+00	1.12E+02	1.00E+02 G
			1048.07	-1.217E+00	+	2.584E+00	6.44E+01	8.00E+01 G
			340.57	0.000E+00	&	4.216E+00	1.00E+03	4.69E+01 G
Np-239	T	-1.1060E+00					2.36E+00	
			103.70	0.000E+00	+	7.589E+00	1.00E+03	2.40E+01 X
			106.13	-1.106E+00	?(	8.094E+00	2.18E+02	2.27E+01 G
			99.50	-2.030E+00	+	1.257E+01	1.85E+02	1.50E+01 X
Nd-147		1.3464E+00					1.11E+01	
			531.00	2.207E+00	?(	7.320E+00	1.33E+02	1.30E+01 G
			91.10	9.511E-01	?(	6.310E+00	1.98E+02	2.83E+01 G
TL-210	N	1.8396E-01					5.84E+05	
			799.60	0.000E+00	?(	1.643E+00	1.00E+03	9.90E+01 G
			296.00	4.144E-01	?(	2.348E+00	1.68E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	-2.696E-01 %		7.252E+00	1.12E+03	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	198.	13.	0.007	151.62	4.519E+00	
AM-241	59.54	266.	-8.	-0.005	273.26	-5.034E-01	
BA-133	80.99	382.	-25.	-0.014	88.30	-1.291E+00	P
Np-237	86.49	343.	19.	0.011	139.26	2.451E+00	
Sn-126	87.57	476.	16.	0.009	192.15	7.237E-01	
Cd-109	88.04	492.	16.	0.009	195.25	7.152E+00	
Nd-147	91.10	508.	16.	0.009	197.84	9.511E-01	
AC-228	93.35	626.	-19.	-0.010	191.72	-5.506E+00	
Gd-153	97.50	607.	-19.	-0.010	188.16	-1.016E+00	
Np-239	99.50	588.	-19.	-0.010	184.95	-2.030E+00	
Gd-153	103.20	570.	-17.	-0.009	203.81	-1.241E+00	
Np-239	106.13	564.	-16.	-0.009	218.26	-1.106E+00	
EU-152	121.78	100.	16.	0.009	94.27	8.902E-01	
CO-57	122.06	108.	-15.	-0.008	103.99	-2.782E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	100.	6.	0.003	239.21	2.407E-01	
PA-234	131.29	363.	-18.	-0.010	155.30	-1.619E+00	
HF-181	136.30	304.	9.	0.005	282.70	2.519E+00	
U-235	143.79	194.	-24.	-0.013	67.92	-3.705E+00	P
CE-141	145.44	129.	7.	0.004	221.84	2.609E-01	
CE-139	165.85	178.	-20.	-0.011	97.79	-4.515E-01	
Cf-251	176.60	73.	8.	0.004	212.07	8.492E-01	
U-235	185.72	79.	32.	0.018	52.87	1.157E+00	P
TH-229	193.51	103.	-20.	-0.011	99.29	-8.868E+00	
U-235	205.33	89.	-17.	-0.010	99.23	-7.129E+00	P
TH-229	210.85	78.	-7.	-0.004	255.25	-4.746E+00	P
Cf-251	227.00	73.	-17.	-0.009	97.15	-5.999E+00	
EU-152	244.69	201.	14.	0.008	146.61	4.308E+00	
TH-227	256.24	51.	-8.	-0.005	164.54	-2.891E+00	
Cd-113m	263.70	70.	-4.	-0.002	300.00	-1.655E+03	
BI-210M	265.83	50.	12.	0.007	90.17	5.884E-01	
Hg-203	279.20	47.	11.	0.006	91.16	3.573E-01	
I-131	284.30	32.	3.	0.002	373.67	1.286E+00	
TL-210	296.00	198.	12.	0.007	167.64	4.144E-01	
PA-231	300.07	222.	12.	0.007	176.75	1.349E+01	
PA-233	300.18	234.	12.	0.007	181.37	5.355E+00	
PA-231	302.65	246.	12.	0.007	185.54	1.162E+01	
BA-133	302.85	258.	6.	0.003	413.01	8.351E-01	
Ir-192	316.49	54.	4.	0.002	264.58	1.316E-01	
CR-51	320.08	43.	10.	0.005	101.71	2.809E+00	P
La-140	328.76	169.	-11.	-0.006	174.89	-1.551E+00	
EU-152	344.29	218.	-16.	-0.009	136.57	-1.800E+00	
HF-181	345.83	195.	14.	0.008	145.40	2.818E+00	
BA-133	356.00	143.	-12.	-0.007	145.49	-6.016E-01	
I-131	364.48	49.	-15.	-0.008	65.14	-5.966E-01	P
BA-133	383.84	39.	9.	0.005	109.14	3.197E+00	
Cf-249	387.95	51.	10.	0.005	110.17	4.895E-01	
SN-113	391.69	82.	-11.	-0.006	116.58	-6.035E-01	
SB-125	427.88	20.	-1.	-0.001	881.29	-1.229E-01	
AG-108M	433.94	32.	-8.	-0.004	142.89	-3.253E-01	
pm-146	453.88	20.	3.	0.001	346.26	1.517E-01	P
SB-125	463.37	62.	-13.	-0.007	69.64	-4.785E+00	P
Ir-192	468.06	64.	1.	0.001	798.34	1.076E-01	
BE-7	477.60	42.	9.	0.005	105.98	3.432E+00	
HF-181	482.00	51.	9.	0.005	115.58	4.529E-01	
La-140	487.02	60.	9.	0.005	129.68	7.757E-01	
RU-103	497.05	42.	-14.	-0.008	68.53	-6.142E-01	P
RH-106	511.86	20.	79.	0.044	18.30	1.653E+01	
Nd-147	531.00	17.	7.	0.004	133.23	2.207E+00	
CS-134	563.24	13.	8.	0.005	95.13	4.479E+00	
CS-134	569.32	22.	7.	0.004	97.06	2.164E+00	
BI-207	569.70	36.	-4.	-0.002	246.61	-1.626E-01	
SB-125	600.50	213.	-14.	-0.008	28.85	-3.706E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	602.73	164.	4.	0.002	417.19	2.105E-01	
RH-106	621.92	31.	-4.	-0.002	282.84	-1.997E+00	P
SB-125	635.89	14.	3.	0.002	190.17	1.282E+00	P
I-131	636.97	24.	-4.	-0.002	136.08	-2.857E+00	P
AG-110M	657.76	28.	-1.	-0.001	754.98	-5.346E-02	
CS-137	661.66	43.	-12.	-0.007	82.50	-7.156E-01	
PM-144	696.54	14.	7.	0.004	119.52	3.733E-01	
NB-94	702.63	9.	7.	0.004	95.77	3.981E-01	
SB-124	722.79	66.	-16.	-0.009	77.31	-7.892E+00	
AG-108M	722.94	82.	-12.	-0.007	107.96	-7.336E-01	
BI-212	727.17	74.	13.	0.007	98.58	9.289E+00	
pm-146	735.72	23.	-3.	-0.002	312.25	-8.146E-01	
pm-146	747.16	14.	5.	0.003	172.30	7.847E-01	P
AG-110M	763.94	37.	-7.	-0.004	128.57	-1.776E+00	
PA-234M	766.41	32.	11.	0.006	81.01	2.066E+02	
EU-152	778.92	9.	8.	0.004	92.37	3.380E+00	
BI-212	785.42	10.	7.	0.004	97.23	3.283E+01	P
CS-134	795.87	27.	2.	0.001	374.17	1.363E-01	
CS-134	801.95	19.	8.	0.004	88.29	5.202E+00	
CO-58	810.78	50.	-12.	-0.007	57.15	-7.407E-01	P
La-140	815.77	62.	-11.	-0.006	66.09	-2.759E+00	P
Cs-136	818.50	52.	10.	0.005	112.37	5.666E-01	
MN-54	834.85	10.	7.	0.004	97.20	4.413E-01	P
Co-56	846.77	19.	-5.	-0.003	150.31	-2.896E-01	P
NB-94	871.10	25.	-8.	-0.005	92.17	-5.196E-01	
EU-154	873.23	38.	-5.	-0.003	193.25	-2.373E+00	
PA-234	880.53	43.	-11.	-0.006	91.86	-1.116E+01	
Sc-46	889.28	32.	8.	0.004	106.05	5.086E-01	
y-88	898.04	5.	2.	0.001	255.77	1.360E-01	
AC-228	911.07	10.	8.	0.005	92.51	1.803E+00	
AG-110M	937.49	25.	-10.	-0.006	114.38	-1.914E+00	
PA-234	946.02	25.	-12.	-0.007	96.04	-5.929E+00	
EU-152	964.11	70.	-20.	-0.011	64.62	-8.965E+00	
AC-228	968.97	44.	10.	0.006	97.10	3.939E+00	
EU-154	996.33	21.	8.	0.005	84.22	5.473E+00	
PA-234M	1001.00	30.	4.	0.002	196.07	3.368E+01	P
EU-154	1004.77	45.	-9.	-0.005	110.55	-3.460E+00	
Co-56	1037.84	10.	1.	0.001	702.38	5.020E-01	
Cs-136	1048.07	32.	-14.	-0.008	64.38	-1.217E+00	
RH-106	1050.36	46.	-3.	-0.002	339.30	-1.319E+01	
BI-207	1063.66	10.	1.	0.001	702.38	9.698E-02	
Ga-68	1077.40	20.	-3.	-0.002	332.78	-7.740E+00	
FE-59	1099.25	22.	-3.	-0.001	315.42	-3.344E-01	P
EU-152	1112.07	55.	-7.	-0.004	146.34	-4.070E+00	
Sc-46	1120.55	36.	11.	0.006	84.21	8.168E-01	
CO-60	1173.24	27.	-2.	-0.001	708.52	-1.298E-01	
Co-56	1238.28	11.	7.	0.004	109.49	8.877E-01	P
NA-22	1274.53	5.	5.	0.003	83.91	3.874E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1291.60	16.	-5.	-0.003	187.26	-9.704E-01		
CO-60	1332.50	11.	-3.	-0.002	243.10	-2.865E-01		
AG-110M	1384.30	0.	7.	0.004	37.80	2.553E+00		
EU-152	1408.00	6.	2.	0.001	248.05	9.975E-01		
La-140	1596.21	24.	-15.	-0.008	100.23	-1.561E+00		P
Co-56	1771.35	22.	-8.	-0.004	96.61	-5.283E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.4321E+00	3.4321E+00	1.060E+02%	1.24E+01
NA-22	#A	3.8745E-01	3.8745E-01	8.391E+01%	1.12E+00
K-40		1.7942E+02	1.7942E+02	7.232E+00%	1.39E+01
Sc-46	#A	6.6267E-01	6.6268E-01	6.771E+01%	1.85E+00
CR-51	#A	2.8094E+00	2.8094E+00	1.017E+02%	9.71E+00
MN-54	#A	4.4131E-01	4.4131E-01	9.720E+01%	1.05E+00
FE-59	#A	-3.3442E-01	-3.3442E-01	3.154E+02%	3.19E+00
Co-56	#A	2.0431E-01	2.0431E-01	1.095E+02%	1.40E+00
CO-57	#A	-2.7823E-01	-2.7823E-01	1.040E+02%	9.74E-01
CO-58	#A	-7.4068E-01	-7.4068E-01	5.715E+01%	2.12E+00
CO-60	#A	-2.8649E-01	-2.8649E-01	2.431E+02%	1.58E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.18E+00
NB-94	#A	3.9807E-01	3.9807E-01	9.577E+01%	9.20E-01
ZR-95	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.08E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.91E+00
RU-103	#A	-6.1421E-01	-6.1421E-01	6.853E+01%	1.48E+00
RH-106	#A	-1.9968E+00	-1.9968E+00	2.828E+02%	1.40E+01
AG-108M	#A	-3.2533E-01	-3.2533E-01	1.429E+02%	1.18E+00
AG-110M	#A	6.3945E-01	6.3945E-01	3.780E+01%	3.18E+00
SN-113	#A	-6.0346E-01	-6.0346E-01	1.166E+02%	2.39E+00
SB-124	#A	2.1050E-01	2.1050E-01	4.172E+02%	3.01E+00
SB-125	#A	2.6538E-01	2.6538E-01	1.902E+02%	2.90E+00
I-131	#A	-5.9658E-01	-5.9660E-01	6.514E+01%	1.38E+00
Gd-153	#A	-1.0160E+00	-1.0160E+00	1.882E+02%	6.40E+00
Ga-68	#A	-7.7022E+00	-7.7404E+00	3.328E+02%	6.08E+01
Tc-99m	#A	1.8613E-08	1.8630E-08	2.624E+09%	1.66E+00
BA-133	#A	-2.7393E-01	-2.7393E-01	1.455E+02%	2.96E+00
CS-134	#A	5.9163E-01	5.9163E-01	8.829E+01%	3.07E+00
CS-137	#A	-7.1563E-01	-7.1563E-01	8.250E+01%	1.98E+00
CE-139	#A	-4.5153E-01	-4.5153E-01	9.779E+01%	1.48E+00
Ba-140	#	2.6041E+00	2.6041E+00	2.695E+01%	1.31E+00
La-140	#A	-1.5606E+00	-1.5607E+00	1.002E+02%	2.68E+00
CE-141	#A	2.6091E-01	2.6091E-01	2.218E+02%	1.98E+00
CE-144	#A	2.5370E+00	2.5370E+00	1.515E+02%	1.29E+01

PM-144 #A	3.7331E-01	3.7331E-01	1.195E+02%		1.07E+00
EU-152 #A	6.1045E-01	6.1045E-01	7.354E+01%		8.27E+00
EU-154 #A	1.2636E+00	1.2636E+00	8.422E+01%		1.61E+01
EU-155 #A	-7.1125E-02	-7.1125E-02	1.674E+03%		8.59E+00
HF-181 #A	9.2355E-01	9.2356E-01	1.128E+02%		1.79E+00
Ta-182 #A	1.9121E+00	1.9121E+00	1.029E+02%		6.72E+00
Hg-203 #A	3.5730E-01	3.5730E-01	9.116E+01%		1.10E+00
TL-208	1.6041E+00	1.6041E+00	2.436E+01%		7.55E-01
pm-146 #A	7.8473E-01	7.8473E-01	1.723E+02%		3.32E+00
y-88 #A	1.3597E-01	1.3597E-01	2.558E+02%		8.93E-01
Cd-113m#A	-1.6550E+03	-1.6550E+03	3.000E+02%		1.73E+04
Cd-109 #A	7.1515E+00	7.1515E+00	1.952E+02%		4.68E+01
Cf-251 #A	8.4921E-01	8.4921E-01	2.121E+02%		4.72E+00
Cf-249 #A	4.8955E-01	4.8955E-01	1.102E+02%		1.84E+00
Sn-126 #A	3.1508E-01	3.1508E-01	1.448E+03%		1.25E+01
PB-210 A	1.8147E+01	1.8147E+01	7.461E+01%		3.61E+01
PB-212	4.7731E+00	4.7731E+00	1.748E+01%		1.75E+00
PB-214 #	8.2615E+00	8.2615E+00	1.161E+01%		1.27E+00
BI-207 #A	-5.0319E-02	-5.0319E-02	2.466E+02%		1.42E+00
BI-212 #A	9.2894E+00	9.2894E+00	9.858E+01%		3.09E+01
U-235 #A	-3.7053E+00	-3.7053E+00	6.792E+01%		1.05E+01
BI-214	6.8242E+00	6.8242E+00	1.667E+01%		2.26E+00
BI-210M#A	5.8837E-01	5.8837E-01	9.017E+01%		1.79E+00
AC-228 #A	2.6059E+00	2.6059E+00	6.706E+01%		3.87E+00
TH-227 #A	4.5189E+00	4.5189E+00	1.516E+02%		2.31E+01
TH-229 #A	-8.8681E+00	-8.8681E+00	9.929E+01%		2.26E+01
TH-234 #A	4.7830E+00	4.7830E+00	5.777E+01%		4.03E+01
PA-231 #A	1.2485E+01	1.2485E+01	1.281E+02%		7.28E+01
PA-233 #A	7.7473E-01	7.7473E-01	1.814E+02%		6.17E+00
PA-234 #A	-1.6190E+00	-1.6190E+00	1.553E+02%		8.44E+00
PA-234M#A	7.8631E+01	7.8631E+01	8.101E+01%		2.33E+02
AM-241 #A	-5.0335E-01	-5.0335E-01	2.733E+02%		4.66E+00
Np-237 #A	2.4512E+00	2.4512E+00	1.393E+02%		1.14E+01
Ir-192 #A	1.2266E-01	1.2266E-01	2.646E+02%		1.22E+00
Cs-136 #A	5.6656E-01	5.6657E-01	1.124E+02%		2.17E+00
Np-239 #A	-1.1059E+00	-1.1060E+00	2.183E+02%		8.09E+00
Nd-147 #A	1.3464E+00	1.3464E+00	1.193E+02%		7.32E+00
TL-210 #A	1.8396E-01	1.8396E-01	1.676E+02%		1.64E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

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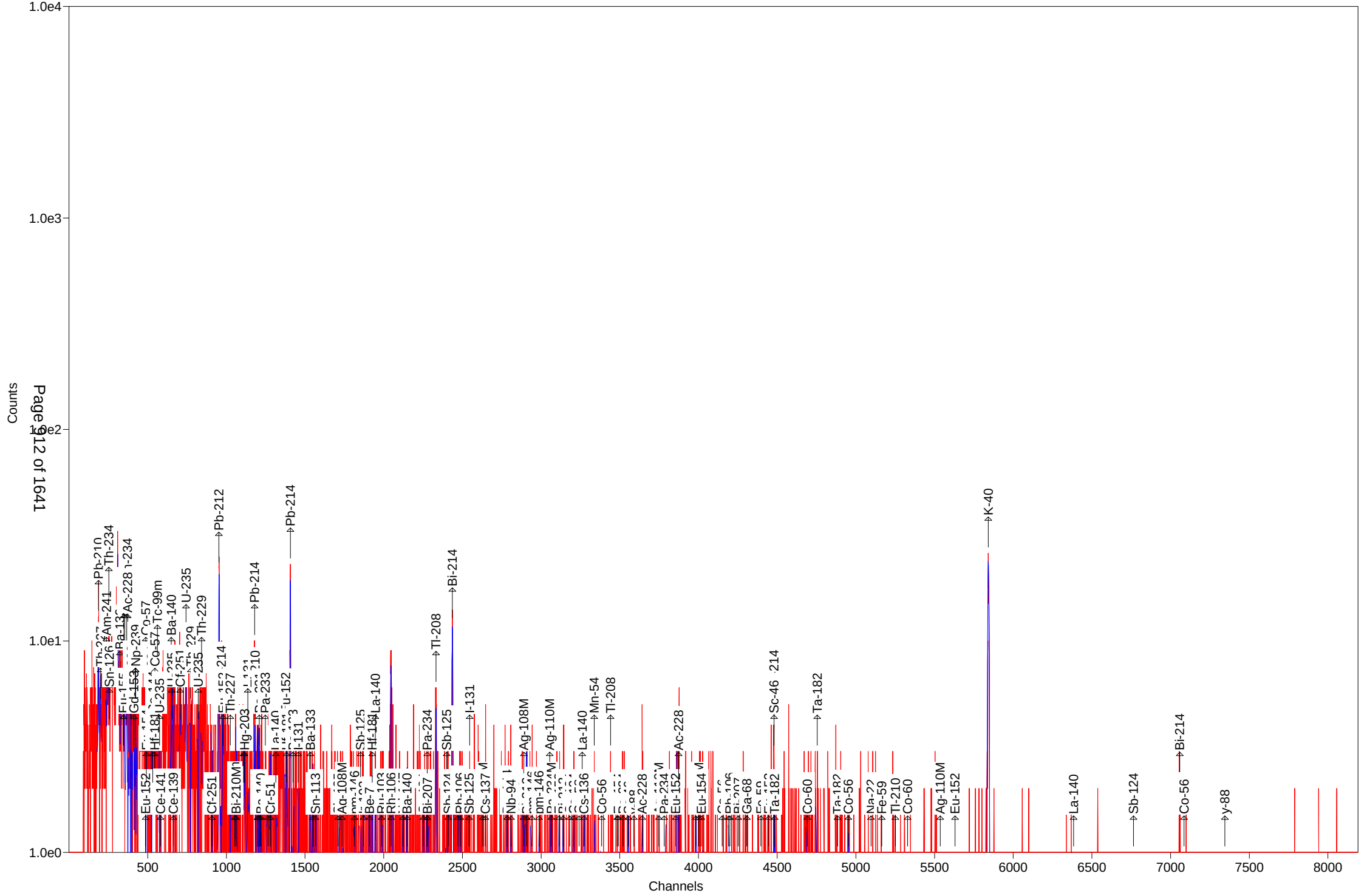
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.7 to  1999.4 keV)     2.190E+02  Bq/Sample
Total Decayed Activity (   37.7 to  1999.4 keV) 2.1902838E+02  Bq/Sample
```

376740_Gamma_160-29521-A-7-C. 19_Gamma_20181432.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20182796

Sample Description: 376740_Gamma_160-29521-A-8-C
Detector: Detector # 8
Batch ID: 376740
Work Order Number: Gamma
Lot Number: 160-29521-A-8-C

Decay to Time: 8/9/2018 07:17 Live Time: 1800 sec
Acquisition Time: 8/9/2018 07:17:38 Real Time: 1847 sec
Analysis Time: 8/9/2018 07:49 Dead Time: 2.54 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-07-14_1855.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.625E+00	109.8	2.881E+00	2.884E+00	9.874E+00
NA-22	4.539E-01	71.3	3.237E-01	3.245E-01	1.079E+00
K-40	1.314E+02	8.2	1.077E+01	1.270E+01	9.546E+00
Sc-46	3.165E-01	91.8	2.904E-01	2.909E-01	1.628E+00
CR-51	-2.877E+00	205.1	5.900E+00	5.902E+00	1.993E+01
MN-54	6.326E-01	50.2	3.174E-01	3.191E-01	7.132E-01
FE-59	7.486E-01	122.9	9.197E-01	9.204E-01	2.177E+00
Co-56	-8.037E-02	201.8	1.622E-01	1.622E-01	1.291E+00
CO-57	3.131E-02	784.2	2.455E-01	2.455E-01	8.482E-01
CO-58	1.259E+00	20.9	2.626E-01	2.705E-01	4.035E-01
CO-60	5.286E-01	40.3	2.129E-01	2.146E-01	8.637E-01
ZN-65	0.000E+00	1.#INF	3.990E-01	3.990E-01	4.381E+00
NB-94	-3.125E-01	166.6	5.206E-01	5.209E-01	1.244E+00
ZR-95	4.885E-01	134.2	6.555E-01	6.560E-01	1.634E+00
NB-95	0.000E+00	1.#INF	7.356E-02	7.356E-02	1.724E+00
RU-103	9.075E-02	424.2	3.849E-01	3.849E-01	9.761E-01
RH-106	1.231E+01	30.6	3.760E+00	3.815E+00	2.649E+01
AG-108M	3.396E-01	69.1	2.348E-01	2.354E-01	7.038E-01
AG-110M	0.000E+00	1.#INF	2.793E-01	2.793E-01	2.242E+00
SN-113	-2.832E-03	22184.0	6.283E-01	6.283E-01	2.070E+00
SB-124	2.636E-01	140.3	3.700E-01	3.702E-01	2.606E+00
SB-125	1.152E+00	69.8	8.037E-01	8.059E-01	2.818E+00
I-131	-1.749E-01	73.8	1.291E-01	1.294E-01	1.216E+00
Gd-153	-9.831E-01	170.1	1.672E+00	1.673E+00	5.587E+00
Ga-68	1.971E+01	35.4	6.968E+00	7.054E+00	1.816E+01
Tc-99m	0.000E+00	1.#INF	1.825E-01	1.825E-01	1.527E+00
BA-133	2.236E-02	3652.4	8.165E-01	8.165E-01	2.810E+00
CS-134	5.020E-01	72.8	3.654E-01	3.663E-01	2.645E+00
CS-137	4.224E-02	1011.6	4.273E-01	4.273E-01	1.535E+00
CE-139	2.548E-01	102.7	2.617E-01	2.629E-01	8.831E-01
Ba-140	3.764E-01	98.6	3.711E-01	3.716E-01	3.508E+00
La-140	1.609E-02	163.8	2.635E-02	2.637E-02	1.421E+00
CE-141	4.463E-02	1836.1	8.194E-01	8.194E-01	2.778E+00

CE-144	0.000E+00	1.#INF	1.009E+00	1.009E+00	1.166E+01
PM-144	-7.051E-01	92.8	6.545E-01	6.555E-01	1.511E+00
EU-152	1.431E+00	76.0	1.087E+00	1.090E+00	6.531E+00
EU-154	1.015E+00	78.3	7.943E-01	7.960E-01	1.117E+01
EU-155	1.049E+00	121.3	1.272E+00	1.273E+00	6.800E+00
HF-181	3.537E-01	118.1	4.176E-01	4.180E-01	1.432E+00
Ta-182	2.082E+00	50.1	1.044E+00	1.049E+00	6.203E+00
Hg-203	-4.647E-01	85.8	3.989E-01	3.998E-01	1.335E+00
TL-208	2.249E+00	17.7	3.976E-01	4.144E-01	7.084E-01
pm-146	-9.471E-01	166.6	1.578E+00	1.579E+00	3.772E+00
y-88	-8.446E-02	493.7	4.170E-01	4.170E-01	1.073E+00
Cd-113m	4.225E+03	89.5	3.783E+03	3.793E+03	1.276E+04
Cd-109	-8.001E+00	179.1	1.433E+01	1.434E+01	4.788E+01
Cf-251	-9.445E-02	1757.8	1.660E+00	1.660E+00	4.385E+00
Cf-249	0.000E+00	1.#INF	1.424E-01	1.424E-01	1.991E+00
Sn-126	-4.055E+00	113.9	4.617E+00	4.622E+00	1.544E+01
PB-210	-5.584E+00	157.7	8.804E+00	8.810E+00	4.446E+01
PB-212	3.954E+00	13.7	5.407E-01	5.982E-01	1.180E+00
PB-214	8.565E+00	11.4	9.769E-01	1.074E+00	1.678E+00
BI-207	4.997E-01	30.4	1.517E-01	1.539E-01	1.128E+00
BI-212	-5.121E-01	1036.3	5.307E+00	5.307E+00	2.113E+01
U-235	3.911E-01	940.3	3.678E+00	3.678E+00	1.244E+01
BI-214	5.795E+00	16.4	9.505E-01	9.971E-01	1.677E+00
BI-210M	-6.798E-03	7107.3	4.832E-01	4.832E-01	1.711E+00
AC-228	4.074E+00	39.9	1.627E+00	1.640E+00	3.511E+00
TH-227	5.037E+00	46.0	2.318E+00	2.334E+00	1.939E+01
TH-229	5.276E+00	96.1	5.070E+00	5.088E+00	1.317E+01
TH-234	1.318E+01	34.2	4.504E+00	4.556E+00	2.200E+01
PA-231	5.368E+00	205.4	1.103E+01	1.103E+01	6.310E+01
PA-233	5.892E-01	210.1	1.238E+00	1.238E+00	5.188E+00
PA-234	-2.270E-01	99.5	2.257E-01	2.260E-01	7.010E+00
PA-234M	-1.484E+01	413.2	6.133E+01	6.133E+01	2.257E+02
AM-241	-1.576E+00	49.2	7.749E-01	7.792E-01	4.050E+00
Np-237	2.092E+00	180.0	3.766E+00	3.768E+00	1.260E+01
Ir-192	2.492E-02	701.8	1.749E-01	1.749E-01	2.170E+00
Cs-136	0.000E+00	1.#INF	1.552E-01	1.553E-01	1.375E+00
Np-239	-1.394E+00	162.1	2.260E+00	2.262E+00	7.546E+00
Nd-147	1.985E+00	97.2	1.930E+00	1.933E+00	4.844E+00
TL-210	-5.236E-01	132.1	6.916E-01	6.922E-01	2.357E+00
Total	4.464E+03				

Analyst: kody Saulters

Sample description
376740_Gamma_160-29521-A-8-C

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182796.An1

Acquisition information
Start time: 8/9/2018 7:17:38 AM
Live time: 1800
Real time: 1847
Dead time: 2.54 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 7:17:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-07-14_1855.PBC 7/14/2018 6:55:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0851

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	9.	206.98	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
63.10	34.	52.21	0.96	3.093E-02	63.29	3.810	PBC<MDA	TH234
74.67	54.	27.96	0.77	3.612E-02				
86.49	20.	180.00	1.04	3.959E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.925E-01	EU155
					86.94	9.040	3.024E+00	Sn126
86.54	20.	182.82	1.04	3.961E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.925E-01	EU155
					86.94	9.040	3.024E+00	Sn126
92.74	46.	44.09	1.16	4.072E-02	92.59	5.584	PBC<MDA	TH234
105.31	20.	159.38	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
121.78	12.	128.02	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
122.54	2.	784.22	1.07	4.146E-02	122.06	85.600	PBC<MDA	CO57
143.80	3.	940.35	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
162.66	16.	98.59	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
163.38	-3.	485.66	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
165.85	13.	102.72	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
185.66	60.	28.66	1.25	3.329E-02	185.72	54.000	1.848E+00	U235
193.51	13.	96.11	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
227.00	6.	256.04	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.68	77.	16.41	0.83	2.744E-02	238.63	43.300	3.580E+00	PB212
241.98	35.	27.90	1.16	2.714E-02	242.00	7.430	9.627E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	11.	173.01	1.16	2.691E-02	244.69	7.580	PBC<MDA	EU152
256.24	25.	46.01	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
263.70	12.	89.55	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
295.35	50.	18.79	1.20	2.324E-02	295.09	19.300	6.241E+00	PB214
296.00	10.	201.11	1.20	2.318E-02	296.00	79.000	PBC<MDA	TL210
300.07	10.	205.41	1.20	2.293E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.010E+01	PA231
					300.18	6.200	4.010E+00	PA233
300.18	10.	210.07	1.20	2.293E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.010E+01	PA231
					300.18	6.200	4.010E+00	PA233
300.29	29.	21.77	1.20	2.294E-02	300.03	3.280	2.164E+01	PB212
					300.07	2.460	2.885E+01	PA231
					300.18	6.200	1.145E+01	PA233
328.76	5.	278.84	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
344.29	5.	403.51	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.93	117.	11.41	1.05	2.021E-02	351.93	37.600	8.565E+00	PB214
433.94	8.	102.06	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
463.37	2.	452.41	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	1.	984.89	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	109.77	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	8.	118.05	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	163.80	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	424.15	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	41.	40.82	2.61	1.494E-02	511.86	20.000	7.625E+00	RH106
531.00	7.	97.24	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
563.24	7.	133.23	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	72.79	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.159E+00	PA234
					569.70	97.740	3.491E-01	BI207
569.47	5.	139.95	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.524E+00	PA234
					569.70	97.740	2.118E-01	BI207
583.10	46.	17.68	0.70	1.342E-02	583.02	84.500	2.235E+00	TL208
600.50	9.	181.14	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	2.	962.68	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
609.16	62.	16.40	1.04	1.294E-02	609.31	46.090	5.795E+00	BI214
635.89	7.	69.78	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
636.97	5.	108.43	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
722.79	4.	140.33	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.315E-01	AG108M
					723.36	20.220	1.040E+00	EU154
722.94	7.	93.30	1.50	1.123E-02	722.79	10.810	3.369E+00	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
756.73	5.	134.19	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
778.92	3.	301.71	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
785.42	5.	107.55	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
810.78	23.	20.85	1.55	1.020E-02	810.78	99.460	1.259E+00	CO58
834.85	11.	50.17	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
860.28	5.	102.28	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	2.	329.47	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
880.53	8.	92.54	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
911.07	20.	39.93	1.62	9.247E-03	911.07	29.000	4.074E+00	AC228
964.11	10.	76.00	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
968.97	4.	211.12	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
996.33	8.	86.40	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-2.	413.18	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	21.	30.56	1.70	8.193E-03	1050.36	1.560	8.942E+01	RH106
1063.66	12.	30.36	1.71	8.106E-03	1063.66	74.500	1.128E+00	BI207
1077.40	8.	35.36	1.72	8.017E-03	1077.40	3.300	1.971E+01	Ga68
1099.25	6.	122.85	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1119.73	7.	116.78	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	9.	91.77	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.133E-01	Sc46
					1121.30	34.900	1.758E+00	Ta182
1121.30	2.	381.67	1.74	7.748E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	4.561E-01	Ta182
1173.24	10.	40.28	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	12.	50.12	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	2.	634.67	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	71.32	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.289E+00	EU154
1332.50	3.	91.50	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1460.72	156.	8.20	1.92	6.165E-03	1460.83	10.670	1.314E+02	K40
1764.62	5.	101.15	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.50	74.67	58.	54.	1.495E+03	27.96	0.768	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	198.	-9.	-0.005	157.68	1.012s
TH-227	200.37	50.14	169.	9.	0.005	206.98	1.015s
AM-241	237.95	59.54	243.	-29.	-0.016	49.15	1.022s
TH-234	252.20	63.10	89.	34.	0.019	52.21	0.964
Sn-126	256.93	64.28	310.	-22.	-0.012	113.86	1.026s
BA-133	323.77	80.99	121.	-3.	-0.002	688.40	1.039s
Np-237	345.77	86.49	608.	20.	0.011	180.00	1.043s
EU-155	345.98	86.54	628.	20.	0.011	182.82	1.043s
Sn-126	350.09	87.57	651.	0.	0.000	1000.00	1.044s
Cd-109	351.97	88.04	751.	-22.	-0.012	179.12	1.044s
Nd-147	364.21	91.10	729.	-22.	-0.012	176.15	1.047s
TH-234	370.76	92.74	118.	46.	0.026	44.09	1.163
AC-228	373.21	93.35	707.	-22.	-0.012	173.25	1.049s
Gd-153	389.81	97.50	685.	-22.	-0.012	170.06	1.052s
Np-239	397.81	99.50	663.	-22.	-0.012	167.11	1.053s
Gd-153	412.62	103.20	641.	-14.	-0.008	252.64	1.056s
EU-155	421.07	105.31	516.	20.	0.011	159.38	1.058s
Np-239	424.34	106.13	735.	-24.	-0.013	162.12	1.058s
EU-152	486.92	121.78	112.	12.	0.007	128.02	1.071s
CO-57	488.06	122.06	122.	2.	0.001	784.22	1.071s
EU-154	492.22	123.10	118.	-14.	-0.008	108.93	1.072s
PA-234	525.00	131.29	369.	-19.	-0.011	141.34	1.078s
HF-181	531.92	133.02	370.	-13.	-0.007	219.11	1.079s
CE-144	533.98	133.54	383.	0.	0.000	1000.00	1.080s
HF-181	545.02	136.30	383.	0.	0.000	1000.00	1.082s
CO-57	545.72	136.47	383.	0.	0.000	1000.00	1.082
Tc-99m	561.86	140.51	383.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	398.	3.	0.002	940.35	1.087s
Ba-140	650.47	162.66	113.	16.	0.009	98.59	1.102s
U-235	653.35	163.38	133.	-3.	-0.002	485.66	1.102
CE-139	663.24	165.85	87.	13.	0.007	102.72	1.104s
U-235	742.49	185.66	62.	60.	0.033	28.66	1.247s
TH-229	773.87	193.51	44.	13.	0.007	96.11	1.125s
U-235	821.17	205.33	77.	-21.	-0.012	64.21	1.134
Cf-251	907.84	227.00	60.	6.	0.003	256.04	1.151s
PB-212	954.37	238.63	23.	85.	0.047	13.67	1.159D
PB-214	967.84	242.00	30.	35.	0.019	27.90	1.162D
EU-152	978.62	244.69	190.	11.	0.006	173.01	1.164s
TH-227	1024.81	256.24	28.	25.	0.014	46.01	1.172s
Cd-113m	1054.65	263.70	48.	12.	0.006	89.55	1.178s
TL-208	1108.99	277.28	64.	-7.	-0.004	149.75	1.188
Hg-203	1116.66	279.20	92.	-17.	-0.009	85.83	1.189s
I-131	1137.05	284.30	53.	-8.	-0.004	142.85	1.193s
PB-214	1180.22	295.09	20.	50.	0.028	18.79	1.201D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	1183.86	296.00	207.	10.	0.006	201.11	1.202s
PB-212	1199.98	300.03	6.	29.	0.016	21.77	1.205D
PA-231	1200.14	300.07	217.	10.	0.006	205.41	1.205s
PA-233	1200.58	300.18	227.	10.	0.006	210.07	1.205s
BA-133	1211.27	302.85	239.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	239.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	239.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	239.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	239.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	239.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	259.	-11.	-0.006	205.11	1.219s
La-140	1314.91	328.76	96.	5.	0.003	278.84	1.226s
Cf-249	1333.63	333.44	191.	-4.	-0.002	466.05	1.229s
AC-228	1353.15	338.32	187.	0.	0.000	1000.00	1.233
Cs-136	1362.15	340.57	187.	0.	0.000	1000.00	1.234
EU-152	1377.01	344.29	173.	5.	0.003	403.51	1.237s
HF-181	1383.19	345.83	205.	-16.	-0.009	133.02	1.238s
PB-214	1407.61	351.93	19.	117.	0.065	11.41	1.054
I-131	1457.81	364.48	48.	-13.	-0.007	100.14	1.252s
BA-133	1535.24	383.84	75.	-5.	-0.003	265.92	1.266s
Cf-249	1551.68	387.95	79.	0.	0.000	1000.00	1.269s
AG-108M	1735.64	433.94	13.	8.	0.004	102.06	1.301s
SB-125	1853.36	463.37	49.	2.	0.001	452.41	1.322s
Ir-192	1872.14	468.06	48.	1.	0.001	984.89	1.325s
BE-7	1910.28	477.60	33.	8.	0.004	109.77	1.332s
HF-181	1927.89	482.00	41.	8.	0.004	118.05	1.335s
La-140	1947.98	487.02	27.	5.	0.003	163.80	1.339s
RU-103	1988.12	497.05	22.	2.	0.001	424.15	1.346s
RH-106	2047.36	511.86	35.	41.	0.023	40.82	2.606s
Nd-147	2123.91	531.00	9.	7.	0.004	97.24	1.369s
Ba-140	2148.95	537.26	17.	-3.	-0.002	260.77	1.373
CS-134	2252.86	563.24	17.	7.	0.004	133.23	1.391s
CS-134	2277.20	569.32	14.	8.	0.005	72.79	1.395s
PA-234	2277.80	569.47	23.	5.	0.003	139.95	1.395
TL-208	2332.33	583.10	6.	46.	0.025	17.68	0.695s
SB-125	2401.92	600.50	143.	9.	0.005	181.14	1.416s
SB-124	2410.85	602.73	152.	2.	0.001	962.68	1.418s
CS-134	2418.76	604.71	154.	0.	0.000	1000.00	1.419s
BI-214	2436.55	609.16	11.	62.	0.035	16.40	1.039s
RU-103	2441.12	610.30	154.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	154.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	154.	0.	0.000	1000.00	1.428s
SB-125	2543.49	635.89	9.	7.	0.004	69.78	1.440s
I-131	2547.83	636.97	12.	5.	0.003	108.43	1.441s
AG-110M	2630.98	657.76	29.	-4.	-0.002	213.01	1.455s
PM-144	2786.11	696.54	37.	-15.	-0.008	92.82	1.480s
NB-94	2810.46	702.63	23.	-6.	-0.004	166.60	1.484s
SB-124	2891.09	722.79	16.	4.	0.002	140.33	1.497s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2891.70	722.94	20.	7.	0.004	93.30	1.498s
EU-154	2893.37	723.36	42.	-3.	-0.002	285.67	1.498s
pm-146	2942.83	735.72	23.	-2.	-0.001	444.01	1.506s
pm-146	2988.59	747.16	23.	-6.	-0.004	166.60	1.513s
ZR-95	3026.87	756.73	10.	5.	0.003	134.19	1.519s
AG-110M	3055.73	763.94	31.	-12.	-0.007	72.45	1.524s
NB-95	3063.11	765.79	43.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	62.	-15.	-0.008	78.87	1.526s
EU-152	3115.64	778.92	14.	3.	0.002	301.71	1.534s
BI-212	3141.64	785.42	5.	5.	0.003	107.55	1.538s
CS-134	3183.43	795.87	62.	-14.	-0.008	82.65	1.544s
TL-210	3198.36	799.60	76.	-10.	-0.005	132.09	1.547s
CS-134	3207.77	801.95	94.	-8.	-0.004	179.10	1.548s
CO-58	3243.06	810.78	0.	23.	0.013	20.85	1.554s
La-140	3263.04	815.77	23.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	23.	0.	0.000	1000.00	1.559s
MN-54	3339.36	834.85	5.	11.	0.006	50.17	1.569s
Co-56	3387.05	846.77	19.	-5.	-0.003	201.78	1.577s
TL-208	3442.23	860.56	5.	5.	0.003	102.28	1.585s
NB-94	3484.36	871.10	12.	2.	0.001	329.47	1.592s
EU-154	3492.89	873.23	20.	-5.	-0.003	130.56	1.593s
PA-234	3522.10	880.53	21.	8.	0.004	92.54	1.598s
PA-234	3532.94	883.24	29.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	29.	0.	0.000	1000.00	1.600s
y-88	3592.14	898.04	9.	-1.	-0.001	493.71	1.608s
AC-228	3644.26	911.07	9.	20.	0.011	39.93	1.616
AG-110M	3749.96	937.49	25.	-7.	-0.004	161.52	1.633s
PA-234	3784.07	946.02	15.	-5.	-0.003	176.07	1.638s
EU-152	3856.43	964.11	24.	10.	0.006	76.00	1.649s
AC-228	3875.88	968.97	35.	4.	0.002	211.12	1.652s
EU-154	3985.31	996.33	21.	8.	0.005	86.40	1.668s
PA-234M	4003.99	1001.00	32.	-2.	-0.001	413.18	1.671s
Co-56	4151.36	1037.84	10.	-3.	-0.002	238.82	1.693s
Cs-136	4192.29	1048.07	20.	-9.	-0.005	77.78	1.698
RH-106	4201.45	1050.36	9.	21.	0.011	30.56	1.700s
BI-207	4254.65	1063.66	1.	12.	0.007	30.36	1.708s
Ga-68	4309.61	1077.40	0.	8.	0.004	35.36	1.716s
FE-59	4397.02	1099.25	10.	6.	0.003	122.85	1.728s
EU-152	4448.32	1112.07	42.	-5.	-0.003	201.02	1.736s
ZN-65	4462.20	1115.55	37.	0.	0.000	1000.00	1.738s
BI-214	4481.17	1120.29	29.	7.	0.004	116.78	1.740
Sc-46	4482.22	1120.55	27.	9.	0.005	91.77	1.740
Ta-182	4485.22	1121.30	35.	2.	0.001	381.67	1.741s
CO-60	4692.97	1173.24	4.	10.	0.006	40.28	1.770s
Ta-182	4756.23	1189.05	5.	12.	0.007	50.12	1.779s
Ta-182	4885.67	1221.41	32.	-11.	-0.006	120.72	1.797s
Co-56	4953.16	1238.28	21.	2.	0.001	634.67	1.806s
NA-22	5098.16	1274.53	5.	6.	0.003	71.32	1.826s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	5098.22	1274.54	11.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	11.	-3.	-0.002	155.49	1.835s
TL-210	5252.05	1313.00	11.	-4.	-0.002	209.09	1.847s
CO-60	5330.06	1332.50	3.	3.	0.002	91.50	1.857s
AG-110M	5537.25	1384.30	11.	-2.	-0.001	452.11	1.884s
EU-152	5632.07	1408.00	11.	-2.	-0.001	176.53	1.896s
K-40	5843.40	1460.83	3.	156.	0.086	8.20	1.923
La-140	6384.93	1596.21	6.	-3.	-0.002	457.90	1.990s
SB-124	6764.03	1690.98	11.	-3.	-0.002	243.10	2.034s
BI-214	7058.07	1764.49	12.	5.	0.003	101.15	2.067s
y-88	7344.36	1836.06	0.	0.	0.000	1000.00	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.6247E+00				5.31E+01	
			477.60	2.625E+00	&(P	9.874E+00 1.10E+02 1.05E+01	G
NA-22	C	4.5393E-01				9.50E+02	
			1274.53	4.539E-01	?(	1.079E+00 7.13E+01 9.99E+01	G
K-40	N	1.3141E+02				4.66E+11	
			1460.83	1.314E+02	?(P	9.546E+00 8.20E+00 1.07E+01	G
Sc-46	F	3.1647E-01				8.38E+01	
			889.28	1.962E-02	%(	1.628E+00 2.28E+03 1.00E+02	G
			1120.55	6.133E-01	?(	1.915E+00 9.18E+01 1.00E+02	G
CR-51	F	-2.8767E+00				2.77E+01	
			320.08	-2.877E+00	&(	1.993E+01 2.05E+02 9.94E+00	G
MN-54	C	6.3263E-01				3.12E+02	
			834.85	6.326E-01	&(	7.132E-01 5.02E+01 1.00E+02	G
FE-59	F	7.4861E-01				4.45E+01	
			1099.25	7.486E-01	?(	2.177E+00 1.23E+02 5.65E+01	G
			1291.60	-5.137E-01	- P	3.371E+00 1.55E+02 4.32E+01	G
Co-56	C	-8.0373E-02				7.73E+01	
			846.77	-2.637E-01	?(	1.291E+00 2.02E+02 9.99E+01	G
			1238.28	1.970E-01	&(	2.864E+00 6.35E+02 6.61E+01	G
			1037.84	-1.425E+00	+	8.287E+00 2.39E+02 1.41E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1771.35	-3.446E-01	%	1.530E+01	1.19E+03	1.55E+01 A
CO-57	C	3.1311E-02					2.72E+02	
			122.06	3.131E-02	?(	8.482E-01	7.84E+02	8.56E+01 G
			136.47	0.000E+00	-	1.222E+01	1.00E+03	1.07E+01 G
CO-58	C	1.2592E+00					7.09E+01	
			810.78	1.259E+00	?(	4.035E-01	2.09E+01	9.95E+01 G
CO-60	F	5.2860E-01					1.93E+03	
			1332.50	2.739E-01	?(P	8.637E-01	9.15E+01	1.00E+02 G
			1173.24	7.835E-01	?(P	8.528E-01	4.03E+01	9.99E+01 G
NB-94	I	-3.1249E-01					7.41E+06	
			702.63	-3.125E-01	?(	1.244E+00	1.67E+02	9.79E+01 G
			871.10	9.052E-02	+ P	1.109E+00	3.29E+02	9.99E+01 G
ZR-95	I	4.8850E-01					6.40E+01	
			756.73	4.885E-01	?(P	1.634E+00	1.34E+02	5.45E+01 G
			724.20	-1.069E-02	% P	3.573E+00	8.34E+03	4.42E+01 G
RU-103	I	9.0746E-02					3.93E+01	
			497.05	9.075E-02	?(P	9.761E-01	4.24E+02	9.09E+01 G
			610.30	0.000E+00	-	4.525E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.2307E+01					3.74E+02	
			621.92	1.918E-01	%(P	2.649E+01	4.01E+03	9.93E+00 G
			1050.36	8.942E+01	?(P	7.396E+01	3.06E+01	1.56E+00 G
			511.86	7.625E+00	?	5.631E+00	4.08E+01	2.00E+01 GA
AG-108M	C	3.3960E-01					1.53E+05	
			433.94	2.780E-01	?(P	7.038E-01	1.02E+02	9.05E+01 G
			722.94	4.010E-01	?(	1.280E+00	9.33E+01	9.08E+01 G
			614.28	0.000E+00	-	2.911E+00	1.00E+03	8.98E+01 G
SN-113	F	-2.8323E-03					1.15E+02	
			391.69	-2.832E-03	&(P	2.070E+00	2.22E+04	6.40E+01 G
SB-124	F	2.6364E-01					6.02E+01	
			602.73	7.869E-02	?(	2.606E+00	9.63E+02	9.83E+01 G
			1690.98	-7.143E-01	+	3.943E+00	2.43E+02	4.78E+01 G
			722.79	1.945E+00	?(	9.679E+00	1.40E+02	1.08E+01 G
SB-125	I	1.1518E+00					1.01E+03	
			427.88	1.585E-02	%(P	2.818E+00	6.65E+03	2.96E+01 G
			600.50	2.252E+00	?(P	1.386E+01	1.81E+02	1.79E+01 G
			635.89	2.784E+00	?(	6.458E+00	6.98E+01	1.13E+01 G
			463.37	7.240E-01	&(P	1.155E+01	4.52E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	-1.7493E-01					8.02E+00	
			364.48	-4.633E-01	?(P	1.216E+00	1.00E+02	8.17E+01 G
			284.30	-2.935E+00	+ P	1.382E+01	1.43E+02	6.14E+00 G
			636.97	3.111E+00	?(	1.181E+01	1.08E+02	7.17E+00 G
Gd-153	F	-9.8312E-01					2.42E+02	
			97.50	-9.831E-01	?(	5.587E+00	1.70E+02	3.00E+01 G
			103.20	-8.699E-01	+	7.367E+00	2.53E+02	2.18E+01 G
Ga-68	C	1.9707E+01					4.71E-02	
			1077.40	1.971E+01	?(	1.816E+01	3.54E+01	3.30E+00 G
BA-133	F	2.2356E-02					3.85E+03	
			356.00	2.236E-02	%(	2.810E+00	3.65E+03	6.20E+01 G
			302.85	0.000E+00	-	9.951E+00	1.00E+03	1.83E+01 G
			383.84	-1.538E+00	&	1.417E+01	2.66E+02	8.94E+00 GA
			80.99	-1.281E-01	+	2.304E+00	6.88E+02	3.41E+01 GA
CS-134	I	5.0200E-01					7.54E+02	
			604.71	0.000E+00	?(	2.645E+00	1.00E+03	9.76E+01 G
			795.87	-8.904E-01	+	2.467E+00	8.27E+01	8.55E+01 G
			569.32	2.217E+00	?(	5.398E+00	7.28E+01	1.54E+01 G
			801.95	-4.863E+00	+	2.981E+01	1.79E+02	8.69E+00 G
			563.24	3.212E+00	?(	1.065E+01	1.33E+02	8.35E+00 G
CS-137	I	4.2242E-02					1.10E+04	
			661.66	4.224E-02	%(P	1.535E+00	1.01E+03	8.52E+01 G
CE-139	F	2.5481E-01					1.38E+02	
			165.85	2.548E-01	&(	8.831E-01	1.03E+02	7.99E+01 G
Ba-140	I	3.7639E-01					1.28E+01	
			537.26	-5.289E-01	?(	3.508E+00	2.61E+02	2.44E+01 G
			162.66	3.926E+00	?(	1.301E+01	9.86E+01	6.22E+00 G
			304.85	0.000E+00	-	4.274E+01	1.00E+03	4.29E+00 G
La-140	I	1.6089E-02					1.28E+01	
			1596.21	-2.846E-01	?(P	1.421E+00	4.58E+02	9.54E+01 G
			487.02	3.653E-01	?(	2.104E+00	1.64E+02	4.55E+01 G
			328.76	6.466E-01	?(P	6.210E+00	2.79E+02	2.03E+01 G
			815.77	0.000E+00	-	5.892E+00	1.00E+03	2.33E+01 G
CE-141	I	4.4626E-02					3.25E+01	
			145.44	4.463E-02	%(	2.778E+00	1.84E+03	4.82E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	-7.0513E-01					3.63E+02	
			696.54	-7.051E-01	?(	1.511E+00	9.28E+01	9.90E+01 G
			618.06	0.000E+00	+	2.653E+00	1.00E+03	9.91E+01 G
EU-152	F	1.4306E+00					4.94E+03	
			344.29	4.736E-01	?(P	6.531E+00	4.04E+02	2.65E+01 G
			1112.07	-2.435E+00	+	1.711E+01	2.01E+02	1.36E+01 G
			121.78	5.624E-01	?(	2.438E+00	1.28E+02	2.86E+01 G
			778.92	1.099E+00	?(P	8.273E+00	3.02E+02	1.29E+01 G
			964.11	4.285E+00	?(	1.092E+01	7.60E+01	1.46E+01 G
			244.69	3.117E+00	&(	1.824E+01	1.73E+02	7.58E+00 G
			1408.00	-7.173E-01	+ P	7.467E+00	1.77E+02	2.10E+01 GA
EU-154	I	1.0148E+00					3.14E+03	
			873.23	-2.441E+00	?(	1.117E+01	1.31E+02	1.23E+01 G
			123.10	-4.773E-01	+	1.752E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.133E+00	1.00E+03	3.52E+01 G
			723.36	-8.030E-01	+	8.080E+00	2.86E+02	2.02E+01 G
			1004.77	-1.208E-01	%	1.029E+01	2.34E+03	1.80E+01 G
			996.33	5.015E+00	?(	1.472E+01	8.64E+01	1.06E+01 G
EU-155	I	1.0488E+00					1.81E+03	
			105.31	1.275E+00	&(P	6.800E+00	1.59E+02	2.12E+01 G
			86.54	8.925E-01	(	5.459E+00	1.83E+02	3.07E+01 G
HF-181	F	3.5372E-01					4.24E+01	
			482.00	3.537E-01	?(	1.432E+00	1.18E+02	8.05E+01 G
			133.02	-3.978E-01	+	2.934E+00	2.19E+02	4.33E+01 G
			345.83	-2.792E+00	&	1.250E+01	1.33E+02	1.51E+01 G
			136.30	0.000E+00	&	2.229E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.0823E+00					1.14E+02	
			1121.30	4.561E-01	?(	6.203E+00	3.82E+02	3.49E+01 G
			1221.41	-3.144E+00	+	8.309E+00	1.21E+02	2.70E+01 G
			1189.05	5.586E+00	?(	6.112E+00	5.01E+01	1.62E+01 G
Hg-203	F	-4.6474E-01					4.66E+01	
			279.20	-4.647E-01	?(	1.335E+00	8.58E+01	8.15E+01 G
TL-208	N	2.2490E+00					6.98E+02	
			583.02	2.235E+00	(P	7.084E-01	1.77E+01	8.45E+01 G
			277.28	-2.651E+00	- P	1.446E+01	1.50E+02	6.31E+00 G
			860.56	2.343E+00	?(P	6.098E+00	1.02E+02	1.24E+01 G
pm-146	C	-9.4715E-01					2.02E+03	
			747.16	-9.471E-01	?(	3.772E+00	1.67E+02	3.40E+01 G
			735.72	-5.205E-01	+	5.626E+00	4.44E+02	2.25E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          453.88-1.650E-02 % P 1.283E+00 3.01E+03 6.50E+01 G

y-88     F  -8.4458E-02                                     1.07E+02
                          898.04-8.446E-02 ?(  1.073E+00 4.94E+02 9.37E+01 G
                         1836.06 0.000E+00 +   8.180E-01 1.00E+03 9.92E+01 G

Cd-113m      4.2250E+03                                     5.33E+03
                          263.70 4.225E+03 ?(  1.276E+04 8.95E+01 6.00E-03   K

Cd-109   F  -8.0005E+00                                     4.53E+02
                           88.04-8.001E+00 ?(  4.788E+01 1.79E+02 3.79E+00 G

Cf-251   T  -9.4454E-02                                     3.28E+05
                          176.60-9.445E-02 %(  4.385E+00 1.76E+03 1.70E+01 G
                          227.00 1.855E+00 ?   1.200E+01 2.56E+02 6.30E+00 GA

Sn-126      -4.0551E+00                                     3.65E+07
                           87.57 0.000E+00 &   4.524E+00 1.00E+03 3.75E+01 GA
                           64.28-4.055E+00 ?(  1.544E+01 1.14E+02 9.70E+00 G
                           86.94 5.574E-01 %   1.878E+01 1.00E+03 9.04E+00 GA

PB-210   N  -5.5836E+00                                     8.14E+03
                           46.54-5.584E+00  (P 4.446E+01 1.58E+02 4.25E+00 G

PB-212   N   3.9543E+00                                     6.98E+02
                          238.63 3.954E+00  (P 1.180E+00 1.37E+01 4.33E+01 G
                          300.03 2.164E+01 +   1.022E+01 2.18E+01 3.28E+00 GA

PB-214   N   8.5646E+00                                     5.84E+05
                          351.93 8.565E+00  (P 1.678E+00 1.14E+01 3.76E+01 G
                          295.09 6.241E+00 -   2.892E+00 1.88E+01 1.93E+01 G
                          242.00 9.627E+00     7.783E+00 2.79E+01 7.43E+00 GA

BI-207   C   4.9966E-01                                     1.18E+04
                          569.70 2.077E-02 &(  1.128E+00 1.49E+03 9.77E+01 G
                         1063.66 1.128E+00 ?(P 6.780E-01 3.04E+01 7.45E+01 G

BI-212   N  -5.1208E-01                                     6.98E+02
                          727.17-5.121E-01 %(P 2.113E+01 1.04E+03 7.55E+00 G
                          785.42 2.000E+01 ? P 5.518E+01 1.08E+02 1.28E+00 GA

U-235    N   3.9113E-01                                     2.57E+11
                          143.79 3.911E-01 ?(P 1.244E+01 9.40E+02 1.10E+01 G
                          205.33-7.449E+00 + P 1.566E+01 6.42E+01 5.01E+00 G
                          163.38-1.023E+00 + P 1.726E+01 4.86E+02 5.08E+00 G
                          185.72 1.848E+00 * P 1.219E+00 2.87E+01 5.40E+01 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	5.7949E+00					5.84E+05	
			609.31	5.795E+00	@(P	1.677E+00	1.64E+01	4.61E+01 G
			1120.29	3.277E+00	- P	1.319E+01	1.17E+02	1.51E+01 G
			1764.49	3.665E+00	- P	1.287E+01	1.01E+02	1.54E+01 G
BI-210M	T	-6.7981E-03					1.10E+09	
			265.83	-6.798E-03	%(P	1.711E+00	7.11E+03	5.00E+01 G
			304.90	0.000E+00	+	6.549E+00	1.00E+03	2.80E+01 G
AC-228	N	4.0744E+00					2.10E+03	
			911.07	4.074E+00	?(	3.511E+00	3.99E+01	2.90E+01 G
			968.97	1.477E+00	-	1.097E+01	2.11E+02	1.75E+01 G
			338.32	0.000E+00	-	1.474E+01	1.00E+03	1.20E+01 G
			93.35	-5.352E+00	-	3.098E+01	1.73E+02	5.56E+00 XA
TH-227	N	5.0372E+00					7.95E+03	
			50.14	2.757E+00	?(	1.939E+01	2.07E+02	8.00E+00 G
			256.24	7.643E+00	?(	8.367E+00	4.60E+01	7.00E+00 G
TH-229	N	5.2758E+00					2.68E+06	
			193.51	5.276E+00	?(P	1.317E+01	9.61E+01	4.40E+00 G
			210.85	-6.152E-01	%	2.312E+01	1.47E+03	2.99E+00 G
TH-234	N	1.3182E+01					1.63E+12	
			63.29	1.604E+01	(P	2.200E+01	5.22E+01	3.81E+00 G
			92.59	1.123E+01	(P	1.303E+01	4.41E+01	5.58E+00 G
PA-231	N	5.3677E+00					1.20E+07	
			302.65	1.323E+00	%(	6.310E+01	1.40E+03	2.88E+00 G
			300.07	1.010E+01	?(	7.025E+01	2.05E+02	2.46E+00 G
PA-233	C	5.8918E-01					7.82E+08	
			312.01	0.000E+00	?(	5.188E+00	1.00E+03	3.60E+01 G
			300.18	4.010E+00	?(	2.851E+01	2.10E+02	6.20E+00 G
PA-234	N	-2.2695E-01					1.63E+12	
			131.29	-1.480E+00	(	7.010E+00	1.41E+02	1.80E+01 G
			946.02	-2.314E+00	+	9.609E+00	1.76E+02	1.34E+01 G
			569.47	2.524E+00	&(	1.238E+01	1.40E+02	8.20E+00 G
			883.24	0.000E+00	+	1.695E+01	1.00E+03	9.60E+00 G
			880.53	7.459E+00	?	2.358E+01	9.25E+01	6.00E+00 GA
PA-234M	N	-1.4842E+01					1.63E+12	
			1001.00	-1.484E+01	?(P	2.257E+02	4.13E+02	8.37E-01 G
			766.41	-2.651E+02	+	6.987E+02	7.89E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -1.5765E+00                                      1.58E+05
                          59.54-1.576E+00 &(P 4.050E+00 4.92E+01 3.59E+01 G

Np-237   F   2.0922E+00                                      2.14E+06
                          86.49 2.092E+00 &(  1.260E+01 1.80E+02 1.31E+01 G

Ir-192   F   2.4917E-02                                      7.40E+01
                         316.49 0.000E+00 ?(  2.170E+00 1.00E+03 8.70E+01 G
                         468.06 6.683E-02 ?(  2.339E+00 9.85E+02 5.18E+01 G
                         308.44 0.000E+00 -   5.829E+00 1.00E+03 3.18E+01 G

Np-239   T  -1.3941E+00                                      2.36E+00
                         103.70 1.057E-07 %   6.616E+00 1.86E+09 2.40E+01 X
                         106.13-1.394E+00 ?(  7.546E+00 1.62E+02 2.27E+01 G
                          99.50-1.961E+00 &   1.095E+01 1.67E+02 1.50E+01 X

Nd-147       1.9848E+00                                      1.11E+01
                         531.00 1.985E+00 ?(  4.844E+00 9.72E+01 1.30E+01 G
                          91.10-1.059E+00 -   6.233E+00 1.76E+02 2.83E+01 G

TL-210   N  -5.2359E-01                                      5.84E+05
                         799.60-5.236E-01 ?(  2.357E+00 1.32E+02 9.90E+01 G
                         296.00 3.105E-01 +   2.114E+00 2.01E+02 7.90E+01 G
                        1313.00-1.434E+00 +   7.013E+00 2.09E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
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N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	198.	-9.	-0.005	157.68	-5.584E+00	P
TH-227	50.14	169.	9.	0.005	206.98	2.757E+00	
AM-241	59.54	243.	-29.	-0.016	49.15	-1.576E+00	P
Sn-126	64.28	310.	-22.	-0.012	113.86	-4.055E+00	
BA-133	80.99	121.	-3.	-0.002	688.40	-1.281E-01	
Np-237	86.49	608.	20.	0.011	180.00	2.092E+00	
EU-155	86.54	628.	20.	0.011	182.82	8.925E-01	
Cd-109	88.04	751.	-22.	-0.012	179.12	-8.001E+00	
Nd-147	91.10	729.	-22.	-0.012	176.15	-1.059E+00	
Gd-153	97.50	685.	-22.	-0.012	170.06	-9.831E-01	
Np-239	99.50	663.	-22.	-0.012	167.11	-1.961E+00	
Gd-153	103.20	641.	-14.	-0.008	252.64	-8.699E-01	
EU-155	105.31	516.	20.	0.011	159.38	1.275E+00	P
Np-239	106.13	735.	-24.	-0.013	162.12	-1.394E+00	
EU-152	121.78	112.	12.	0.007	128.02	5.624E-01	
EU-154	123.10	118.	-14.	-0.008	108.93	-4.773E-01	
PA-234	131.29	369.	-19.	-0.011	141.34	-1.480E+00	
HF-181	133.02	370.	-13.	-0.007	219.11	-3.978E-01	
Ba-140	162.66	113.	16.	0.009	98.59	3.926E+00	
CE-139	165.85	87.	13.	0.007	102.72	2.548E-01	
TH-229	193.51	44.	13.	0.007	96.11	5.276E+00	P
Cf-251	227.00	60.	6.	0.003	256.04	1.855E+00	
EU-152	244.69	190.	11.	0.006	173.01	3.117E+00	
TH-227	256.24	28.	25.	0.014	46.01	7.643E+00	
Cd-113m	263.70	48.	12.	0.006	89.55	4.225E+03	
Hg-203	279.20	92.	-17.	-0.009	85.83	-4.647E-01	
I-131	284.30	53.	-8.	-0.004	142.85	-2.935E+00	P
TL-210	296.00	207.	10.	0.006	201.11	3.105E-01	
PA-231	300.07	217.	10.	0.006	205.41	1.010E+01	
PA-233	300.18	227.	10.	0.006	210.07	4.010E+00	
CR-51	320.08	259.	-11.	-0.006	205.11	-2.877E+00	
La-140	328.76	96.	5.	0.003	278.84	6.466E-01	P
Cf-249	333.44	191.	-4.	-0.002	466.05	-7.164E-01	
EU-152	344.29	173.	5.	0.003	403.51	4.736E-01	P
HF-181	345.83	205.	-16.	-0.009	133.02	-2.792E+00	
I-131	364.48	48.	-13.	-0.007	100.14	-4.633E-01	P
BA-133	383.84	75.	-5.	-0.003	265.92	-1.538E+00	
AG-108M	433.94	13.	8.	0.004	102.06	2.780E-01	P
SB-125	463.37	49.	2.	0.001	452.41	7.240E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	468.06	48.	1.	0.001	984.89	6.683E-02	
BE-7	477.60	33.	8.	0.004	109.77	2.625E+00	P
HF-181	482.00	41.	8.	0.004	118.05	3.537E-01	
La-140	487.02	27.	5.	0.003	163.80	3.653E-01	
RU-103	497.05	22.	2.	0.001	424.15	9.075E-02	P
RH-106	511.86	35.	41.	0.023	40.82	7.625E+00	
Nd-147	531.00	9.	7.	0.004	97.24	1.985E+00	
Ba-140	537.26	17.	-3.	-0.002	260.77	-5.289E-01	
CS-134	563.24	17.	7.	0.004	133.23	3.212E+00	
CS-134	569.32	14.	8.	0.005	72.79	2.217E+00	
PA-234	569.47	23.	5.	0.003	139.95	2.524E+00	
SB-125	600.50	143.	9.	0.005	181.14	2.252E+00	P
SB-124	602.73	152.	2.	0.001	962.68	7.869E-02	
SB-125	635.89	9.	7.	0.004	69.78	2.784E+00	
I-131	636.97	12.	5.	0.003	108.43	3.111E+00	
AG-110M	657.76	29.	-4.	-0.002	213.01	-1.772E-01	
PM-144	696.54	37.	-15.	-0.008	92.82	-7.051E-01	
NB-94	702.63	23.	-6.	-0.004	166.60	-3.125E-01	
SB-124	722.79	16.	4.	0.002	140.33	1.945E+00	
AG-108M	722.94	20.	7.	0.004	93.30	4.010E-01	
EU-154	723.36	42.	-3.	-0.002	285.67	-8.030E-01	
pm-146	735.72	23.	-2.	-0.001	444.01	-5.205E-01	
pm-146	747.16	23.	-6.	-0.004	166.60	-9.471E-01	
ZR-95	756.73	10.	5.	0.003	134.19	4.885E-01	P
AG-110M	763.94	31.	-12.	-0.007	72.45	-2.751E+00	
PA-234M	766.41	62.	-15.	-0.008	78.87	-2.651E+02	
EU-152	778.92	14.	3.	0.002	301.71	1.099E+00	P
BI-212	785.42	5.	5.	0.003	107.55	2.000E+01	P
CS-134	795.87	62.	-14.	-0.008	82.65	-8.904E-01	
TL-210	799.60	76.	-10.	-0.005	132.09	-5.236E-01	
CS-134	801.95	94.	-8.	-0.004	179.10	-4.863E+00	
MN-54	834.85	5.	11.	0.006	50.17	6.326E-01	
Co-56	846.77	19.	-5.	-0.003	201.78	-2.637E-01	
NB-94	871.10	12.	2.	0.001	329.47	9.052E-02	P
EU-154	873.23	20.	-5.	-0.003	130.56	-2.441E+00	
PA-234	880.53	21.	8.	0.004	92.54	7.459E+00	
y-88	898.04	9.	-1.	-0.001	493.71	-8.446E-02	
AG-110M	937.49	25.	-7.	-0.004	161.52	-1.254E+00	
PA-234	946.02	15.	-5.	-0.003	176.07	-2.314E+00	
EU-152	964.11	24.	10.	0.006	76.00	4.285E+00	
EU-154	996.33	21.	8.	0.005	86.40	5.015E+00	
PA-234M	1001.00	32.	-2.	-0.001	413.18	-1.484E+01	P
Co-56	1037.84	10.	-3.	-0.002	238.82	-1.425E+00	
Cs-136	1048.07	20.	-9.	-0.005	77.78	-7.614E-01	
RH-106	1050.36	9.	21.	0.011	30.56	8.942E+01	P
BI-207	1063.66	1.	12.	0.007	30.36	1.128E+00	P
FE-59	1099.25	10.	6.	0.003	122.85	7.486E-01	
EU-152	1112.07	42.	-5.	-0.003	201.02	-2.435E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sc-46	1120.55	27.	9.	0.005	91.77	6.133E-01		
Ta-182	1121.30	35.	2.	0.001	381.67	4.561E-01		
CO-60	1173.24	4.	10.	0.006	40.28	7.835E-01		P
Ta-182	1189.05	5.	12.	0.007	50.12	5.586E+00		
Ta-182	1221.41	32.	-11.	-0.006	120.72	-3.144E+00		
Co-56	1238.28	21.	2.	0.001	634.67	1.970E-01		
NA-22	1274.53	5.	6.	0.003	71.32	4.539E-01		
FE-59	1291.60	11.	-3.	-0.002	155.49	-5.137E-01		P
TL-210	1313.00	11.	-4.	-0.002	209.09	-1.434E+00		
CO-60	1332.50	3.	3.	0.002	91.50	2.739E-01		P
AG-110M	1384.30	11.	-2.	-0.001	452.11	-5.901E-01		
EU-152	1408.00	11.	-2.	-0.001	176.53	-7.173E-01		P
La-140	1596.21	6.	-3.	-0.002	457.90	-2.846E-01		P
SB-124	1690.98	11.	-3.	-0.002	243.10	-7.143E-01		

P - Peakbackground subtraction

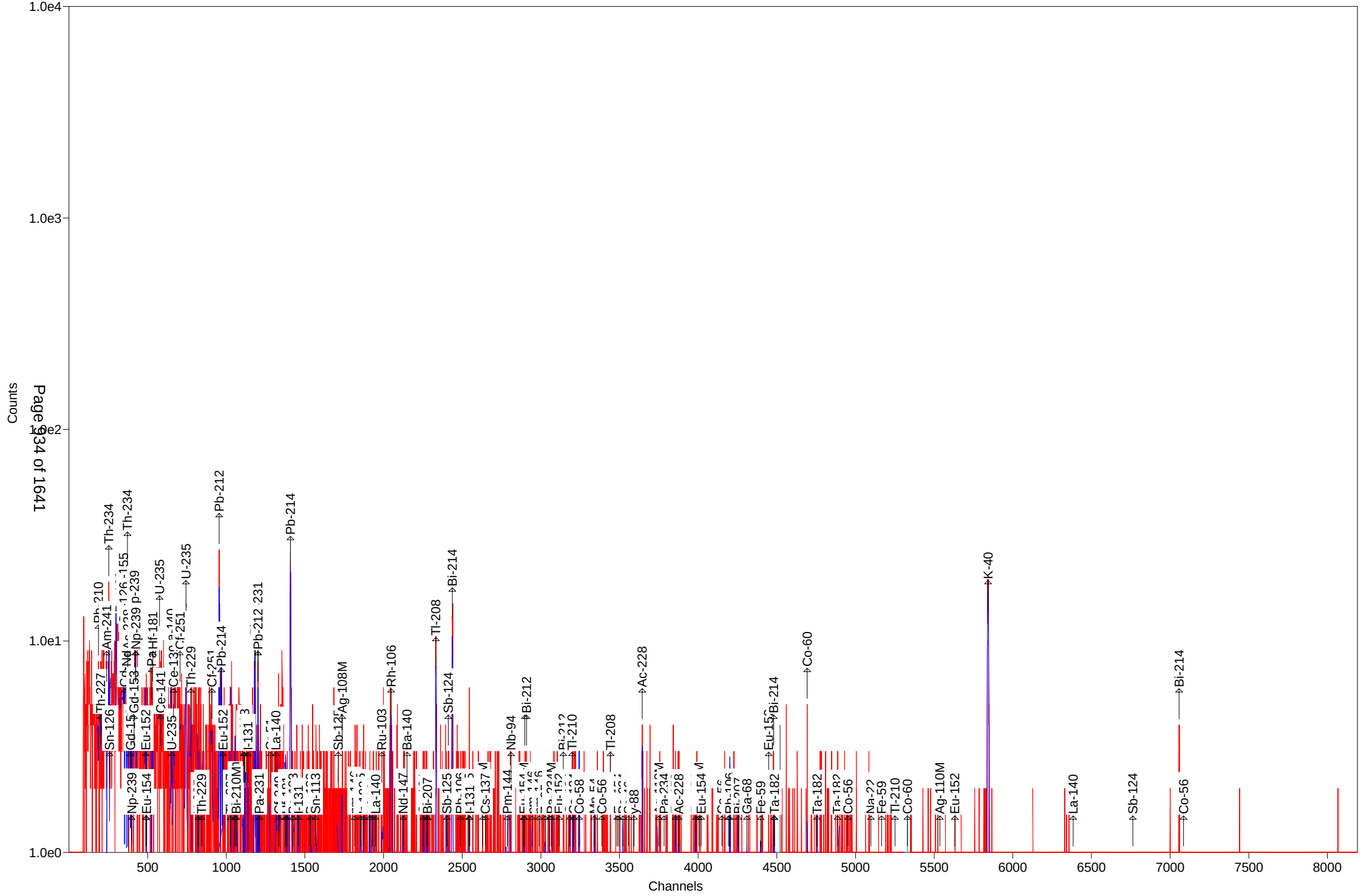
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.6247E+00	2.6247E+00	1.098E+02%	9.87E+00
NA-22	#A	4.5393E-01	4.5393E-01	7.132E+01%	1.08E+00
K-40	#	1.3141E+02	1.3141E+02	8.199E+00%	9.55E+00
Sc-46	#A	3.1647E-01	3.1647E-01	9.177E+01%	1.63E+00
CR-51	#A	-2.8766E+00	-2.8767E+00	2.051E+02%	1.99E+01
MN-54	#A	6.3263E-01	6.3263E-01	5.017E+01%	7.13E-01
FE-59	#A	7.4861E-01	7.4861E-01	1.229E+02%	2.18E+00
Co-56	#A	-8.0372E-02	-8.0373E-02	2.018E+02%	1.29E+00
CO-57	#A	3.1311E-02	3.1311E-02	7.842E+02%	8.48E-01
CO-58	#	1.2592E+00	1.2592E+00	2.085E+01%	4.03E-01
CO-60	#A	5.2860E-01	5.2860E-01	4.028E+01%	8.64E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.38E+00
NB-94	#A	-3.1249E-01	-3.1249E-01	1.666E+02%	1.24E+00
ZR-95	#A	4.8850E-01	4.8850E-01	1.342E+02%	1.63E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.72E+00
RU-103	#A	9.0745E-02	9.0746E-02	4.242E+02%	9.76E-01
RH-106	#A	1.2307E+01	1.2307E+01	3.056E+01%	2.65E+01
AG-108M	#A	3.3960E-01	3.3960E-01	6.914E+01%	7.04E-01
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.24E+00
SN-113	#A	-2.8323E-03	-2.8323E-03	2.218E+04%	2.07E+00
SB-124	#A	2.6364E-01	2.6364E-01	1.403E+02%	2.61E+00
SB-125	#A	1.1518E+00	1.1518E+00	6.978E+01%	2.82E+00
I-131	#A	-1.7492E-01	-1.7493E-01	7.380E+01%	1.22E+00
Gd-153	#A	-9.8312E-01	-9.8312E-01	1.701E+02%	5.59E+00
Ga-68	#	1.9580E+01	1.9707E+01	3.536E+01%	1.82E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.53E+00

BA-133 #A	2.2356E-02	2.2356E-02	3.652E+03%	2.81E+00
CS-134 #A	5.0200E-01	5.0200E-01	7.279E+01%	2.65E+00
CS-137 #A	4.2242E-02	4.2242E-02	1.012E+03%	1.54E+00
CE-139 #A	2.5481E-01	2.5481E-01	1.027E+02%	8.83E-01
Ba-140 #A	3.7638E-01	3.7639E-01	9.859E+01%	3.51E+00
La-140 #A	1.6089E-02	1.6089E-02	1.638E+02%	1.42E+00
CE-141 #A	4.4626E-02	4.4626E-02	1.836E+03%	2.78E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.17E+01
PM-144 #A	-7.0513E-01	-7.0513E-01	9.282E+01%	1.51E+00
EU-152 #A	1.4306E+00	1.4306E+00	7.600E+01%	6.53E+00
EU-154 #A	1.0148E+00	1.0148E+00	7.828E+01%	1.12E+01
EU-155 #A	1.0488E+00	1.0488E+00	1.213E+02%	6.80E+00
HF-181 #A	3.5372E-01	3.5372E-01	1.181E+02%	1.43E+00
Ta-182 #A	2.0823E+00	2.0823E+00	5.012E+01%	6.20E+00
Hg-203 #A	-4.6474E-01	-4.6474E-01	8.583E+01%	1.34E+00
TL-208	2.2490E+00	2.2490E+00	1.768E+01%	7.08E-01
pm-146 #A	-9.4715E-01	-9.4715E-01	1.666E+02%	3.77E+00
y-88 #A	-8.4458E-02	-8.4458E-02	4.937E+02%	1.07E+00
Cd-113m#A	4.2250E+03	4.2250E+03	8.955E+01%	1.28E+04
Cd-109 #A	-8.0005E+00	-8.0005E+00	1.791E+02%	4.79E+01
Cf-251 #A	-9.4454E-02	-9.4454E-02	1.758E+03%	4.39E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.99E+00
Sn-126 #A	-4.0551E+00	-4.0551E+00	1.139E+02%	1.54E+01
PB-210 #A	-5.5836E+00	-5.5836E+00	1.577E+02%	4.45E+01
PB-212	3.9543E+00	3.9543E+00	1.367E+01%	1.18E+00
PB-214	8.5646E+00	8.5646E+00	1.141E+01%	1.68E+00
BI-207 #A	4.9966E-01	4.9966E-01	3.036E+01%	1.13E+00
BI-212 #A	-5.1208E-01	-5.1208E-01	1.036E+03%	2.11E+01
U-235 #A	3.9113E-01	3.9113E-01	9.403E+02%	1.24E+01
BI-214 #	5.7949E+00	5.7949E+00	1.640E+01%	1.68E+00
BI-210M#A	-6.7981E-03	-6.7981E-03	7.107E+03%	1.71E+00
AC-228 #	4.0744E+00	4.0744E+00	3.993E+01%	3.51E+00
TH-227 #A	5.0372E+00	5.0372E+00	4.601E+01%	1.94E+01
TH-229 #A	5.2758E+00	5.2758E+00	9.611E+01%	1.32E+01
TH-234 A	1.3182E+01	1.3182E+01	3.417E+01%	2.20E+01
PA-231 #A	5.3677E+00	5.3677E+00	2.054E+02%	6.31E+01
PA-233 #A	5.8918E-01	5.8918E-01	2.101E+02%	5.19E+00
PA-234 #A	-2.2695E-01	-2.2695E-01	9.945E+01%	7.01E+00
PA-234M#A	-1.4842E+01	-1.4842E+01	4.132E+02%	2.26E+02
AM-241 #A	-1.5765E+00	-1.5765E+00	4.915E+01%	4.05E+00
Np-237 #A	2.0922E+00	2.0922E+00	1.800E+02%	1.26E+01
Ir-192 #A	2.4917E-02	2.4917E-02	7.018E+02%	2.17E+00
Cs-136 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.38E+00
Np-239 #A	-1.3939E+00	-1.3941E+00	1.621E+02%	7.55E+00
Nd-147 #A	1.9847E+00	1.9848E+00	9.724E+01%	4.84E+00
TL-210 #A	-5.2359E-01	-5.2359E-01	1.321E+02%	2.36E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.5 to  2000.0 keV)     1.652E+02  Bq/Sample
Total Decayed Activity (   37.5 to  2000.0 keV) 1.6515523E+02  Bq/Sample
```

376740_Gamma_160-29521-A-8-C. 8_Gamma_20182796.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20182925

Sample Description: 376740_Gamma_160-29521-A-9-C
Detector: Detector # 7
Batch ID: 376740
Work Order Number: Gamma
Lot Number: 160-29521-A-9-C

Decay to Time: 8/9/2018 07:18 Live Time: 1800 sec
Acquisition Time: 8/9/2018 07:18:43 Real Time: 1826 sec
Analysis Time: 8/9/2018 07:49 Dead Time: 1.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev14.lib
Bkgd Correction File: 7_2018-07-14_1851.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.417E+00	78.1	1.887E+00	1.891E+00	6.350E+00
NA-22	7.385E-01	30.2	2.227E-01	2.257E-01	4.948E-01
K-40	1.535E+02	6.9	1.064E+01	1.322E+01	8.218E+00
Sc-46	-3.947E-01	109.0	4.302E-01	4.306E-01	1.474E+00
CR-51	1.024E+00	304.6	3.119E+00	3.120E+00	1.071E+01
MN-54	1.526E-02	2755.0	4.205E-01	4.205E-01	1.046E+00
FE-59	-3.460E-01	319.7	1.106E+00	1.106E+00	2.516E+00
Co-56	7.354E-01	35.7	2.622E-01	2.649E-01	7.916E-01
CO-57	-1.920E-01	107.8	2.070E-01	2.073E-01	6.956E-01
CO-58	3.503E-01	87.3	3.057E-01	3.062E-01	1.040E+00
CO-60	-1.289E-02	1618.1	2.085E-01	2.085E-01	5.151E-01
ZN-65	-1.990E+00	84.5	1.681E+00	1.684E+00	5.623E+00
NB-94	-5.694E-02	98.9	5.629E-02	5.637E-02	1.019E+00
ZR-95	-4.364E-01	167.1	7.292E-01	7.296E-01	1.759E+00
NB-95	3.963E-01	89.3	3.538E-01	3.544E-01	1.200E+00
RU-103	-5.308E-02	575.3	3.054E-01	3.054E-01	7.771E-01
RH-106	0.000E+00	1.#INF	8.694E-01	8.694E-01	1.497E+01
AG-108M	-2.466E-01	103.0	2.540E-01	2.543E-01	7.864E-01
AG-110M	1.454E-01	308.9	4.491E-01	4.491E-01	1.624E+00
SN-113	4.023E-01	125.8	5.060E-01	5.064E-01	1.718E+00
SB-124	6.548E-01	30.5	1.998E-01	2.026E-01	4.914E-01
SB-125	1.069E+00	37.1	3.966E-01	4.003E-01	2.045E+00
I-131	2.814E-01	75.2	2.116E-01	2.121E-01	7.880E-01
Gd-153	3.871E-01	146.0	5.652E-01	5.657E-01	1.915E+00
Ga-68	-1.227E+01	156.9	1.926E+01	1.928E+01	4.368E+01
Tc-99m	9.601E-02	171.6	1.648E-01	1.649E-01	5.640E-01
BA-133	-2.388E-01	216.3	5.165E-01	5.166E-01	1.770E+00
CS-134	4.181E-01	64.7	2.703E-01	2.712E-01	8.970E-01
CS-137	1.456E-02	2368.5	3.449E-01	3.449E-01	1.252E+00
CE-139	1.118E-01	161.2	1.803E-01	1.806E-01	6.179E-01
Ba-140	1.034E+00	72.3	7.478E-01	7.497E-01	2.091E+00
La-140	2.617E-01	102.8	2.690E-01	2.694E-01	6.371E-01
CE-141	4.072E-02	1225.7	4.990E-01	4.990E-01	1.701E+00

CE-144	1.392E+00	120.5	1.677E+00	1.679E+00	5.649E+00
PM-144	-9.561E-02	491.1	4.696E-01	4.696E-01	1.084E+00
EU-152	1.345E+00	72.9	9.805E-01	9.830E-01	3.132E+00
EU-154	4.953E+00	23.6	1.167E+00	1.195E+00	6.918E+00
EU-155	4.753E-01	121.3	5.764E-01	5.769E-01	1.959E+00
HF-181	4.738E-01	79.4	3.763E-01	3.771E-01	9.849E-01
Ta-182	1.902E+00	112.4	2.138E+00	2.140E+00	7.253E+00
Hg-203	1.117E-01	169.7	1.896E-01	1.897E-01	6.618E-01
TL-208	4.220E-01	165.3	6.974E-01	6.977E-01	1.174E+00
pm-146	5.285E-01	116.2	6.138E-01	6.145E-01	1.558E+00
y-88	2.359E-01	162.3	3.829E-01	3.831E-01	9.282E-01
Cd-113m	2.936E+03	94.6	2.776E+03	2.782E+03	9.404E+03
Cd-109	-5.128E+00	132.5	6.796E+00	6.802E+00	2.279E+01
Cf-251	7.570E-01	109.9	8.317E-01	8.344E-01	2.181E+00
Cf-249	-4.403E-01	115.1	5.068E-01	5.073E-01	1.714E+00
Sn-126	1.772E+00	107.2	1.900E+00	1.902E+00	6.421E+00
PB-210	-3.453E+00	257.2	8.880E+00	8.883E+00	3.093E+01
PB-212	9.433E-01	49.8	4.693E-01	4.733E-01	1.513E+00
PB-214	3.144E+00	21.8	6.844E-01	7.036E-01	1.918E+00
BI-207	1.870E-02	260.7	4.875E-02	4.876E-02	7.577E-01
BI-212	-7.470E+00	84.1	6.285E+00	6.297E+00	2.109E+01
U-235	1.552E+00	100.8	1.564E+00	1.566E+00	6.791E+00
BI-214	2.699E+00	28.8	7.788E-01	7.913E-01	2.297E+00
BI-210M	3.960E-02	873.7	3.460E-01	3.460E-01	1.225E+00
AC-228	1.068E+00	96.5	1.031E+00	1.032E+00	4.516E+00
TH-227	1.894E+00	128.0	2.424E+00	2.427E+00	1.305E+01
TH-229	3.097E+00	108.5	3.360E+00	3.369E+00	9.099E+00
TH-234	-2.454E+00	218.0	5.350E+00	5.351E+00	1.879E+01
PA-231	-9.768E+00	187.7	1.834E+01	1.834E+01	6.162E+01
PA-233	-8.090E-01	167.5	1.355E+00	1.356E+00	4.559E+00
PA-234	1.068E+00	56.2	6.001E-01	6.026E-01	4.013E+00
PA-234M	-7.478E+01	65.2	4.873E+01	4.887E+01	2.200E+02
AM-241	-6.657E-01	112.7	7.503E-01	7.511E-01	2.029E+00
Np-237	4.820E-01	374.9	1.807E+00	1.807E+00	6.137E+00
Ir-192	-9.048E-02	111.7	1.010E-01	1.012E-01	1.953E+00
Cs-136	-5.580E-01	91.9	5.130E-01	5.140E-01	1.730E+00
Np-239	7.036E-02	823.4	5.794E-01	5.794E-01	2.018E+00
Nd-147	-3.146E-01	643.2	2.024E+00	2.024E+00	5.217E+00
TL-210	-1.111E-02	4197.7	4.663E-01	4.663E-01	1.655E+00
Total	3.130E+03				

Analyst: kody Saulters

Sample description
376740_Gamma_160-29521-A-9-C

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20182925.An1

Acquisition information
Start time: 8/9/2018 7:18:43 AM
Live time: 1800
Real time: 1826
Dead time: 1.41 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 7:18:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-07-14_1851.PBC 7/14/2018 6:51:14 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1314

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-7.	257.18	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	180.73	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.29	-7.	218.02	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	13.	107.24	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
86.49	6.	374.91	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.056E-01	EU155
97.50	12.	146.02	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
103.70	12.	113.09	0.90	5.626E-02	103.70	24.000	PBC<MDA	Np239
105.31	10.	121.26	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
106.13	2.	823.41	0.90	5.643E-02	106.13	22.700	PBC<MDA	Np239
123.10	14.	111.83	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
133.54	15.	120.46	0.93	5.459E-02	133.54	11.090	PBC<MDA	CE144
136.30	14.	134.01	0.93	5.413E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.309E+00	CO57
140.51	8.	171.65	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	13.	163.94	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
162.66	11.	100.97	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
163.38	10.	117.34	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
165.85	8.	161.19	0.96	4.881E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	109.87	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
185.72	27.	54.87	0.99	4.443E-02	185.72	54.000	PBC<MDA	U235
193.51	11.	108.47	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	6.	207.78	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
227.00	8.	140.29	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.63	26.	49.75	1.04	3.602E-02	238.63	43.300	PBC<MDA	PB212
242.00	10.	140.67	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214
244.69	11.	144.93	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
256.24	7.	181.27	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
263.70	10.	94.56	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	1.	873.74	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
277.28	1.	693.04	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
279.20	5.	169.65	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
284.30	10.	111.66	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
320.08	5.	304.60	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	9.	102.81	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
338.32	8.	119.98	1.14	2.677E-02	338.32	12.010	PBC<MDA	AC228
340.57	9.	120.39	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
344.29	8.	142.99	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	8.	149.53	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
351.93	55.	21.77	1.16	2.588E-02	351.93	37.600	3.144E+00	PB214
391.69	11.	125.78	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
463.37	15.	37.11	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	143.97	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
477.60	9.	78.07	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
482.00	6.	128.33	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	129.04	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.86	31.	45.66	2.56	1.870E-02	511.86	20.000	4.653E+00	RH106
537.26	6.	103.60	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	1.	742.74	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.47	7.	80.51	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.678E+00	PA234
					569.70	97.740	2.248E-01	BI207
583.02	7.	165.26	1.38	1.669E-02	583.02	84.500	PBC<MDA	TL208
600.50	6.	40.97	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
602.73	18.	30.51	1.40	1.621E-02	602.73	98.260	6.244E-01	SB124
604.71	12.	64.65	1.40	1.616E-02	604.71	97.620	PBC<MDA	CS134
609.31	36.	28.85	1.41	1.605E-02	609.31	46.090	2.699E+00	BI214
636.97	7.	97.71	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
722.79	2.	275.68	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.108E-01	AG108M
					723.36	20.220	4.981E-01	EU154
747.16	4.	116.15	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
765.79	9.	89.29	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.346E+02	PA234M
766.41	5.	89.25	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	7.773E+01	PA234M
785.42	1.	692.82	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
810.78	8.	87.27	1.59	1.246E-02	810.78	99.460	PBC<MDA	CO58
815.77	2.	404.11	1.59	1.239E-02	815.77	23.280	PBC<MDA	La140
860.56	4.	239.70	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
871.10	4.	122.47	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
873.23	4.	141.42	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
880.53	6.	89.61	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
883.24	6.	107.19	1.65	1.154E-02	883.24	9.600	PBC<MDA	PA234
884.68	2.	308.86	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
898.04	5.	162.33	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
946.02	4.	132.68	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
964.11	6.	79.91	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
968.97	8.	96.54	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
996.33	18.	23.57	1.75	1.035E-02	996.33	10.600	9.113E+00	EU154
1037.84	14.	44.89	1.78	9.978E-03	1037.84	14.130	5.442E+00	Co56
1048.07	2.	208.49	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	2.	474.24	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1121.30	11.	112.39	1.85	9.303E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.902E+00	Ta182
1238.28	8.	35.66	1.94	8.501E-03	1238.28	66.070	8.048E-01	Co56
1274.53	11.	30.15	1.96	8.280E-03	1274.53	99.940	7.385E-01	NA22
					1274.54	35.190	2.097E+00	EU154
1313.00	2.	248.05	1.99	8.059E-03	1313.00	21.000	PBC<MDA	TL210
1461.11	215.	6.93	2.93	7.309E-03	1460.83	10.670	1.535E+02	K40
1690.98	1.	600.00	2.25	6.388E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	2.	251.15	2.29	6.141E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	145.	-7.	-0.004	257.18	0.836s
TH-227	200.12	50.14	118.	9.	0.005	180.73	0.840s
AM-241	237.70	59.54	97.	-16.	-0.009	112.71	0.850s
TH-234	252.71	63.29	110.	-7.	-0.004	218.02	0.854s
Sn-126	256.68	64.28	85.	13.	0.007	107.24	0.856s
BA-133	323.52	80.99	83.	-4.	-0.002	377.94	0.874s
Np-237	345.53	86.49	250.	6.	0.003	374.91	0.880s
EU-155	345.74	86.54	256.	0.	0.000	1000.00	0.880s
Sn-126	347.33	86.94	256.	0.	0.000	1000.00	0.880s
Sn-126	349.85	87.57	256.	0.	0.000	1000.00	0.881s
Cd-109	351.73	88.04	296.	-19.	-0.010	132.53	0.881s
Nd-147	363.97	91.10	302.	-19.	-0.010	133.48	0.885s
TH-234	369.93	92.59	346.	-43.	-0.024	38.12	0.886
Gd-153	389.57	97.50	138.	12.	0.006	146.02	0.892
Np-239	397.57	99.50	198.	-12.	-0.007	164.82	0.894s
Np-239	414.38	103.70	88.	12.	0.007	113.09	0.898s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	420.83	105.31	72.	10.	0.006	121.26	0.900s
Np-239	424.10	106.13	88.	2.	0.001	823.41	0.901s
EU-152	486.69	121.78	135.	-17.	-0.009	102.09	0.918s
CO-57	487.83	122.06	152.	-17.	-0.009	107.81	0.918s
EU-154	491.98	123.10	108.	14.	0.008	111.83	0.919s
PA-234	524.77	131.29	218.	-17.	-0.010	122.41	0.928s
HF-181	531.68	133.02	235.	-17.	-0.010	126.77	0.930s
CE-144	533.74	133.54	159.	15.	0.008	120.46	0.930s
HF-181	544.79	136.30	160.	14.	0.008	134.01	0.933s
CO-57	545.48	136.47	146.	0.	0.000	1000.00	0.933s
Tc-99m	561.63	140.51	90.	8.	0.004	171.65	0.938s
U-235	574.73	143.79	212.	13.	0.007	163.94	0.941
Ba-140	650.24	162.66	52.	11.	0.006	100.97	0.961
U-235	653.11	163.38	63.	10.	0.006	117.34	0.962s
CE-139	663.01	165.85	76.	8.	0.004	161.19	0.965s
Cf-251	706.00	176.60	37.	11.	0.006	109.87	0.976s
U-235	742.49	185.72	55.	27.	0.015	54.87	0.986s
TH-229	773.64	193.51	37.	11.	0.006	108.47	0.994s
U-235	820.94	205.33	66.	-4.	-0.002	266.19	1.007s
TH-229	843.01	210.85	48.	6.	0.004	207.78	1.012s
Cf-251	907.62	227.00	37.	8.	0.005	140.29	1.029s
PB-212	954.15	238.63	73.	26.	0.015	49.75	1.041s
PB-214	967.61	242.00	99.	10.	0.006	140.67	1.045s
EU-152	978.39	244.69	114.	11.	0.006	144.93	1.048s
TH-227	1024.59	256.24	44.	7.	0.004	181.27	1.060s
Cd-113m	1054.43	263.70	44.	10.	0.006	94.56	1.067s
BI-210M	1062.96	265.83	52.	1.	0.001	873.74	1.070s
TL-208	1108.77	277.28	45.	1.	0.001	693.04	1.081s
Hg-203	1116.44	279.20	36.	5.	0.003	169.65	1.083s
I-131	1136.83	284.30	29.	10.	0.005	111.66	1.089
PB-214	1180.00	295.09	310.	-15.	-0.008	170.16	1.100
TL-210	1183.64	296.00	325.	-15.	-0.008	173.92	1.101s
PB-212	1199.76	300.03	340.	-15.	-0.008	71.04	1.105s
PA-231	1199.92	300.07	355.	-15.	-0.008	180.86	1.105s
PA-233	1200.36	300.18	369.	-15.	-0.008	184.54	1.105s
PA-231	1210.24	302.65	384.	-15.	-0.008	187.72	1.107s
BA-133	1211.05	302.85	399.	-15.	-0.008	191.22	1.108s
Ba-140	1219.04	304.85	414.	-13.	-0.007	224.45	1.110
PA-233	1247.69	312.01	310.	-15.	-0.008	167.55	1.117s
Ir-192	1265.61	316.49	325.	-15.	-0.008	170.78	1.122s
CR-51	1279.99	320.08	120.	5.	0.003	304.60	1.125s
La-140	1314.69	328.76	37.	9.	0.005	102.81	1.134s
Cf-249	1333.41	333.44	57.	-2.	-0.001	650.00	1.139s
AC-228	1352.93	338.32	45.	8.	0.005	119.98	1.144s
Cs-136	1361.93	340.57	53.	9.	0.005	120.39	1.146s
EU-152	1376.80	344.29	62.	8.	0.004	142.99	1.150s
HF-181	1382.97	345.83	62.	8.	0.004	149.53	1.151s
PB-214	1407.39	351.93	44.	55.	0.031	21.77	1.157s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1423.66	356.00	106.	-7.	-0.004	216.32	1.162
I-131	1457.59	364.48	32.	-7.	-0.004	169.91	1.170s
BA-133	1535.03	383.84	84.	-12.	-0.007	108.27	1.189s
Cf-249	1551.47	387.95	96.	-12.	-0.007	115.10	1.193s
SN-113	1566.43	391.69	89.	11.	0.006	125.78	1.197s
AG-108M	1735.43	433.94	29.	-9.	-0.005	102.99	1.239s
pm-146	1815.20	453.88	32.	-8.	-0.004	142.89	1.258s
SB-125	1853.15	463.37	8.	15.	0.008	37.11	1.268s
Ir-192	1871.93	468.06	37.	6.	0.003	143.97	1.272s
BE-7	1910.07	477.60	21.	9.	0.005	78.07	1.282s
HF-181	1927.68	482.00	30.	6.	0.004	128.33	1.286s
La-140	1947.77	487.02	46.	8.	0.004	129.04	1.291s
RU-103	1987.91	497.05	22.	-2.	-0.001	575.33	1.301s
RH-106	2047.15	511.86	27.	31.	0.017	45.66	2.565
Nd-147	2123.70	531.00	17.	-1.	-0.001	643.23	1.333s
Ba-140	2148.74	537.26	9.	6.	0.004	103.60	1.339s
CS-134	2252.65	563.24	13.	1.	0.001	742.74	1.364s
CS-134	2276.99	569.32	17.	-2.	-0.001	260.69	1.369s
PA-234	2277.59	569.47	11.	7.	0.004	80.51	1.370s
BI-207	2278.51	569.70	18.	-2.	-0.001	260.75	1.370s
TL-208	2331.79	583.02	34.	7.	0.004	165.26	1.382
SB-125	2401.71	600.50	0.	6.	0.003	40.97	1.399s
SB-124	2410.64	602.73	6.	18.	0.010	30.51	1.401s
CS-134	2418.55	604.71	24.	12.	0.007	64.65	1.403s
BI-214	2436.96	609.31	36.	36.	0.020	28.85	1.407s
RU-103	2440.91	610.30	72.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	72.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	72.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	72.	0.	0.000	1000.00	1.419s
SB-125	2543.28	635.89	26.	-10.	-0.005	79.75	1.432s
I-131	2547.62	636.97	20.	7.	0.004	97.71	1.433s
AG-110M	2630.77	657.76	29.	-4.	-0.002	213.01	1.452s
PM-144	2785.90	696.54	28.	-2.	-0.001	491.12	1.487s
NB-94	2810.25	702.63	24.	-8.	-0.004	155.21	1.493s
SB-124	2890.87	722.79	22.	2.	0.001	275.68	1.511s
AG-108M	2891.48	722.94	25.	0.	0.000	1000.00	1.511s
EU-154	2893.15	723.36	25.	0.	0.000	1000.00	1.511s
ZR-95	2896.52	724.20	32.	-12.	-0.007	101.15	1.512s
BI-212	2908.41	727.17	62.	-14.	-0.008	84.14	1.515s
pm-146	2942.61	735.72	24.	-10.	-0.005	123.96	1.523s
pm-146	2988.37	747.16	5.	4.	0.002	116.15	1.533s
ZR-95	3026.65	756.73	19.	-6.	-0.003	167.10	1.541s
AG-110M	3055.51	763.94	28.	-12.	-0.007	68.88	1.548s
NB-95	3062.89	765.79	30.	9.	0.005	89.29	1.549
PA-234M	3065.38	766.41	9.	5.	0.003	89.25	1.550s
EU-152	3115.41	778.92	28.	-8.	-0.004	144.70	1.561s
BI-212	3141.41	785.42	19.	1.	0.001	692.82	1.567s
CS-134	3183.20	795.87	42.	-12.	-0.007	80.50	1.576s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3207.54	801.95	57.	-2.	-0.001	643.43	1.581s
CO-58	3242.84	810.78	19.	8.	0.004	87.27	1.589s
La-140	3262.82	815.77	27.	2.	0.001	404.11	1.593s
Cs-136	3273.74	818.50	59.	-12.	-0.007	91.94	1.596s
TL-208	3442.00	860.56	15.	4.	0.002	239.70	1.632s
NB-94	3484.13	871.10	10.	4.	0.002	122.47	1.641s
EU-154	3492.66	873.23	10.	4.	0.002	141.42	1.643s
PA-234	3521.86	880.53	10.	6.	0.003	89.61	1.649s
PA-234	3532.70	883.24	16.	6.	0.003	107.19	1.652s
AG-110M	3538.47	884.68	22.	2.	0.001	308.86	1.653s
Sc-46	3556.86	889.28	35.	-8.	-0.005	108.99	1.657s
y-88	3591.90	898.04	10.	5.	0.003	162.33	1.664s
AG-110M	3749.71	937.49	25.	-12.	-0.007	96.04	1.697s
PA-234	3783.82	946.02	5.	4.	0.002	132.68	1.704s
EU-152	3856.18	964.11	9.	6.	0.003	79.91	1.719s
AC-228	3875.62	968.97	24.	8.	0.004	96.54	1.724s
EU-154	3985.06	996.33	0.	18.	0.010	23.57	1.746s
PA-234M	4003.73	1001.00	46.	-12.	-0.006	65.16	1.750s
EU-154	4018.84	1004.77	7.	0.	0.000	1000.00	1.753s
Co-56	4151.10	1037.84	5.	14.	0.008	44.89	1.780s
Cs-136	4192.02	1048.07	11.	2.	0.001	208.49	1.788
RH-106	4201.18	1050.36	30.	-12.	-0.007	68.08	1.790s
BI-207	4254.38	1063.66	16.	2.	0.001	474.24	1.801s
Ga-68	4309.34	1077.40	16.	-6.	-0.003	156.94	1.812s
FE-59	4396.74	1099.25	21.	-3.	-0.002	319.69	1.829s
EU-152	4448.04	1112.07	77.	-17.	-0.009	77.29	1.839s
ZN-65	4461.92	1115.55	94.	-17.	-0.009	84.47	1.842s
BI-214	4480.88	1120.29	111.	-4.	-0.002	362.51	1.845s
Sc-46	4481.94	1120.55	115.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	72.	11.	0.006	112.39	1.846s
CO-60	4692.68	1173.24	21.	-8.	-0.005	109.72	1.886s
Ta-182	4755.93	1189.05	16.	0.	0.000	1000.00	1.899s
Ta-182	4885.37	1221.41	32.	-10.	-0.006	91.82	1.923s
Co-56	4952.84	1238.28	0.	8.	0.005	35.66	1.936s
NA-22	5097.84	1274.53	0.	11.	0.006	30.15	1.963s
EU-154	5097.89	1274.54	11.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	6.	-2.	-0.001	343.80	1.975s
TL-210	5251.71	1313.00	6.	2.	0.001	248.05	1.991s
AG-110M	5536.89	1384.30	6.	-1.	0.000	846.32	2.042s
EU-152	5631.70	1408.00	17.	-9.	-0.005	112.49	2.059s
K-40	5844.11	1461.11	4.	215.	0.120	6.93	2.925s
La-140	6384.49	1596.21	0.	0.	0.000	1000.00	2.185s
SB-124	6763.55	1690.98	6.	1.	0.001	600.00	2.245s
BI-214	7057.56	1764.49	10.	2.	0.001	251.15	2.290s
Co-56	7084.99	1771.35	13.	-1.	0.000	617.74	2.294s
y-88	7343.81	1836.06	0.	0.	0.000	1000.00	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   2.4173E+00                                      5.31E+01
                           477.60 2.417E+00 ?(  6.350E+00 7.81E+01 1.05E+01 G

NA-22    C   7.3847E-01                                      9.50E+02
                          1274.53 7.385E-01 ?(  4.948E-01 3.02E+01 9.99E+01 G

K-40     N   1.5346E+02                                      4.66E+11
                          1460.83 1.535E+02  (P 8.218E+00 6.93E+00 1.07E+01 G

Sc-46    F  -3.9468E-01                                      8.38E+01
                           889.28-3.947E-01 ?(  1.474E+00 1.09E+02 1.00E+02 G
                          1120.55 0.000E+00 &   3.145E+00 1.00E+03 1.00E+02 G

CR-51    F   1.0240E+00                                      2.77E+01
                           320.08 1.024E+00 ?(  1.071E+01 3.05E+02 9.94E+00 G

MN-54    C   1.5264E-02                                      3.12E+02
                           834.85 1.526E-02 %(  1.046E+00 2.75E+03 1.00E+02 G

FE-59    F  -3.4602E-01                                      4.45E+01
                          1099.25-3.460E-01 ?(  2.516E+00 3.20E+02 5.65E+01 G
                          1291.60-2.620E-01 +   2.170E+00 3.44E+02 4.32E+01 G

Co-56    C   7.3536E-01                                      7.73E+01
                           846.77 2.389E-02 %(P 7.916E-01 1.27E+03 9.99E+01 G
                          1238.28 8.048E-01 ?(P 7.290E-01 3.57E+01 6.61E+01 G
                          1037.84 5.442E+00 &(P 5.250E+00 4.49E+01 1.41E+01 G
                          1771.35-4.888E-01 +   1.138E+01 6.18E+02 1.55E+01  A

CO-57    C  -1.9204E-01                                      2.72E+02
                           122.06-1.920E-01 ?(  6.956E-01 1.08E+02 8.56E+01 G
                           136.47 0.000E+00 &   5.675E+00 1.00E+03 1.07E+01 G

CO-58    C   3.5033E-01                                      7.09E+01
                           810.78 3.503E-01 ?(  1.040E+00 8.73E+01 9.95E+01 G

CO-60    F  -1.2885E-02                                      1.93E+03
                          1332.50-1.289E-02 %(P 5.151E-01 1.62E+03 1.00E+02 G
                          1173.24-5.237E-01 + P 1.512E+00 1.10E+02 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.9898E+00					2.44E+02	
			1115.55	-1.990E+00	?(	5.623E+00	8.45E+01	5.06E+01 G
NB-94	I	-5.6941E-02					7.41E+06	
			702.63	-3.094E-01	?(P	1.019E+00	1.55E+02	9.79E+01 G
			871.10	1.904E-01	?(	8.306E-01	1.22E+02	9.99E+01 G
ZR-95	I	-4.3638E-01					6.40E+01	
			756.73	-4.364E-01	&(	1.759E+00	1.67E+02	5.45E+01 G
			724.20	-1.083E+00	+ P	2.647E+00	1.01E+02	4.42E+01 G
NB-95	I	3.9628E-01					6.40E+01	
			765.79	3.963E-01	?(	1.200E+00	8.93E+01	9.98E+01 G
RU-103	I	-5.3079E-02					3.93E+01	
			497.05	-5.308E-02	?(	7.771E-01	5.75E+02	9.09E+01 G
			610.30	0.000E+00	+	2.543E+01	1.00E+03	5.75E+00 GA
AG-108M	C	-2.4662E-01					1.53E+05	
			433.94	-2.466E-01	?(P	7.864E-01	1.03E+02	9.05E+01 G
			722.94	0.000E+00	+	1.153E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	1.637E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.4539E-01					2.50E+02	
			884.68	1.454E-01	?(	1.624E+00	3.09E+02	7.27E+01 G
			657.76	-1.435E-01	+	1.082E+00	2.13E+02	9.46E+01 G
			937.49	-1.774E+00	+	3.846E+00	9.60E+01	3.44E+01 G
			1384.30	-1.986E-01	+	4.112E+00	8.46E+02	2.43E+01 G
			763.94	-2.284E+00	+	5.223E+00	6.89E+01	2.23E+01 G
SN-113	F	4.0227E-01					1.15E+02	
			391.69	4.023E-01	?(P	1.718E+00	1.26E+02	6.40E+01 G
SB-124	F	6.5478E-01					6.02E+01	
			602.73	6.244E-01	&(	4.914E-01	3.05E+01	9.83E+01 G
			1690.98	1.820E-01	-	2.571E+00	6.00E+02	4.78E+01 G
			722.79	9.311E-01	?(	9.242E+00	2.76E+02	1.08E+01 G
SB-125	I	1.0685E+00					1.01E+03	
			427.88	4.016E-02	%(P	2.045E+00	1.89E+03	2.96E+01 G
			600.50	1.140E+00	?(	1.410E+00	4.10E+01	1.79E+01 G
			635.89	-3.125E+00	+	8.388E+00	7.98E+01	1.13E+01 G
			463.37	3.855E+00	?(P	4.055E+00	3.71E+01	1.05E+01 G
I-131	I	2.8139E-01					8.02E+00	
			364.48	-1.913E-01	?(P	7.880E-01	1.70E+02	8.17E+01 G
			284.30	2.769E+00	?(P	8.163E+00	1.12E+02	6.14E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			636.97	3.537E+00	?(	1.187E+01	9.77E+01	7.17E+00 G
Gd-153	F	3.8708E-01					2.42E+02	
			97.50	3.871E-01	(	1.915E+00	1.46E+02	3.00E+01 G
			103.20	-1.891E-08	&	3.014E+00	4.64E+09	2.18E+01 G
Ga-68	C	-1.2274E+01					4.71E-02	
			1077.40	-1.227E+01	?(	4.368E+01	1.57E+02	3.30E+00 G
Tc-99m	I	9.6014E-02					2.51E-01	
			140.51	9.601E-02	?(	5.640E-01	1.72E+02	8.93E+01 G
BA-133	F	-2.3876E-01					3.85E+03	
			356.00	-2.388E-01	?(	1.770E+00	2.16E+02	6.20E+01 G
			302.85	-1.536E+00	+	9.868E+00	1.91E+02	1.83E+01 G
			383.84	-3.210E+00	+	1.175E+01	1.08E+02	8.94E+00 GA
			80.99	-1.394E-01	+	1.456E+00	3.78E+02	3.41E+01 GA
CS-134	I	4.1808E-01					7.54E+02	
			604.71	4.208E-01	&(	8.970E-01	6.47E+01	9.76E+01 G
			795.87	-6.283E-01	-	1.697E+00	8.05E+01	8.55E+01 G
			569.32	-4.947E-01	-	4.687E+00	2.61E+02	1.54E+01 G
			801.95	-8.471E-01	-	1.921E+01	6.43E+02	8.69E+00 G
			563.24	3.868E-01	&(	7.547E+00	7.43E+02	8.35E+00 G
CS-137	I	1.4563E-02					1.10E+04	
			661.66	1.456E-02	%(	1.252E+00	2.37E+03	8.52E+01 G
CE-139	F	1.1184E-01					1.38E+02	
			165.85	1.118E-01	&(	6.179E-01	1.61E+02	7.99E+01 G
Ba-140	I	1.0339E+00					1.28E+01	
			537.26	8.004E-01	?(P	2.091E+00	1.04E+02	2.44E+01 G
			162.66	1.949E+00	&(	6.677E+00	1.01E+02	6.22E+00 G
			304.85	-5.718E+00	+	4.316E+01	2.24E+02	4.29E+00 G
La-140	I	2.6168E-01					1.28E+01	
			1596.21	0.000E+00	?(	6.371E-01	1.00E+03	9.54E+01 G
			487.02	4.859E-01	?(	2.154E+00	1.29E+02	4.55E+01 G
			328.76	8.794E-01	?(	3.085E+00	1.03E+02	2.03E+01 G
			815.77	3.572E-01	?(	5.199E+00	4.04E+02	2.33E+01 G
CE-141	I	4.0715E-02					3.25E+01	
			145.44	4.072E-02	%(	1.701E+00	1.23E+03	4.82E+01 G
CE-144	I	1.3925E+00					2.85E+02	
			133.54	1.392E+00	?(	5.649E+00	1.20E+02	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C -9.5614E-02					3.63E+02	
		696.54	-9.561E-02	?(P	1.084E+00	4.91E+02	9.90E+01 G
		618.06	0.000E+00	+	1.492E+00	1.00E+03	9.91E+01 G
EU-152	F 1.3449E+00					4.94E+03	
		344.29	6.387E-01	?(	3.132E+00	1.43E+02	2.65E+01 G
		1112.07	-7.348E+00	+	1.894E+01	7.73E+01	1.36E+01 G
		121.78	-5.747E-01	+	1.971E+00	1.02E+02	2.86E+01 G
		778.92	-2.660E+00	+	9.101E+00	1.45E+02	1.29E+01 G
		964.11	2.176E+00	?(	5.907E+00	7.99E+01	1.46E+01 G
		244.69	2.212E+00	?(P	1.088E+01	1.45E+02	7.58E+00 G
		1408.00	-3.149E+00	+	7.670E+00	1.12E+02	2.10E+01 GA
EU-154	I 4.9530E+00					3.14E+03	
		873.23	1.360E+00	?(	6.918E+00	1.41E+02	1.23E+01 G
		123.10	3.300E-01	-	1.246E+00	1.12E+02	4.08E+01 G
		1274.54	0.000E+00	-	3.463E+00	1.00E+03	3.52E+01 G
		723.36	0.000E+00	-	5.183E+00	1.00E+03	2.02E+01 G
		1004.77	0.000E+00	-	4.636E+00	1.00E+03	1.80E+01 G
		996.33	9.113E+00	?(	3.731E+00	2.36E+01	1.06E+01 G
EU-155	I 4.7529E-01					1.81E+03	
		105.31	4.753E-01	?(P	1.959E+00	1.21E+02	2.12E+01 G
		86.54	0.000E+00	&	2.648E+00	1.00E+03	3.07E+01 G
HF-181	F 4.7376E-01					4.24E+01	
		482.00	2.214E-01	?(	9.849E-01	1.28E+02	8.05E+01 G
		133.02	-4.086E-01	+	1.740E+00	1.27E+02	4.33E+01 G
		345.83	1.079E+00	?(P	5.536E+00	1.50E+02	1.51E+01 G
		136.30	2.389E+00	&(	1.081E+01	1.34E+02	5.85E+00 G
Ta-182	F 1.9021E+00					1.14E+02	
		1121.30	1.902E+00	&(	7.253E+00	1.12E+02	3.49E+01 G
		1221.41	-2.405E+00	+ P	6.955E+00	9.18E+01	2.70E+01 G
		1189.05	0.000E+00	&	8.301E+00	1.00E+03	1.62E+01 G
Hg-203	F 1.1173E-01					4.66E+01	
		279.20	1.117E-01	?(	6.618E-01	1.70E+02	8.15E+01 G
TL-208	N 4.2199E-01					6.98E+02	
		583.02	2.834E-01	?(P	1.174E+00	1.65E+02	8.45E+01 G
		277.28	3.816E-01	(P	9.392E+00	6.93E+02	6.31E+00 G
		860.56	1.386E+00	&(P	7.940E+00	2.40E+02	1.24E+01 G
pm-146	C 5.2849E-01					2.02E+03	
		747.16	5.285E-01	?(	1.558E+00	1.16E+02	3.40E+01 G
		735.72	-1.764E+00	+ P	4.617E+00	1.24E+02	2.25E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			453.88	-3.292E-01	-	1.196E+00	1.43E+02	6.50E+01 G
y-88	F	2.3587E-01					1.07E+02	
			898.04	2.359E-01	?(P	9.282E-01	1.62E+02	9.37E+01 G
			1836.06	0.000E+00	-	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		2.9355E+03					5.33E+03	
			263.70	2.936E+03	?(	9.404E+03	9.46E+01	6.00E-03 K
Cd-109	F	-5.1278E+00					4.53E+02	
			88.04	-5.128E+00	?(	2.279E+01	1.33E+02	3.79E+00 G
Cf-251	T	7.5702E-01					3.28E+05	
			176.60	7.570E-01	(	2.181E+00	1.10E+02	1.70E+01 G
			227.00	1.956E+00	?	7.260E+00	1.40E+02	6.30E+00 GA
Cf-249	T	-4.4027E-01					1.28E+05	
			387.95	-4.403E-01	?(	1.714E+00	1.15E+02	6.60E+01 G
			333.44	-2.180E-01	+	4.993E+00	6.50E+02	1.55E+01 G
Sn-126		1.7715E+00					3.65E+07	
			87.57	0.000E+00	-	2.154E+00	1.00E+03	3.75E+01 GA
			64.28	1.772E+00	(	6.421E+00	1.07E+02	9.70E+00 G
			86.94	0.000E+00	-	8.970E+00	1.00E+03	9.04E+00 GA
PB-210	N	-3.4529E+00					8.14E+03	
			46.54	-3.453E+00	*(P	3.093E+01	2.57E+02	4.25E+00 G
PB-212	N	9.4333E-01					6.98E+02	
			238.63	9.433E-01	*(P	1.513E+00	4.98E+01	4.33E+01 G
			300.03	-8.549E+00	- P	5.059E+01	7.10E+01	3.28E+00 GA
PB-214	N	3.1444E+00					5.84E+05	
			351.93	3.144E+00	(P	1.918E+00	2.18E+01	3.76E+01 G
			295.09	-1.417E+00	-	8.109E+00	1.70E+02	1.93E+01 G
			242.00	2.159E+00	-	1.033E+01	1.41E+02	7.43E+00 GA
BI-207	C	1.8697E-02					1.18E+04	
			569.70	-8.015E-02	?(	7.577E-01	2.61E+02	9.77E+01 G
			1063.66	1.484E-01	&(P	1.634E+00	4.74E+02	7.45E+01 G
BI-212	N	-7.4701E+00					6.98E+02	
			727.17	-7.470E+00	?(	2.109E+01	8.41E+01	7.55E+00 G
			785.42	4.516E+00	+	7.737E+01	6.93E+02	1.28E+00 GA
U-235	N	1.5517E+00					2.57E+11	
			143.79	1.227E+00	?(P	6.791E+00	1.64E+02	1.10E+01 G
			205.33	-1.210E+00	& P	1.104E+01	2.66E+02	5.01E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	2.251E+00	?(P	8.988E+00	1.17E+02	5.08E+00 G
			185.72	6.251E-01		8.629E-01	5.49E+01	5.40E+01 GA
BI-214	N	2.6995E+00					5.84E+05	
			609.31	2.699E+00	?(	2.297E+00	2.88E+01	4.61E+01 G
			1120.29	-1.638E+00	&	2.046E+01	3.63E+02	1.51E+01 G
			1764.49	1.102E+00	- P	1.030E+01	2.51E+02	1.54E+01 G
BI-210M	T	3.9601E-02					1.10E+09	
			265.83	3.960E-02	?(	1.225E+00	8.74E+02	5.00E+01 G
			304.90	5.173E-07	%	6.713E+00	3.83E+08	2.80E+01 G
AC-228	N	1.0679E+00					2.10E+03	
			911.07	1.777E-01	%(P	4.516E+00	1.07E+03	2.90E+01 G
			968.97	2.300E+00	?(P	7.593E+00	9.65E+01	1.75E+01 G
			338.32	1.426E+00	(P	5.858E+00	1.20E+02	1.20E+01 G
			93.35	-1.350E-01	%	1.619E+01	3.53E+03	5.56E+00 XA
TH-227	N	1.8943E+00					7.95E+03	
			50.14	2.119E+00	?(	1.305E+01	1.81E+02	8.00E+00 G
			256.24	1.638E+00	&(	7.867E+00	1.81E+02	7.00E+00 G
TH-229	N	3.0974E+00					2.68E+06	
			193.51	3.201E+00	?(P	9.099E+00	1.08E+02	4.40E+00 G
			210.85	2.944E+00	&(	1.622E+01	2.08E+02	2.99E+00 G
TH-234	N	-2.4537E+00					1.63E+12	
			63.29	-2.454E+00	&(P	1.879E+01	2.18E+02	3.81E+00 G
			92.59	-7.879E+00	+ P	1.630E+01	3.81E+01	5.58E+00 G
PA-231	N	-9.7678E+00					1.20E+07	
			302.65	-9.768E+00	(	6.162E+01	1.88E+02	2.88E+00 G
			300.07	-1.133E+01	+	6.887E+01	1.81E+02	2.46E+00 G
PA-233	C	-8.0902E-01					7.82E+08	
			312.01	-8.090E-01	(	4.559E+00	1.68E+02	3.60E+01 G
			300.18	-4.495E+00	+	2.788E+01	1.85E+02	6.20E+00 G
PA-234	N	1.0676E+00					1.63E+12	
			131.29	-9.762E-01	?(	4.013E+00	1.22E+02	1.80E+01 G
			946.02	1.529E+00	?(	5.018E+00	1.33E+02	1.34E+01 G
			569.47	2.678E+00	?(	7.317E+00	8.05E+01	8.20E+00 G
			883.24	2.880E+00	?(	1.073E+01	1.07E+02	9.60E+00 G
			880.53	4.589E+00	?	1.416E+01	8.96E+01	6.00E+00 GA
PA-234M	N	-7.4782E+01					1.63E+12	
			1001.00	-7.478E+01	?(P	2.200E+02	6.52E+01	8.37E-01 G
			766.41	7.773E+01	+	2.393E+02	8.93E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -6.6571E-01                                      1.58E+05
                          59.54-6.657E-01  (  2.029E+00 1.13E+02 3.59E+01 G

Np-237   F   4.8200E-01                                      2.14E+06
                          86.49 4.820E-01 &(  6.137E+00 3.75E+02 1.31E+01 G

Ir-192   F  -9.0477E-02                                      7.40E+01
                         316.49-3.401E-01 ?(  1.953E+00 1.71E+02 8.70E+01 G
                         468.06 3.294E-01 ?(  1.644E+00 1.44E+02 5.18E+01 G
                         308.44-4.608E-07 %   5.979E+00 3.83E+08 3.18E+01 G

Cs-136   F  -5.5799E-01                                      1.30E+01
                         818.50-5.580E-01 ?(  1.730E+00 9.19E+01 1.00E+02 G
                        1048.07 1.638E-01 &   1.259E+00 2.08E+02 8.00E+01 G
                         340.57 3.965E-01 +   1.631E+00 1.20E+02 4.69E+01 G

Np-239   T   7.0361E-02                                      2.36E+00
                         103.70 4.977E-01 &   1.905E+00 1.13E+02 2.40E+01 X
                         106.13 7.036E-02 &(  2.018E+00 8.23E+02 2.27E+01 G
                          99.50-8.144E-01 +   4.536E+00 1.65E+02 1.50E+01 X

Nd-147      -3.1458E-01                                      1.11E+01
                         531.00-3.146E-01 ?(  5.217E+00 6.43E+02 1.30E+01 G
                          91.10-6.783E-01 &   3.036E+00 1.33E+02 2.83E+01 G

TL-210   N  -1.1109E-02                                      5.84E+05
                         799.60-1.111E-02 %(  1.655E+00 4.20E+03 9.90E+01 G
                         296.00-3.473E-01 +   2.032E+00 1.74E+02 7.90E+01 G
                        1313.00 7.660E-01 ?   4.531E+00 2.48E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
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} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	145.	-7.	-0.004	257.18	-3.453E+00	P
TH-227	50.14	118.	9.	0.005	180.73	2.119E+00	
AM-241	59.54	97.	-16.	-0.009	112.71	-6.657E-01	
TH-234	63.29	110.	-7.	-0.004	218.02	-2.454E+00	P
Sn-126	64.28	85.	13.	0.007	107.24	1.772E+00	
BA-133	80.99	83.	-4.	-0.002	377.94	-1.394E-01	
Np-237	86.49	250.	6.	0.003	374.91	4.820E-01	
Cd-109	88.04	296.	-19.	-0.010	132.53	-5.128E+00	
Nd-147	91.10	302.	-19.	-0.010	133.48	-6.783E-01	
TH-234	92.59	346.	-43.	-0.024	38.12	-7.879E+00	P
Gd-153	97.50	138.	12.	0.006	146.02	3.871E-01	
Np-239	99.50	198.	-12.	-0.007	164.82	-8.144E-01	
Np-239	103.70	88.	12.	0.007	113.09	4.977E-01	
EU-155	105.31	72.	10.	0.006	121.26	4.753E-01	P
Np-239	106.13	88.	2.	0.001	823.41	7.036E-02	
EU-152	121.78	135.	-17.	-0.009	102.09	-5.747E-01	
CO-57	122.06	152.	-17.	-0.009	107.81	-1.920E-01	
EU-154	123.10	108.	14.	0.008	111.83	3.300E-01	
PA-234	131.29	218.	-17.	-0.010	122.41	-9.762E-01	
HF-181	133.02	235.	-17.	-0.010	126.77	-4.086E-01	
CE-144	133.54	159.	15.	0.008	120.46	1.392E+00	
HF-181	136.30	160.	14.	0.008	134.01	2.389E+00	
Tc-99m	140.51	90.	8.	0.004	171.65	9.601E-02	
U-235	143.79	212.	13.	0.007	163.94	1.227E+00	P
Ba-140	162.66	52.	11.	0.006	100.97	1.949E+00	
U-235	163.38	63.	10.	0.006	117.34	2.251E+00	P
CE-139	165.85	76.	8.	0.004	161.19	1.118E-01	
Cf-251	176.60	37.	11.	0.006	109.87	7.570E-01	
U-235	185.72	55.	27.	0.015	54.87	6.251E-01	
TH-229	193.51	37.	11.	0.006	108.47	3.201E+00	P
U-235	205.33	66.	-4.	-0.002	266.19	-1.210E+00	P
TH-229	210.85	48.	6.	0.004	207.78	2.944E+00	
Cf-251	227.00	37.	8.	0.005	140.29	1.956E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	238.63	73.	26.	0.015	49.75	9.433E-01	P
EU-152	244.69	114.	11.	0.006	144.93	2.212E+00	P
TH-227	256.24	44.	7.	0.004	181.27	1.638E+00	
Cd-113m	263.70	44.	10.	0.006	94.56	2.936E+03	
BI-210M	265.83	52.	1.	0.001	873.74	3.960E-02	
TL-208	277.28	45.	1.	0.001	693.04	3.816E-01	P
Hg-203	279.20	36.	5.	0.003	169.65	1.117E-01	
I-131	284.30	29.	10.	0.005	111.66	2.769E+00	P
TL-210	296.00	325.	-15.	-0.008	173.92	-3.473E-01	
PB-212	300.03	340.	-15.	-0.008	71.04	-8.549E+00	P
PA-231	300.07	355.	-15.	-0.008	180.86	-1.133E+01	
PA-233	300.18	369.	-15.	-0.008	184.54	-4.495E+00	
PA-231	302.65	384.	-15.	-0.008	187.72	-9.768E+00	
BA-133	302.85	399.	-15.	-0.008	191.22	-1.536E+00	
Ba-140	304.85	414.	-13.	-0.007	224.45	-5.718E+00	
PA-233	312.01	310.	-15.	-0.008	167.55	-8.090E-01	
Ir-192	316.49	325.	-15.	-0.008	170.78	-3.401E-01	
CR-51	320.08	120.	5.	0.003	304.60	1.024E+00	
La-140	328.76	37.	9.	0.005	102.81	8.794E-01	
Cf-249	333.44	57.	-2.	-0.001	650.00	-2.180E-01	
AC-228	338.32	45.	8.	0.005	119.98	1.426E+00	P
Cs-136	340.57	53.	9.	0.005	120.39	3.965E-01	
EU-152	344.29	62.	8.	0.004	142.99	6.387E-01	
HF-181	345.83	62.	8.	0.004	149.53	1.079E+00	P
BA-133	356.00	106.	-7.	-0.004	216.32	-2.388E-01	
I-131	364.48	32.	-7.	-0.004	169.91	-1.913E-01	P
BA-133	383.84	84.	-12.	-0.007	108.27	-3.210E+00	
Cf-249	387.95	96.	-12.	-0.007	115.10	-4.403E-01	
SN-113	391.69	89.	11.	0.006	125.78	4.023E-01	P
AG-108M	433.94	29.	-9.	-0.005	102.99	-2.466E-01	P
pm-146	453.88	32.	-8.	-0.004	142.89	-3.292E-01	
SB-125	463.37	8.	15.	0.008	37.11	3.855E+00	P
Ir-192	468.06	37.	6.	0.003	143.97	3.294E-01	
BE-7	477.60	21.	9.	0.005	78.07	2.417E+00	
HF-181	482.00	30.	6.	0.004	128.33	2.214E-01	
La-140	487.02	46.	8.	0.004	129.04	4.859E-01	
RU-103	497.05	22.	-2.	-0.001	575.33	-5.308E-02	
RH-106	511.86	27.	31.	0.017	45.66	4.653E+00	
Nd-147	531.00	17.	-1.	-0.001	643.23	-3.146E-01	
Ba-140	537.26	9.	6.	0.004	103.60	8.004E-01	P
CS-134	563.24	13.	1.	0.001	742.74	3.868E-01	
CS-134	569.32	17.	-2.	-0.001	260.69	-4.947E-01	
PA-234	569.47	11.	7.	0.004	80.51	2.678E+00	
BI-207	569.70	18.	-2.	-0.001	260.75	-8.015E-02	
TL-208	583.02	34.	7.	0.004	165.26	2.834E-01	P
SB-125	600.50	0.	6.	0.003	40.97	1.140E+00	
CS-134	604.71	24.	12.	0.007	64.65	4.208E-01	
SB-125	635.89	26.	-10.	-0.005	79.75	-3.125E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	636.97	20.	7.	0.004	97.71	3.537E+00	
AG-110M	657.76	29.	-4.	-0.002	213.01	-1.435E-01	
PM-144	696.54	28.	-2.	-0.001	491.12	-9.561E-02	P
NB-94	702.63	24.	-8.	-0.004	155.21	-3.094E-01	P
ZR-95	724.20	32.	-12.	-0.007	101.15	-1.083E+00	P
BI-212	727.17	62.	-14.	-0.008	84.14	-7.470E+00	
pm-146	735.72	24.	-10.	-0.005	123.96	-1.764E+00	P
pm-146	747.16	5.	4.	0.002	116.15	5.285E-01	
ZR-95	756.73	19.	-6.	-0.003	167.10	-4.364E-01	
AG-110M	763.94	28.	-12.	-0.007	68.88	-2.284E+00	
NB-95	765.79	30.	9.	0.005	89.29	3.963E-01	
PA-234M	766.41	9.	5.	0.003	89.25	7.773E+01	
EU-152	778.92	28.	-8.	-0.004	144.70	-2.660E+00	
BI-212	785.42	19.	1.	0.001	692.82	4.516E+00	
CS-134	795.87	42.	-12.	-0.007	80.50	-6.283E-01	
CS-134	801.95	57.	-2.	-0.001	643.43	-8.471E-01	
CO-58	810.78	19.	8.	0.004	87.27	3.503E-01	
La-140	815.77	27.	2.	0.001	404.11	3.572E-01	
Cs-136	818.50	59.	-12.	-0.007	91.94	-5.580E-01	
TL-208	860.56	15.	4.	0.002	239.70	1.386E+00	P
NB-94	871.10	10.	4.	0.002	122.47	1.904E-01	
EU-154	873.23	10.	4.	0.002	141.42	1.360E+00	
PA-234	880.53	10.	6.	0.003	89.61	4.589E+00	
PA-234	883.24	16.	6.	0.003	107.19	2.880E+00	
AG-110M	884.68	22.	2.	0.001	308.86	1.454E-01	
Sc-46	889.28	35.	-8.	-0.005	108.99	-3.947E-01	
y-88	898.04	10.	5.	0.003	162.33	2.359E-01	P
AG-110M	937.49	25.	-12.	-0.007	96.04	-1.774E+00	
PA-234	946.02	5.	4.	0.002	132.68	1.529E+00	
EU-152	964.11	9.	6.	0.003	79.91	2.176E+00	
AC-228	968.97	24.	8.	0.004	96.54	2.300E+00	P
EU-154	996.33	0.	18.	0.010	23.57	9.113E+00	
PA-234M	1001.00	46.	-12.	-0.006	65.16	-7.478E+01	P
Co-56	1037.84	5.	14.	0.008	44.89	5.442E+00	P
Cs-136	1048.07	11.	2.	0.001	208.49	1.638E-01	
RH-106	1050.36	30.	-12.	-0.007	68.08	-4.490E+01	
BI-207	1063.66	16.	2.	0.001	474.24	1.484E-01	P
Ga-68	1077.40	16.	-6.	-0.003	156.94	-1.227E+01	
FE-59	1099.25	21.	-3.	-0.002	319.69	-3.460E-01	
EU-152	1112.07	77.	-17.	-0.009	77.29	-7.348E+00	
ZN-65	1115.55	94.	-17.	-0.009	84.47	-1.990E+00	
Ta-182	1121.30	72.	11.	0.006	112.39	1.902E+00	
CO-60	1173.24	21.	-8.	-0.005	109.72	-5.237E-01	P
Ta-182	1221.41	32.	-10.	-0.006	91.82	-2.405E+00	P
Co-56	1238.28	0.	8.	0.005	35.66	8.048E-01	P
FE-59	1291.60	6.	-2.	-0.001	343.80	-2.620E-01	
TL-210	1313.00	6.	2.	0.001	248.05	7.660E-01	
AG-110M	1384.30	6.	-1.	0.000	846.32	-1.986E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1408.00	17.	-9.	-0.005	112.49	-3.149E+00	
Co-56	1771.35	13.	-1.	0.000	617.74	-4.888E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.4172E+00	2.4173E+00	7.807E+01%	6.35E+00
NA-22	#	7.3847E-01	7.3847E-01	3.015E+01%	4.95E-01
K-40		1.5346E+02	1.5346E+02	6.932E+00%	8.22E+00
Sc-46	#A	-3.9467E-01	-3.9468E-01	1.090E+02%	1.47E+00
CR-51	#A	1.0240E+00	1.0240E+00	3.046E+02%	1.07E+01
MN-54	#A	1.5264E-02	1.5264E-02	2.755E+03%	1.05E+00
FE-59	#A	-3.4602E-01	-3.4602E-01	3.197E+02%	2.52E+00
Co-56	#A	7.3536E-01	7.3536E-01	3.566E+01%	7.92E-01
CO-57	#A	-1.9204E-01	-1.9204E-01	1.078E+02%	6.96E-01
CO-58	#A	3.5033E-01	3.5033E-01	8.727E+01%	1.04E+00
CO-60	#A	-1.2885E-02	-1.2885E-02	1.618E+03%	5.15E-01
ZN-65	#A	-1.9898E+00	-1.9898E+00	8.447E+01%	5.62E+00
NB-94	#A	-5.6941E-02	-5.6941E-02	9.886E+01%	1.02E+00
ZR-95	#A	-4.3638E-01	-4.3638E-01	1.671E+02%	1.76E+00
NB-95	#A	3.9628E-01	3.9628E-01	8.929E+01%	1.20E+00
RU-103	#A	-5.3079E-02	-5.3079E-02	5.753E+02%	7.77E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+01
AG-108M	#A	-2.4662E-01	-2.4662E-01	1.030E+02%	7.86E-01
AG-110M	#A	1.4539E-01	1.4539E-01	3.089E+02%	1.62E+00
SN-113	#A	4.0226E-01	4.0227E-01	1.258E+02%	1.72E+00
SB-124	#	6.5478E-01	6.5478E-01	3.051E+01%	4.91E-01
SB-125	#A	1.0685E+00	1.0685E+00	3.711E+01%	2.05E+00
I-131	#A	2.8138E-01	2.8139E-01	7.519E+01%	7.88E-01
Gd-153	#A	3.8708E-01	3.8708E-01	1.460E+02%	1.91E+00
Ga-68	#A	-1.2185E+01	-1.2274E+01	1.569E+02%	4.37E+01
Tc-99m	#A	9.5882E-02	9.6014E-02	1.716E+02%	5.64E-01
BA-133	#A	-2.3876E-01	-2.3876E-01	2.163E+02%	1.77E+00
CS-134	#A	4.1808E-01	4.1808E-01	6.465E+01%	8.97E-01
CS-137	#A	1.4563E-02	1.4563E-02	2.369E+03%	1.25E+00
CE-139	#A	1.1184E-01	1.1184E-01	1.612E+02%	6.18E-01
Ba-140	#A	1.0339E+00	1.0339E+00	7.233E+01%	2.09E+00
La-140	#A	2.6167E-01	2.6168E-01	1.028E+02%	6.37E-01
CE-141	#A	4.0715E-02	4.0715E-02	1.226E+03%	1.70E+00
CE-144	#A	1.3925E+00	1.3925E+00	1.205E+02%	5.65E+00
PM-144	#A	-9.5614E-02	-9.5614E-02	4.911E+02%	1.08E+00
EU-152	#A	1.3449E+00	1.3449E+00	7.290E+01%	3.13E+00
EU-154	#A	4.9530E+00	4.9530E+00	2.357E+01%	6.92E+00
EU-155	#A	4.7529E-01	4.7529E-01	1.213E+02%	1.96E+00

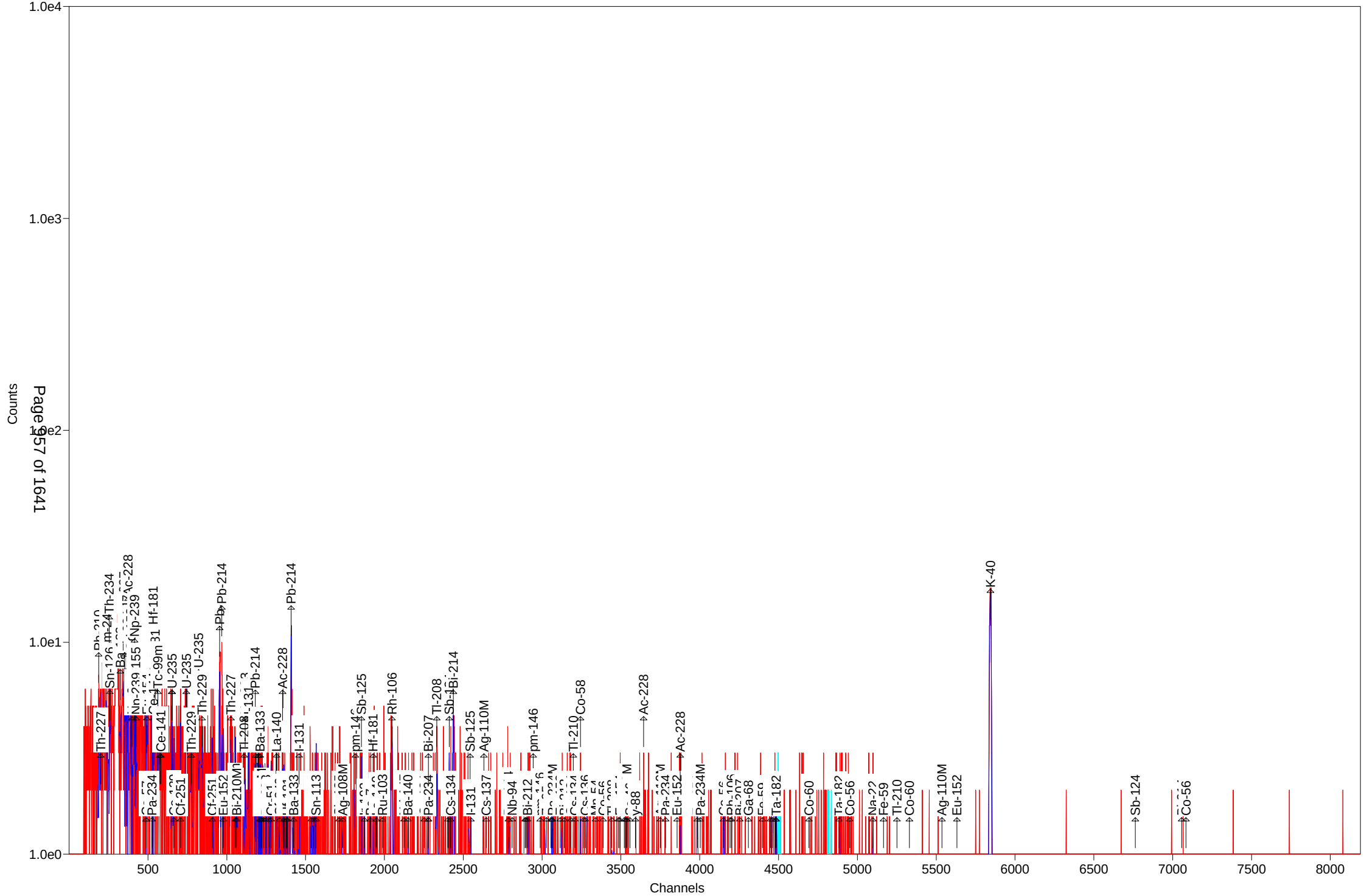
HF-181 #A	4.7376E-01	4.7376E-01	7.943E+01%		9.85E-01
Ta-182 #A	1.9021E+00	1.9021E+00	1.124E+02%		7.25E+00
Hg-203 #A	1.1173E-01	1.1173E-01	1.697E+02%		6.62E-01
TL-208 #A	4.2199E-01	4.2199E-01	1.653E+02%		1.17E+00
pm-146 #A	5.2849E-01	5.2849E-01	1.162E+02%		1.56E+00
y-88 #A	2.3587E-01	2.3587E-01	1.623E+02%		9.28E-01
Cd-113m#A	2.9355E+03	2.9355E+03	9.456E+01%		9.40E+03
Cd-109 #A	-5.1277E+00	-5.1278E+00	1.325E+02%		2.28E+01
Cf-251 #A	7.5702E-01	7.5702E-01	1.099E+02%		2.18E+00
Cf-249 #A	-4.4027E-01	-4.4027E-01	1.151E+02%		1.71E+00
Sn-126 #A	1.7715E+00	1.7715E+00	1.072E+02%		6.42E+00
PB-210 #A	-3.4529E+00	-3.4529E+00	2.572E+02%		3.09E+01
PB-212 #A	9.4333E-01	9.4333E-01	4.975E+01%		1.51E+00
PB-214 #	3.1444E+00	3.1444E+00	2.177E+01%		1.92E+00
BI-207 #A	1.8697E-02	1.8697E-02	2.607E+02%		7.58E-01
BI-212 #A	-7.4701E+00	-7.4701E+00	8.414E+01%		2.11E+01
U-235 #A	1.5517E+00	1.5517E+00	1.008E+02%		6.79E+00
BI-214 #	2.6995E+00	2.6995E+00	2.885E+01%		2.30E+00
BI-210M#A	3.9601E-02	3.9601E-02	8.737E+02%		1.23E+00
AC-228 #A	1.0679E+00	1.0679E+00	9.654E+01%		4.52E+00
TH-227 #A	1.8943E+00	1.8943E+00	1.280E+02%		1.31E+01
TH-229 #A	3.0974E+00	3.0974E+00	1.085E+02%		9.10E+00
TH-234 #A	-2.4537E+00	-2.4537E+00	2.180E+02%		1.88E+01
PA-231 #A	-9.7678E+00	-9.7678E+00	1.877E+02%		6.16E+01
PA-233 #A	-8.0902E-01	-8.0902E-01	1.675E+02%		4.56E+00
PA-234 #A	1.0676E+00	1.0676E+00	5.621E+01%		4.01E+00
PA-234M#A	-7.4782E+01	-7.4782E+01	6.516E+01%		2.20E+02
AM-241 #A	-6.6571E-01	-6.6571E-01	1.127E+02%		2.03E+00
Np-237 #A	4.8200E-01	4.8200E-01	3.749E+02%		6.14E+00
Ir-192 #A	-9.0477E-02	-9.0477E-02	1.117E+02%		1.95E+00
Cs-136 #A	-5.5798E-01	-5.5799E-01	9.194E+01%		1.73E+00
Np-239 #A	7.0351E-02	7.0361E-02	8.234E+02%		2.02E+00
Nd-147 #A	-3.1457E-01	-3.1458E-01	6.432E+02%		5.22E+00
TL-210 #A	-1.1109E-02	-1.1109E-02	4.198E+03%		1.66E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.535E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.5345967E+02 Bq/Sample

376740_Gamma_160-29521-A-9-C. 7_Gamma_20182925.spc.



Prep Batch: 376765

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Lab ID: MB 160-376765/1-A Analyzed: 08/09/18 16:28 Ts: 30 Sigma: 2
Client ID: Detector: GV14 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.1020	0.305	0.305	U	pCi/g		0.678	381203
Radium-226	-0.06220	0.104	0.104	U	pCi/g	1.00	0.349	381203
Radium-228	0.09479	0.180	0.181	U	pCi/g		0.224	381203
Thallium-208	0.01635	0.0404	0.0404	U	pCi/g		0.0645	381203
Thorium-232	0.09479	0.180	0.181	U	pCi/g		0.224	381203
Thorium-234	0.4005	0.513	0.515	U	pCi/g		1.30	381203
Uranium-235	-0.1513	0.308	0.308	U	pCi/g		0.559	381203
Uranium-238	0.4005	0.513	0.515	U	pCi/g		1.30	381203
Actinium-228	0.09479	0.180	0.181	U	pCi/g		0.224	381203
Bismuth-212	-0.3579	0.751	0.752	U	pCi/g		1.44	381203
Bismuth-214	-0.06220	0.104	0.104	U	pCi/g		0.349	381203
Lead-210	0.4951	1.01	1.01	U	pCi/g		1.58	381203
Lead-212	-0.07233	0.0559	0.0567	U	pCi/g		0.179	381203
Lead-214	-0.006153	0.0895	0.0895	U	pCi/g		0.164	381203
Potassium-40	-0.3683	0.847	0.847	U	pCi/g		1.19	381203
Protactinium-231	-0.6810	1.94	1.94	U	pCi/g		3.31	381203

Lab ID: LCS 160-376765/2-A Analyzed: 08/09/18 16:29 Ts: 30 Sigma: 2
Client ID: Detector: GV15 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	95.84	1.77	10.1		pCi/g		1.30	381205
Cesium-137	26.93	0.748	2.90		pCi/g		0.265	381205
Cobalt-60	12.38	0.420	1.31		pCi/g		0.154	381205

Lab ID: 160-29569-A-1-C DU Analyzed: 08/09/18 17:13 Ts: 30 Sigma: 2
Client ID: Detector: GV5 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.06409	0.647	0.647	U	pCi/g		0.948	381208
Radium-226	0.5513	0.143	0.154		pCi/g	1.00	0.109	381208
Radium-228	0.5562	0.202	0.210		pCi/g		0.324	381208
Thallium-208	0.1922	0.0541	0.0577		pCi/g		0.0275	381208
Thorium-232	0.5562	0.202	0.210		pCi/g		0.324	381208
Thorium-234	1.394	1.20	1.21	U	pCi/g		1.51	381208
Uranium-235	-0.01323	0.415	0.415	U	pCi/g		0.540	381208

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Lab ID: 160-29569-A-1-C DU | Analyzed: 08/09/18 17:13 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV5 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	1.394	1.20	1.21	U	pCi/g		1.51	381208
Actinium-228	0.5562	0.202	0.210		pCi/g		0.324	381208
Bismuth-212	1.205	0.492	0.508		pCi/g		0.370	381208
Bismuth-214	0.5513	0.143	0.154		pCi/g		0.109	381208
Lead-210	-0.4112	1.40	1.40	U	pCi/g		2.14	381208
Lead-212	0.5040	0.0997	0.119		pCi/g		0.0984	381208
Lead-214	0.4092	0.127	0.134		pCi/g		0.129	381208
Potassium-40	8.334	1.50	1.72		pCi/g		0.729	381208
Protactinium-231	0.0000	0.474	0.474	U	pCi/g		4.56	381208

Lab ID: 160-29521-10 | Analyzed: 08/09/18 18:07 | Ts: 30 | Sigma: 2
Client ID: CRC-B15-0204 | Detector: GV12 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.0773	0.126	0.126	U	pCi/g		1.90	381202
Radium-226	1.06	0.219	0.244		pCi/g	1.00	0.187	381202
Radium-228	0.699	0.208	0.220		pCi/g		0.114	381202
Thallium-208	0.227	0.0767	0.0801		pCi/g		0.0613	381202
Thorium-232	0.699	0.208	0.220		pCi/g		0.114	381202
Thorium-234	-0.0976	2.13	2.13	U	pCi/g		3.62	381202
Uranium-235	0.178	0.802	0.802	U	pCi/g		1.34	381202
Uranium-238	-0.0976	2.13	2.13	U	pCi/g		3.62	381202
Actinium-228	0.699	0.208	0.220		pCi/g		0.114	381202
Bismuth-212	0.282	1.01	1.01	U	pCi/g		1.75	381202
Bismuth-214	1.06	0.219	0.244		pCi/g		0.187	381202
Lead-210	0.831	1.77	1.78	U	pCi/g		2.68	381202
Lead-212	0.501	0.118	0.129		pCi/g		0.139	381202
Lead-214	1.27	0.211	0.247		pCi/g		0.161	381202
Potassium-40	12.9	1.76	2.19		pCi/g		0.444	381202
Protactinium-231	0.855	2.94	2.94	U	pCi/g		6.59	381202

Lab ID: 160-29521-11 | Analyzed: 08/09/18 18:09 | Ts: 30 | Sigma: 2
Client ID: CRC-B15-0608 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.246	0.580	0.581	U	pCi/g		0.836	381203

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Lab ID: 160-29521-11 Analyzed: 08/09/18 18:09 Ts: 30 Sigma: 2
Client ID: CRC-B15-0608 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.244	0.104	0.107		pCi/g	1.00	0.115	381203
Radium-228	0.328	0.137	0.141		pCi/g		0.105	381203
Thallium-208	0.0463	0.0902	0.0904	U	pCi/g		0.0984	381203
Thorium-232	0.328	0.137	0.141		pCi/g		0.105	381203
Thorium-234	0.0116	0.0883	0.0883	U	pCi/g		1.85	381203
Uranium-235	0.126	0.322	0.322	U	pCi/g		0.523	381203
Uranium-238	0.0116	0.0883	0.0883	U	pCi/g		1.85	381203
Actinium-228	0.328	0.137	0.141		pCi/g		0.105	381203
Bismuth-212	0.368	0.734	0.735	U	pCi/g		1.25	381203
Bismuth-214	0.244	0.104	0.107		pCi/g		0.115	381203
Lead-210	0.304	1.30	1.30	U	pCi/g		1.95	381203
Lead-212	0.127	0.0708	0.0727		pCi/g		0.103	381203
Lead-214	0.258	0.102	0.106		pCi/g		0.109	381203
Potassium-40	11.1	1.62	1.98		pCi/g		0.659	381203
Protactinium-231	0.316	1.12	1.12	U	pCi/g		3.68	381203

Lab ID: 160-29521-12 Analyzed: 08/09/18 18:11 Ts: 30 Sigma: 2
Client ID: CRC-B15-1214 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.251	0.762	0.763	U	pCi/g		1.30	381205
Radium-226	0.396	0.142	0.148		pCi/g	1.00	0.123	381205
Radium-228	0.112	0.203	0.203	U	pCi/g		0.219	381205
Thallium-208	0.0652	0.0911	0.0913	U	pCi/g		0.0869	381205
Thorium-232	0.112	0.203	0.203	U	pCi/g		0.219	381205
Thorium-234	-0.122	1.44	1.44	U	pCi/g		2.47	381205
Uranium-235	0.141	0.280	0.280	U	pCi/g		0.826	381205
Uranium-238	-0.122	1.44	1.44	U	pCi/g		2.47	381205
Actinium-228	0.112	0.203	0.203	U	pCi/g		0.219	381205
Bismuth-212	0.361	0.925	0.926	U	pCi/g		1.60	381205
Bismuth-214	0.396	0.142	0.148		pCi/g		0.123	381205
Lead-210	-0.886	1.52	1.53	U	pCi/g		3.15	381205
Lead-212	0.181	0.0761	0.0796		pCi/g		0.0991	381205
Lead-214	0.378	0.0978	0.105		pCi/g		0.0868	381205
Potassium-40	12.6	1.89	2.29		pCi/g		0.693	381205
Protactinium-231	0.600	1.85	1.85	U	pCi/g		4.24	381205

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Lab ID: 160-29521-13 Analyzed: 08/09/18 18:08 Ts: 30 Sigma: 2
Client ID: CRC-B16-0608 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0850	0.260	0.260	U	pCi/g		0.974	381206
Radium-226	0.429	0.141	0.148		pCi/g	1.00	0.124	381206
Radium-228	0.345	0.184	0.188		pCi/g		0.192	381206
Thallium-208	0.0658	0.0411	0.0416		pCi/g		0.0503	381206
Thorium-232	0.345	0.184	0.188		pCi/g		0.192	381206
Thorium-234	0.668	0.598	0.602	U	pCi/g		1.61	381206
Uranium-235	0.0256	0.0991	0.0991	U	pCi/g		0.619	381206
Uranium-238	0.668	0.598	0.602	U	pCi/g		1.61	381206
Actinium-228	0.345	0.184	0.188		pCi/g		0.192	381206
Bismuth-212	-0.438	0.794	0.795	U	pCi/g		1.34	381206
Bismuth-214	0.429	0.141	0.148		pCi/g		0.124	381206
Lead-210	0.923	1.04	1.05	U	pCi/g		1.60	381206
Lead-212	0.195	0.0709	0.0753		pCi/g		0.0905	381206
Lead-214	0.373	0.101	0.108		pCi/g		0.0888	381206
Potassium-40	12.8	1.63	2.09		pCi/g		0.774	381206
Protactinium-231	0.522	1.58	1.58	U	pCi/g		3.62	381206

Lab ID: 160-29521-14 Analyzed: 08/09/18 18:17 Ts: 30 Sigma: 2
Client ID: CRC-B16-0204 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.272	0.525	0.526	U	pCi/g		2.02	381207
Radium-226	1.09	0.264	0.286		pCi/g	1.00	0.215	381207
Radium-228	0.293	0.369	0.370	U	pCi/g		0.512	381207
Thallium-208	0.233	0.0853	0.0885		pCi/g		0.0770	381207
Thorium-232	0.293	0.369	0.370	U	pCi/g		0.512	381207
Thorium-234	1.06	0.855	0.863	U	pCi/g		2.34	381207
Uranium-235	-0.405	0.642	0.643	U	pCi/g		1.71	381207
Uranium-238	1.06	0.855	0.863	U	pCi/g		2.34	381207
Actinium-228	0.293	0.369	0.370	U	pCi/g		0.512	381207
Bismuth-212	-0.0533	1.24	1.24	U	pCi/g		2.21	381207
Bismuth-214	1.09	0.264	0.286		pCi/g		0.215	381207
Lead-210	2.13	2.19	2.21	U	pCi/g		3.00	381207
Lead-212	0.562	0.126	0.139		pCi/g		0.131	381207
Lead-214	1.26	0.252	0.283		pCi/g		0.188	381207
Potassium-40	9.41	1.97	2.19		pCi/g		1.48	381207

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Lab ID: 160-29521-14 Analyzed: 08/09/18 18:17 Ts: 30 Sigma: 2
Client ID: CRC-B16-0204 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	0.976	3.08	3.09	U	pCi/g		6.98	381207

Lab ID: 160-29521-15 Analyzed: 08/09/18 18:43 Ts: 30 Sigma: 2
Client ID: CRC-B16-1416 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.332	0.691	0.692	U	pCi/g		1.16	381204
Radium-226	0.191	0.0840	0.0863		pCi/g	1.00	0.0964	381204
Radium-228	0.112	0.192	0.192	U	pCi/g		0.254	381204
Thallium-208	0.116	0.0482	0.0497		pCi/g		0.0463	381204
Thorium-232	0.112	0.192	0.192	U	pCi/g		0.254	381204
Thorium-234	0.479	1.10	1.10	U	pCi/g		1.84	381204
Uranium-235	0.181	0.281	0.281	U	pCi/g		0.714	381204
Uranium-238	0.479	1.10	1.10	U	pCi/g		1.84	381204
Actinium-228	0.112	0.192	0.192	U	pCi/g		0.254	381204
Bismuth-212	-0.388	0.681	0.683	U	pCi/g		1.15	381204
Bismuth-214	0.191	0.0840	0.0863		pCi/g		0.0964	381204
Lead-210	0.202	1.16	1.16	U	pCi/g		1.99	381204
Lead-212	0.154	0.0634	0.0665		pCi/g		0.0870	381204
Lead-214	0.386	0.107	0.114		pCi/g		0.0933	381204
Potassium-40	12.9	1.52	2.02		pCi/g		0.654	381204
Protactinium-231	0.691	2.12	2.12	U	pCi/g		3.57	381204

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-376765/1-A	Actinium-227			0.1020	U	pCi/g							.6684491 2
MB 160-376765/1-A	Radium-226			-0.06220	U	pCi/g							-1.190649 86
MB 160-376765/1-A	Radium-228			0.09479	U	pCi/g							1.050304 2
MB 160-376765/1-A	Thallium-208			0.01635	U	pCi/g							.8093831 4
MB 160-376765/1-A	Thorium-232			0.09479	U	pCi/g							1.050304 2
MB 160-376765/1-A	Thorium-234			0.4005	U	pCi/g							1.556445 1
MB 160-376765/1-A	Uranium-235			-0.1513	U	pCi/g							-.9816711 8
MB 160-376765/1-A	Uranium-238			0.4005	U	pCi/g							1.556445 1
MB 160-376765/1-A	Actinium-228			0.09479	U	pCi/g							1.050304 2
MB 160-376765/1-A	Bismuth-212			-0.3579	U	pCi/g							-.9516917 1
MB 160-376765/1-A	Bismuth-214			-0.06220	U	pCi/g							-1.190649 86
MB 160-376765/1-A	Lead-210			0.4951	U	pCi/g							.9770294 6
MB 160-376765/1-A	Lead-212			-0.07233	U	pCi/g							-2.553554 52
MB 160-376765/1-A	Lead-214			-0.006153	U	pCi/g							-.137449
MB 160-376765/1-A	Potassium-40			-0.3683	U	pCi/g							-.8691083 6
MB 160-376765/1-A	Protactinium-231			-0.6810	U	pCi/g							-.7006709 7

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-376765/2-A	Americium-241		96.8	95.84		pCi/g	99	87 - 116					-.1331493 276
LCS 160-376765/2-A	Cesium-137		28.2	26.93		pCi/g	95	87 - 120					-.6074923 157
LCS 160-376765/2-A	Cobalt-60		12.9	12.38		pCi/g	96	87 - 115					-.5309838 036

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29569-A-1-C DU	Actinium-227	-0.353		0.06409	U	pCi/g			289	0.29	0.82	1	
160-29569-A-1-C DU	Radium-226	0.588		0.5513		pCi/g			6	0.12	0.34	1	
160-29569-A-1-C DU	Radium-228	0.476		0.5562		pCi/g			15	0.22	0.62	1	
160-29569-A-1-C DU	Thallium-208	0.273		0.1922		pCi/g			35	0.65	1.84	1	
160-29569-A-1-C DU	Thorium-232	0.476		0.5562		pCi/g			15	0.22	0.62	1	
160-29569-A-1-C DU	Thorium-234	0.240		1.394	U	pCi/g			141	0.69	1.79	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376765

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29569-A-1-C DU	Uranium-235	0.0974		-0.01323	U	pCi/g			263	0.14	0.40	1	
160-29569-A-1-C DU	Uranium-238	0.240		1.394	U	pCi/g			141	0.69	1.79	1	
160-29569-A-1-C DU	Actinium-228	0.476		0.5562		pCi/g			15	0.22	0.62	1	
160-29569-A-1-C DU	Bismuth-212	0.194		1.205		pCi/g			145	0.82	2.27	1	
160-29569-A-1-C DU	Bismuth-214	0.588		0.5513		pCi/g			6	0.12	0.34	1	
160-29569-A-1-C DU	Lead-210	0.372		-0.4112	U	pCi/g			3943	0.28	0.78	1	
160-29569-A-1-C DU	Lead-212	0.436		0.5040		pCi/g			15	0.30	0.85	1	
160-29569-A-1-C DU	Lead-214	0.621		0.4092		pCi/g			41	0.75	2.10	1	
160-29569-A-1-C DU	Potassium-40	9.33		8.334		pCi/g			11	0.30	0.85	1	
160-29569-A-1-C DU	Protactinium-231	-0.642		0.0000	U	pCi/g			200	0.21	0.49	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29521-1

SDG No.:

Batch Number: 376765 Batch Start Date: 07/19/18 17:38 Batch Analyst: Small, Sean J

Batch Method: Fill_Geo-21 Batch End Date: 07/19/18 18:19

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-376765/1		Fill_Geo-21, 901.1				291.18 g	7/19/18 18:15	8/9/18	tuna can
LCS 160-376765/2		Fill_Geo-21, 901.1				341.9 g	7/19/18 18:15	8/9/18	tuna can
160-29569-A-1-A DU		Fill_Geo-21, 901.1	T	46.7 g	478.5 g	431.8 g	7/19/18 18:15	8/9/18	tuna can
160-29521-A-10-B	CRC-B15-0204	Fill_Geo-21, 901.1	T	46.6 g	375.1 g	328.5 g	7/19/18 18:15	8/9/18	tuna can
160-29521-A-11-B	CRC-B15-0608	Fill_Geo-21, 901.1	T	46.9 g	404.8 g	357.9 g	7/19/18 18:15	8/9/18	tuna can
160-29521-B-12-A	CRC-B15-1214	Fill_Geo-21, 901.1	T	46.9 g	399.5 g	352.6 g	7/19/18 18:15	8/9/18	tuna can
160-29521-B-13-A	CRC-B16-0608	Fill_Geo-21, 901.1	T	46.7 g	411.8 g	365.1 g	7/19/18 18:15	8/9/18	tuna can
160-29521-A-14-B	CRC-B16-0204	Fill_Geo-21, 901.1	T	46.9 g	351.8 g	304.9 g	7/19/18 18:15	8/9/18	tuna can
160-29521-B-15-B	CRC-B16-1416	Fill_Geo-21, 901.1	T	46.7 g	385.7 g	339 g	7/19/18 18:15	8/9/18	tuna can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00007					
MB 160-376765/1		Fill_Geo-21, 901.1							
LCS 160-376765/2		Fill_Geo-21, 901.1		# g					
160-29569-A-1-A DU		Fill_Geo-21, 901.1	T						
160-29521-A-10-B	CRC-B15-0204	Fill_Geo-21, 901.1	T						
160-29521-A-11-B	CRC-B15-0608	Fill_Geo-21, 901.1	T						
160-29521-B-12-A	CRC-B15-1214	Fill_Geo-21, 901.1	T						
160-29521-B-13-A	CRC-B16-0608	Fill_Geo-21, 901.1	T						
160-29521-A-14-B	CRC-B16-0204	Fill_Geo-21, 901.1	T						
160-29521-B-15-B	CRC-B16-1416	Fill_Geo-21, 901.1	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29521-1

SDG No.:

Batch Number: 376765 Batch Start Date: 07/19/18 17:38 Batch Analyst: Small, Sean J

Batch Method: Fill_Geo-21 Batch End Date: 07/19/18 18:19

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 14_Gamma_20183006

Sample Description: 376765_Gamma_MB 160-376765~1-A
Detector: Detector #14
Batch ID: 376765
Work Order Number: Gamma
Lot Number: MB 160-376765~1-A

Decay to Time: 8/9/2018 16:28 Live Time: 1800 sec
Acquisition Time: 8/9/2018 16:28:34 Real Time: 1802 sec
Analysis Time: 8/9/2018 16:59 Dead Time: 0.13 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-07-14_1759.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.104E+00	89.3	2.773E+00	2.777E+00	9.386E+00
NA-22	0.000E+00	1.#INF	7.219E-02	7.219E-02	5.320E-01
K-40	-3.968E+00	114.9	4.561E+00	4.565E+00	1.277E+01
Sc-46	-4.972E-01	99.8	4.962E-01	4.969E-01	1.690E+00
CR-51	-1.975E+00	97.7	1.929E+00	1.932E+00	7.460E+00
MN-54	-1.021E-01	403.1	4.116E-01	4.116E-01	1.028E+00
FE-59	-6.784E-01	122.9	8.334E-01	8.341E-01	1.973E+00
Co-56	4.044E-01	37.3	1.507E-01	1.521E-01	3.808E-01
CO-57	9.521E-02	126.4	1.204E-01	1.205E-01	4.170E-01
CO-58	-7.517E-02	301.8	2.269E-01	2.269E-01	8.556E-01
CO-60	2.934E-03	224.7	6.592E-03	6.594E-03	1.024E+00
ZN-65	0.000E+00	1.#INF	1.278E-01	1.278E-01	2.321E+00
NB-94	-1.385E-01	215.2	2.979E-01	2.980E-01	8.865E-01
ZR-95	-1.154E-01	330.2	3.811E-01	3.812E-01	1.074E+00
NB-95	-7.949E-03	2437.2	1.937E-01	1.937E-01	7.644E-01
RU-103	7.406E-02	397.9	2.947E-01	2.947E-01	7.906E-01
RH-106	-7.754E-01	93.7	7.263E-01	7.275E-01	1.887E+01
AG-108M	7.406E-03	2338.9	1.732E-01	1.732E-01	5.247E-01
AG-110M	3.087E-01	44.7	1.380E-01	1.389E-01	1.075E+00
SN-113	1.658E-01	142.7	2.365E-01	2.367E-01	8.453E-01
SB-124	1.675E-01	44.7	7.489E-02	7.539E-02	1.583E+00
SB-125	5.040E-01	103.6	5.220E-01	5.226E-01	1.253E+00
I-131	-1.490E-01	155.4	2.316E-01	2.317E-01	5.997E-01
Gd-153	2.700E-01	137.3	3.708E-01	3.711E-01	1.285E+00
Ga-68	4.449E+00	255.8	1.138E+01	1.138E+01	2.921E+01
Tc-99m	1.188E-01	133.8	1.589E-01	1.591E-01	5.460E-01
BA-133	-1.957E-01	175.8	3.440E-01	3.441E-01	1.207E+00
CS-134	3.744E-01	37.0	1.386E-01	1.399E-01	1.681E+00
CS-137	-3.310E-01	107.5	3.557E-01	3.561E-01	1.228E+00
CE-139	-1.720E-01	122.5	2.106E-01	2.113E-01	7.181E-01
Ba-140	-2.999E-01	90.9	2.726E-01	2.731E-01	3.135E+00
La-140	0.000E+00	1.#INF	9.113E-02	9.113E-02	6.716E-01
CE-141	8.453E-02	432.3	3.655E-01	3.655E-01	1.269E+00

CE-144	0.000E+00	1.#INF	4.382E-01	4.382E-01	5.600E+00
PM-144	0.000E+00	1.#INF	1.889E-01	1.890E-01	8.690E-01
EU-152	9.189E-01	79.6	7.317E-01	7.333E-01	3.303E+00
EU-154	3.323E+00	33.3	1.108E+00	1.121E+00	7.938E+00
EU-155	0.000E+00	1.#INF	3.571E-01	3.571E-01	2.515E+00
HF-181	4.133E-02	942.0	3.893E-01	3.893E-01	1.386E+00
Ta-182	-9.302E-02	969.5	9.019E-01	9.019E-01	3.444E+00
Hg-203	-7.450E-02	287.6	2.142E-01	2.143E-01	7.619E-01
TL-208	1.761E-01	123.4	2.174E-01	2.176E-01	6.951E-01
pm-146	4.267E-01	40.3	1.719E-01	1.733E-01	1.724E+00
y-88	-1.246E-01	147.9	1.842E-01	1.843E-01	7.682E-01
Cd-113m	-2.818E+03	101.5	2.860E+03	2.866E+03	9.778E+03
Cd-109	2.882E+00	153.6	4.427E+00	4.430E+00	1.515E+01
Cf-251	5.430E-01	113.4	6.156E-01	6.175E-01	1.746E+00
Cf-249	0.000E+00	1.#INF	1.779E-01	1.779E-01	1.201E+00
Sn-126	-9.448E-01	227.5	2.149E+00	2.149E+00	7.421E+00
PB-210	5.334E+00	102.2	5.450E+00	5.459E+00	1.704E+01
PB-212	-7.793E-01	38.6	3.010E-01	3.052E-01	1.925E+00
PB-214	-6.629E-02	727.5	4.823E-01	4.823E-01	1.768E+00
BI-207	0.000E+00	1.#INF	1.086E-01	1.086E-01	4.785E-01
BI-212	-3.856E+00	104.9	4.047E+00	4.052E+00	1.555E+01
U-235	-1.630E+00	101.7	1.659E+00	1.661E+00	6.025E+00
BI-214	-6.701E-01	83.8	5.617E-01	5.628E-01	3.764E+00
BI-210M	2.979E-01	132.6	3.951E-01	3.955E-01	9.246E-01
AC-228	1.021E+00	95.1	9.710E-01	9.724E-01	2.414E+00
TH-227	1.099E+00	149.5	1.643E+00	1.644E+00	7.303E+00
TH-229	1.586E+00	148.4	2.354E+00	2.357E+00	8.007E+00
TH-234	4.315E+00	64.0	2.763E+00	2.772E+00	1.397E+01
PA-231	-7.337E+00	142.6	1.046E+01	1.047E+01	3.570E+01
PA-233	6.481E-02	628.5	4.073E-01	4.073E-01	1.177E+00
PA-234	-8.341E-01	133.6	1.114E+00	1.115E+00	3.775E+00
PA-234M	-5.114E+00	474.7	2.428E+01	2.428E+01	1.219E+02
AM-241	5.049E-02	927.4	4.682E-01	4.682E-01	1.425E+00
Np-237	-1.152E+00	169.3	1.951E+00	1.952E+00	6.604E+00
Ir-192	1.668E-01	103.0	1.718E-01	1.720E-01	5.942E-01
Cs-136	0.000E+00	1.#INF	5.023E-02	5.023E-02	4.228E-01
Np-239	4.691E-01	122.2	5.731E-01	5.738E-01	1.963E+00
Nd-147	3.754E-01	146.3	5.490E-01	5.495E-01	5.145E+00
TL-210	0.000E+00	1.#INF	7.044E-02	7.044E-02	1.155E+00
Total	3.012E+01				

Analyst: Joey Sausto

Sample description
376765_Gamma_MB 160-376765~1-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183006.An1

Acquisition information
Start time: 8/9/2018 4:28:34 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 4:28:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-07-14_1759.PBC 7/14/2018 5:59:49 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 4 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2407

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.78	9.	102.18	1.06	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	149.50	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
59.54	1.	927.36	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.38	13.	86.54	0.76	3.281E-02	63.29	3.810	PBC<MDA	TH234
80.99	3.	312.69	0.78	4.020E-02	80.99	34.060	PBC<MDA	BA133
88.04	8.	153.61	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
91.10	9.	146.25	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.40	14.	94.41	0.84	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.35	10.	153.61	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	6.	137.35	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
106.13	8.	122.17	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	6.	113.50	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	9.515E-02	CO57
122.06	6.	126.41	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	9.521E-02	CO57
123.10	3.	243.94	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
140.51	8.	133.76	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	3.	432.35	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
162.66	9.	119.80	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140
176.60	6.	113.37	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
185.72	8.	105.49	0.89	3.553E-02	185.72	54.000	PBC<MDA	U235
193.51	5.	148.41	0.90	3.443E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	2.	410.83	0.92	3.224E-02	210.85	2.990	PBC<MDA	TH229
242.00	7.	131.37	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	7.	126.78	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
256.24	2.	397.49	0.96	2.775E-02	256.24	7.000	PBC<MDA	TH227
265.83	5.	133.38	0.97	2.697E-02	265.83	50.000	PBC<MDA	BI210M
277.28	6.	123.44	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
304.90	6.	229.23	1.01	2.424E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.784E-01	BI210M
312.01	1.	628.49	1.02	2.381E-02	312.01	36.000	PBC<MDA	PA233
316.49	6.	102.99	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
344.29	8.	130.21	1.05	2.205E-02	344.29	26.500	PBC<MDA	EU152
351.93	-1.	727.52	1.06	2.167E-02	351.93	37.600	PBC<MDA	PB214
391.69	4.	142.65	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
427.88	1.	579.12	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
453.88	7.	40.29	1.15	1.774E-02	453.88	65.000	PBC<MDA	pm146
463.37	6.	103.57	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
482.00	1.	942.05	1.18	1.691E-02	482.00	80.500	PBC<MDA	HF181
497.05	2.	397.91	1.19	1.650E-02	497.05	90.900	PBC<MDA	RU103
511.86	50.	19.55	2.46	1.612E-02	511.86	20.000	8.689E+00	RH106
531.00	1.	685.57	1.23	1.566E-02	531.00	13.000	PBC<MDA	Nd147
563.24	8.	37.01	1.25	1.494E-02	563.24	8.350	3.474E+00	CS134
569.32	4.	80.31	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.004E+00	PA234
					569.70	97.740	1.682E-01	BI207
583.02	1.	464.90	1.27	1.453E-02	583.02	84.500	PBC<MDA	TL208
722.79	2.	273.86	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.000E-01	AG108M
					723.36	20.220	4.496E-01	EU154
747.16	5.	105.78	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
763.94	2.	146.97	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
778.92	4.	127.11	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
785.42	1.	483.21	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212
846.77	8.	37.26	1.50	1.076E-02	846.77	99.935	4.006E-01	Co56
873.23	4.	119.91	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
880.53	7.	39.19	1.53	1.042E-02	880.53	6.000	PBC<MDA	PA234
911.07	5.	95.07	1.55	1.014E-02	911.07	29.000	PBC<MDA	AC228
937.49	5.	44.72	1.58	9.905E-03	937.49	34.360	PBC<MDA	AG110M
964.11	6.	79.63	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
996.33	9.	33.33	1.62	9.425E-03	996.33	10.600	5.005E+00	EU154
1037.84	1.	501.66	1.65	9.116E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	4.	112.22	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	2.	255.77	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	1.	552.09	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
1173.24	2.	285.94	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	-1.	921.77	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1690.98	5.	44.72	2.10	6.091E-03	1690.98	47.790	PBC<MDA	SB124

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.55	46.78	30.	9.	0.005	102.18	1.063s
TH-227	199.98	50.14	24.	6.	0.003	149.50	0.751s
AM-241	237.55	59.54	30.	1.	0.001	927.36	0.761s
TH-234	252.91	63.38	38.	13.	0.007	86.54	0.759s
Sn-126	256.52	64.28	76.	-6.	-0.003	227.45	0.766s
BA-133	323.33	80.99	30.	3.	0.002	312.69	0.784s
Np-237	345.33	86.49	178.	-11.	-0.006	169.28	0.789s
EU-155	345.54	86.54	166.	-11.	-0.006	163.92	0.790s
Sn-126	347.13	86.94	155.	-11.	-0.006	158.38	0.790
Sn-126	349.65	87.57	144.	-8.	-0.004	222.54	0.791s
Cd-109	351.53	88.04	76.	8.	0.005	153.61	0.791s
Nd-147	363.77	91.10	85.	9.	0.005	146.25	0.794s
TH-234	368.96	92.40	52.	14.	0.008	94.41	0.837
AC-228	372.76	93.35	104.	10.	0.005	153.61	0.797s
Gd-153	389.36	97.50	35.	6.	0.004	137.35	0.801s
Np-239	397.36	99.50	41.	0.	0.000	1000.00	0.803s
Gd-153	412.15	103.20	68.	-4.	-0.002	295.80	0.807s
Np-239	414.15	103.70	72.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	72.	0.	0.000	1000.00	0.809s
Np-239	423.87	106.13	49.	8.	0.005	122.17	0.810s
EU-152	486.43	121.78	23.	6.	0.004	113.50	0.826s
CO-57	487.58	122.06	30.	6.	0.004	126.41	0.826s
EU-154	491.73	123.10	35.	3.	0.002	243.94	0.828s
PA-234	524.50	131.29	115.	-12.	-0.006	133.55	0.836s
HF-181	531.42	133.02	85.	-9.	-0.005	153.44	0.838s
CE-144	533.47	133.54	94.	0.	0.000	1000.00	0.838
HF-181	544.52	136.30	94.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	94.	0.	0.000	1000.00	0.841s
Tc-99m	561.35	140.51	50.	8.	0.004	133.76	0.845s
U-235	574.45	143.79	100.	-13.	-0.007	101.74	0.849s
CE-141	581.07	145.44	84.	3.	0.002	432.35	0.850s
Ba-140	649.93	162.66	48.	9.	0.005	119.80	0.868s
CE-139	662.70	165.85	64.	-10.	-0.005	122.46	0.871s
Cf-251	705.68	176.60	13.	6.	0.003	113.37	0.882s
U-235	742.15	185.72	27.	8.	0.005	105.49	0.892s
TH-229	773.30	193.51	17.	5.	0.003	148.41	0.899s
U-235	820.58	205.33	28.	-3.	-0.002	250.63	0.912s
TH-229	842.65	210.85	20.	2.	0.001	410.83	0.917s
PB-212	953.75	238.63	78.	-18.	-0.010	38.62	0.945s
PB-214	967.21	242.00	43.	7.	0.004	131.37	0.948s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	977.99	244.69	32.	7.	0.004	126.78	0.951s
TH-227	1024.17	256.24	13.	2.	0.001	397.49	0.962s
Cd-113m	1054.01	263.70	31.	-8.	-0.005	101.50	0.970s
BI-210M	1062.53	265.83	18.	5.	0.003	133.38	0.972s
TL-208	1108.33	277.28	21.	6.	0.003	123.44	0.983s
Hg-203	1115.99	279.20	32.	-3.	-0.002	287.59	0.985s
I-131	1136.39	284.30	18.	-2.	-0.001	298.30	0.990s
PB-214	1179.54	295.09	79.	-13.	-0.007	62.26	1.001s
TL-210	1183.18	296.00	82.	-4.	-0.002	295.78	1.002s
PA-231	1209.78	302.65	83.	-9.	-0.005	142.62	1.008s
BA-133	1210.59	302.85	92.	-9.	-0.005	149.95	1.009s
Ba-140	1218.57	304.85	101.	-9.	-0.005	156.68	1.011s
BI-210M	1218.76	304.90	87.	6.	0.003	229.23	1.011s
PA-233	1247.22	312.01	11.	1.	0.001	628.49	1.018s
Ir-192	1265.13	316.49	17.	6.	0.003	102.99	1.022s
CR-51	1279.51	320.08	37.	-8.	-0.005	97.69	1.026s
La-140	1314.21	328.76	18.	-1.	-0.001	568.74	1.034
Cf-249	1332.92	333.44	18.	-2.	-0.001	349.49	1.039s
AC-228	1352.44	338.32	53.	-7.	-0.004	151.86	1.043
Cs-136	1361.44	340.57	60.	0.	0.000	1000.00	1.045s
EU-152	1376.30	344.29	47.	8.	0.004	130.21	1.049s
PB-214	1406.88	351.93	25.	-1.	-0.001	727.52	1.056s
BA-133	1423.15	356.00	32.	-5.	-0.003	175.77	1.060
I-131	1457.08	364.48	12.	-5.	-0.003	155.40	1.069s
BA-133	1534.50	383.84	27.	-4.	-0.002	190.39	1.087s
Cf-249	1550.94	387.95	31.	0.	0.000	1000.00	1.091s
SN-113	1565.90	391.69	13.	4.	0.002	142.65	1.095s
SB-125	1710.63	427.88	4.	1.	0.000	579.12	1.129s
pm-146	1814.64	453.88	0.	7.	0.004	40.29	1.154s
SB-125	1852.59	463.37	15.	6.	0.003	103.57	1.163s
Ir-192	1871.36	468.06	20.	-1.	0.000	884.37	1.167s
BE-7	1909.50	477.60	35.	-10.	-0.006	89.34	1.176s
HF-181	1927.10	482.00	45.	1.	0.001	942.05	1.180s
La-140	1947.19	487.02	12.	-4.	-0.002	67.27	1.185s
RU-103	1987.33	497.05	16.	2.	0.001	397.91	1.194s
RH-106	2046.57	511.86	8.	50.	0.028	19.55	2.458s
Nd-147	2123.11	531.00	12.	1.	0.001	685.57	1.225s
Ba-140	2148.15	537.26	16.	-6.	-0.003	136.76	1.231s
CS-134	2252.06	563.24	0.	8.	0.004	37.01	1.255s
CS-134	2276.40	569.32	4.	4.	0.002	80.31	1.260s
PA-234	2276.99	569.47	4.	0.	0.000	1000.00	1.261s
BI-207	2277.92	569.70	4.	0.	0.000	1000.00	1.261s
TL-208	2331.20	583.02	7.	1.	0.001	464.90	1.273s
SB-125	2401.12	600.50	55.	-8.	-0.004	61.98	1.289s
SB-124	2410.04	602.73	63.	-7.	-0.004	159.13	1.291s
CS-134	2417.96	604.71	70.	0.	0.000	1000.00	1.292s
BI-214	2436.36	609.31	78.	-8.	-0.004	83.83	1.296s
AG-108M	2456.25	614.28	69.	0.	0.000	1000.00	1.301s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2471.37	618.06	69.	0.	0.000	1000.00	1.304s
RH-106	2486.79	621.92	88.	-9.	-0.005	150.01	1.308
SB-125	2542.69	635.89	13.	-4.	-0.002	136.93	1.320s
I-131	2547.03	636.97	19.	-1.	-0.001	624.50	1.321s
AG-110M	2630.18	657.76	13.	-1.	-0.001	396.86	1.339s
CS-137	2645.77	661.66	22.	-7.	-0.004	107.47	1.343s
PM-144	2785.32	696.54	13.	0.	0.000	1000.00	1.374s
NB-94	2809.67	702.63	13.	-3.	-0.002	215.16	1.379s
SB-124	2890.31	722.79	14.	2.	0.001	273.86	1.396s
AG-108M	2890.91	722.94	16.	0.	0.000	1000.00	1.397s
EU-154	2892.59	723.36	16.	0.	0.000	1000.00	1.397s
BI-212	2907.84	727.17	24.	-6.	-0.004	104.95	1.400s
pm-146	2987.81	747.16	4.	5.	0.003	105.78	1.417s
ZR-95	3026.09	756.73	4.	-1.	-0.001	330.25	1.426s
AG-110M	3054.96	763.94	6.	2.	0.001	146.97	1.432s
EU-152	3114.87	778.92	4.	4.	0.002	127.11	1.444s
BI-212	3140.88	785.42	9.	1.	0.001	483.21	1.450s
CS-134	3182.67	795.87	17.	-3.	-0.001	225.00	1.459s
TL-210	3197.61	799.60	19.	0.	0.000	1000.00	1.462s
CO-58	3242.31	810.77	10.	-2.	-0.001	301.85	1.471s
La-140	3262.30	815.77	11.	0.	0.000	1000.00	1.475s
Cs-136	3273.22	818.50	2.	0.	0.000	1000.00	1.478s
MN-54	3338.63	834.85	14.	-2.	-0.001	403.11	1.492s
Co-56	3386.32	846.77	0.	8.	0.004	37.26	1.501s
TL-208	3441.51	860.56	19.	-6.	-0.003	51.23	1.513s
NB-94	3483.65	871.10	9.	-5.	-0.003	55.36	1.522s
EU-154	3492.19	873.23	11.	4.	0.002	119.91	1.523s
PA-234	3521.39	880.53	0.	7.	0.004	39.19	1.529s
PA-234	3532.24	883.24	7.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	7.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	38.	-9.	-0.005	99.80	1.536s
y-88	3591.45	898.04	5.	-2.	-0.001	147.85	1.543s
AC-228	3643.58	911.07	5.	5.	0.003	95.07	1.554
AG-110M	3749.30	937.49	0.	5.	0.003	44.72	1.576s
PA-234	3783.42	946.02	5.	-2.	-0.001	285.66	1.582s
EU-152	3855.80	964.11	7.	6.	0.003	79.63	1.597s
AC-228	3875.25	968.97	21.	-3.	-0.002	209.86	1.601s
EU-154	3984.71	996.33	0.	9.	0.005	33.33	1.622s
PA-234M	4003.39	1001.00	10.	-1.	0.000	474.66	1.626s
EU-154	4018.51	1004.77	30.	-8.	-0.004	102.93	1.629s
Co-56	4150.81	1037.84	5.	1.	0.001	501.66	1.655s
Cs-136	4191.74	1048.07	11.	-4.	-0.002	127.48	1.663s
RH-106	4200.91	1050.36	10.	4.	0.002	112.22	1.665s
Ga-68	4309.10	1077.40	5.	2.	0.001	255.77	1.685s
FE-59	4396.54	1099.25	10.	-6.	-0.003	122.85	1.702s
EU-152	4447.85	1112.07	10.	1.	0.000	552.09	1.712s
ZN-65	4461.74	1115.55	11.	0.	0.000	1000.00	1.714s
BI-214	4480.72	1120.29	12.	-1.	-0.001	507.98	1.718s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.77	1121.30	12.	0.	0.000	969.54	1.719s
CO-60	4692.60	1173.24	5.	2.	0.001	285.94	1.757s
Ta-182	4755.88	1189.05	0.	0.	0.000	1000.00	1.769s
Ta-182	4885.38	1221.41	5.	-3.	-0.002	166.73	1.792s
Co-56	4952.89	1238.28	5.	-2.	-0.001	216.18	1.805s
NA-22	5097.96	1274.53	0.	0.	0.000	1000.00	1.831s
EU-154	5098.01	1274.54	0.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	1.	-1.	0.000	921.77	1.843s
TL-210	5251.92	1313.00	5.	-3.	-0.002	166.73	1.858s
CO-60	5329.96	1332.50	6.	-2.	-0.001	346.61	1.871s
AG-110M	5537.26	1384.30	5.	-3.	-0.002	166.73	1.907s
EU-152	5632.13	1408.00	11.	-7.	-0.004	117.90	1.923s
K-40	5843.58	1460.83	9.	-5.	-0.003	114.95	1.958s
La-140	6385.44	1596.21	0.	0.	0.000	1000.00	2.044s
SB-124	6764.81	1690.98	0.	5.	0.003	44.72	2.102s
BI-214	7059.07	1764.49	11.	-7.	-0.004	95.14	2.145s
y-88	7345.59	1836.06	0.	0.	0.000	1000.00	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.1038E+00					5.31E+01
			477.60	-3.104E+00	?(	9.386E+00 8.93E+01 1.05E+01	G
K-40	N	-3.9675E+00					4.66E+11
			1460.83	-3.968E+00	?(P	1.277E+01 1.15E+02 1.07E+01	G
Sc-46	F	-4.9725E-01					8.38E+01
			889.28	-4.972E-01	?(	1.690E+00 9.98E+01 1.00E+02	G
			1120.55	-1.082E-02	%	1.187E+00 2.85E+03 1.00E+02	G
CR-51	F	-1.9746E+00					2.77E+01
			320.08	-1.975E+00	&(P	7.460E+00 9.77E+01 9.94E+00	G
MN-54	C	-1.0210E-01					3.12E+02
			834.85	-1.021E-01	?(	1.028E+00 4.03E+02 1.00E+02	G
FE-59	F	-6.7840E-01					4.45E+01
			1099.25	-6.784E-01	?(	1.973E+00 1.23E+02 5.65E+01	G
			1291.60	-9.693E-02	+ P	1.244E+00 9.22E+02 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	4.0442E-01				7.73E+01		
			846.77	4.006E-01	?(P	3.808E-01	3.73E+01	9.99E+01 G
			1238.28	-2.550E-01	- P	1.443E+00	2.16E+02	6.61E+01 G
			1037.84	4.313E-01	?(	5.663E+00	5.02E+02	1.41E+01 G
			1771.35	-2.042E-01	%	1.271E+01	1.65E+03	1.55E+01 A
CO-57	C	9.5214E-02				2.72E+02		
			122.06	9.521E-02	?(	4.170E-01	1.26E+02	8.56E+01 G
			136.47	0.000E+00	-	5.861E+00	1.00E+03	1.07E+01 G
CO-58	C	-7.5173E-02				7.09E+01		
			810.78	-7.517E-02	?(	8.556E-01	3.02E+02	9.95E+01 G
CO-60	F	2.9343E-03				1.93E+03		
			1332.50	-1.154E-01	?(P	1.024E+00	3.47E+02	1.00E+02 G
			1173.24	1.213E-01	?(P	8.998E-01	2.86E+02	9.99E+01 G
NB-94	I	-1.3846E-01				7.41E+06		
			702.63	-1.385E-01	?(P	8.865E-01	2.15E+02	9.79E+01 G
			871.10	-2.861E-01	+ P	8.994E-01	5.54E+01	9.99E+01 G
ZR-95	I	-1.1541E-01				6.40E+01		
			756.73	-1.154E-01	?(	1.074E+00	3.30E+02	5.45E+01 G
			724.20	-2.198E-02	% P	2.213E+00	3.10E+03	4.42E+01 G
NB-95	I	-7.9491E-03				6.40E+01		
			765.79	-7.949E-03	%(	7.644E-01	2.44E+03	9.98E+01 G
RU-103	I	7.4060E-02				3.93E+01		
			497.05	7.406E-02	?(	7.906E-01	3.98E+02	9.09E+01 G
			610.30	3.448E-01	%	2.866E+01	2.36E+03	5.75E+00 GA
RH-106	I	-7.7542E-01				3.74E+02		
			621.92	-3.686E+00	?(	1.887E+01	1.50E+02	9.93E+00 G
			1050.36	1.775E+01	?(	7.026E+01	1.12E+02	1.56E+00 G
			511.86	8.689E+00	? P	2.675E+00	1.96E+01	2.00E+01 GA
AG-108M	C	7.4065E-03				1.53E+05		
			433.94	7.406E-03	%(P	5.247E-01	2.34E+03	9.05E+01 G
			722.94	0.000E+00	-	1.068E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	1.837E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.0869E-01				2.50E+02		
			884.68	0.000E+00	?(	1.075E+00	1.00E+03	7.27E+01 G
			657.76	-5.932E-02	+	8.776E-01	3.97E+02	9.46E+01 G
			937.49	8.162E-01	?(	1.203E+00	4.47E+01	3.44E+01 G
			1384.30	-1.060E+00	+	4.284E+00	1.67E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	5.330E-01	?(	2.908E+00	1.47E+02	2.23E+01 G
SN-113	F	1.6579E-01					1.15E+02	
			391.69	1.658E-01	?(	8.453E-01	1.43E+02	6.40E+01 G
SB-124	F	1.6746E-01					6.02E+01	
			602.73	-2.893E-01	?(	1.583E+00	1.59E+02	9.83E+01 G
			1690.98	9.543E-01	?(	1.407E+00	4.47E+01	4.78E+01 G
			722.79	8.404E-01	?(	8.466E+00	2.74E+02	1.08E+01 G
SB-125	I	5.0401E-01					1.01E+03	
			427.88	6.744E-02	?(P	1.253E+00	5.79E+02	2.96E+01 G
			600.50	-1.762E+00	+ P	8.187E+00	6.20E+01	1.79E+01 G
			635.89	-1.449E+00	+	7.069E+00	1.37E+02	1.13E+01 G
			463.37	1.738E+00	&(	6.251E+00	1.04E+02	1.05E+01 G
I-131	I	-1.4904E-01					8.02E+00	
			364.48	-1.490E-01	?(P	5.997E-01	1.55E+02	8.17E+01 G
			284.30	-8.265E-01	+ P	8.012E+00	2.98E+02	6.14E+00 G
			636.97	-5.723E-01	+	1.318E+01	6.24E+02	7.17E+00 G
Gd-153	F	2.6995E-01					2.42E+02	
			97.50	2.700E-01	&(	1.285E+00	1.37E+02	3.00E+01 G
			103.20	-2.321E-01	+	2.387E+00	2.96E+02	2.18E+01 G
Ga-68	C	4.4488E+00					4.71E-02	
			1077.40	4.449E+00	?(	2.921E+01	2.56E+02	3.30E+00 G
Tc-99m	I	1.1883E-01					2.51E-01	
			140.51	1.188E-01	?(	5.460E-01	1.34E+02	8.93E+01 G
BA-133	F	-1.9568E-01					3.85E+03	
			356.00	-1.957E-01	?(	1.207E+00	1.76E+02	6.20E+01 G
			302.85	-1.154E+00	+	5.899E+00	1.50E+02	1.83E+01 G
			383.84	-1.228E+00	&	8.264E+00	1.90E+02	8.94E+00 GA
			80.99	1.217E-01	?	1.146E+00	3.13E+02	3.41E+01 GA
CS-134	I	3.7445E-01					7.54E+02	
			604.71	0.000E+00	?(	1.681E+00	1.00E+03	9.76E+01 G
			795.87	-1.531E-01	+	1.248E+00	2.25E+02	8.55E+01 G
			569.32	1.068E+00	?(	2.934E+00	8.03E+01	1.54E+01 G
			801.95	-1.895E-01	%	1.329E+01	1.89E+03	8.69E+00 G
			563.24	3.474E+00	?(P	3.282E+00	3.70E+01	8.35E+00 G
CS-137	I	-3.3099E-01					1.10E+04	
			661.66	-3.310E-01	?(	1.228E+00	1.07E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-1.7199E-01					1.38E+02	
			165.85	-1.720E-01	(	7.181E-01	1.22E+02	7.99E+01 G
Ba-140	I	-2.9991E-01					1.28E+01	
			537.26	-8.809E-01	?(	3.135E+00	1.37E+02	2.44E+01 G
			162.66	1.978E+00	?(	8.113E+00	1.20E+02	6.22E+00 G
			304.85	-4.964E+00	+	2.651E+01	1.57E+02	4.29E+00 G
CE-141	I	8.4535E-02					3.25E+01	
			145.44	8.453E-02	?(	1.269E+00	4.32E+02	4.82E+01 G
EU-152	F	9.1894E-01					4.94E+03	
			344.29	7.389E-01	?(P	3.303E+00	1.30E+02	2.65E+01 G
			1112.07	3.939E-01	?(	8.304E+00	5.52E+02	1.36E+01 G
			121.78	2.849E-01	?(	1.119E+00	1.14E+02	2.86E+01 G
			778.92	1.367E+00	&(	4.628E+00	1.27E+02	1.29E+01 G
			964.11	2.182E+00	?(	5.909E+00	7.96E+01	1.46E+01 G
			244.69	1.685E+00	?(	7.392E+00	1.27E+02	7.58E+00 G
			1408.00	-2.486E+00	+	6.687E+00	1.18E+02	2.10E+01 GA
EU-154	I	3.3227E+00					3.14E+03	
			873.23	1.870E+00	?(	7.938E+00	1.20E+02	1.23E+01 G
			123.10	1.088E-01	&	9.373E-01	2.44E+02	4.08E+01 G
			1274.54	0.000E+00	-	1.511E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	4.799E+00	1.00E+03	2.02E+01 G
			1004.77	-2.640E+00	+	9.304E+00	1.03E+02	1.80E+01 G
			996.33	5.005E+00	?(	4.098E+00	3.33E+01	1.06E+01 G
HF-181	F	4.1329E-02					4.24E+01	
			482.00	4.133E-02	?(	1.386E+00	9.42E+02	8.05E+01 G
			133.02	-2.609E-01	+	1.368E+00	1.53E+02	4.33E+01 G
			345.83	-1.068E-01	& P	5.678E+00	1.60E+03	1.51E+01 G
			136.30	0.000E+00	-	1.069E+01	1.00E+03	5.85E+00 G
Ta-182	F	-9.3025E-02					1.14E+02	
			1121.30	-9.302E-02	?(	3.444E+00	9.70E+02	3.49E+01 G
			1221.41	-8.600E-01	+	3.476E+00	1.67E+02	2.70E+01 G
			1189.05	0.000E+00	+	3.100E+00	1.00E+03	1.62E+01 G
Hg-203	F	-7.4497E-02					4.66E+01	
			279.20	-7.450E-02	&(	7.619E-01	2.88E+02	8.15E+01 G
TL-208	N	1.7610E-01					6.98E+02	
			583.02	4.749E-02	?(P	6.951E-01	4.65E+02	8.45E+01 G
			277.28	1.898E+00	?(P	8.154E+00	1.23E+02	6.31E+00 G
			860.56	-2.421E+00	& P	9.640E+00	5.12E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	4.2668E-01					2.02E+03	
			747.16	6.216E-01	?(P	1.724E+00	1.06E+02	3.40E+01 G
			735.72	-6.827E-02	%	2.542E+00	1.29E+03	2.25E+01 G
			453.88	3.247E-01	?(P	3.551E-01	4.03E+01	6.50E+01 G
y-88	F	-1.2460E-01					1.07E+02	
			898.04	-1.246E-01	?(P	7.682E-01	1.48E+02	9.37E+01 G
			1836.06	0.000E+00	+	7.259E-01	1.00E+03	9.92E+01 G
Cd-113m		-2.8178E+03					5.33E+03	
			263.70	-2.818E+03	?(	9.778E+03	1.02E+02	6.00E-03 K
Cd-109	F	2.8818E+00					4.53E+02	
			88.04	2.882E+00	?(	1.515E+01	1.54E+02	3.79E+00 G
Cf-251	T	5.4300E-01					3.28E+05	
			176.60	5.430E-01	?(	1.746E+00	1.13E+02	1.70E+01 G
			227.00	-9.649E-02	%	7.301E+00	2.58E+03	6.30E+00 GA
Sn-126		-9.4477E-01					3.65E+07	
			87.57	-2.732E-01	+	2.073E+00	2.23E+02	3.75E+01 GA
			64.28	-9.448E-01	?(	7.421E+00	2.27E+02	9.70E+00 G
			86.94	-1.667E+00	&	8.945E+00	1.58E+02	9.04E+00 GA
PB-210	N	5.3337E+00					8.14E+03	
			46.54	5.334E+00	*(P	1.704E+01	1.02E+02	4.25E+00 G
PB-212	N	-7.7928E-01					6.98E+02	
			238.63	-7.793E-01	&(P	1.925E+00	3.86E+01	4.33E+01 G
			300.03	-2.282E-01	% P	3.180E+01	2.38E+03	3.28E+00 GA
PB-214	N	-6.6293E-02					5.84E+05	
			351.93	-6.629E-02	?(P	1.768E+00	7.28E+02	3.76E+01 G
			295.09	-1.450E+00	+ P	5.105E+00	6.23E+01	1.93E+01 G
			242.00	1.900E+00	?	8.595E+00	1.31E+02	7.43E+00 GA
BI-212	N	-3.8563E+00					6.98E+02	
			727.17	-3.856E+00	&(P	1.555E+01	1.05E+02	7.55E+00 G
			785.42	4.817E+00	? P	6.254E+01	4.83E+02	1.28E+00 GA
U-235	N	-1.6305E+00					2.57E+11	
			143.79	-1.630E+00	&(P	6.025E+00	1.02E+02	1.10E+01 G
			205.33	-1.060E+00	+ P	9.245E+00	2.51E+02	5.01E+00 G
			163.38	-4.213E-02	% P	1.080E+01	7.23E+03	5.08E+00 G
			185.72	2.437E-01	+ P	7.743E-01	1.05E+02	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	-6.7013E-01					5.84E+05	
			609.31	-6.701E-01	?(P	3.764E+00	8.38E+01	4.61E+01 G
			1120.29	-4.434E-01	+ P	8.110E+00	5.08E+02	1.51E+01 G
			1764.49	-4.160E+00	+ P	1.105E+01	9.51E+01	1.54E+01 G
BI-210M	T	2.9795E-01					1.10E+09	
			265.83	1.969E-01	?(	9.246E-01	1.33E+02	5.00E+01 G
			304.90	4.784E-01	?(	3.776E+00	2.29E+02	2.80E+01 G
AC-228	N	1.0213E+00					2.10E+03	
			911.07	1.021E+00	?(	2.414E+00	9.51E+01	2.90E+01 G
			968.97	-1.063E+00	-	7.978E+00	2.10E+02	1.75E+01 G
			338.32	-1.449E+00	+	7.581E+00	1.52E+02	1.20E+01 G
			93.35	2.233E+00	?	1.168E+01	1.54E+02	5.56E+00 XA
TH-227	N	1.0987E+00					7.95E+03	
			50.14	1.643E+00	(P	7.303E+00	1.49E+02	8.00E+00 G
			256.24	4.768E-01	?(	5.643E+00	3.97E+02	7.00E+00 G
TH-229	N	1.5859E+00					2.68E+06	
			193.51	1.891E+00	?(P	8.007E+00	1.48E+02	4.40E+00 G
			210.85	1.136E+00	?(P	1.358E+01	4.11E+02	2.99E+00 G
TH-234	N	4.3146E+00					1.63E+12	
			63.29	5.791E+00	(P	1.397E+01	8.65E+01	3.81E+00 G
			92.59	3.307E+00	(P	8.426E+00	9.44E+01	5.58E+00 G
PA-231	N	-7.3371E+00					1.20E+07	
			302.65	-7.337E+00	?(	3.570E+01	1.43E+02	2.88E+00 G
			300.07	-3.043E-01	% P	4.241E+01	2.40E+03	2.46E+00 G
PA-233	C	6.4810E-02					7.82E+08	
			312.01	6.481E-02	&(	1.177E+00	6.28E+02	3.60E+01 G
			300.18	-1.208E-01	% P	1.683E+01	2.42E+03	6.20E+00 G
PA-234	N	-8.3408E-01					1.63E+12	
			131.29	-8.341E-01	?(	3.775E+00	1.34E+02	1.80E+01 G
			946.02	-7.028E-01	+	5.388E+00	2.86E+02	1.34E+01 G
			569.47	0.000E+00	+	5.702E+00	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	8.127E+00	1.00E+03	9.60E+00 G
			880.53	5.785E+00	?	6.547E+00	3.92E+01	6.00E+00 GA
PA-234M	N	-5.1144E+00					1.63E+12	
			1001.00	-5.114E+00	?(P	1.219E+02	4.75E+02	8.37E-01 G
			766.41	-7.153E-01	% P	1.603E+02	1.09E+04	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   5.0487E-02                                      1.58E+05
                          59.54 5.049E-02 ?(  1.425E+00 9.27E+02 3.59E+01 G

Np-237   F  -1.1525E+00                                      2.14E+06
                          86.49-1.152E+00 ?(  6.604E+00 1.69E+02 1.31E+01 G

Ir-192   F   1.6677E-01                                      7.40E+01
                         316.49 1.668E-01 ?(  5.942E-01 1.03E+02 8.70E+01 G
                         468.06-4.443E-02 -   1.451E+00 8.84E+02 5.18E+01 G
                         308.44-1.389E-07 &   3.252E+00 6.67E+08 3.18E+01 G

Np-239   T   4.6913E-01                                      2.36E+00
                         103.70 0.000E+00 -   2.226E+00 1.00E+03 2.40E+01 X
                         106.13 4.691E-01  (  1.963E+00 1.22E+02 2.27E+01 G
                          99.50 0.000E+00 &   2.762E+00 1.00E+03 1.50E+01 X

Nd-147       3.7540E-01                                      1.11E+01
                         531.00 2.729E-01 ?(  5.145E+00 6.86E+02 1.30E+01 G
                          91.10 4.225E-01 ?(  2.108E+00 1.46E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
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R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	24.	6.	0.003	149.50	1.643E+00	P
AM-241	59.54	30.	1.	0.001	927.36	5.049E-02	
Sn-126	64.28	76.	-6.	-0.003	227.45	-9.448E-01	
BA-133	80.99	30.	3.	0.002	312.69	1.217E-01	
Np-237	86.49	178.	-11.	-0.006	169.28	-1.152E+00	
EU-155	86.54	166.	-11.	-0.006	163.92	-4.918E-01	
Sn-126	86.94	155.	-11.	-0.006	158.38	-1.667E+00	
Sn-126	87.57	144.	-8.	-0.004	222.54	-2.732E-01	
Cd-109	88.04	76.	8.	0.005	153.61	2.882E+00	
Nd-147	91.10	85.	9.	0.005	146.25	4.225E-01	
AC-228	93.35	104.	10.	0.005	153.61	2.233E+00	
Gd-153	97.50	35.	6.	0.004	137.35	2.700E-01	
Gd-153	103.20	68.	-4.	-0.002	295.80	-2.321E-01	
Np-239	106.13	49.	8.	0.005	122.17	4.691E-01	
EU-152	121.78	23.	6.	0.004	113.50	2.849E-01	
CO-57	122.06	30.	6.	0.004	126.41	9.521E-02	
EU-154	123.10	35.	3.	0.002	243.94	1.088E-01	
PA-234	131.29	115.	-12.	-0.006	133.55	-8.341E-01	
HF-181	133.02	85.	-9.	-0.005	153.44	-2.609E-01	
Tc-99m	140.51	50.	8.	0.004	133.76	1.188E-01	
U-235	143.79	100.	-13.	-0.007	101.74	-1.630E+00	P
CE-141	145.44	84.	3.	0.002	432.35	8.453E-02	
Ba-140	162.66	48.	9.	0.005	119.80	1.978E+00	
CE-139	165.85	64.	-10.	-0.005	122.46	-1.720E-01	
Cf-251	176.60	13.	6.	0.003	113.37	5.430E-01	
U-235	185.72	27.	8.	0.005	105.49	2.437E-01	P
TH-229	193.51	17.	5.	0.003	148.41	1.891E+00	P
U-235	205.33	28.	-3.	-0.002	250.63	-1.060E+00	P
TH-229	210.85	20.	2.	0.001	410.83	1.136E+00	P
PB-212	238.63	78.	-18.	-0.010	38.62	-7.793E-01	P
PB-214	242.00	43.	7.	0.004	131.37	1.900E+00	
EU-152	244.69	32.	7.	0.004	126.78	1.685E+00	
TH-227	256.24	13.	2.	0.001	397.49	4.768E-01	
Cd-113m	263.70	31.	-8.	-0.005	101.50	-2.818E+03	
BI-210M	265.83	18.	5.	0.003	133.38	1.969E-01	
TL-208	277.28	21.	6.	0.003	123.44	1.898E+00	P
Hg-203	279.20	32.	-3.	-0.002	287.59	-7.450E-02	
I-131	284.30	18.	-2.	-0.001	298.30	-8.265E-01	P
PB-214	295.09	79.	-13.	-0.007	62.26	-1.450E+00	P
TL-210	296.00	82.	-4.	-0.002	295.78	-1.243E-01	
PA-231	302.65	83.	-9.	-0.005	142.62	-7.337E+00	
BA-133	302.85	92.	-9.	-0.005	149.95	-1.154E+00	
Ba-140	304.85	101.	-9.	-0.005	156.68	-4.964E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-210M	304.90	87.	6.	0.003	229.23	4.784E-01		
PA-233	312.01	11.	1.	0.001	628.49	6.481E-02		
Ir-192	316.49	17.	6.	0.003	102.99	1.668E-01		
CR-51	320.08	37.	-8.	-0.005	97.69	-1.975E+00		P
La-140	328.76	18.	-1.	-0.001	568.74	-1.703E-01		P
Cf-249	333.44	18.	-2.	-0.001	349.49	-3.697E-01		
AC-228	338.32	53.	-7.	-0.004	151.86	-1.449E+00		
EU-152	344.29	47.	8.	0.004	130.21	7.389E-01		P
PB-214	351.93	25.	-1.	-0.001	727.52	-6.629E-02		P
BA-133	356.00	32.	-5.	-0.003	175.77	-1.957E-01		
I-131	364.48	12.	-5.	-0.003	155.40	-1.490E-01		P
BA-133	383.84	27.	-4.	-0.002	190.39	-1.228E+00		
SN-113	391.69	13.	4.	0.002	142.65	1.658E-01		
SB-125	427.88	4.	1.	0.000	579.12	6.744E-02		P
pm-146	453.88	0.	7.	0.004	40.29	3.247E-01		P
SB-125	463.37	15.	6.	0.003	103.57	1.738E+00		
Ir-192	468.06	20.	-1.	0.000	884.37	-4.443E-02		
BE-7	477.60	35.	-10.	-0.006	89.34	-3.104E+00		
HF-181	482.00	45.	1.	0.001	942.05	4.133E-02		
La-140	487.02	12.	-4.	-0.002	67.27	-3.062E-01		P
RU-103	497.05	16.	2.	0.001	397.91	7.406E-02		
RH-106	511.86	8.	50.	0.028	19.55	8.689E+00		P
Nd-147	531.00	12.	1.	0.001	685.57	2.729E-01		
Ba-140	537.26	16.	-6.	-0.003	136.76	-8.809E-01		
CS-134	563.24	0.	8.	0.004	37.01	3.474E+00		P
CS-134	569.32	4.	4.	0.002	80.31	1.068E+00		
TL-208	583.02	7.	1.	0.001	464.90	4.749E-02		P
SB-125	600.50	55.	-8.	-0.004	61.98	-1.762E+00		P
SB-124	602.73	63.	-7.	-0.004	159.13	-2.893E-01		
BI-214	609.31	78.	-8.	-0.004	83.83	-6.701E-01		P
RH-106	621.92	88.	-9.	-0.005	150.01	-3.686E+00		
SB-125	635.89	13.	-4.	-0.002	136.93	-1.449E+00		
I-131	636.97	19.	-1.	-0.001	624.50	-5.723E-01		
AG-110M	657.76	13.	-1.	-0.001	396.86	-5.932E-02		
CS-137	661.66	22.	-7.	-0.004	107.47	-3.310E-01		
NB-94	702.63	13.	-3.	-0.002	215.16	-1.385E-01		P
SB-124	722.79	14.	2.	0.001	273.86	8.404E-01		
BI-212	727.17	24.	-6.	-0.004	104.95	-3.856E+00		P
pm-146	747.16	4.	5.	0.003	105.78	6.216E-01		P
ZR-95	756.73	4.	-1.	-0.001	330.25	-1.154E-01		
AG-110M	763.94	6.	2.	0.001	146.97	5.330E-01		
EU-152	778.92	4.	4.	0.002	127.11	1.367E+00		
BI-212	785.42	9.	1.	0.001	483.21	4.817E+00		P
CS-134	795.87	17.	-3.	-0.001	225.00	-1.531E-01		
CO-58	810.77	10.	-2.	-0.001	301.85	-7.517E-02		
MN-54	834.85	14.	-2.	-0.001	403.11	-1.021E-01		
TL-208	860.56	19.	-6.	-0.003	51.23	-2.421E+00		P
NB-94	871.10	9.	-5.	-0.003	55.36	-2.861E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	873.23	11.	4.	0.002	119.91	1.870E+00		
PA-234	880.53	0.	7.	0.004	39.19	5.785E+00		
Sc-46	889.28	38.	-9.	-0.005	99.80	-4.972E-01		
y-88	898.04	5.	-2.	-0.001	147.85	-1.246E-01		P
AC-228	911.07	5.	5.	0.003	95.07	1.021E+00		
AG-110M	937.49	0.	5.	0.003	44.72	8.162E-01		
PA-234	946.02	5.	-2.	-0.001	285.66	-7.028E-01		
EU-152	964.11	7.	6.	0.003	79.63	2.182E+00		
AC-228	968.97	21.	-3.	-0.002	209.86	-1.063E+00		
EU-154	996.33	0.	9.	0.005	33.33	5.005E+00		
PA-234M	1001.00	10.	-1.	0.000	474.66	-5.114E+00		P
EU-154	1004.77	30.	-8.	-0.004	102.93	-2.640E+00		
Cs-136	1048.07	11.	-4.	-0.002	127.48	-3.072E-01		
RH-106	1050.36	10.	4.	0.002	112.22	1.775E+01		
Ga-68	1077.40	5.	2.	0.001	255.77	4.449E+00		
FE-59	1099.25	10.	-6.	-0.003	122.85	-6.784E-01		
EU-152	1112.07	10.	1.	0.000	552.09	3.939E-01		
BI-214	1120.29	12.	-1.	-0.001	507.98	-4.434E-01		P
Ta-182	1121.30	12.	0.	0.000	969.54	-9.302E-02		
CO-60	1173.24	5.	2.	0.001	285.94	1.213E-01		P
Ta-182	1221.41	5.	-3.	-0.002	166.73	-8.600E-01		
FE-59	1291.60	1.	-1.	0.000	921.77	-9.693E-02		P
TL-210	1313.00	5.	-3.	-0.002	166.73	-1.174E+00		
CO-60	1332.50	6.	-2.	-0.001	346.61	-1.154E-01		P
AG-110M	1384.30	5.	-3.	-0.002	166.73	-1.060E+00		
EU-152	1408.00	11.	-7.	-0.004	117.90	-2.486E+00		
K-40	1460.83	9.	-5.	-0.003	114.95	-3.968E+00		P
SB-124	1690.98	0.	5.	0.003	44.72	9.543E-01		
BI-214	1764.49	11.	-7.	-0.004	95.14	-4.160E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.1037E+00	-3.1038E+00	8.934E+01%	9.39E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.32E-01
K-40	#A	-3.9675E+00	-3.9675E+00	1.149E+02%	1.28E+01
Sc-46	#A	-4.9724E-01	-4.9725E-01	9.980E+01%	1.69E+00
CR-51	#A	-1.9746E+00	-1.9746E+00	9.769E+01%	7.46E+00
MN-54	#A	-1.0210E-01	-1.0210E-01	4.031E+02%	1.03E+00
FE-59	#A	-6.7839E-01	-6.7840E-01	1.229E+02%	1.97E+00
Co-56	#	4.0442E-01	4.0442E-01	3.726E+01%	3.81E-01
CO-57	#A	9.5214E-02	9.5214E-02	1.264E+02%	4.17E-01
CO-58	#A	-7.5173E-02	-7.5173E-02	3.018E+02%	8.56E-01
CO-60	#A	2.9343E-03	2.9343E-03	2.247E+02%	1.02E+00

ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.32E+00
NB-94	#A	-1.3846E-01	-1.3846E-01	2.152E+02%	8.86E-01
ZR-95	#A	-1.1541E-01	-1.1541E-01	3.302E+02%	1.07E+00
NB-95	#A	-7.9491E-03	-7.9491E-03	2.437E+03%	7.64E-01
RU-103	#A	7.4059E-02	7.4060E-02	3.979E+02%	7.91E-01
RH-106	#A	-7.7542E-01	-7.7542E-01	9.367E+01%	1.89E+01
AG-108M	#A	7.4065E-03	7.4065E-03	2.339E+03%	5.25E-01
AG-110M	#A	3.0869E-01	3.0869E-01	4.472E+01%	1.07E+00
SN-113	#A	1.6579E-01	1.6579E-01	1.427E+02%	8.45E-01
SB-124	#A	1.6746E-01	1.6746E-01	4.472E+01%	1.58E+00
SB-125	#A	5.0401E-01	5.0401E-01	1.036E+02%	1.25E+00
I-131	#A	-1.4903E-01	-1.4904E-01	1.554E+02%	6.00E-01
Gd-153	#A	2.6995E-01	2.6995E-01	1.373E+02%	1.28E+00
Ga-68	#A	4.4231E+00	4.4488E+00	2.558E+02%	2.92E+01
Tc-99m	#A	1.1870E-01	1.1883E-01	1.338E+02%	5.46E-01
BA-133	#A	-1.9568E-01	-1.9568E-01	1.758E+02%	1.21E+00
CS-134	#A	3.7445E-01	3.7445E-01	3.701E+01%	1.68E+00
CS-137	#A	-3.3099E-01	-3.3099E-01	1.075E+02%	1.23E+00
CE-139	#A	-1.7199E-01	-1.7199E-01	1.225E+02%	7.18E-01
Ba-140	#A	-2.9990E-01	-2.9991E-01	9.091E+01%	3.13E+00
La-140	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.72E-01
CE-141	#A	8.4534E-02	8.4535E-02	4.323E+02%	1.27E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.60E+00
PM-144	#A	0.0000E+00	0.0000E+00	7.071E+02%	8.69E-01
EU-152	#A	9.1894E-01	9.1894E-01	7.963E+01%	3.30E+00
EU-154	#A	3.3227E+00	3.3227E+00	3.333E+01%	7.94E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.51E+00
HF-181	#A	4.1329E-02	4.1329E-02	9.420E+02%	1.39E+00
Ta-182	#A	-9.3025E-02	-9.3025E-02	9.695E+02%	3.44E+00
Hg-203	#A	-7.4496E-02	-7.4497E-02	2.876E+02%	7.62E-01
TL-208	#A	1.7610E-01	1.7610E-01	1.234E+02%	6.95E-01
pm-146	#A	4.2668E-01	4.2668E-01	4.029E+01%	1.72E+00
y-88	#A	-1.2460E-01	-1.2460E-01	1.479E+02%	7.68E-01
Cd-113m	#A	-2.8178E+03	-2.8178E+03	1.015E+02%	9.78E+03
Cd-109	#A	2.8818E+00	2.8818E+00	1.536E+02%	1.52E+01
Cf-251	#A	5.4300E-01	5.4300E-01	1.134E+02%	1.75E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.20E+00
Sn-126	#A	-9.4477E-01	-9.4477E-01	2.275E+02%	7.42E+00
PB-210	#A	5.3337E+00	5.3337E+00	1.022E+02%	1.70E+01
PB-212	#A	-7.7928E-01	-7.7928E-01	3.862E+01%	1.93E+00
PB-214	#A	-6.6293E-02	-6.6293E-02	7.275E+02%	1.77E+00
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.79E-01
BI-212	#A	-3.8563E+00	-3.8563E+00	1.049E+02%	1.55E+01
U-235	#A	-1.6305E+00	-1.6305E+00	1.017E+02%	6.02E+00
BI-214	#A	-6.7013E-01	-6.7013E-01	8.383E+01%	3.76E+00
BI-210M	#A	2.9795E-01	2.9795E-01	1.326E+02%	9.25E-01
AC-228	#A	1.0213E+00	1.0213E+00	9.507E+01%	2.41E+00
TH-227	#A	1.0987E+00	1.0987E+00	1.495E+02%	7.30E+00
TH-229	#A	1.5859E+00	1.5859E+00	1.484E+02%	8.01E+00

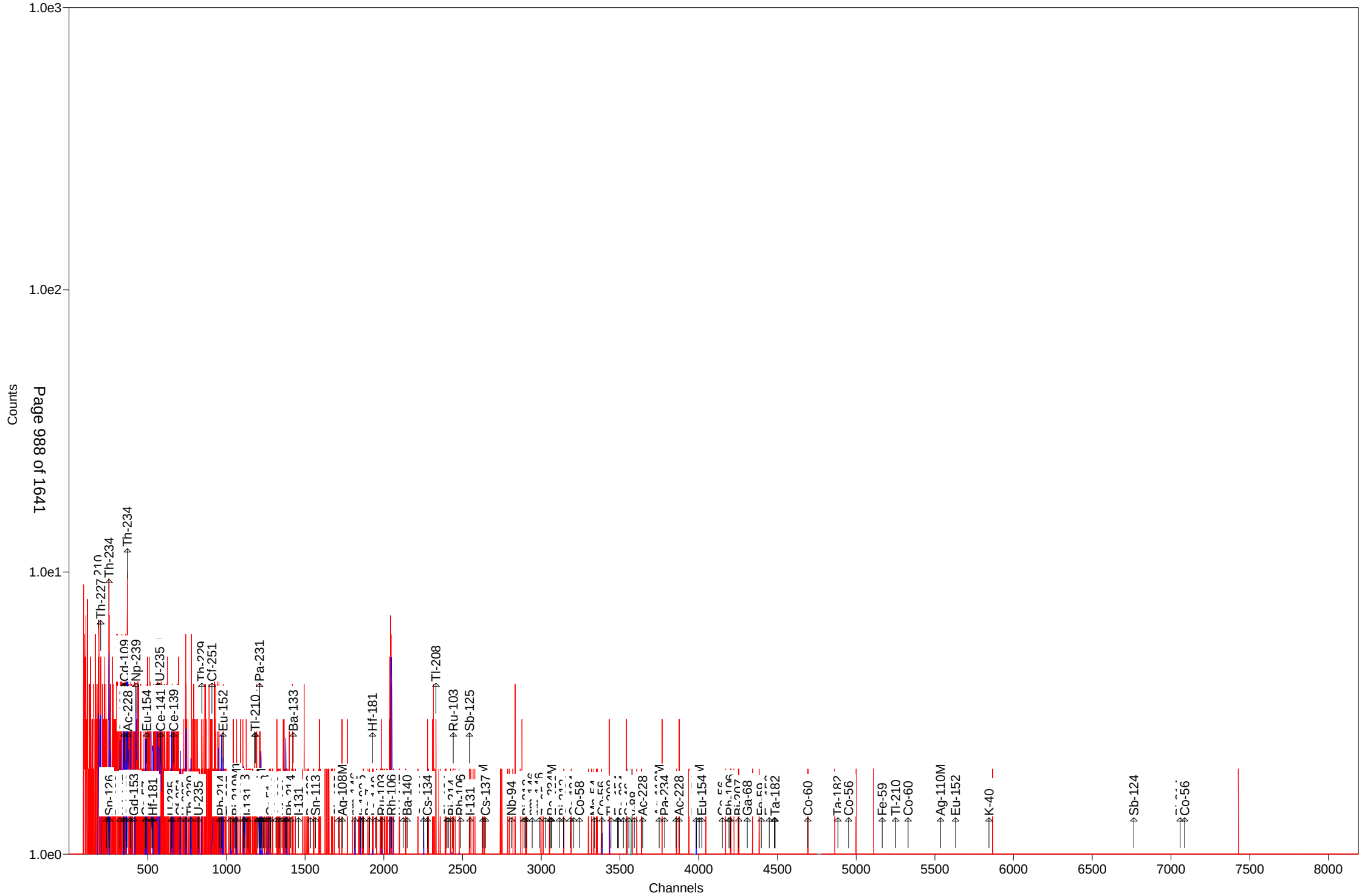
TH-234	A	4.3146E+00	4.3146E+00	6.404E+01%	1.40E+01
PA-231	#A	-7.3371E+00	-7.3371E+00	1.426E+02%	3.57E+01
PA-233	#A	6.4810E-02	6.4810E-02	6.285E+02%	1.18E+00
PA-234	#A	-8.3408E-01	-8.3408E-01	1.336E+02%	3.78E+00
PA-234M	#A	-5.1144E+00	-5.1144E+00	4.747E+02%	1.22E+02
AM-241	#A	5.0487E-02	5.0487E-02	9.274E+02%	1.43E+00
Np-237	#A	-1.1525E+00	-1.1525E+00	1.693E+02%	6.60E+00
Ir-192	#A	1.6677E-01	1.6677E-01	1.030E+02%	5.94E-01
Cs-136	#A	0.0000E+00	0.0000E+00	7.071E+02%	4.23E-01
Np-239	#A	4.6908E-01	4.6913E-01	1.222E+02%	1.96E+00
Nd-147	#A	3.7539E-01	3.7540E-01	1.463E+02%	5.14E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.16E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 0.0000000E+00 Bq/Sample

376765_Gamma_MB 160-376765~1-A. 14_Gamma_20183006.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20182608

Sample Description: 376765_Gamma_LCS 160-376765~2-A
Detector: Detector #15
Batch ID: 376765
Work Order Number: Gamma
Lot Number: LCS 160-376765~2-A

Decay to Time: 8/9/2018 16:29 Live Time: 1800 sec
Acquisition Time: 8/9/2018 16:29:47 Real Time: 1806 sec
Analysis Time: 8/9/2018 17:00 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-07-21_1011.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.543E+00	418.2	1.482E+01	1.482E+01	4.855E+01
NA-22	-1.127E-01	497.5	5.605E-01	5.605E-01	2.048E+00
K-40	4.008E+00	143.0	5.729E+00	5.733E+00	1.434E+01
Sc-46	-2.062E+00	52.4	1.080E+00	1.085E+00	6.088E+00
CR-51	8.626E-01	2081.3	1.795E+01	1.795E+01	5.987E+01
MN-54	-5.853E-02	2634.4	1.542E+00	1.542E+00	3.543E+00
FE-59	3.155E+00	50.0	1.576E+00	1.584E+00	6.673E+00
Co-56	1.122E+00	131.5	1.476E+00	1.477E+00	3.536E+00
CO-57	7.307E-01	150.1	1.096E+00	1.097E+00	2.714E+00
CO-58	-1.844E+00	83.9	1.547E+00	1.550E+00	5.140E+00
CO-60	1.567E+02	1.7	2.654E+00	8.301E+00	1.953E+00
ZN-65	0.000E+00	1.#INF	1.361E+00	1.361E+00	1.151E+01
NB-94	-1.799E+00	82.4	1.482E+00	1.485E+00	3.556E+00
ZR-95	1.062E+00	215.7	2.291E+00	2.292E+00	5.257E+00
NB-95	-1.689E+00	69.6	1.175E+00	1.179E+00	3.889E+00
RU-103	-1.521E+00	101.3	1.540E+00	1.542E+00	3.582E+00
RH-106	1.421E+01	130.0	1.847E+01	1.849E+01	6.154E+01
AG-108M	3.818E-01	79.8	3.045E-01	3.051E-01	3.869E+00
AG-110M	5.241E-01	190.4	9.981E-01	9.985E-01	7.750E+00
SN-113	6.992E-01	297.2	2.078E+00	2.078E+00	6.953E+00
SB-124	-6.746E-01	44.7	3.017E-01	3.037E-01	6.442E+00
SB-125	5.508E-01	646.6	3.561E+00	3.561E+00	1.087E+01
I-131	3.550E-01	99.2	3.520E-01	3.525E-01	3.486E+00
Gd-153	0.000E+00	1.#INF	1.120E+00	1.120E+00	1.498E+01
Ga-68	-7.759E+00	853.4	6.621E+01	6.622E+01	1.470E+02
Tc-99m	5.006E-01	248.2	1.243E+00	1.243E+00	4.131E+00
BA-133	1.817E+00	90.8	1.650E+00	1.652E+00	5.279E+00
CS-134	5.475E-01	79.3	4.342E-01	4.352E-01	6.378E+00
CS-137	3.407E+02	1.4	4.730E+00	1.835E+01	3.347E+00
CE-139	-9.449E-01	98.6	9.320E-01	9.363E-01	3.092E+00
Ba-140	3.560E+00	99.7	3.550E+00	3.555E+00	1.162E+01
La-140	6.853E-01	96.7	6.626E-01	6.636E-01	1.493E+00
CE-141	1.510E+00	148.8	2.246E+00	2.247E+00	7.452E+00

CE-144	6.277E+00	148.8	9.337E+00	9.343E+00	3.098E+01
PM-144	-1.722E+00	84.4	1.454E+00	1.457E+00	3.449E+00
EU-152	5.000E+00	114.5	5.722E+00	5.728E+00	1.879E+01
EU-154	-6.938E+00	177.3	1.230E+01	1.230E+01	4.141E+01
EU-155	-3.746E+00	170.3	6.379E+00	6.382E+00	2.114E+01
HF-181	1.775E+00	137.0	2.432E+00	2.434E+00	6.424E+00
Ta-182	8.179E+00	33.2	2.717E+00	2.747E+00	1.616E+01
Hg-203	1.220E+00	83.6	1.020E+00	1.022E+00	3.382E+00
TL-208	1.712E+00	141.2	2.417E+00	2.419E+00	3.439E+00
pm-146	-5.296E+00	87.5	4.632E+00	4.640E+00	1.040E+01
y-88	8.009E-01	40.8	3.270E-01	3.295E-01	3.851E+00
Cd-113m	7.963E+03	162.8	1.296E+04	1.297E+04	4.336E+04
Cd-109	2.092E+01	173.1	3.621E+01	3.623E+01	1.200E+02
Cf-251	-2.925E+00	158.3	4.630E+00	4.638E+00	1.173E+01
Cf-249	-4.490E-01	421.1	1.891E+00	1.891E+00	6.341E+00
Sn-126	-2.090E+01	222.6	4.652E+01	4.653E+01	1.537E+02
PB-210	9.904E+03	1.0	9.548E+01	5.894E+02	1.665E+02
PB-212	7.234E+00	19.1	1.379E+00	1.456E+00	4.221E+00
PB-214	7.817E+00	22.6	1.765E+00	1.811E+00	5.362E+00
BI-207	1.159E+00	66.0	7.643E-01	7.666E-01	2.525E+00
BI-212	-2.128E+01	78.7	1.674E+01	1.677E+01	5.555E+01
U-235	-5.005E-01	101.1	5.058E-01	5.064E-01	3.434E+01
BI-214	1.146E+01	23.1	2.644E+00	2.710E+00	5.482E+00
BI-210M	-9.085E-01	143.1	1.300E+00	1.301E+00	5.769E+00
AC-228	4.300E+00	72.0	3.098E+00	3.105E+00	1.510E+01
TH-227	5.946E+01	43.4	2.580E+01	2.600E+01	8.465E+01
TH-229	-2.239E+01	96.4	2.159E+01	2.166E+01	5.437E+01
TH-234	-5.831E+01	122.3	7.134E+01	7.140E+01	3.939E+02
PA-231	0.000E+00	1.#INF	2.485E+01	2.485E+01	1.985E+02
PA-233	0.000E+00	1.#INF	1.925E+00	1.925E+00	1.626E+01
PA-234	7.810E+00	90.1	7.034E+00	7.045E+00	1.879E+01
PA-234M	-4.346E+01	266.7	1.159E+02	1.159E+02	7.702E+02
AM-241	1.212E+03	0.9	1.121E+01	6.391E+01	1.645E+01
Np-237	-9.001E-02	12196.4	1.098E+01	1.098E+01	3.648E+01
Ir-192	0.000E+00	1.#INF	6.248E-01	6.248E-01	6.800E+00
Cs-136	-2.182E+00	87.2	1.903E+00	1.907E+00	6.317E+00
Np-239	3.373E+00	171.8	5.793E+00	5.797E+00	1.920E+01
Nd-147	8.749E+00	97.8	8.561E+00	8.576E+00	2.002E+01
TL-210	1.386E+00	83.9	1.164E+00	1.166E+00	4.095E+00
Total	1.977E+04				

Analyst: Joey Sausto

Sample description
376765_Gamma_LCS 160-376765~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182608.An1

Acquisition information
Start time: 8/9/2018 4:29:47 PM
Live time: 1800
Real time: 1806
Dead time: 0.33 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 4:29:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-07-21_1011.PBC 7/21/2018 10:11:36 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0715

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
32.16	172.	27.42	0.83	9.588E-03				
36.66	159.	31.23	0.80	1.271E-02				
43.12	377.	19.71	0.94	1.721E-02				
46.57	14827.	0.96	0.95	1.956E-02	46.54	4.250	9.904E+03	PB210
50.02	213.	36.56	0.95	2.181E-02	50.14	8.000	6.752E+01	TH227
59.56	21443.	0.92	0.91	2.739E-02	59.54	35.900	1.212E+03	AM241
72.50	54.	43.59	0.46	3.303E-02				
86.94	53.	171.13	0.98	3.686E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.598E+00	EU155
					86.94	9.040	8.806E+00	Sn126
87.57	53.	172.12	0.98	3.698E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	2.091E+01	Cd109
88.04	53.	173.13	0.98	3.706E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	2.092E+01	Cd109
91.10	53.	173.73	0.99	3.755E-02	91.10	28.300	PBC<MDA	Nd147
92.59	35.	266.13	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
93.35	17.	560.15	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
99.29	21.	150.15	0.99	3.846E-02	99.50	15.000	PBC<MDA	Np239
103.01	107.	32.76	0.61	3.867E-02	103.20	21.800	7.051E+00	Gd153
					103.70	24.000	6.402E+00	Np239
105.92	53.	171.76	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
131.29	47.	147.54	1.02	3.775E-02	131.29	18.000	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
133.02	47.	147.38	1.03	3.759E-02	133.02	43.300	PBC<MDA	HF181
133.54	47.	148.75	1.03	3.754E-02	133.54	11.090	PBC<MDA	CE144
136.30	47.	148.63	1.03	3.725E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.587E+00	CO57
136.47	47.	150.06	1.03	3.723E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.587E+00	CO57
140.51	29.	248.24	1.03	3.678E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	47.	148.77	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
162.66	44.	99.73	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	44.	101.90	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
185.72	47.	97.17	1.07	3.123E-02	185.72	54.000	PBC<MDA	U235
212.42	75.	43.09	0.74	2.828E-02				
238.65	179.	18.19	0.93	2.592E-02	238.63	43.300	8.868E+00	PB212
242.06	10.	258.27	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
256.71	13.	309.79	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
263.70	21.	162.75	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	11.	324.04	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
279.20	41.	83.60	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
284.30	39.	99.16	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
294.83	101.	30.54	0.70	2.206E-02	295.09	19.300	1.319E+01	PB214
296.00	40.	164.83	1.17	2.200E-02	296.00	79.000	PBC<MDA	TL210
300.03	11.	613.54	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.85	15.	457.44	1.18	2.161E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.042E+00	BA133
344.29	39.	135.07	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
345.83	40.	137.00	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.93	66.	33.27	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
356.00	37.	90.77	1.22	1.906E-02	356.00	62.050	PBC<MDA	BA133
389.41	28.	74.31	0.35	1.776E-02				
391.69	14.	297.19	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
511.86	27.	212.11	2.60	1.426E-02	511.86	20.000	PBC<MDA	RH106
531.00	28.	97.85	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	332.94	1.37	1.371E-02	537.26	24.390	PBC<MDA	Ba140
563.24	21.	131.88	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
567.67	7.	275.53	1.40	1.307E-02	569.47	8.200	PBC<MDA	PA234
569.70	27.	65.96	1.40	1.307E-02	569.70	97.740	PBC<MDA	BI207
583.02	18.	155.51	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
609.06	93.	30.75	1.98	1.236E-02	609.31	46.090	9.081E+00	BI214
621.92	31.	130.04	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
635.89	3.	646.62	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
661.74	6034.	1.39	1.50	1.154E-02	661.66	85.210	3.407E+02	CS137
722.94	26.	79.75	1.52	1.072E-02	722.79	10.810	1.240E+01	SB124
					722.94	90.840	1.475E+00	AG108M
					723.36	20.220	6.632E+00	EU154
723.36	10.	204.14	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.686E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	2.556E+00	EU154
756.73	11.	215.73	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
763.94	9.	190.43	1.55	1.024E-02	763.94	22.280	PBC<MDA	AG110M
766.64	4.	497.67	1.55	1.021E-02	766.41	0.294	PBC<MDA	PA234M
778.92	20.	114.46	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
795.87	26.	79.31	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
799.60	26.	83.94	1.58	9.848E-03	799.60	98.960	PBC<MDA	TL210
801.95	6.	407.09	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
846.77	9.	301.03	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.56	12.	224.12	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
880.18	30.	87.06	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
882.89	24.	109.04	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234
898.04	14.	194.48	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
946.02	21.	142.14	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
964.11	6.	412.98	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
968.97	33.	72.03	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
1037.84	11.	238.35	1.75	7.875E-03	1037.84	14.130	PBC<MDA	Co56
1048.48	19.	81.37	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1099.25	28.	86.49	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	10.	217.62	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1119.97	26.	80.58	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.30	27.	84.42	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	5.753E+00	Ta182
1173.37	1942.	2.38	1.77	7.076E-03	1173.24	99.900	1.526E+02	CO60
1189.05	27.	33.22	1.85	6.994E-03	1189.05	16.200	1.340E+01	Ta182
1221.41	1.	884.59	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	131.51	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	13.	50.07	1.91	6.502E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	6.	189.97	1.93	6.408E-03	1313.00	21.000	PBC<MDA	TL210
1332.66	1829.	2.41	1.87	6.324E-03	1332.50	99.980	1.607E+02	CO60
1408.00	8.	35.36	1.98	6.023E-03	1408.00	21.005	3.513E+00	EU152
1460.83	4.	142.96	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1596.21	6.	96.69	2.09	5.382E-03	1596.21	95.400	PBC<MDA	La140
1690.98	5.	44.72	2.14	5.109E-03	1690.98	47.790	PBC<MDA	SB124
1764.44	23.	23.06	2.18	4.916E-03	1764.49	15.400	1.712E+01	BI214
1836.06	6.	40.82	2.22	4.741E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
128.35	32.16	557.	172.	1.791E+04	27.42	0.832	-	
146.37	36.66	818.	159.	1.253E+04	31.23	0.803	-	s
172.12	43.08	2579.	374.	2.176E+04	19.86	0.943	-	sD
289.59	72.50	250.	54.	1.635E+03	43.59	0.461	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
848.93	212.42	303.	75.	2.640E+03	43.09	0.741	- s
1556.57	389.41	141.	28.	1.568E+03	74.31	0.352	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	2800.	14827.	8.237	0.96	0.946D
TH-227	200.23	50.14	3220.	188.	0.104	43.39	0.950D
AM-241	237.90	59.56	3824.	21443.	11.913	0.92	0.915
TH-234	252.78	63.29	28531.	-117.	-0.065	122.33	0.962s
Sn-126	256.75	64.28	29035.	-108.	-0.060	222.55	0.963s
BA-133	323.54	80.99	1101.	-54.	-0.030	36.53	0.978s
Sn-126	347.33	86.94	4060.	53.	0.029	171.13	0.984s
Sn-126	349.84	87.57	4112.	53.	0.029	172.12	0.984s
Cd-109	351.72	88.04	4165.	53.	0.029	173.13	0.985s
Nd-147	363.95	91.10	4218.	53.	0.029	173.73	0.987s
TH-234	369.91	92.59	4289.	35.	0.019	266.13	0.989s
AC-228	372.95	93.35	4324.	17.	0.009	560.15	0.990s
Gd-153	389.54	97.50	4341.	0.	0.000	1000.00	0.993s
Np-239	397.53	99.50	476.	21.	0.012	150.15	0.995D
Gd-153	412.32	103.20	4341.	0.	0.000	1000.00	0.998s
Np-239	414.32	103.70	4296.	45.	0.025	206.30	0.999s
EU-155	420.77	105.31	4422.	-55.	-0.031	170.28	1.001s
Np-239	424.03	106.13	4185.	53.	0.030	171.76	1.001s
EU-152	486.57	121.78	1115.	-36.	-0.020	132.23	1.016s
CO-57	487.72	122.06	1151.	0.	0.000	1000.00	1.016s
EU-154	491.87	123.10	1134.	-55.	-0.031	87.35	1.017s
PA-234	524.63	131.29	2375.	47.	0.026	147.54	1.024
HF-181	531.54	133.02	2377.	47.	0.026	147.38	1.026s
CE-144	533.60	133.54	2424.	47.	0.026	148.75	1.026s
HF-181	544.63	136.30	2432.	47.	0.026	148.63	1.029s
CO-57	545.33	136.47	2479.	47.	0.026	150.06	1.029s
Tc-99m	561.46	140.51	2526.	29.	0.016	248.24	1.032s
U-235	574.56	143.79	2738.	-53.	-0.030	174.53	1.036s
CE-141	581.17	145.44	2461.	47.	0.026	148.77	1.037
Ba-140	650.01	162.66	956.	44.	0.025	99.73	1.053s
U-235	652.88	163.38	1000.	44.	0.025	101.90	1.053s
CE-139	662.77	165.85	1010.	-46.	-0.026	98.63	1.055
Cf-251	705.73	176.60	594.	-29.	-0.016	158.32	1.065s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	742.19	185.72	579.	47.	0.026	97.17	1.073
TH-229	773.33	193.51	752.	-54.	-0.030	96.42	1.080s
U-235	820.60	205.33	634.	-50.	-0.028	95.57	1.091
TH-229	842.65	210.85	712.	-16.	-0.009	234.77	1.096s
Cf-251	907.22	227.00	583.	-8.	-0.004	565.75	1.110s
PB-212	953.72	238.63	314.	146.	0.081	19.06	1.120D
PB-214	967.17	242.00	345.	10.	0.006	258.27	1.123D
EU-152	977.95	244.69	1290.	-49.	-0.027	56.96	1.126
TH-227	1024.12	256.24	436.	13.	0.007	309.79	1.136s
Cd-113m	1053.94	263.70	555.	21.	0.011	162.75	1.142s
BI-210M	1062.46	265.83	678.	-20.	-0.011	143.10	1.144s
TL-208	1108.25	277.28	669.	11.	0.006	324.04	1.154s
Hg-203	1115.91	279.20	571.	41.	0.023	83.60	1.156s
I-131	1136.30	284.30	388.	39.	0.022	99.16	1.160s
PB-214	1178.38	294.83	232.	101.	0.056	30.54	0.704s
TL-210	1183.08	296.00	2182.	40.	0.022	164.83	1.170s
PB-212	1199.19	300.03	2214.	11.	0.006	613.54	1.174s
PA-231	1199.35	300.07	2225.	0.	0.000	1000.00	1.174s
PA-233	1199.79	300.18	2225.	0.	0.000	1000.00	1.174s
PA-231	1209.66	302.65	2225.	0.	0.000	1000.00	1.176s
BA-133	1210.47	302.85	2210.	15.	0.008	457.44	1.176s
Ba-140	1218.46	304.85	2225.	0.	0.000	1000.00	1.178
BI-210M	1218.64	304.90	2225.	0.	0.000	1000.00	1.178
Ir-192	1232.81	308.44	2225.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	2225.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	2225.	0.	0.000	1000.00	1.188
La-140	1314.06	328.76	1753.	-44.	-0.024	151.50	1.199
Cf-249	1332.77	333.44	1774.	-44.	-0.024	136.70	1.203
AC-228	1352.28	338.32	1818.	-44.	-0.024	137.89	1.207
Cs-136	1361.28	340.57	1873.	-8.	-0.005	752.57	1.209s
EU-152	1376.13	344.29	1372.	39.	0.022	135.07	1.212s
HF-181	1382.30	345.83	1465.	40.	0.022	137.00	1.213
PB-214	1406.71	351.93	207.	66.	0.037	33.27	1.219D
BA-133	1422.97	356.00	554.	37.	0.021	90.77	1.222s
I-131	1456.89	364.48	400.	-22.	-0.012	179.26	1.229s
BA-133	1534.29	383.84	946.	-8.	-0.005	533.81	1.246s
Cf-249	1550.72	387.95	796.	-10.	-0.005	421.12	1.249s
SN-113	1565.67	391.69	888.	14.	0.008	297.19	1.253s
AG-108M	1734.60	433.94	460.	-19.	-0.011	222.20	1.288s
SB-125	1852.29	463.37	889.	-49.	-0.027	87.03	1.312s
Ir-192	1871.05	468.06	912.	-9.	-0.005	456.59	1.316s
BE-7	1909.18	477.60	851.	-10.	-0.006	418.20	1.324s
La-140	1946.87	487.02	404.	-45.	-0.025	93.11	1.332s
RU-103	1987.00	497.05	316.	-36.	-0.020	101.29	1.340s
RH-106	2046.22	511.86	476.	27.	0.015	212.11	2.602s
Nd-147	2122.75	531.00	178.	28.	0.016	97.85	1.368s
Ba-140	2147.78	537.26	208.	9.	0.005	332.94	1.373s
CS-134	2251.67	563.24	173.	21.	0.011	131.88	1.394s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2276.00	569.32	170.	-6.	-0.003	318.65	1.399s
PA-234	2276.59	569.47	174.	7.	0.004	275.53	1.399s
BI-207	2277.52	569.70	141.	27.	0.015	65.96	1.399s
TL-208	2330.79	583.02	191.	18.	0.010	155.51	1.410s
SB-125	2400.69	600.50	802.	-20.	-0.011	201.49	1.424s
SB-124	2409.62	602.73	895.	-34.	-0.019	124.43	1.425s
CS-134	2417.53	604.71	861.	-34.	-0.019	121.93	1.427s
BI-214	2434.94	609.06	132.	93.	0.052	30.75	1.983s
RU-103	2439.88	610.30	826.	-34.	-0.019	119.16	1.431s
AG-108M	2455.81	614.28	840.	-35.	-0.019	119.87	1.435s
PM-144	2470.93	618.06	875.	-28.	-0.016	149.02	1.437s
RH-106	2486.35	621.92	790.	31.	0.017	130.04	1.440s
SB-125	2542.23	635.89	147.	3.	0.001	646.62	1.451s
I-131	2546.57	636.97	220.	-28.	-0.015	78.11	1.452s
CS-137	2645.63	661.74	147.	6034.	3.352	1.39	1.498
PM-144	2784.82	696.54	196.	-34.	-0.019	84.43	1.499s
NB-94	2809.17	702.63	201.	-35.	-0.019	82.38	1.503s
SB-124	2889.79	722.79	237.	-12.	-0.007	186.20	1.519s
AG-108M	2890.40	722.94	200.	26.	0.014	79.75	1.519s
EU-154	2892.07	723.36	202.	10.	0.006	204.14	1.519
ZR-95	2895.44	724.20	212.	0.	0.000	1000.00	1.520
BI-212	2907.33	727.17	279.	-31.	-0.017	78.65	1.522s
pm-146	2941.53	735.72	164.	-27.	-0.015	108.03	1.529s
pm-146	2987.29	747.16	187.	-34.	-0.019	87.46	1.537s
ZR-95	3025.56	756.73	117.	11.	0.006	215.73	1.544s
AG-110M	3054.42	763.94	148.	9.	0.005	190.43	1.550s
NB-95	3061.80	765.79	217.	-31.	-0.017	69.60	1.551s
PA-234M	3064.30	766.41	211.	4.	0.002	497.67	1.552s
EU-152	3114.33	778.92	112.	20.	0.011	114.46	1.561s
BI-212	3140.33	785.42	154.	-13.	-0.007	204.39	1.566s
CS-134	3182.12	795.87	194.	26.	0.014	79.31	1.574s
TL-210	3197.05	799.60	220.	26.	0.014	83.94	1.577s
CS-134	3206.46	801.95	259.	6.	0.003	407.09	1.578s
CO-58	3241.75	810.78	347.	-32.	-0.018	83.90	1.585s
La-140	3261.74	815.77	327.	-34.	-0.019	51.76	1.589s
Cs-136	3272.66	818.50	528.	-38.	-0.021	87.22	1.591s
Co-56	3385.75	846.77	149.	9.	0.005	301.03	1.612s
TL-208	3440.93	860.56	149.	12.	0.006	224.12	1.622s
NB-94	3483.06	871.10	240.	-34.	-0.019	65.81	1.629s
EU-154	3491.60	873.23	301.	-14.	-0.008	177.28	1.631s
PA-234	3520.80	880.53	334.	30.	0.017	87.06	1.636s
PA-234	3531.64	883.24	340.	24.	0.014	109.04	1.638
AG-110M	3537.42	884.68	364.	0.	0.000	1000.00	1.639
Sc-46	3555.81	889.28	423.	-33.	-0.019	52.37	1.642s
y-88	3590.85	898.04	140.	14.	0.008	194.48	1.649s
AG-110M	3748.69	937.49	255.	-42.	-0.023	85.72	1.677s
PA-234	3782.81	946.02	180.	21.	0.012	142.14	1.683
EU-152	3855.18	964.11	304.	6.	0.003	412.98	1.696s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3874.63	968.97	264.	33.	0.018	72.03	1.699
EU-154	3984.09	996.33	395.	-35.	-0.019	82.43	1.718s
PA-234M	4002.77	1001.00	386.	-10.	-0.006	266.68	1.722s
EU-154	4017.88	1004.77	419.	-13.	-0.007	224.31	1.724s
Co-56	4150.18	1037.84	130.	11.	0.006	238.35	1.747s
Cs-136	4191.11	1048.07	110.	19.	0.011	81.37	1.754s
RH-106	4200.27	1050.36	194.	-14.	-0.008	138.53	1.755s
BI-207	4253.49	1063.66	150.	-17.	-0.009	160.23	1.765s
Ga-68	4308.47	1077.40	135.	-3.	-0.002	853.42	1.774s
FE-59	4395.90	1099.25	107.	28.	0.015	86.49	1.789s
EU-152	4447.22	1112.07	248.	10.	0.006	217.62	1.797s
ZN-65	4461.11	1115.55	258.	0.	0.000	1000.00	1.800s
BI-214	4480.08	1120.29	206.	26.	0.014	80.58	1.803s
Sc-46	4481.13	1120.55	268.	-5.	-0.003	471.43	1.803s
Ta-182	4484.13	1121.30	239.	27.	0.015	84.42	1.803s
CO-60	4692.52	1173.37	31.	1942.	1.079	2.38	1.768
Ta-182	4755.25	1189.05	11.	27.	0.015	33.22	1.848s
Ta-182	4884.75	1221.41	27.	1.	0.001	884.59	1.869s
Co-56	4952.26	1238.28	27.	9.	0.005	131.51	1.879s
NA-22	5097.34	1274.53	21.	-1.	-0.001	497.49	1.902s
EU-154	5097.40	1274.54	23.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	5.	13.	0.007	50.07	1.913s
TL-210	5251.31	1313.00	21.	6.	0.003	189.97	1.926s
CO-60	5330.01	1332.66	18.	1829.	1.016	2.41	1.871
EU-152	5631.56	1408.00	0.	8.	0.004	35.36	1.984s
K-40	5843.03	1460.83	8.	4.	0.002	142.96	2.015s
La-140	6384.98	1596.21	6.	6.	0.004	96.69	2.092s
SB-124	6764.43	1690.98	0.	5.	0.003	44.72	2.142s
BI-214	7058.76	1764.49	3.	23.	0.013	23.06	2.181s
Co-56	7086.23	1771.35	36.	-8.	-0.004	118.12	2.184s
y-88	7345.35	1836.06	0.	6.	0.003	40.82	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5428E+00				5.31E+01	
			477.60	-3.543E+00	(P	4.855E+01 4.18E+02 1.05E+01 G	
NA-22	C	-1.1266E-01				9.50E+02	
			1274.53	-1.127E-01	?(	2.048E+00 4.97E+02 9.99E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	4.0077E+00					4.66E+11	
			1460.83	4.008E+00	?(P	1.434E+01	1.43E+02	1.07E+01 G
Sc-46	F	-2.0623E+00					8.38E+01	
			889.28	-2.062E+00	&(P	6.088E+00	5.24E+01	1.00E+02 G
			1120.55	-3.721E-01	+	5.958E+00	4.71E+02	1.00E+02 G
CR-51	F	8.6256E-01					2.77E+01	
			320.08	8.626E-01	%(P	5.987E+01	2.08E+03	9.94E+00 G
MN-54	C	-5.8530E-02					3.12E+02	
			834.85	-5.853E-02	%(	3.543E+00	2.63E+03	1.00E+02 G
FE-59	F	3.1550E+00					4.45E+01	
			1099.25	3.652E+00	*(	6.673E+00	8.65E+01	5.65E+01 G
			1291.60	2.505E+00	&(	2.665E+00	5.01E+01	4.32E+01 G
Co-56	C	1.1224E+00					7.73E+01	
			846.77	5.136E-01	?(	3.536E+00	3.01E+02	9.99E+01 G
			1238.28	1.150E+00	?(P	3.342E+00	1.32E+02	6.61E+01 G
			1037.84	5.298E+00	&(P	2.792E+01	2.38E+02	1.41E+01 G
			1771.35	-5.568E+00	+	2.261E+01	1.18E+02	1.55E+01 A
CO-57	C	7.3068E-01					2.72E+02	
			122.06	0.000E+00	?(	2.714E+00	1.00E+03	8.56E+01 G
			136.47	6.587E+00	&(	3.279E+01	1.50E+02	1.07E+01 G
CO-58	C	-1.8441E+00					7.09E+01	
			810.78	-1.844E+00	&(	5.140E+00	8.39E+01	9.95E+01 G
CO-60	F	1.5667E+02					1.93E+03	
			1332.50	1.607E+02	(P	1.953E+00	2.41E+00	1.00E+02 G
			1173.24	1.526E+02	(	2.252E+00	2.38E+00	9.99E+01 G
NB-94	I	-1.7990E+00					7.41E+06	
			702.63	-1.799E+00	?(P	3.556E+00	8.24E+01	9.79E+01 G
			871.10	-2.096E+00	&	4.554E+00	6.58E+01	9.99E+01 G
ZR-95	I	1.0621E+00					6.40E+01	
			756.73	1.062E+00	&(P	5.257E+00	2.16E+02	5.45E+01 G
			724.20	0.000E+00	&	8.294E+00	1.00E+03	4.42E+01 G
NB-95	I	-1.6887E+00					6.40E+01	
			765.79	-1.689E+00	&(	3.889E+00	6.96E+01	9.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RU-103	I	-1.5206E+00					3.93E+01	
			497.05	-1.521E+00	?(	3.582E+00	1.01E+02	9.09E+01 G
			610.30	-2.698E+01	&	1.070E+02	1.19E+02	5.75E+00 GA
RH-106	I	1.4207E+01					3.74E+02	
			621.92	1.421E+01	?(	6.154E+01	1.30E+02	9.93E+00 G
			1050.36	-6.626E+01	+	3.094E+02	1.39E+02	1.56E+00 G
			511.86	5.260E+00	?	2.033E+01	2.12E+02	2.00E+01 GA
AG-108M	C	3.8183E-01					1.53E+05	
			433.94	-7.161E-01	?(	3.869E+00	2.22E+02	9.05E+01 G
			722.94	1.475E+00	&(	3.912E+00	7.98E+01	9.08E+01 G
			614.28	-1.740E+00	+	6.938E+00	1.20E+02	8.98E+01 G
AG-110M	F	5.2415E-01					2.50E+02	
			884.68	0.000E+00	&(	7.750E+00	1.00E+03	7.27E+01 G
			657.76	2.277E-01	%	1.881E+01	2.49E+03	9.46E+01 G
			937.49	-7.831E+00	+	1.450E+01	8.57E+01	3.44E+01 G
			1384.30	-1.247E-01	%	6.882E+00	2.37E+03	2.43E+01 G
			763.94	2.234E+00	&(P	1.446E+01	1.90E+02	2.23E+01 G
SN-113	F	6.9921E-01					1.15E+02	
			391.69	6.992E-01	&(P	6.953E+00	2.97E+02	6.40E+01 G
SB-124	F	-6.7456E-01					6.02E+01	
			602.73	-1.556E+00	?(	6.442E+00	1.24E+02	9.83E+01 G
			1690.98	1.138E+00	?(	1.677E+00	4.47E+01	4.78E+01 G
			722.79	-5.671E+00	&	3.567E+01	1.86E+02	1.08E+01 G
SB-125	I	5.5077E-01					1.01E+03	
			427.88	3.418E-01	&(	1.087E+01	1.30E+03	2.96E+01 G
			600.50	-4.972E+00	+	3.348E+01	2.01E+02	1.79E+01 G
			635.89	1.098E+00	(	2.440E+01	6.47E+02	1.13E+01 G
			463.37	-1.687E+01	&	4.864E+01	8.70E+01	1.05E+01 G
I-131	I	3.5496E-01					8.02E+00	
			364.48	-7.997E-01	(	3.486E+00	1.79E+02	8.17E+01 G
			284.30	1.572E+01	&(P	3.770E+01	9.92E+01	6.14E+00 G
			636.97	-1.799E+01	&	4.667E+01	7.81E+01	7.17E+00 G
Ga-68	C	-7.7587E+00					4.71E-02	
			1077.40	-7.759E+00	&(	1.470E+02	8.53E+02	3.30E+00 G
Tc-99m	I	5.0062E-01					2.51E-01	
			140.51	5.006E-01	?(	4.131E+00	2.48E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	1.8174E+00					3.85E+03	
			356.00	1.751E+00	&(	5.279E+00	9.08E+01	6.20E+01 G
			302.85	2.042E+00	?(	3.111E+01	4.57E+02	1.83E+01 G
			383.84	-2.826E+00	&	5.054E+01	5.34E+02	8.94E+00 GA
			80.99	-2.459E+00	+ P	7.213E+00	3.65E+01	3.41E+01 GA
CS-134	I	5.4752E-01					7.54E+02	
			604.71	-1.572E+00	&(	6.378E+00	1.22E+02	9.76E+01 G
			795.87	1.686E+00	&(	4.446E+00	7.93E+01	8.55E+01 G
			569.32	-1.612E+00	&	1.753E+01	3.19E+02	1.54E+01 G
			801.95	3.661E+00	?(	5.061E+01	4.07E+02	8.69E+00 G
			563.24	1.043E+01	*(	3.232E+01	1.32E+02	8.35E+00 G
CS-137	I	3.4073E+02					1.10E+04	
			661.66	3.407E+02	(	3.347E+00	1.39E+00	8.52E+01 G
CE-139	F	-9.4494E-01					1.38E+02	
			165.85	-9.449E-01	?(	3.092E+00	9.86E+01	7.99E+01 G
Ba-140	I	3.5595E+00					1.28E+01	
			537.26	1.477E+00	?(P	1.162E+01	3.33E+02	2.44E+01 G
			162.66	1.173E+01	&(	3.881E+01	9.97E+01	6.22E+00 G
			304.85	0.000E+00	-	1.340E+02	1.00E+03	4.29E+00 G
La-140	I	6.8527E-01					1.28E+01	
			1596.21	6.853E-01	?(	1.493E+00	9.67E+01	9.54E+01 G
			487.02	-3.672E+00	&	7.926E+00	9.31E+01	4.55E+01 G
			328.76	-5.925E+00	+ P	2.670E+01	1.52E+02	2.03E+01 G
			815.77	-8.322E+00	+ P	2.144E+01	5.18E+01	2.33E+01 G
CE-141	I	1.5097E+00					3.25E+01	
			145.44	1.510E+00	(	7.452E+00	1.49E+02	4.82E+01 G
CE-144	I	6.2770E+00					2.85E+02	
			133.54	6.277E+00	?(	3.098E+01	1.49E+02	1.11E+01 G
PM-144	C	-1.7219E+00					3.63E+02	
			696.54	-1.722E+00	?(P	3.449E+00	8.44E+01	9.90E+01 G
			618.06	-1.298E+00	&	6.448E+00	1.49E+02	9.91E+01 G
EU-152	F	4.9996E+00					4.94E+03	
			344.29	4.186E+00	&(	1.879E+01	1.35E+02	2.65E+01 G
			1112.07	5.674E+00	&(	4.176E+01	2.18E+02	1.36E+01 G
			121.78	-1.819E+00	-	7.998E+00	1.32E+02	2.86E+01 G
			778.92	8.528E+00	&(	2.218E+01	1.14E+02	1.29E+01 G
			964.11	2.719E+00	*(	3.805E+01	4.13E+02	1.46E+01 G
			244.69	-1.412E+01	+ P	4.902E+01	5.70E+01	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	3.513E+00	?	3.237E+00	3.54E+01	2.10E+01 GA
EU-154	I	-6.9376E+00					3.14E+03	
			873.23	-6.938E+00	?(	4.141E+01	1.77E+02	1.23E+01 G
			123.10	-1.957E+00	&	5.662E+00	8.74E+01	4.08E+01 G
			1274.54	0.000E+00	+	5.974E+00	1.00E+03	3.52E+01 G
			723.36	2.556E+00	+	1.768E+01	2.04E+02	2.02E+01 G
			1004.77	-4.951E+00	+	3.735E+01	2.24E+02	1.80E+01 G
			996.33	-2.238E+01	+	6.124E+01	8.24E+01	1.06E+01 G
EU-155	I	-3.7459E+00					1.81E+03	
			105.31	-3.746E+00	(	2.114E+01	1.70E+02	2.12E+01 G
			86.54	-3.753E-07	%	1.556E+01	1.25E+09	3.07E+01 G
HF-181	F	1.7750E+00					4.24E+01	
			482.00	4.610E-02	%(	6.424E+00	4.15E+03	8.05E+01 G
			133.02	1.605E+00	?(	7.848E+00	1.47E+02	4.33E+01 G
			345.83	7.523E+00	(	3.425E+01	1.37E+02	1.51E+01 G
			136.30	1.202E+01	&(	5.928E+01	1.49E+02	5.85E+00 G
Ta-182	F	8.1786E+00					1.14E+02	
			1121.30	5.753E+00	?(	1.616E+01	8.44E+01	3.49E+01 G
			1221.41	4.017E-01	-	8.065E+00	8.85E+02	2.70E+01 G
			1189.05	1.340E+01	?(	8.792E+00	3.32E+01	1.62E+01 G
Hg-203	F	1.2202E+00					4.66E+01	
			279.20	1.220E+00	&(	3.382E+00	8.36E+01	8.15E+01 G
TL-208	N	1.7120E+00					6.98E+02	
			583.02	9.402E-01	(	3.439E+00	1.56E+02	8.45E+01 G
			277.28	4.315E+00	&(	4.691E+01	3.24E+02	6.31E+00 G
			860.56	5.641E+00	(	2.884E+01	2.24E+02	1.24E+01 G
pm-146	C	-5.2958E+00					2.02E+03	
			747.16	-5.296E+00	?(	1.040E+01	8.75E+01	3.40E+01 G
			735.72	-6.207E+00	& P	1.456E+01	1.08E+02	2.25E+01 G
			453.88	3.626E-02	%	5.731E+00	6.75E+03	6.50E+01 G
y-88	F	8.0094E-01					1.07E+02	
			898.04	8.985E-01	&(P	3.851E+00	1.94E+02	9.37E+01 G
			1836.06	7.088E-01	?(	8.706E-01	4.08E+01	9.92E+01 G
Cd-113m		7.9632E+03					5.33E+03	
			263.70	7.963E+03	?(	4.336E+04	1.63E+02	6.00E-03 K
Cd-109	F	2.0917E+01					4.53E+02	
			88.04	2.092E+01	*(	1.200E+02	1.73E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	-2.9247E+00					3.28E+05	
			176.60	-2.925E+00	*(	1.173E+01	1.58E+02	1.70E+01 G
			227.00	-2.622E+00	&	3.776E+01	5.66E+02	6.30E+00 GA
Cf-249	T	-4.4903E-01					1.28E+05	
			387.95	-4.490E-01	?(	6.341E+00	4.21E+02	6.60E+01 G
			333.44	-7.830E+00	+	3.554E+01	1.37E+02	1.55E+01 G
Sn-126		-2.0901E+01					3.65E+07	
			87.57	2.118E+00	+	1.208E+01	1.72E+02	3.75E+01 GA
			64.28	-2.090E+01	?(	1.537E+02	2.23E+02	9.70E+00 G
			86.94	8.806E+00	&	4.995E+01	1.71E+02	9.04E+00 GA
PB-210	N	9.9044E+03					8.14E+03	
			46.54	9.904E+03	(P	1.665E+02	9.64E-01	4.25E+00 G
PB-212	N	7.2342E+00					6.98E+02	
			238.63	7.234E+00	(P	4.221E+00	1.91E+01	4.33E+01 G
			300.03	8.450E+00	? P	1.727E+02	6.14E+02	3.28E+00 GA
PB-214	N	7.8171E+00					5.84E+05	
			351.93	5.061E+00	(	5.362E+00	3.33E+01	3.76E+01 G
			295.09	1.319E+01	(	9.621E+00	3.05E+01	1.93E+01 G
			242.00	2.987E+00	-	2.603E+01	2.58E+02	7.43E+00 GA
BI-207	C	1.1587E+00					1.18E+04	
			569.70	1.159E+00	&(	2.525E+00	6.60E+01	9.77E+01 G
			1063.66	-1.645E+00	-	5.783E+00	1.60E+02	7.45E+01 G
BI-212	N	-2.1279E+01					6.98E+02	
			727.17	-2.128E+01	&(	5.555E+01	7.87E+01	7.55E+00 G
			785.42	-5.643E+01	+	2.628E+02	2.04E+02	1.28E+00 GA
U-235	N	-5.0052E-01					2.57E+11	
			143.79	-7.412E+00	?(P	3.434E+01	1.75E+02	1.10E+01 G
			205.33	-1.906E+01	+	4.591E+01	9.56E+01	5.01E+00 G
			163.38	1.441E+01	*(	4.874E+01	1.02E+02	5.08E+00 G
			185.72	1.544E+00		3.784E+00	9.72E+01	5.40E+01 GA
BI-214	N	1.1465E+01					5.84E+05	
			609.31	9.081E+00	@(P	5.482E+00	3.08E+01	4.61E+01 G
			1120.29	1.297E+01	?(P	3.475E+01	8.06E+01	1.51E+01 G
			1764.49	1.712E+01	?(P	7.573E+00	2.31E+01	1.54E+01 G
BI-210M	T	-9.0854E-01					1.10E+09	
			265.83	-9.085E-01	&(P	5.769E+00	1.43E+02	5.00E+01 G
			304.90	0.000E+00	+	2.054E+01	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	4.3005E+00					2.10E+03	
			911.07	-6.522E-01	%(	1.510E+01	1.05E+03	2.90E+01 G
			968.97	1.253E+01	?(	2.988E+01	7.20E+01	1.75E+01 G
			338.32	-1.026E+01	+	4.698E+01	1.38E+02	1.20E+01 G
			93.35	4.386E+00		8.159E+01	5.60E+02	5.56E+00 XA
TH-227	N	5.9456E+01					7.95E+03	
			50.14	5.946E+01	(	8.465E+01	4.34E+01	8.00E+00 G
			256.24	4.093E+00	-	3.233E+01	3.10E+02	7.00E+00 G
TH-229	N	-2.2391E+01					2.68E+06	
			193.51	-2.239E+01	?(	5.437E+01	9.64E+01	4.40E+00 G
			210.85	-1.056E+01	+	8.303E+01	2.35E+02	2.99E+00 G
TH-234	N	-5.8313E+01					1.63E+12	
			63.29	-5.831E+01	*(P	3.939E+02	1.22E+02	3.81E+00 G
			92.59	9.192E+00	& P	8.114E+01	2.66E+02	5.58E+00 G
PA-234	N	7.8099E+00					1.63E+12	
			131.29	3.838E+00	&(	1.879E+01	1.48E+02	1.80E+01 G
			946.02	1.021E+01	(	3.170E+01	1.42E+02	1.34E+01 G
			569.47	3.542E+00	&(	3.325E+01	2.76E+02	8.20E+00 G
			883.24	1.556E+01	?(	5.666E+01	1.09E+02	9.60E+00 G
			880.53	3.096E+01	&	8.964E+01	8.71E+01	6.00E+00 GA
PA-234M	N	-4.3457E+01					1.63E+12	
			1001.00	-8.570E+01	?(	7.702E+02	2.67E+02	8.37E-01 G
			766.41	7.682E+01	?(	1.304E+03	4.98E+02	2.94E-01 G
AM-241	T	1.2124E+03					1.58E+05	
			59.54	1.212E+03	(	1.645E+01	9.24E-01	3.59E+01 G
Np-237	F	-9.0008E-02					2.14E+06	
			86.49	-9.001E-02	%(	3.648E+01	1.22E+04	1.31E+01 G
Cs-136	F	-2.1818E+00					1.30E+01	
			818.50	-2.182E+00	?(	6.317E+00	8.72E+01	1.00E+02 G
			1048.07	1.690E+00	+	4.588E+00	8.14E+01	8.00E+01 G
			340.57	-4.889E-01	+	1.227E+01	7.53E+02	4.69E+01 G
Np-239	T	3.3730E+00					2.36E+00	
			103.70	2.695E+00	&	1.844E+01	2.06E+02	2.40E+01 X
			106.13	3.373E+00	&(	1.920E+01	1.72E+02	2.27E+01 G
			99.50	2.001E+00		1.006E+01	1.50E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	8.7492E+00					1.11E+01	
		531.00	8.749E+00	&(	2.002E+01	9.78E+01	1.30E+01 G
		91.10	2.773E+00	&	1.596E+01	1.74E+02	2.83E+01 G
TL-210 N	1.3865E+00					5.84E+05	
		799.60	1.466E+00	?(	4.095E+00	8.39E+01	9.90E+01 G
		296.00	1.287E+00	?(	7.046E+00	1.65E+02	7.90E+01 G
		1313.00	2.339E+00	?	1.000E+01	1.90E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	63.29	28531.	-117.	-0.065	122.33	-5.831E+01	P
Sn-126	64.28	29035.	-108.	-0.060	222.55	-2.090E+01	
Sn-126	86.94	4060.	53.	0.029	171.13	8.806E+00	
Sn-126	87.57	4112.	53.	0.029	172.12	2.118E+00	
Cd-109	88.04	4165.	53.	0.029	173.13	2.092E+01	
Nd-147	91.10	4218.	53.	0.029	173.73	2.773E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	92.59	4289.	35.	0.019	266.13	9.192E+00	P
AC-228	93.35	4324.	17.	0.009	560.15	4.386E+00	
EU-155	105.31	4422.	-55.	-0.031	170.28	-3.746E+00	
EU-152	121.78	1115.	-36.	-0.020	132.23	-1.819E+00	
EU-154	123.10	1134.	-55.	-0.031	87.35	-1.957E+00	
CE-144	133.54	2424.	47.	0.026	148.75	6.277E+00	
CO-57	136.47	2479.	47.	0.026	150.06	6.587E+00	
Tc-99m	140.51	2526.	29.	0.016	248.24	5.006E-01	
U-235	143.79	2738.	-53.	-0.030	174.53	-7.412E+00	P
Ba-140	162.66	956.	44.	0.025	99.73	1.173E+01	
U-235	163.38	1000.	44.	0.025	101.90	1.441E+01	
CE-139	165.85	1010.	-46.	-0.026	98.63	-9.449E-01	
Cf-251	176.60	594.	-29.	-0.016	158.32	-2.925E+00	
U-235	185.72	579.	47.	0.026	97.17	1.544E+00	
TH-229	193.51	752.	-54.	-0.030	96.42	-2.239E+01	
U-235	205.33	634.	-50.	-0.028	95.57	-1.906E+01	
TH-229	210.85	712.	-16.	-0.009	234.77	-1.056E+01	
Cf-251	227.00	583.	-8.	-0.004	565.75	-2.622E+00	
EU-152	244.69	1290.	-49.	-0.027	56.96	-1.412E+01	P
Cd-113m	263.70	555.	21.	0.011	162.75	7.963E+03	
BI-210M	265.83	678.	-20.	-0.011	143.10	-9.085E-01	P
TL-208	277.28	669.	11.	0.006	324.04	4.315E+00	
Hg-203	279.20	571.	41.	0.023	83.60	1.220E+00	
I-131	284.30	388.	39.	0.022	99.16	1.572E+01	P
TL-210	296.00	2182.	40.	0.022	164.83	1.287E+00	
La-140	328.76	1753.	-44.	-0.024	151.50	-5.925E+00	P
Cf-249	333.44	1774.	-44.	-0.024	136.70	-7.830E+00	
AC-228	338.32	1818.	-44.	-0.024	137.89	-1.026E+01	
EU-152	344.29	1372.	39.	0.022	135.07	4.186E+00	
I-131	364.48	400.	-22.	-0.012	179.26	-7.997E-01	
Cf-249	387.95	796.	-10.	-0.005	421.12	-4.490E-01	
SN-113	391.69	888.	14.	0.008	297.19	6.992E-01	P
AG-108M	433.94	460.	-19.	-0.011	222.20	-7.161E-01	
SB-125	463.37	889.	-49.	-0.027	87.03	-1.687E+01	
Ir-192	468.06	912.	-9.	-0.005	456.59	-6.566E-01	
BE-7	477.60	851.	-10.	-0.006	418.20	-3.543E+00	P
La-140	487.02	404.	-45.	-0.025	93.11	-3.672E+00	
RU-103	497.05	316.	-36.	-0.020	101.29	-1.521E+00	
RH-106	511.86	476.	27.	0.015	212.11	5.260E+00	
Nd-147	531.00	178.	28.	0.016	97.85	8.749E+00	
Ba-140	537.26	208.	9.	0.005	332.94	1.477E+00	P
CS-134	563.24	173.	21.	0.011	131.88	1.043E+01	
CS-134	569.32	170.	-6.	-0.003	318.65	-1.612E+00	
BI-207	569.70	141.	27.	0.015	65.96	1.159E+00	
TL-208	583.02	191.	18.	0.010	155.51	9.402E-01	
SB-125	600.50	802.	-20.	-0.011	201.49	-4.972E+00	
SB-124	602.73	895.	-34.	-0.019	124.43	-1.556E+00	
CS-134	604.71	861.	-34.	-0.019	121.93	-1.572E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	610.30	826.	-34.	-0.019	119.16	-2.698E+01	
AG-108M	614.28	840.	-35.	-0.019	119.87	-1.740E+00	
PM-144	618.06	875.	-28.	-0.016	149.02	-1.298E+00	
RH-106	621.92	790.	31.	0.017	130.04	1.421E+01	
SB-125	635.89	147.	3.	0.001	646.62	1.098E+00	
I-131	636.97	220.	-28.	-0.015	78.11	-1.799E+01	
PM-144	696.54	196.	-34.	-0.019	84.43	-1.722E+00	P
NB-94	702.63	201.	-35.	-0.019	82.38	-1.799E+00	P
SB-124	722.79	237.	-12.	-0.007	186.20	-5.671E+00	
AG-108M	722.94	200.	26.	0.014	79.75	1.475E+00	
EU-154	723.36	202.	10.	0.006	204.14	2.556E+00	
BI-212	727.17	279.	-31.	-0.017	78.65	-2.128E+01	
pm-146	735.72	164.	-27.	-0.015	108.03	-6.207E+00	P
pm-146	747.16	187.	-34.	-0.019	87.46	-5.296E+00	
ZR-95	756.73	117.	11.	0.006	215.73	1.062E+00	P
AG-110M	763.94	148.	9.	0.005	190.43	2.234E+00	P
NB-95	765.79	217.	-31.	-0.017	69.60	-1.689E+00	
EU-152	778.92	112.	20.	0.011	114.46	8.528E+00	
BI-212	785.42	154.	-13.	-0.007	204.39	-5.643E+01	
CS-134	795.87	194.	26.	0.014	79.31	1.686E+00	
TL-210	799.60	220.	26.	0.014	83.94	1.466E+00	
CS-134	801.95	259.	6.	0.003	407.09	3.661E+00	
CO-58	810.78	347.	-32.	-0.018	83.90	-1.844E+00	
La-140	815.77	327.	-34.	-0.019	51.76	-8.322E+00	P
Co-56	846.77	149.	9.	0.005	301.03	5.136E-01	
TL-208	860.56	149.	12.	0.006	224.12	5.641E+00	
NB-94	871.10	240.	-34.	-0.019	65.81	-2.096E+00	
EU-154	873.23	301.	-14.	-0.008	177.28	-6.938E+00	
Sc-46	889.28	423.	-33.	-0.019	52.37	-2.062E+00	P
y-88	898.04	140.	14.	0.008	194.48	8.985E-01	P
AG-110M	937.49	255.	-42.	-0.023	85.72	-7.831E+00	
EU-152	964.11	304.	6.	0.003	412.98	2.719E+00	
AC-228	968.97	264.	33.	0.018	72.03	1.253E+01	
EU-154	996.33	395.	-35.	-0.019	82.43	-2.238E+01	
EU-154	1004.77	419.	-13.	-0.007	224.31	-4.951E+00	
Co-56	1037.84	130.	11.	0.006	238.35	5.298E+00	P
RH-106	1050.36	194.	-14.	-0.008	138.53	-6.626E+01	
BI-207	1063.66	150.	-17.	-0.009	160.23	-1.645E+00	
Ga-68	1077.40	135.	-3.	-0.002	853.42	-7.759E+00	
FE-59	1099.25	107.	28.	0.015	86.49	3.652E+00	
EU-152	1112.07	248.	10.	0.006	217.62	5.674E+00	
Sc-46	1120.55	268.	-5.	-0.003	471.43	-3.721E-01	
Ta-182	1121.30	239.	27.	0.015	84.42	5.753E+00	
Ta-182	1189.05	11.	27.	0.015	33.22	1.340E+01	
Ta-182	1221.41	27.	1.	0.001	884.59	4.017E-01	
Co-56	1238.28	27.	9.	0.005	131.51	1.150E+00	P
NA-22	1274.53	21.	-1.	-0.001	497.49	-1.127E-01	
FE-59	1291.60	5.	13.	0.007	50.07	2.505E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
TL-210	1313.00	21.	6.	0.003	189.97	2.339E+00		
EU-152	1408.00	0.	8.	0.004	35.36	3.513E+00		
K-40	1460.83	8.	4.	0.002	142.96	4.008E+00		P
La-140	1596.21	6.	6.	0.004	96.69	6.853E-01		
SB-124	1690.98	0.	5.	0.003	44.72	1.138E+00		
Co-56	1771.35	36.	-8.	-0.004	118.12	-5.568E+00		
y-88	1836.06	0.	6.	0.003	40.82	7.088E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.5428E+00	-3.5428E+00	4.182E+02%	4.86E+01
NA-22	#A	-1.1266E-01	-1.1266E-01	4.975E+02%	2.05E+00
K-40	#A	4.0077E+00	4.0077E+00	1.430E+02%	1.43E+01
Sc-46	#A	-2.0623E+00	-2.0623E+00	5.237E+01%	6.09E+00
CR-51	#A	8.6255E-01	8.6256E-01	2.081E+03%	5.99E+01
MN-54	#A	-5.8530E-02	-5.8530E-02	2.634E+03%	3.54E+00
FE-59	#A	3.1549E+00	3.1550E+00	4.997E+01%	6.67E+00
Co-56	#A	1.1224E+00	1.1224E+00	1.315E+02%	3.54E+00
CO-57	#A	7.3068E-01	7.3068E-01	1.501E+02%	2.71E+00
CO-58	#A	-1.8441E+00	-1.8441E+00	8.390E+01%	5.14E+00
CO-60		1.5667E+02	1.5667E+02	1.694E+00%	1.95E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.15E+01
NB-94	#A	-1.7990E+00	-1.7990E+00	8.238E+01%	3.56E+00
ZR-95	#A	1.0621E+00	1.0621E+00	2.157E+02%	5.26E+00
NB-95	#A	-1.6887E+00	-1.6887E+00	6.960E+01%	3.89E+00
RU-103	#A	-1.5206E+00	-1.5206E+00	1.013E+02%	3.58E+00
RH-106	#A	1.4207E+01	1.4207E+01	1.300E+02%	6.15E+01
AG-108M	#A	3.8183E-01	3.8183E-01	7.975E+01%	3.87E+00
AG-110M	#A	5.2415E-01	5.2415E-01	1.904E+02%	7.75E+00
SN-113	#A	6.9921E-01	6.9921E-01	2.972E+02%	6.95E+00
SB-124	#A	-6.7455E-01	-6.7456E-01	4.472E+01%	6.44E+00
SB-125	#A	5.5077E-01	5.5077E-01	6.466E+02%	1.09E+01
I-131	#A	3.5494E-01	3.5496E-01	9.916E+01%	3.49E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.50E+01
Ga-68	#A	-7.6968E+00	-7.7587E+00	8.534E+02%	1.47E+02
Tc-99m	#A	4.9987E-01	5.0062E-01	2.482E+02%	4.13E+00
BA-133	#A	1.8174E+00	1.8174E+00	9.077E+01%	5.28E+00
CS-134	#A	5.4752E-01	5.4752E-01	7.931E+01%	6.38E+00
CS-137		3.4073E+02	3.4073E+02	1.388E+00%	3.35E+00
CE-139	#A	-9.4494E-01	-9.4494E-01	9.863E+01%	3.09E+00
Ba-140	#A	3.5594E+00	3.5595E+00	9.973E+01%	1.16E+01
La-140	#A	6.8524E-01	6.8527E-01	9.669E+01%	1.49E+00
CE-141	A	1.5097E+00	1.5097E+00	1.488E+02%	7.45E+00

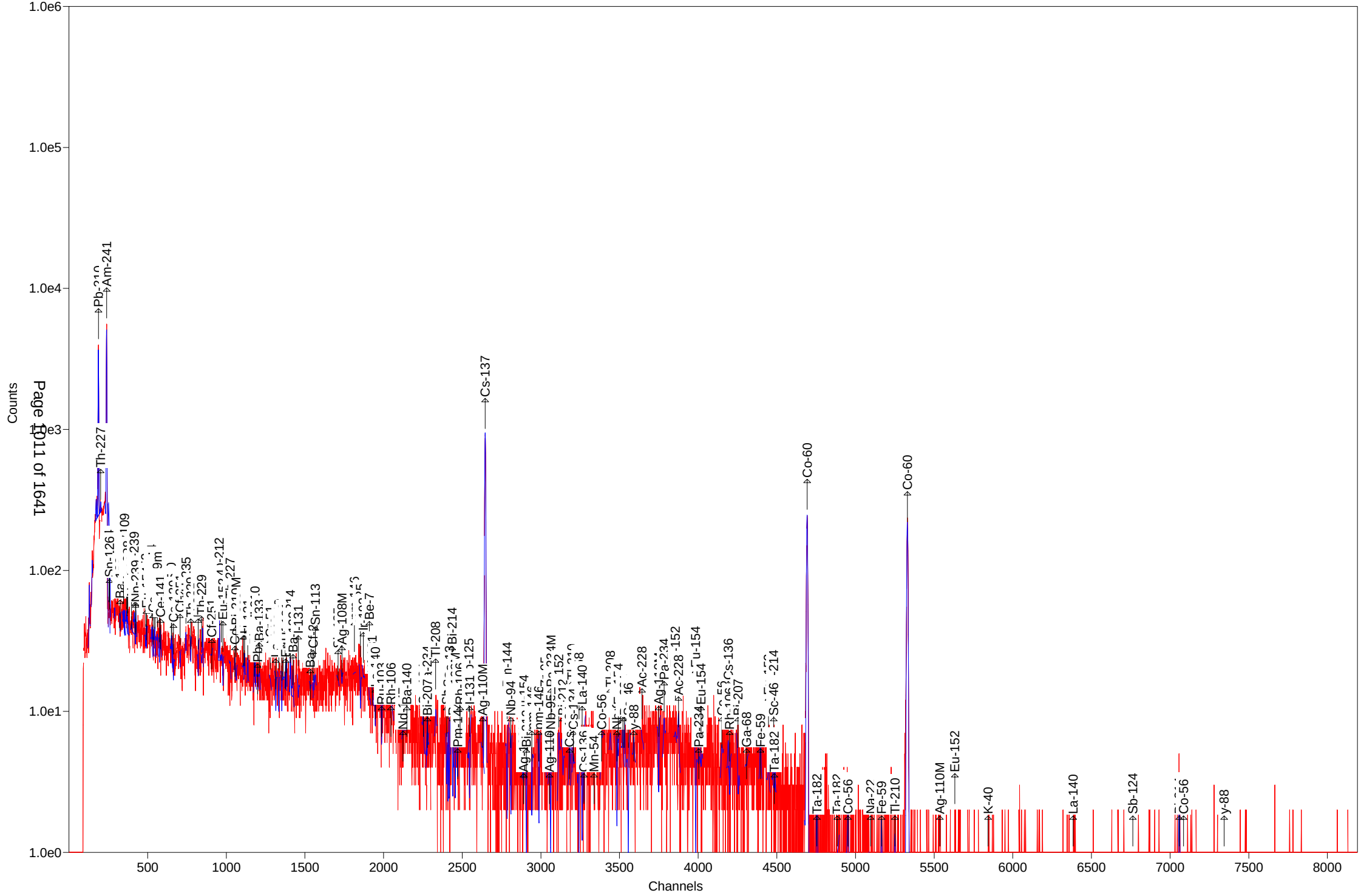
CE-144 #A	6.2769E+00	6.2770E+00	1.488E+02%	3.10E+01
PM-144 #A	-1.7219E+00	-1.7219E+00	8.443E+01%	3.45E+00
EU-152 #A	4.9996E+00	4.9996E+00	1.145E+02%	1.88E+01
EU-154 #A	-6.9376E+00	-6.9376E+00	1.773E+02%	4.14E+01
EU-155 #A	-3.7459E+00	-3.7459E+00	1.703E+02%	2.11E+01
HF-181 A	1.7750E+00	1.7750E+00	1.370E+02%	6.42E+00
Ta-182 #A	8.1785E+00	8.1786E+00	3.322E+01%	1.62E+01
Hg-203 #A	1.2201E+00	1.2202E+00	8.360E+01%	3.38E+00
TL-208 #A	1.7120E+00	1.7120E+00	1.412E+02%	3.44E+00
pm-146 #A	-5.2958E+00	-5.2958E+00	8.746E+01%	1.04E+01
y-88 #A	8.0094E-01	8.0094E-01	4.082E+01%	3.85E+00
Cd-113m#A	7.9632E+03	7.9632E+03	1.628E+02%	4.34E+04
Cd-109 #A	2.0917E+01	2.0917E+01	1.731E+02%	1.20E+02
Cf-251 #A	-2.9247E+00	-2.9247E+00	1.583E+02%	1.17E+01
Cf-249 #A	-4.4903E-01	-4.4903E-01	4.211E+02%	6.34E+00
Sn-126 #A	-2.0901E+01	-2.0901E+01	2.226E+02%	1.54E+02
PB-210	9.9044E+03	9.9044E+03	9.640E-01%	1.67E+02
PB-212	7.2342E+00	7.2342E+00	1.906E+01%	4.22E+00
PB-214	7.8171E+00	7.8171E+00	2.258E+01%	5.36E+00
BI-207 #A	1.1587E+00	1.1587E+00	6.596E+01%	2.53E+00
BI-212 #A	-2.1279E+01	-2.1279E+01	7.865E+01%	5.56E+01
U-235 #A	-5.0052E-01	-5.0052E-01	1.011E+02%	3.43E+01
BI-214 #	1.1465E+01	1.1465E+01	2.306E+01%	5.48E+00
BI-210M#A	-9.0854E-01	-9.0854E-01	1.431E+02%	5.77E+00
AC-228 #A	4.3005E+00	4.3005E+00	7.203E+01%	1.51E+01
TH-227 #A	5.9456E+01	5.9456E+01	4.339E+01%	8.46E+01
TH-229 #A	-2.2391E+01	-2.2391E+01	9.642E+01%	5.44E+01
TH-234 #A	-5.8313E+01	-5.8313E+01	1.223E+02%	3.94E+02
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.99E+02
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.63E+01
PA-234 A	7.8099E+00	7.8099E+00	9.006E+01%	1.88E+01
PA-234M#A	-4.3457E+01	-4.3457E+01	2.667E+02%	7.70E+02
AM-241	1.2124E+03	1.2124E+03	9.244E-01%	1.64E+01
Np-237 #A	-9.0008E-02	-9.0008E-02	1.220E+04%	3.65E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.80E+00
Cs-136 #A	-2.1818E+00	-2.1818E+00	8.722E+01%	6.32E+00
Np-239 A	3.3724E+00	3.3730E+00	1.718E+02%	1.92E+01
Nd-147 #A	8.7489E+00	8.7492E+00	9.785E+01%	2.00E+01
TL-210 #A	1.3865E+00	1.3865E+00	8.394E+01%	4.09E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.170E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.1700119E+04 Bq/Sample

376765_Gamma_LCS 160-376765~2-A. 15_Gamma_20182608.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20182735

Sample Description: 376765_Gamma_160-29569-A-1-C DU
Detector: Detector # 5
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29569-A-1-C DU

Decay to Time: 8/9/2018 17:12 Live Time: 1800 sec
Acquisition Time: 8/9/2018 17:13:04 Real Time: 1816 sec
Analysis Time: 8/9/2018 17:44 Dead Time: 0.86 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-07-14_1831.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.393E+00	87.5	2.970E+00	2.975E+00	1.009E+01
NA-22	-1.198E+00	60.1	7.201E-01	7.226E-01	2.353E+00
K-40	1.332E+02	9.0	1.197E+01	1.378E+01	1.165E+01
Sc-46	-8.648E-01	96.4	8.335E-01	8.347E-01	2.815E+00
CR-51	3.515E+00	120.4	4.232E+00	4.236E+00	1.435E+01
MN-54	3.293E-01	106.8	3.518E-01	3.522E-01	8.981E-01
FE-59	6.066E-01	180.9	1.097E+00	1.098E+00	2.646E+00
Co-56	7.298E-01	91.6	6.682E-01	6.692E-01	1.387E+00
CO-57	4.771E-01	89.5	4.268E-01	4.276E-01	9.981E-01
CO-58	-8.897E-02	474.3	4.220E-01	4.220E-01	1.548E+00
CO-60	6.294E-01	93.8	5.906E-01	5.914E-01	1.381E+00
ZN-65	-1.497E+00	119.1	1.783E+00	1.785E+00	6.099E+00
NB-94	-8.279E-01	91.4	7.563E-01	7.575E-01	1.813E+00
ZR-95	1.917E-01	108.2	2.075E-01	2.077E-01	2.548E+00
NB-95	-1.012E+00	63.6	6.444E-01	6.465E-01	2.124E+00
RU-103	-1.088E-01	416.2	4.527E-01	4.528E-01	1.332E+00
RH-106	-2.119E+00	67.1	1.423E+00	1.427E+00	1.703E+01
AG-108M	5.640E-01	51.1	2.879E-01	2.894E-01	6.926E-01
AG-110M	5.364E-01	44.7	2.399E-01	2.415E-01	3.162E+00
SN-113	4.989E-01	152.4	7.602E-01	7.606E-01	2.596E+00
SB-124	-6.340E-01	63.3	4.013E-01	4.027E-01	3.307E+00
SB-125	1.671E+00	30.7	5.133E-01	5.203E-01	4.031E+00
I-131	-1.453E-01	330.8	4.806E-01	4.806E-01	1.167E+00
Gd-153	6.212E-01	114.3	7.098E-01	7.108E-01	2.403E+00
Ga-68	-1.500E+01	201.7	3.026E+01	3.027E+01	7.067E+01
Tc-99m	1.756E-01	173.6	3.049E-01	3.050E-01	1.038E+00
BA-133	9.863E-02	876.4	8.644E-01	8.645E-01	2.984E+00
CS-134	1.420E-01	209.8	2.979E-01	2.980E-01	3.220E+00
CS-137	1.200E+00	34.2	4.106E-01	4.153E-01	1.029E+00
CE-139	6.658E-02	544.7	3.626E-01	3.627E-01	1.248E+00
Ba-140	3.040E-02	417.0	1.268E-01	1.268E-01	4.574E+00
La-140	4.183E-01	101.6	4.251E-01	4.257E-01	1.697E+00
CE-141	-1.605E-01	358.0	5.747E-01	5.748E-01	1.586E+00

CE-144	-2.468E+00	137.2	3.385E+00	3.387E+00	1.137E+01
PM-144	-9.838E-02	575.3	5.660E-01	5.660E-01	1.440E+00
EU-152	-1.594E+00	128.4	2.047E+00	2.048E+00	6.917E+00
EU-154	2.048E+00	37.9	7.767E-01	7.837E-01	1.298E+01
EU-155	1.023E+00	155.4	1.590E+00	1.591E+00	5.358E+00
HF-181	5.385E-01	116.9	6.294E-01	6.300E-01	1.649E+00
Ta-182	-1.619E-01	427.2	6.916E-01	6.916E-01	8.596E+00
Hg-203	3.036E-01	110.9	3.367E-01	3.371E-01	1.148E+00
TL-208	3.070E+00	14.1	4.324E-01	4.608E-01	4.392E-01
pm-146	1.288E+00	93.0	1.198E+00	1.200E+00	2.994E+00
y-88	1.762E-01	294.3	5.185E-01	5.185E-01	1.330E+00
Cd-113m	4.277E+03	98.9	4.231E+03	4.240E+03	1.438E+04
Cd-109	0.000E+00	1.#INF	3.225E+00	3.225E+00	3.715E+01
Cf-251	-6.591E-01	268.4	1.769E+00	1.770E+00	4.877E+00
Cf-249	-2.087E-01	366.4	7.648E-01	7.649E-01	2.643E+00
Sn-126	-3.756E+00	121.3	4.555E+00	4.560E+00	1.529E+01
PB-210	-6.570E+00	169.9	1.116E+01	1.117E+01	3.412E+01
PB-212	8.052E+00	9.9	7.962E-01	9.515E-01	1.573E+00
PB-214	6.538E+00	15.5	1.012E+00	1.068E+00	2.055E+00
BI-207	1.685E-02	1634.0	2.753E-01	2.753E-01	1.039E+00
BI-212	1.926E+01	20.4	3.931E+00	4.056E+00	5.914E+00
U-235	-2.113E-01	1567.6	3.313E+00	3.313E+00	8.620E+00
BI-214	8.809E+00	13.0	1.146E+00	1.234E+00	1.735E+00
BI-210M	1.818E-01	324.1	5.893E-01	5.894E-01	2.057E+00
AC-228	8.885E+00	18.2	1.615E+00	1.678E+00	5.170E+00
TH-227	1.024E+00	504.8	5.168E+00	5.169E+00	1.515E+01
TH-229	4.628E+00	80.5	3.727E+00	3.746E+00	1.951E+01
TH-234	2.227E+01	43.0	9.571E+00	9.642E+00	2.408E+01
PA-231	0.000E+00	1.#INF	3.790E+00	3.790E+00	7.291E+01
PA-233	0.000E+00	1.#INF	7.340E-01	7.340E-01	5.982E+00
PA-234	-3.128E-01	92.7	2.900E-01	2.905E-01	6.517E+00
PA-234M	2.004E+02	30.1	6.039E+01	6.123E+01	1.419E+02
AM-241	2.163E-01	530.8	1.148E+00	1.148E+00	3.341E+00
Np-237	-2.184E+00	151.8	3.315E+00	3.317E+00	1.112E+01
Ir-192	-4.936E-01	90.3	4.457E-01	4.466E-01	1.498E+00
Cs-136	-6.023E-01	93.4	5.624E-01	5.634E-01	1.912E+00
Np-239	9.531E-01	153.1	1.459E+00	1.461E+00	4.919E+00
Nd-147	-5.174E+00	93.7	4.849E+00	4.858E+00	1.205E+01
TL-210	0.000E+00	1.#INF	9.374E-02	9.374E-02	2.428E+00
Total	4.716E+03				

Analyst: Joey Sausto

Sample description
376765_Gamma_160-29569-A-1-C DU

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182735.An1

Acquisition information
Start time: 8/9/2018 5:13:04 PM
Live time: 1800
Real time: 1816
Dead time: 0.86 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 5:12:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-07-14_1831.PBC 7/14/2018 6:31:50 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2389

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	15.	67.92	0.74	1.789E-02	46.54	4.250	PBC<MDA	PB210
50.14	3.	504.77	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.54	4.	530.75	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.47	56.	30.79	0.52	2.720E-02	63.29	3.810	PBC<MDA	TH234
74.82	69.	20.83	0.81	3.152E-02				
77.18	121.	12.75	0.82	3.222E-02				
80.99	14.	129.89	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
92.50	4.	330.44	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.26	17.	141.47	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	12.	114.26	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	12.	116.05	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
105.31	14.	155.41	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
106.13	14.	153.12	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
122.06	16.	103.36	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.873E-01	CO57
136.47	13.	146.04	0.88	3.457E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.999E+00	CO57
140.51	9.	173.65	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	4.	435.89	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
165.85	3.	544.67	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
185.72	36.	45.89	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
193.51	5.	329.81	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.85	11.	80.54	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
238.70	153.	9.93	1.20	2.319E-02	238.63	43.300	8.465E+00	PB212
242.12	25.	44.39	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
263.70	10.	98.93	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	3.	324.08	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
277.28	11.	96.04	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	110.88	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.22	73.	13.92	1.21	1.945E-02	295.09	19.300	1.078E+01	PB214
301.13	7.	290.49	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
320.08	11.	120.40	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	173.70	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.57	35.	22.15	0.89	1.736E-02	338.32	12.010	9.348E+00	AC228
345.83	10.	122.64	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.12	74.	15.48	0.88	1.679E-02	351.93	37.600	6.538E+00	PB214
356.00	2.	876.42	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
391.69	9.	152.38	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
433.94	13.	51.05	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
463.37	24.	30.72	1.19	1.336E-02	463.37	10.470	9.370E+00	SB125
468.06	3.	316.55	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	87.53	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
482.00	4.	199.00	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	101.64	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
511.86	33.	51.87	2.48	1.230E-02	511.86	20.000	7.454E+00	RH106
563.24	1.	789.51	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	209.76	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.505E+00	PA234
					569.70	97.740	1.263E-01	BI207
569.47	4.	133.44	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.308E+00	PA234
					569.70	97.740	1.937E-01	BI207
583.41	52.	13.87	1.22	1.103E-02	583.02	84.500	3.070E+00	TL208
609.61	78.	13.01	1.42	1.063E-02	609.31	46.090	8.809E+00	BI214
					610.30	5.750	7.070E+01	RU103
635.89	1.	416.80	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
662.30	18.	34.21	1.44	9.924E-03	661.66	85.210	1.200E+00	CS137
724.20	7.	113.58	1.42	9.202E-03	724.20	44.150	PBC<MDA	ZR95
727.52	24.	20.41	2.31	9.170E-03	727.17	7.550	1.926E+01	BI212
747.16	7.	92.99	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
766.41	12.	87.06	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.577E+02	PA234M
785.32	9.	33.33	1.47	8.597E-03	785.42	1.280	4.544E+01	BI212
834.85	5.	106.82	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
846.77	6.	138.44	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
859.49	3.	245.20	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	5.	77.20	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
880.53	9.	93.62	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
898.04	2.	294.32	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.88	34.	28.83	1.57	7.591E-03	911.07	29.000	8.694E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.21	10.	86.02	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
996.33	7.	37.93	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	19.	30.13	1.64	7.014E-03	1001.00	0.837	1.803E+02	PA234M
1037.84	1.	563.08	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	6.	94.28	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	4.	180.85	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1120.55	7.	149.12	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.118E-01	Sc46
					1121.30	34.900	1.754E+00	Ta182
1120.82	10.	118.42	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1189.05	1.	702.38	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	9.	91.56	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1313.00	3.	206.16	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	6.	93.84	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	44.72	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	3.	170.87	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.43	131.	8.99	2.04	5.103E-03	1460.83	10.670	1.332E+02	K40
1764.35	16.	27.85	2.11	4.351E-03	1764.49	15.400	1.333E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.90	74.85	69.	69.	2.191E+03	20.82	0.813	- sD
308.36	77.22	59.	125.	3.890E+03	12.43	0.815	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	89.	-9.	-0.005	169.92	0.783
TH-227	200.11	50.14	78.	3.	0.002	504.77	0.787s
AM-241	237.72	59.54	124.	4.	0.002	530.75	0.797s
TH-234	253.46	63.47	82.	41.	0.023	42.97	0.523s
Sn-126	256.71	64.28	231.	-18.	-0.010	121.27	0.802s
BA-133	323.61	80.99	100.	14.	0.008	129.89	0.819

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.63	86.49	352.	-18.	-0.010	151.78	0.825s
Sn-126	347.43	86.94	333.	0.	0.000	1000.00	0.825s
Sn-126	349.95	87.57	333.	0.	0.000	1000.00	0.826s
Cd-109	351.83	88.04	333.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	337.	-18.	-0.010	146.14	0.829s
TH-234	370.05	92.59	87.	4.	0.002	330.44	0.831D
AC-228	373.09	93.35	285.	17.	0.010	141.47	0.832s
Gd-153	389.70	97.50	88.	12.	0.007	114.26	0.836s
Np-239	397.71	99.50	91.	12.	0.007	116.05	0.838s
Gd-153	412.52	103.20	181.	-16.	-0.009	119.20	0.842s
Np-239	414.52	103.70	197.	-4.	-0.002	566.18	0.842s
EU-155	420.98	105.31	234.	14.	0.008	155.41	0.844
Np-239	424.25	106.13	226.	14.	0.008	153.12	0.845s
EU-152	486.88	121.78	164.	-14.	-0.008	129.21	0.861
CO-57	488.03	122.06	126.	16.	0.009	103.36	0.861
EU-154	492.18	123.10	135.	-9.	-0.005	188.51	0.862s
PA-234	524.99	131.29	235.	-17.	-0.010	128.73	0.871s
HF-181	531.91	133.02	252.	-17.	-0.010	132.92	0.872s
CE-144	533.97	133.54	269.	-17.	-0.010	137.16	0.873s
CO-57	545.72	136.47	181.	13.	0.007	146.04	0.876s
Tc-99m	561.88	140.51	127.	9.	0.005	173.65	0.880s
CE-141	581.61	145.44	87.	-5.	-0.003	358.00	0.885s
Ba-140	650.54	162.66	150.	4.	0.002	435.89	0.902s
CE-139	663.32	165.85	132.	3.	0.002	544.67	0.905s
Cf-251	706.34	176.60	80.	-6.	-0.003	268.40	0.916s
U-235	742.85	185.72	73.	36.	0.020	45.89	0.925
TH-229	774.03	193.51	73.	5.	0.003	329.81	0.933s
U-235	821.35	205.33	74.	-10.	-0.006	219.93	0.945s
TH-229	843.44	210.85	23.	11.	0.006	80.54	0.950s
Cf-251	908.08	227.00	73.	-16.	-0.009	99.87	0.966s
PB-212	954.64	238.63	30.	146.	0.081	9.89	0.978D
PB-214	968.10	242.00	47.	25.	0.014	44.39	0.981D
EU-152	978.89	244.69	328.	-15.	-0.009	169.24	0.984s
TH-227	1025.11	256.24	55.	0.	0.000	1000.00	0.995s
Cd-113m	1054.97	263.70	43.	10.	0.005	98.93	1.002s
BI-210M	1063.50	265.83	62.	3.	0.002	324.08	1.005s
TL-208	1109.33	277.28	46.	11.	0.006	96.04	1.016
Hg-203	1117.00	279.20	46.	9.	0.005	110.88	1.017
I-131	1137.41	284.30	40.	-5.	-0.003	226.94	1.022s
PB-214	1181.10	295.22	8.	73.	0.040	13.92	1.206
TL-210	1184.24	296.00	242.	-11.	-0.006	195.62	1.034
PB-212	1200.37	300.03	214.	7.	0.004	290.49	1.038s
PA-231	1200.53	300.07	221.	0.	0.000	1000.00	1.038
PA-233	1200.97	300.18	221.	0.	0.000	1000.00	1.038
PA-231	1210.86	302.65	221.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	221.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	221.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	221.	0.	0.000	1000.00	1.042s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1234.03	308.44	221.	0.	0.000	1000.00	1.046
PA-233	1248.32	312.01	221.	0.	0.000	1000.00	1.049s
Ir-192	1266.25	316.49	75.	-14.	-0.008	90.30	1.053s
CR-51	1280.63	320.08	89.	11.	0.006	120.40	1.057s
La-140	1315.35	328.76	48.	8.	0.004	173.70	1.065s
Cf-249	1334.08	333.44	48.	-2.	-0.001	778.84	1.070s
AC-228	1354.59	338.57	8.	35.	0.019	22.15	0.893s
Cs-136	1362.62	340.57	146.	-13.	-0.007	134.64	1.077s
EU-152	1377.49	344.29	133.	-13.	-0.007	128.40	1.080s
HF-181	1383.66	345.83	70.	10.	0.006	122.64	1.082s
PB-214	1408.85	352.12	20.	74.	0.041	15.48	0.878
BA-133	1424.36	356.00	128.	2.	0.001	876.42	1.091s
I-131	1458.32	364.48	29.	-3.	-0.002	330.83	1.099s
BA-133	1535.78	383.84	86.	-12.	-0.006	115.93	1.117s
Cf-249	1552.22	387.95	97.	-4.	-0.002	366.43	1.121
SN-113	1567.19	391.69	86.	9.	0.005	152.38	1.125s
SB-125	1711.99	427.88	36.	-8.	-0.004	144.17	1.158s
AG-108M	1736.25	433.94	8.	13.	0.007	51.05	1.164s
SB-125	1854.01	463.37	14.	24.	0.013	30.72	1.191s
Ir-192	1872.79	468.06	60.	3.	0.002	316.55	1.195s
BE-7	1910.94	477.59	23.	8.	0.005	87.53	1.204s
HF-181	1928.56	482.00	37.	4.	0.002	199.00	1.208s
La-140	1948.65	487.02	20.	9.	0.005	101.64	1.212s
RU-103	1988.80	497.05	28.	-2.	-0.001	416.21	1.221s
RH-106	2048.06	511.86	40.	33.	0.018	51.87	2.485s
Nd-147	2124.62	531.00	44.	-14.	-0.008	93.72	1.252
Ba-140	2149.67	537.26	20.	-1.	-0.001	711.04	1.258s
CS-134	2253.60	563.24	16.	1.	0.001	789.51	1.280s
CS-134	2277.94	569.32	12.	2.	0.001	209.76	1.286
PA-234	2278.54	569.47	11.	4.	0.002	133.44	1.286
TL-208	2334.31	583.41	0.	52.	0.029	14.08	1.215
SB-125	2402.69	600.50	174.	-10.	-0.006	185.38	1.313s
SB-124	2411.61	602.73	166.	-12.	-0.007	63.30	1.315s
CS-134	2419.53	604.71	154.	0.	0.000	1000.00	1.317s
BI-214	2439.15	609.61	7.	78.	0.043	13.01	1.416
RU-103	2441.89	610.30	154.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	154.	0.	0.000	1000.00	1.325s
RH-106	2488.37	621.92	39.	-14.	-0.008	95.62	1.332s
SB-125	2544.26	635.89	10.	1.	0.001	416.80	1.344
I-131	2548.61	636.97	17.	-4.	-0.002	115.39	1.345s
AG-110M	2631.76	657.76	64.	-10.	-0.006	114.10	1.362s
CS-137	2649.90	662.30	8.	18.	0.010	34.21	1.443
PM-144	2786.90	696.54	22.	-2.	-0.001	575.33	1.395s
NB-94	2811.25	702.63	35.	-14.	-0.008	91.35	1.400s
SB-124	2891.88	722.79	46.	-9.	-0.005	117.50	1.417s
AG-108M	2892.48	722.94	37.	-4.	-0.002	199.50	1.417s
EU-154	2894.16	723.36	33.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	25.	7.	0.004	113.58	1.418s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	2910.79	727.52	0.	24.	0.013	20.41	2.312s
pm-146	2943.61	735.72	13.	-5.	-0.003	153.84	1.428
pm-146	2989.37	747.16	9.	7.	0.004	92.99	1.437
ZR-95	3027.65	756.73	17.	-3.	-0.002	184.22	1.445s
NB-95	3063.89	765.79	44.	-16.	-0.009	63.65	1.453s
PA-234M	3066.38	766.41	48.	12.	0.007	87.06	1.453s
EU-152	3116.41	778.92	23.	-10.	-0.006	103.93	1.463s
BI-212	3142.41	785.42	0.	9.	0.005	33.33	1.468s
CS-134	3184.19	795.87	42.	-10.	-0.006	93.07	1.477s
TL-210	3199.12	799.60	53.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	64.	-10.	-0.005	122.98	1.482s
CO-58	3243.82	810.78	19.	-1.	-0.001	474.34	1.489s
La-140	3263.80	815.77	21.	0.	0.000	1000.00	1.493s
Cs-136	3274.72	818.50	31.	-9.	-0.005	93.37	1.495s
MN-54	3340.10	834.85	5.	5.	0.003	106.82	1.508s
Co-56	3387.78	846.77	14.	6.	0.003	138.44	1.518s
TL-208	3442.95	860.56	15.	3.	0.002	245.20	1.529s
NB-94	3485.08	871.10	6.	5.	0.003	77.20	1.537s
EU-154	3493.61	873.23	18.	-1.	-0.001	731.91	1.539s
PA-234	3522.80	880.53	31.	9.	0.005	93.62	1.544s
PA-234	3533.64	883.24	40.	0.	0.000	1000.00	1.547
AG-110M	3539.41	884.68	40.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	62.	-12.	-0.007	96.39	1.551s
y-88	3592.83	898.04	10.	2.	0.001	294.32	1.558s
AC-228	3644.94	911.07	15.	34.	0.019	28.83	1.568s
PA-234	3784.70	946.02	28.	-13.	-0.007	90.69	1.595s
EU-152	3857.05	964.11	44.	-6.	-0.004	150.34	1.609s
AC-228	3876.48	968.97	30.	10.	0.005	86.02	1.612s
EU-154	3985.88	996.33	0.	7.	0.004	37.93	1.633s
PA-234M	4004.55	1001.00	7.	19.	0.011	30.13	1.636s
EU-154	4019.65	1004.77	26.	0.	0.000	1000.00	1.639s
Co-56	4151.87	1037.84	5.	1.	0.000	563.08	1.664
Cs-136	4192.77	1048.07	18.	0.	0.000	1000.00	1.671
RH-106	4201.93	1050.36	13.	6.	0.003	94.28	1.673s
BI-207	4255.11	1063.66	16.	-4.	-0.002	143.76	1.682
Ga-68	4310.04	1077.40	20.	-5.	-0.003	201.66	1.692s
FE-59	4397.41	1099.25	10.	4.	0.002	180.85	1.708s
EU-152	4448.68	1112.07	62.	-12.	-0.007	97.45	1.717s
ZN-65	4462.56	1115.55	50.	-9.	-0.005	119.12	1.720s
BI-214	4481.51	1120.29	65.	10.	0.006	118.42	1.723s
Sc-46	4482.57	1120.55	51.	7.	0.004	149.12	1.723s
Ta-182	4485.56	1121.30	46.	-2.	-0.001	486.48	1.724s
CO-60	4693.21	1173.24	15.	-6.	-0.003	195.29	1.760s
Ta-182	4756.42	1189.05	10.	1.	0.001	702.38	1.771s
Ta-182	4885.79	1221.41	48.	-19.	-0.010	87.38	1.793s
Co-56	4953.23	1238.28	11.	9.	0.005	91.56	1.804
NA-22	5098.13	1274.53	21.	-12.	-0.007	60.13	1.828s
EU-154	5098.19	1274.54	34.	0.	0.000	1000.00	1.828s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	5166.35	1291.60	21.	-9.	-0.005	84.87	1.840s
TL-210	5251.91	1313.00	5.	3.	0.001	206.16	1.854s
CO-60	5329.85	1332.50	6.	6.	0.003	93.84	1.866
AG-110M	5536.88	1384.30	0.	5.	0.003	44.72	1.899s
EU-152	5631.62	1408.00	6.	3.	0.002	170.87	1.914s
K-40	5845.15	1461.43	3.	131.	0.073	8.99	2.044
SB-124	6762.39	1690.98	6.	-3.	-0.001	218.12	2.076s
BI-214	7056.06	1764.49	2.	16.	0.009	27.85	2.114s
Co-56	7083.46	1771.35	18.	0.	0.000	1000.00	2.117s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.3935E+00					5.31E+01	
			477.60	3.393E+00	?(	1.009E+01	8.75E+01	1.05E+01 G
NA-22	C	-1.1976E+00					9.50E+02	
			1274.53	-1.198E+00	?(	2.353E+00	6.01E+01	9.99E+01 G
K-40	N	1.3315E+02					4.66E+11	
			1460.83	1.332E+02	(P	1.165E+01	8.99E+00	1.07E+01 G
Sc-46	F	-8.6478E-01					8.38E+01	
			889.28	-8.648E-01	?(	2.815E+00	9.64E+01	1.00E+02 G
			1120.55	6.118E-01	+	3.144E+00	1.49E+02	1.00E+02 G
CR-51	F	3.5150E+00					2.77E+01	
			320.08	3.515E+00	?(P	1.435E+01	1.20E+02	9.94E+00 G
MN-54	C	3.2929E-01					3.12E+02	
			834.85	3.293E-01	?(P	8.981E-01	1.07E+02	1.00E+02 G
FE-59	F	6.0663E-01					4.45E+01	
			1099.25	6.066E-01	?(	2.646E+00	1.81E+02	5.65E+01 G
			1291.60	-2.150E+00	+ P	5.520E+00	8.49E+01	4.32E+01 G
Co-56	C	7.2977E-01					7.73E+01	
			846.77	4.132E-01	?(	1.387E+00	1.38E+02	9.99E+01 G
			1238.28	1.254E+00	?(P	2.582E+00	9.16E+01	6.61E+01 G
			1037.84	5.164E-01	?(P	7.650E+00	5.63E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.860E+01	1.00E+03	1.55E+01 A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	4.7712E-01					2.72E+02	
			122.06	2.873E-01	?(	9.981E-01	1.03E+02	8.56E+01 G
			136.47	1.999E+00	?(	9.856E+00	1.46E+02	1.07E+01 G
CO-58	C	-8.8967E-02					7.09E+01	
			810.78	-8.897E-02	?(	1.548E+00	4.74E+02	9.95E+01 G
CO-60	F	6.2940E-01					1.93E+03	
			1332.50	6.294E-01	&(P	1.381E+00	9.38E+01	1.00E+02 G
			1173.24	-5.514E-01	- P	1.885E+00	1.95E+02	9.99E+01 G
ZN-65	F	-1.4971E+00					2.44E+02	
			1115.55	-1.497E+00	?(	6.099E+00	1.19E+02	5.06E+01 G
NB-94	I	-8.2791E-01					7.41E+06	
			702.63	-8.279E-01	?(	1.813E+00	9.14E+01	9.79E+01 G
			871.10	3.770E-01	+	9.853E-01	7.72E+01	9.99E+01 G
ZR-95	I	1.9174E-01					6.40E+01	
			756.73	-3.919E-01	?(P	2.548E+00	1.84E+02	5.45E+01 G
			724.20	9.117E-01	?(	3.578E+00	1.14E+02	4.42E+01 G
NB-95	I	-1.0124E+00					6.40E+01	
			765.79	-1.012E+00	?(	2.124E+00	6.36E+01	9.98E+01 G
RU-103	I	-1.0877E-01					3.93E+01	
			497.05	-1.088E-01	?(P	1.332E+00	4.16E+02	9.09E+01 G
			610.30	0.000E+00	+	5.509E+01	1.00E+03	5.75E+00 GA
RH-106	I	-2.1187E+00					3.74E+02	
			621.92	-7.435E+00	?(	1.703E+01	9.56E+01	9.93E+00 G
			1050.36	3.172E+01	&(	1.032E+02	9.43E+01	1.56E+00 G
			511.86	7.454E+00	?	7.269E+00	5.19E+01	2.00E+01 GA
AG-108M	C	5.6395E-01					1.53E+05	
			433.94	5.640E-01	?(P	6.926E-01	5.11E+01	9.05E+01 G
			722.94	-2.964E-01	-	2.073E+00	1.99E+02	9.08E+01 G
			614.28	0.000E+00	-	3.545E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.3644E-01					2.50E+02	
			884.68	0.000E+00	&(	3.162E+00	1.00E+03	7.27E+01 G
			657.76	-6.082E-01	+	2.359E+00	1.14E+02	9.46E+01 G
			937.49	-7.272E-02	%	3.697E+00	1.95E+03	3.44E+01 G
			1384.30	2.142E+00	?(	3.157E+00	4.47E+01	2.43E+01 G
			763.94	9.446E-02	%	6.915E+00	1.98E+03	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	4.9887E-01					1.15E+02	
			391.69	4.989E-01	?(	2.596E+00	1.52E+02	6.40E+01 G
SB-124	F	-6.3403E-01					6.02E+01	
			602.73	-6.340E-01	?(P	3.307E+00	6.33E+01	9.83E+01 G
			1690.98	-6.873E-01	+	3.557E+00	2.18E+02	4.78E+01 G
			722.79	-4.758E+00	+	1.913E+01	1.17E+02	1.08E+01 G
SB-125	I	1.6710E+00					1.01E+03	
			427.88	-1.052E+00	?(P	4.031E+00	1.44E+02	2.96E+01 G
			600.50	-2.951E+00	+	1.855E+01	1.85E+02	1.79E+01 G
			635.89	5.266E-01	+ P	8.317E+00	4.17E+02	1.13E+01 G
			463.37	9.370E+00	@(P	8.100E+00	3.07E+01	1.05E+01 G
I-131	I	-1.4526E-01					8.02E+00	
			364.48	-1.453E-01	&(P	1.167E+00	3.31E+02	8.17E+01 G
			284.30	-2.406E+00	+	1.457E+01	2.27E+02	6.14E+00 G
			636.97	-3.047E+00	+ P	1.659E+01	1.15E+02	7.17E+00 G
Gd-153	F	6.2120E-01					2.42E+02	
			97.50	6.212E-01	&(	2.403E+00	1.14E+02	3.00E+01 G
			103.20	-1.151E+00	+	4.613E+00	1.19E+02	2.18E+01 G
Ga-68	C	-1.5004E+01					4.71E-02	
			1077.40	-1.500E+01	?(	7.067E+01	2.02E+02	3.30E+00 G
Tc-99m	I	1.7558E-01					2.51E-01	
			140.51	1.756E-01	(	1.038E+00	1.74E+02	8.93E+01 G
BA-133	F	9.8634E-02					3.85E+03	
			356.00	9.863E-02	&(	2.984E+00	8.76E+02	6.20E+01 G
			302.85	0.000E+00	-	1.146E+01	1.00E+03	1.83E+01 G
			383.84	-4.635E+00	+	1.821E+01	1.16E+02	8.94E+00 GA
			80.99	6.878E-01	?	2.423E+00	1.30E+02	3.41E+01 GA
CS-134	I	1.4203E-01					7.54E+02	
			604.71	0.000E+00	?(	3.220E+00	1.00E+03	9.76E+01 G
			795.87	-8.021E-01	+	2.528E+00	9.31E+01	8.55E+01 G
			569.32	8.025E-01	&(	6.159E+00	2.10E+02	1.54E+01 G
			801.95	-7.189E+00	+	3.015E+01	1.23E+02	8.69E+00 G
			563.24	5.860E-01	?(	1.251E+01	7.90E+02	8.35E+00 G
CS-137	I	1.2003E+00					1.10E+04	
			661.66	1.200E+00	(P	1.029E+00	3.42E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	6.6580E-02					1.38E+02	
			165.85	6.658E-02	?(	1.248E+00	5.45E+02	7.99E+01 G
Ba-140	I	3.0398E-02					1.28E+01	
			537.26	-2.546E-01	?(P	4.574E+00	7.11E+02	2.44E+01 G
			162.66	1.148E+00	?(	1.715E+01	4.36E+02	6.22E+00 G
			304.85	0.000E+00	-	4.925E+01	1.00E+03	4.29E+00 G
La-140	I	4.1827E-01					1.28E+01	
			1596.21	4.099E-02	%(	1.697E+00	1.68E+03	9.54E+01 G
			487.02	8.714E-01	?(P	2.257E+00	1.02E+02	4.55E+01 G
			328.76	1.176E+00	*(P	5.405E+00	1.74E+02	2.03E+01 G
			815.77	0.000E+00	-	6.847E+00	1.00E+03	2.33E+01 G
CE-141	I	-1.6053E-01					3.25E+01	
			145.44	-1.605E-01	(	1.586E+00	3.58E+02	4.82E+01 G
CE-144	I	-2.4677E+00					2.85E+02	
			133.54	-2.468E+00	?(	1.137E+01	1.37E+02	1.11E+01 G
PM-144	C	-9.8380E-02					3.63E+02	
			696.54	-9.838E-02	?(	1.440E+00	5.75E+02	9.90E+01 G
			618.06	-9.610E-03	% P	3.232E+00	5.63E+03	9.91E+01 G
EU-152	F	-1.5941E+00					4.94E+03	
			344.29	-1.594E+00	?(	6.917E+00	1.28E+02	2.65E+01 G
			1112.07	-7.568E+00	+	2.493E+01	9.75E+01	1.36E+01 G
			121.78	-7.775E-01	&	3.387E+00	1.29E+02	2.86E+01 G
			778.92	-5.124E+00	+	1.251E+01	1.04E+02	1.29E+01 G
			964.11	-3.415E+00	+	1.776E+01	1.50E+02	1.46E+01 G
			244.69	-4.938E+00	+	2.810E+01	1.69E+02	7.58E+00 G
			1408.00	1.654E+00	& P	6.955E+00	1.71E+02	2.10E+01 GA
EU-154	I	2.0476E+00					3.14E+03	
			873.23	-6.524E-01	?(P	1.298E+01	7.32E+02	1.23E+01 G
			123.10	-3.373E-01	&	2.165E+00	1.89E+02	4.08E+01 G
			1274.54	0.000E+00	+	8.204E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.794E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	+	1.168E+01	1.00E+03	1.80E+01 G
			996.33	5.173E+00	?(	5.485E+00	3.79E+01	1.06E+01 G
EU-155	I	1.0233E+00					1.81E+03	
			105.31	1.023E+00	(P	5.358E+00	1.55E+02	2.12E+01 G
			86.54	-4.819E-02	%	4.628E+00	2.83E+03	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.3847E-01					4.24E+01	
			482.00	2.364E-01	?(P	1.649E+00	1.99E+02	8.05E+01 G
			133.02	-6.307E-01	+	2.816E+00	1.33E+02	4.33E+01 G
			345.83	2.152E+00	&(	8.988E+00	1.23E+02	1.51E+01 G
			136.30	-5.151E-02	&	2.239E+01	1.28E+04	5.85E+00 G
Ta-182	F	-1.6188E-01					1.14E+02	
			1121.30	-4.993E-01	?(	8.596E+00	4.86E+02	3.49E+01 G
			1221.41	-6.481E+00	+	1.214E+01	8.74E+01	2.70E+01 G
			1189.05	5.650E-01	?(	9.858E+00	7.02E+02	1.62E+01 G
Hg-203	F	3.0363E-01					4.66E+01	
			279.20	3.036E-01	?(P	1.148E+00	1.11E+02	8.15E+01 G
TL-208	N	3.0702E+00					6.98E+02	
			583.02	3.070E+00	(P	4.392E-01	1.41E+01	8.45E+01 G
			277.28	4.556E+00	+	1.483E+01	9.60E+01	6.31E+00 G
			860.56	1.885E+00	& P	1.154E+01	2.45E+02	1.24E+01 G
pm-146	C	1.2879E+00					2.02E+03	
			747.16	1.288E+00	(	2.994E+00	9.30E+01	3.40E+01 G
			735.72	-1.359E+00	-	5.305E+00	1.54E+02	2.25E+01 G
			453.88	8.260E-03	% P	1.850E+00	8.50E+03	6.50E+01 G
y-88	F	1.7615E-01					1.07E+02	
			898.04	1.762E-01	?(P	1.330E+00	2.94E+02	9.37E+01 G
			1836.06	-1.022E-02	% P	9.809E-01	5.87E+03	9.92E+01 G
Cd-113m		4.2771E+03					5.33E+03	
			263.70	4.277E+03	&(	1.438E+04	9.89E+01	6.00E-03 K
Cf-251	T	-6.5914E-01					3.28E+05	
			176.60	-6.591E-01	(	4.877E+00	2.68E+02	1.70E+01 G
			227.00	-5.752E+00	+	1.555E+01	9.99E+01	6.30E+00 GA
Cf-249	T	-2.0871E-01					1.28E+05	
			387.95	-2.087E-01	?(	2.643E+00	3.66E+02	6.60E+01 G
			333.44	-3.397E-01	+	7.111E+00	7.79E+02	1.55E+01 G
Sn-126		-3.7563E+00					3.65E+07	
			87.57	0.000E+00	&	3.764E+00	1.00E+03	3.75E+01 GA
			64.28	-3.756E+00	?(	1.529E+01	1.21E+02	9.70E+00 G
			86.94	0.000E+00	+	1.566E+01	1.00E+03	9.04E+00 GA
PB-210	N	-6.5702E+00					8.14E+03	
			46.54	-6.570E+00	?(P	3.412E+01	1.70E+02	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	8.0518E+00					6.98E+02	
			238.63	8.052E+00	(P	1.573E+00	9.89E+00	4.33E+01 G
			300.03	6.340E+00	& P	6.256E+01	2.90E+02	3.28E+00 GA
PB-214	N	6.5377E+00					5.84E+05	
			351.93	6.538E+00	(P	2.055E+00	1.55E+01	3.76E+01 G
			295.09	1.078E+01	+ P	2.374E+00	1.39E+01	1.93E+01 G
			242.00	8.028E+00		1.135E+01	4.44E+01	7.43E+00 GA
BI-207	C	1.6846E-02					1.18E+04	
			569.70	1.685E-02	&(	1.039E+00	1.63E+03	9.77E+01 G
			1063.66	-4.020E-01	+ P	2.362E+00	1.44E+02	7.45E+01 G
BI-212	N	1.9258E+01					6.98E+02	
			727.17	1.926E+01	(	5.914E+00	2.04E+01	7.55E+00 G
			785.42	4.544E+01	+	3.721E+01	3.33E+01	1.28E+00 GA
U-235	N	-2.1133E-01					2.57E+11	
			143.79	-2.113E-01	%(P	8.620E+00	1.57E+03	1.10E+01 G
			205.33	-4.242E+00	+ P	1.807E+01	2.20E+02	5.01E+00 G
			163.38	-8.355E-02	& P	2.136E+01	9.31E+03	5.08E+00 G
			185.72	1.286E+00	?	1.536E+00	4.59E+01	5.40E+01 GA
BI-214	N	8.8086E+00					5.84E+05	
			609.31	8.809E+00	(P	1.735E+00	1.30E+01	4.61E+01 G
			1120.29	5.780E+00	- P	2.327E+01	1.18E+02	1.51E+01 G
			1764.49	1.333E+01	+ P	7.607E+00	2.79E+01	1.54E+01 G
BI-210M	T	1.8184E-01					1.10E+09	
			265.83	1.818E-01	&(	2.057E+00	3.24E+02	5.00E+01 G
			304.90	0.000E+00	-	7.546E+00	1.00E+03	2.80E+01 G
AC-228	N	8.8854E+00					2.10E+03	
			911.07	8.694E+00	&(P	5.170E+00	2.88E+01	2.90E+01 G
			968.97	4.284E+00	-	1.246E+01	8.60E+01	1.75E+01 G
			338.32	9.348E+00	(P	4.215E+00	2.22E+01	1.20E+01 G
			93.35	4.836E+00	-	2.298E+01	1.41E+02	5.56E+00 XA
TH-227	N	1.0239E+00					7.95E+03	
			50.14	1.024E+00	?(P	1.515E+01	5.05E+02	8.00E+00 G
			256.24	0.000E+00	-	1.353E+01	1.00E+03	7.00E+00 G
TH-229	N	4.6283E+00					2.68E+06	
			193.51	2.136E+00	(	1.951E+01	3.30E+02	4.40E+00 G
			210.85	8.296E+00	&(	1.824E+01	8.05E+01	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   2.2275E+01                                      1.63E+12
                          63.29 2.227E+01 @(P 2.408E+01 4.30E+01 3.81E+00 G
                          92.59 1.145E+00 - P 1.303E+01 3.30E+02 5.58E+00 G

PA-234   N  -3.1283E-01                                      1.63E+12
                         131.29-1.507E+00 &(  6.517E+00 1.29E+02 1.80E+01 G
                         946.02-7.328E+00 +   1.543E+01 9.07E+01 1.34E+01 G
                         569.47 2.308E+00 &(  1.101E+01 1.33E+02 8.20E+00 G
                         883.24 0.000E+00 &   2.390E+01 1.00E+03 9.60E+00 G
                         880.53 1.067E+01 ?   3.397E+01 9.36E+01 6.00E+00 GA

PA-234M  N   2.0040E+02                                      1.63E+12
                        1001.00 1.803E+02 &(  1.419E+02 3.01E+01 8.37E-01 G
                         766.41 2.577E+02 ?(  7.557E+02 8.71E+01 2.94E-01 G

AM-241   T   2.1635E-01                                      1.58E+05
                          59.54 2.163E-01 ?(P 3.341E+00 5.31E+02 3.59E+01 G

Np-237   F  -2.1840E+00                                      2.14E+06
                          86.49-2.184E+00 @(  1.112E+01 1.52E+02 1.31E+01 G

Ir-192   F  -4.9358E-01                                      7.40E+01
                         316.49-4.936E-01  (  1.498E+00 9.03E+01 8.70E+01 G
                         468.06 2.833E-01 &   3.132E+00 3.17E+02 5.18E+01 G
                         308.44 0.000E+00 &   6.719E+00 1.00E+03 3.18E+01 G

Cs-136   F  -6.0229E-01                                      1.30E+01
                         818.50-6.023E-01 ?(  1.912E+00 9.34E+01 1.00E+02 G
                        1048.07 0.000E+00 +   2.313E+00 1.00E+03 8.00E+01 G
                         340.57-8.899E-01 +   4.049E+00 1.35E+02 4.69E+01 G

Np-239   T   9.5312E-01                                      2.36E+00
                         103.70-2.257E-01 -   4.366E+00 5.66E+02 2.40E+01 X
                         106.13 9.531E-01 *(  4.919E+00 1.53E+02 2.27E+01 G
                          99.50 1.240E+00 ?   4.872E+00 1.16E+02 1.50E+01 X

Nd-147      -5.1737E+00                                      1.11E+01
                         531.00-5.174E+00 &(  1.205E+01 9.37E+01 1.30E+01 G
                          91.10-1.007E+00 +   4.939E+00 1.46E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
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% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	89.	-9.	-0.005	169.92	-6.570E+00	P
TH-227	50.14	78.	3.	0.002	504.77	1.024E+00	P
AM-241	59.54	124.	4.	0.002	530.75	2.163E-01	P
Sn-126	64.28	231.	-18.	-0.010	121.27	-3.756E+00	
BA-133	80.99	100.	14.	0.008	129.89	6.878E-01	
Np-237	86.49	352.	-18.	-0.010	151.78	-2.184E+00	
Nd-147	91.10	337.	-18.	-0.010	146.14	-1.007E+00	
Gd-153	97.50	88.	12.	0.007	114.26	6.212E-01	
Np-239	99.50	91.	12.	0.007	116.05	1.240E+00	
Gd-153	103.20	181.	-16.	-0.009	119.20	-1.151E+00	
Np-239	103.70	197.	-4.	-0.002	566.18	-2.257E-01	
EU-155	105.31	234.	14.	0.008	155.41	1.023E+00	P
Np-239	106.13	226.	14.	0.008	153.12	9.531E-01	
EU-152	121.78	164.	-14.	-0.008	129.21	-7.775E-01	
CO-57	122.06	126.	16.	0.009	103.36	2.873E-01	
EU-154	123.10	135.	-9.	-0.005	188.51	-3.373E-01	
PA-234	131.29	235.	-17.	-0.010	128.73	-1.507E+00	
HF-181	133.02	252.	-17.	-0.010	132.92	-6.307E-01	
CE-144	133.54	269.	-17.	-0.010	137.16	-2.468E+00	
CO-57	136.47	181.	13.	0.007	146.04	1.999E+00	
Tc-99m	140.51	127.	9.	0.005	173.65	1.756E-01	
CE-141	145.44	87.	-5.	-0.003	358.00	-1.605E-01	
Ba-140	162.66	150.	4.	0.002	435.89	1.148E+00	
CE-139	165.85	132.	3.	0.002	544.67	6.658E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	176.60	80.	-6.	-0.003	268.40	-6.591E-01	
U-235	185.72	73.	36.	0.020	45.89	1.286E+00	
TH-229	193.51	73.	5.	0.003	329.81	2.136E+00	
U-235	205.33	74.	-10.	-0.006	219.93	-4.242E+00	P
TH-229	210.85	23.	11.	0.006	80.54	8.296E+00	
Cf-251	227.00	73.	-16.	-0.009	99.87	-5.752E+00	
EU-152	244.69	328.	-15.	-0.009	169.24	-4.938E+00	
Cd-113m	263.70	43.	10.	0.005	98.93	4.277E+03	
BI-210M	265.83	62.	3.	0.002	324.08	1.818E-01	
Hg-203	279.20	46.	9.	0.005	110.88	3.036E-01	P
I-131	284.30	40.	-5.	-0.003	226.94	-2.406E+00	
TL-210	296.00	242.	-11.	-0.006	195.62	-4.122E-01	
Ir-192	316.49	75.	-14.	-0.008	90.30	-4.936E-01	
CR-51	320.08	89.	11.	0.006	120.40	3.515E+00	P
La-140	328.76	48.	8.	0.004	173.70	1.176E+00	P
Cf-249	333.44	48.	-2.	-0.001	778.84	-3.397E-01	
Cs-136	340.57	146.	-13.	-0.007	134.64	-8.899E-01	
EU-152	344.29	133.	-13.	-0.007	128.40	-1.594E+00	
HF-181	345.83	70.	10.	0.006	122.64	2.152E+00	
BA-133	356.00	128.	2.	0.001	876.42	9.863E-02	
I-131	364.48	29.	-3.	-0.002	330.83	-1.453E-01	P
BA-133	383.84	86.	-12.	-0.006	115.93	-4.635E+00	
Cf-249	387.95	97.	-4.	-0.002	366.43	-2.087E-01	
SN-113	391.69	86.	9.	0.005	152.38	4.989E-01	
SB-125	427.88	36.	-8.	-0.004	144.17	-1.052E+00	P
AG-108M	433.94	8.	13.	0.007	51.05	5.640E-01	P
SB-125	463.37	14.	24.	0.013	30.72	9.370E+00	P
Ir-192	468.06	60.	3.	0.002	316.55	2.833E-01	
BE-7	477.59	23.	8.	0.005	87.53	3.393E+00	
HF-181	482.00	37.	4.	0.002	199.00	2.364E-01	P
La-140	487.02	20.	9.	0.005	101.64	8.714E-01	P
RU-103	497.05	28.	-2.	-0.001	416.21	-1.088E-01	P
RH-106	511.86	40.	33.	0.018	51.87	7.454E+00	
Nd-147	531.00	44.	-14.	-0.008	93.72	-5.174E+00	
Ba-140	537.26	20.	-1.	-0.001	711.04	-2.546E-01	P
CS-134	563.24	16.	1.	0.001	789.51	5.860E-01	
CS-134	569.32	12.	2.	0.001	209.76	8.025E-01	
PA-234	569.47	11.	4.	0.002	133.44	2.308E+00	
SB-125	600.50	174.	-10.	-0.006	185.38	-2.951E+00	
SB-124	602.73	166.	-12.	-0.007	63.30	-6.340E-01	P
RH-106	621.92	39.	-14.	-0.008	95.62	-7.435E+00	
SB-125	635.89	10.	1.	0.001	416.80	5.266E-01	P
I-131	636.97	17.	-4.	-0.002	115.39	-3.047E+00	P
AG-110M	657.76	64.	-10.	-0.006	114.10	-6.082E-01	
PM-144	696.54	22.	-2.	-0.001	575.33	-9.838E-02	
NB-94	702.63	35.	-14.	-0.008	91.35	-8.279E-01	
SB-124	722.79	46.	-9.	-0.005	117.50	-4.758E+00	
AG-108M	722.94	37.	-4.	-0.002	199.50	-2.964E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
ZR-95	724.20	25.	7.	0.004	113.58	9.117E-01		
pm-146	735.72	13.	-5.	-0.003	153.84	-1.359E+00		
pm-146	747.16	9.	7.	0.004	92.99	1.288E+00		
ZR-95	756.73	17.	-3.	-0.002	184.22	-3.919E-01		P
NB-95	765.79	44.	-16.	-0.009	63.65	-1.012E+00		
EU-152	778.92	23.	-10.	-0.006	103.93	-5.124E+00		
CS-134	795.87	42.	-10.	-0.006	93.07	-8.021E-01		
CS-134	801.95	64.	-10.	-0.005	122.98	-7.189E+00		
CO-58	810.78	19.	-1.	-0.001	474.34	-8.897E-02		
Cs-136	818.50	31.	-9.	-0.005	93.37	-6.023E-01		
MN-54	834.85	5.	5.	0.003	106.82	3.293E-01		P
Co-56	846.77	14.	6.	0.003	138.44	4.132E-01		
NB-94	871.10	6.	5.	0.003	77.20	3.770E-01		
EU-154	873.23	18.	-1.	-0.001	731.91	-6.524E-01		P
PA-234	880.53	31.	9.	0.005	93.62	1.067E+01		
Sc-46	889.28	62.	-12.	-0.007	96.39	-8.648E-01		
y-88	898.04	10.	2.	0.001	294.32	1.762E-01		P
PA-234	946.02	28.	-13.	-0.007	90.69	-7.328E+00		
EU-152	964.11	44.	-6.	-0.004	150.34	-3.415E+00		
EU-154	996.33	0.	7.	0.004	37.93	5.173E+00		
Co-56	1037.84	5.	1.	0.000	563.08	5.164E-01		P
RH-106	1050.36	13.	6.	0.003	94.28	3.172E+01		
BI-207	1063.66	16.	-4.	-0.002	143.76	-4.020E-01		P
Ga-68	1077.40	20.	-5.	-0.003	201.66	-1.500E+01		
FE-59	1099.25	10.	4.	0.002	180.85	6.066E-01		
EU-152	1112.07	62.	-12.	-0.007	97.45	-7.568E+00		
ZN-65	1115.55	50.	-9.	-0.005	119.12	-1.497E+00		
Sc-46	1120.55	51.	7.	0.004	149.12	6.118E-01		
Ta-182	1121.30	46.	-2.	-0.001	486.48	-4.993E-01		
CO-60	1173.24	15.	-6.	-0.003	195.29	-5.514E-01		P
Ta-182	1189.05	10.	1.	0.001	702.38	5.650E-01		
Ta-182	1221.41	48.	-19.	-0.010	87.38	-6.481E+00		
Co-56	1238.28	11.	9.	0.005	91.56	1.254E+00		P
NA-22	1274.53	21.	-12.	-0.007	60.13	-1.198E+00		
FE-59	1291.60	21.	-9.	-0.005	84.87	-2.150E+00		P
TL-210	1313.00	5.	3.	0.001	206.16	1.264E+00		
CO-60	1332.50	6.	6.	0.003	93.84	6.294E-01		P
AG-110M	1384.30	0.	5.	0.003	44.72	2.142E+00		
EU-152	1408.00	6.	3.	0.002	170.87	1.654E+00		P
SB-124	1690.98	6.	-3.	-0.001	218.12	-6.873E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.3935E+00	3.3935E+00	8.753E+01%	1.01E+01
NA-22	#A	-1.1976E+00	-1.1976E+00	6.013E+01%	2.35E+00
K-40		1.3315E+02	1.3315E+02	8.993E+00%	1.16E+01
Sc-46	#A	-8.6478E-01	-8.6478E-01	9.639E+01%	2.82E+00
CR-51	#A	3.5150E+00	3.5150E+00	1.204E+02%	1.43E+01
MN-54	#A	3.2928E-01	3.2929E-01	1.068E+02%	8.98E-01
FE-59	#A	6.0662E-01	6.0663E-01	1.809E+02%	2.65E+00
Co-56	#A	7.2976E-01	7.2977E-01	9.156E+01%	1.39E+00
CO-57	#A	4.7712E-01	4.7712E-01	8.946E+01%	9.98E-01
CO-58	#A	-8.8966E-02	-8.8967E-02	4.743E+02%	1.55E+00
CO-60	#A	6.2940E-01	6.2940E-01	9.384E+01%	1.38E+00
ZN-65	#A	-1.4971E+00	-1.4971E+00	1.191E+02%	6.10E+00
NB-94	#A	-8.2791E-01	-8.2791E-01	9.135E+01%	1.81E+00
ZR-95	#A	1.9174E-01	1.9174E-01	1.082E+02%	2.55E+00
NB-95	#A	-1.0124E+00	-1.0124E+00	6.365E+01%	2.12E+00
RU-103	#A	-1.0877E-01	-1.0877E-01	4.162E+02%	1.33E+00
RH-106	#A	-2.1187E+00	-2.1187E+00	6.714E+01%	1.70E+01
AG-108M	#A	5.6395E-01	5.6395E-01	5.105E+01%	6.93E-01
AG-110M	#A	5.3643E-01	5.3644E-01	4.472E+01%	3.16E+00
SN-113	#A	4.9887E-01	4.9887E-01	1.524E+02%	2.60E+00
SB-124	#A	-6.3402E-01	-6.3403E-01	6.330E+01%	3.31E+00
SB-125	#A	1.6710E+00	1.6710E+00	3.072E+01%	4.03E+00
I-131	#A	-1.4525E-01	-1.4526E-01	3.308E+02%	1.17E+00
Gd-153	#A	6.2120E-01	6.2120E-01	1.143E+02%	2.40E+00
Ga-68	#A	-1.4842E+01	-1.5004E+01	2.017E+02%	7.07E+01
Tc-99m	#A	1.7522E-01	1.7558E-01	1.736E+02%	1.04E+00
BA-133	#A	9.8634E-02	9.8634E-02	8.764E+02%	2.98E+00
CS-134	#A	1.4203E-01	1.4203E-01	2.098E+02%	3.22E+00
CS-137		1.2003E+00	1.2003E+00	3.421E+01%	1.03E+00
CE-139	#A	6.6579E-02	6.6580E-02	5.447E+02%	1.25E+00
Ba-140	#A	3.0396E-02	3.0398E-02	4.170E+02%	4.57E+00
La-140	#A	4.1825E-01	4.1827E-01	1.016E+02%	1.70E+00
CE-141	#A	-1.6053E-01	-1.6053E-01	3.580E+02%	1.59E+00
CE-144	#A	-2.4677E+00	-2.4677E+00	1.372E+02%	1.14E+01
PM-144	#A	-9.8380E-02	-9.8380E-02	5.753E+02%	1.44E+00
EU-152	#A	-1.5941E+00	-1.5941E+00	1.284E+02%	6.92E+00
EU-154	#A	2.0476E+00	2.0476E+00	3.793E+01%	1.30E+01
EU-155	#A	1.0233E+00	1.0233E+00	1.554E+02%	5.36E+00
HF-181	#A	5.3846E-01	5.3847E-01	1.169E+02%	1.65E+00
Ta-182	#A	-1.6188E-01	-1.6188E-01	4.272E+02%	8.60E+00
Hg-203	#A	3.0363E-01	3.0363E-01	1.109E+02%	1.15E+00
TL-208		3.0702E+00	3.0702E+00	1.408E+01%	4.39E-01
pm-146	#A	1.2879E+00	1.2879E+00	9.299E+01%	2.99E+00

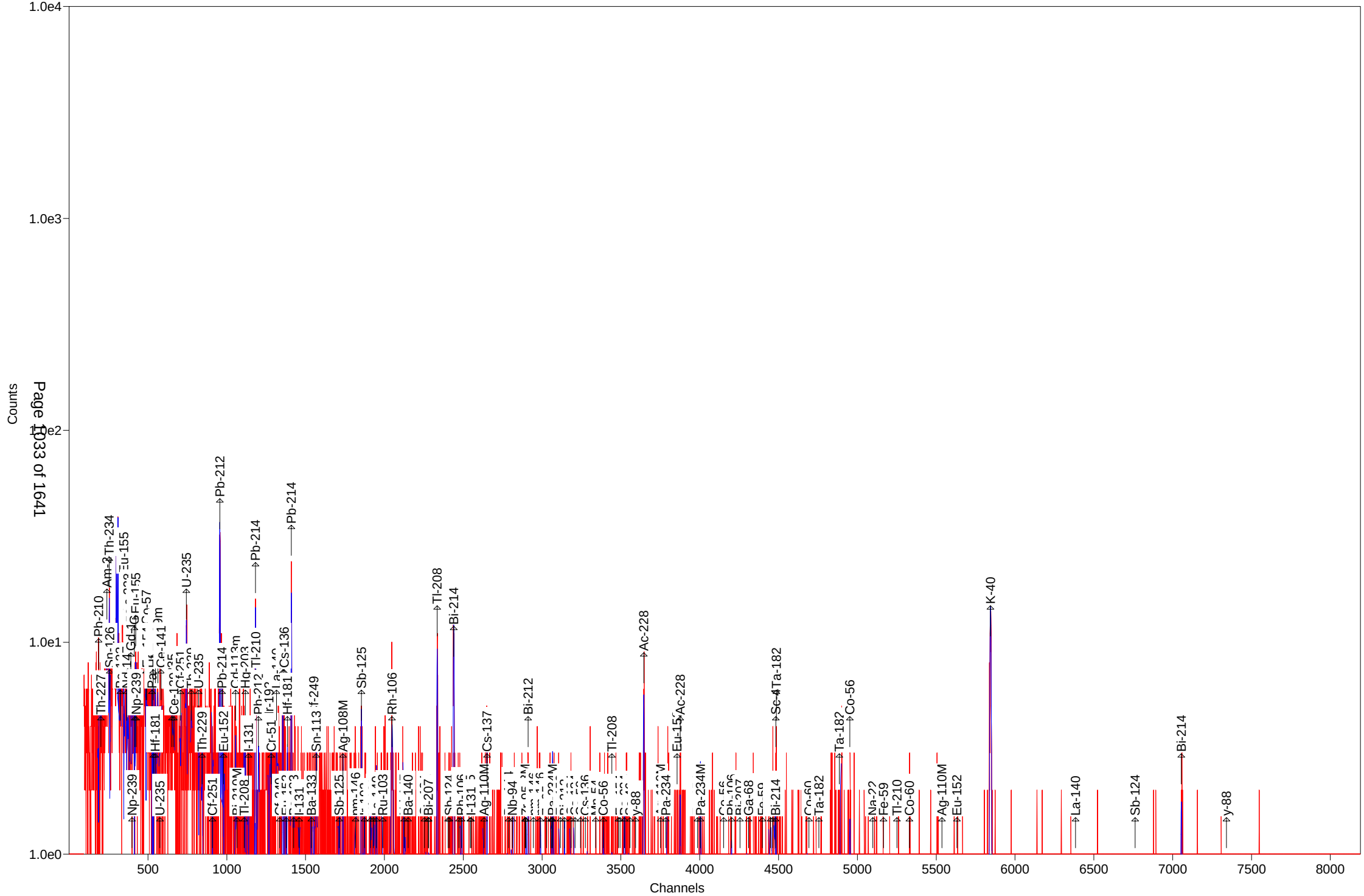
y-88 #A	1.7615E-01	1.7615E-01	2.943E+02%		1.33E+00
Cd-113m#A	4.2771E+03	4.2771E+03	9.893E+01%		1.44E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.72E+01
Cf-251 #A	-6.5914E-01	-6.5914E-01	2.684E+02%		4.88E+00
Cf-249 #A	-2.0871E-01	-2.0871E-01	3.664E+02%		2.64E+00
Sn-126 #A	-3.7563E+00	-3.7563E+00	1.213E+02%		1.53E+01
PB-210 #A	-6.5702E+00	-6.5702E+00	1.699E+02%		3.41E+01
PB-212	8.0518E+00	8.0518E+00	9.889E+00%		1.57E+00
PB-214	6.5377E+00	6.5377E+00	1.548E+01%		2.06E+00
BI-207 #A	1.6846E-02	1.6846E-02	1.634E+03%		1.04E+00
BI-212	1.9258E+01	1.9258E+01	2.041E+01%		5.91E+00
U-235 #A	-2.1133E-01	-2.1133E-01	1.568E+03%		8.62E+00
BI-214	8.8086E+00	8.8086E+00	1.301E+01%		1.73E+00
BI-210M#A	1.8184E-01	1.8184E-01	3.241E+02%		2.06E+00
AC-228 #	8.8854E+00	8.8854E+00	1.818E+01%		5.17E+00
TH-227 #A	1.0239E+00	1.0239E+00	5.048E+02%		1.51E+01
TH-229 #A	4.6283E+00	4.6283E+00	8.054E+01%		1.95E+01
TH-234 #A	2.2275E+01	2.2275E+01	4.297E+01%		2.41E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.29E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		5.98E+00
PA-234 #A	-3.1283E-01	-3.1283E-01	9.271E+01%		6.52E+00
PA-234M#	2.0040E+02	2.0040E+02	3.013E+01%		1.42E+02
AM-241 #A	2.1635E-01	2.1635E-01	5.308E+02%		3.34E+00
Np-237 #A	-2.1840E+00	-2.1840E+00	1.518E+02%		1.11E+01
Ir-192 #A	-4.9358E-01	-4.9358E-01	9.030E+01%		1.50E+00
Cs-136 #A	-6.0227E-01	-6.0229E-01	9.337E+01%		1.91E+00
Np-239 #A	9.5292E-01	9.5312E-01	1.531E+02%		4.92E+00
Nd-147 #A	-5.1735E+00	-5.1737E+00	9.372E+01%		1.20E+01
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.43E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 2.112E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 2.1124101E+02 Bq/Sample

376765_Gamma_160-29569-A-1-C DU. 5_Gamma_20182735.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181355

Sample Description: 376765_Gamma_160-29521-A-10-C
Detector: Detector #12
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-A-10-C

Decay to Time: 8/9/2018 18:07 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:07:16 Real Time: 1801 sec
Analysis Time: 8/9/2018 18:37 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-07-14_1810.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.785E+00	105.5	5.046E+00	5.052E+00	1.699E+01
NA-22	-1.405E-01	300.0	4.215E-01	4.215E-01	1.540E+00
K-40	1.567E+02	6.8	1.071E+01	1.332E+01	5.395E+00
Sc-46	4.405E-01	100.4	4.422E-01	4.427E-01	1.512E+00
CR-51	3.794E-01	1957.9	7.428E+00	7.428E+00	2.514E+01
MN-54	-5.141E-01	141.1	7.253E-01	7.257E-01	1.692E+00
FE-59	7.159E-01	90.5	6.481E-01	6.491E-01	1.498E+00
Co-56	7.612E-01	71.5	5.446E-01	5.460E-01	1.079E+00
CO-57	5.519E-02	486.7	2.686E-01	2.686E-01	9.263E-01
CO-58	-4.048E-01	114.6	4.638E-01	4.642E-01	1.591E+00
CO-60	1.165E-01	44.7	5.208E-02	5.240E-02	1.337E+00
ZN-65	0.000E+00	1.#INF	5.019E-01	5.019E-01	5.404E+00
NB-94	4.898E-01	39.1	1.915E-01	1.931E-01	1.059E+00
ZR-95	-8.792E-01	116.6	1.025E+00	1.026E+00	2.406E+00
NB-95	2.527E-01	174.3	4.403E-01	4.405E-01	1.536E+00
RU-103	3.904E-01	92.3	3.603E-01	3.608E-01	9.109E-01
RH-106	-4.607E+00	201.9	9.302E+00	9.305E+00	3.144E+01
AG-108M	2.277E-01	118.3	2.693E-01	2.696E-01	1.129E+00
AG-110M	7.706E-01	75.8	5.842E-01	5.855E-01	2.630E+00
SN-113	-3.641E-01	177.1	6.448E-01	6.451E-01	2.206E+00
SB-124	8.511E-01	79.1	6.734E-01	6.747E-01	3.209E+00
SB-125	6.614E-01	194.2	1.285E+00	1.285E+00	3.566E+00
I-131	-1.593E-01	71.5	1.140E-01	1.143E-01	1.398E+00
Gd-153	6.705E-02	1504.6	1.009E+00	1.009E+00	2.774E+00
Ga-68	1.968E+01	88.8	1.749E+01	1.752E+01	3.915E+01
Tc-99m	-3.329E-01	174.8	5.818E-01	5.821E-01	1.948E+00
BA-133	-1.074E-01	155.7	1.671E-01	1.672E-01	3.693E+00
CS-134	8.727E-02	1111.4	9.699E-01	9.699E-01	3.303E+00
CS-137	-6.822E-01	84.8	5.787E-01	5.797E-01	1.943E+00
CE-139	-7.147E-02	513.1	3.667E-01	3.667E-01	1.257E+00
Ba-140	3.455E-01	125.7	4.344E-01	4.347E-01	4.861E+00
La-140	7.042E-01	35.4	2.490E-01	2.516E-01	6.487E-01
CE-141	5.626E-01	173.6	9.764E-01	9.768E-01	3.274E+00

CE-144	-2.675E+00	158.6	4.243E+00	4.245E+00	1.421E+01
PM-144	-4.555E-02	1126.9	5.133E-01	5.133E-01	1.247E+00
EU-152	1.353E+00	86.6	1.172E+00	1.174E+00	5.851E+00
EU-154	1.037E+00	87.3	9.054E-01	9.069E-01	1.249E+01
EU-155	1.113E+00	133.8	1.489E+00	1.491E+00	5.011E+00
HF-181	-6.318E-01	111.3	7.034E-01	7.041E-01	2.369E+00
Ta-182	3.443E-01	302.3	1.041E+00	1.041E+00	7.890E+00
Hg-203	4.641E-02	755.0	3.504E-01	3.504E-01	1.224E+00
TL-208	2.764E+00	16.9	4.662E-01	4.869E-01	7.446E-01
pm-146	2.162E-01	172.0	3.718E-01	3.720E-01	3.519E+00
y-88	2.313E-01	180.9	4.183E-01	4.185E-01	1.009E+00
Cd-113m	4.671E+03	94.7	4.423E+03	4.431E+03	1.491E+04
Cd-109	0.000E+00	1.#INF	3.008E+00	3.008E+00	4.502E+01
Cf-251	-1.748E+00	115.4	2.017E+00	2.019E+00	5.184E+00
Cf-249	8.509E-01	78.2	6.655E-01	6.669E-01	1.779E+00
Sn-126	1.288E+00	378.9	4.879E+00	4.880E+00	1.323E+01
PB-210	1.010E+01	106.7	1.078E+01	1.080E+01	3.253E+01
PB-212	6.087E+00	11.8	7.187E-01	7.857E-01	1.695E+00
PB-214	1.540E+01	8.3	1.282E+00	1.501E+00	1.963E+00
BI-207	2.058E-01	198.2	4.077E-01	4.079E-01	1.418E+00
BI-212	3.425E+00	178.7	6.121E+00	6.123E+00	2.126E+01
U-235	2.159E+00	225.6	4.873E+00	4.874E+00	1.633E+01
BI-214	1.285E+01	10.3	1.330E+00	1.482E+00	2.273E+00
BI-210M	4.612E-01	102.3	4.719E-01	4.725E-01	1.601E+00
AC-228	8.496E+00	14.9	1.267E+00	1.338E+00	1.391E+00
TH-227	-9.400E-01	81.6	7.666E-01	7.686E-01	2.314E+01
TH-229	-2.948E+00	221.6	6.533E+00	6.535E+00	1.713E+01
TH-234	-1.186E+00	1092.2	1.295E+01	1.295E+01	4.399E+01
PA-231	1.039E+01	171.9	1.785E+01	1.786E+01	8.014E+01
PA-233	6.547E-01	243.1	1.591E+00	1.592E+00	6.820E+00
PA-234	7.033E-01	89.3	6.280E-01	6.290E-01	6.644E+00
PA-234M	0.000E+00	1.#INF	1.401E+01	1.401E+01	2.093E+02
AM-241	1.069E+00	129.5	1.385E+00	1.386E+00	4.641E+00
Np-237	1.390E+00	277.5	3.858E+00	3.859E+00	1.296E+01
Ir-192	6.053E-02	427.4	2.587E-01	2.587E-01	2.851E+00
Cs-136	-1.689E-02	2924.0	4.939E-01	4.939E-01	1.762E+00
Np-239	1.120E+00	131.8	1.476E+00	1.478E+00	4.959E+00
Nd-147	1.989E+00	153.4	3.052E+00	3.054E+00	7.522E+00
TL-210	9.785E-02	233.5	2.285E-01	2.285E-01	2.155E+00
Total	4.941E+03				

Analyst: Morgan Reichert

Sample description
376765_Gamma_160-29521-A-10-C

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181355.An1

Acquisition information

Start time:	8/9/2018 6:07:16 PM
Live time:	1800
Real time:	1801
Dead time:	0.06 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:07:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-07-14_1810.PBC 7/14/2018 6:10:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1522

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.57	14.	106.73	0.74	1.805E-02	46.54	4.250	PBC<MDA	PB210
59.54	19.	129.49	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
64.28	7.	378.87	0.87	3.015E-02	64.28	9.700	PBC<MDA	Sn126
74.69	102.	14.89	0.88	3.329E-02				
77.11	153.	12.22	0.88	3.385E-02				
80.99	3.	648.85	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
86.49	12.	277.53	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.930E-01	EU155
92.41	-12.	264.29	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
92.87	85.	25.41	1.57	3.645E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.329E+01	AC228
103.18	4.	713.79	0.91	3.720E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	2.494E-01	Np239
105.31	16.	133.78	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
106.13	17.	131.79	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
122.06	3.	486.66	0.93	3.724E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.519E-02	CO57
123.10	16.	94.90	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
144.02	15.	225.64	0.95	3.599E-02	143.79	10.960	PBC<MDA	U235
145.44	18.	173.56	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
162.66	11.	170.80	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
186.01	34.	38.60	1.08	3.215E-02	185.72	54.000	PBC<MDA	U235
238.53	121.	12.79	1.05	2.744E-02	238.63	43.300	5.676E+00	PB212
241.88	56.	23.30	1.05	2.716E-02	242.00	7.430	1.533E+01	PB214
256.24	14.	101.74	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
263.70	13.	94.69	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	11.	102.32	1.07	2.539E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.28	33.	30.40	1.08	2.462E-02	277.28	6.310	1.192E+01	TL208
279.20	2.	754.98	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
295.05	160.	10.20	1.48	2.350E-02	295.09	19.300	1.965E+01	PB214
					296.00	79.000	4.811E+00	TL210
300.03	12.	236.35	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.123E+01	PA231
					300.18	6.200	4.455E+00	PA233
300.07	12.	239.99	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.123E+01	PA231
					300.18	6.200	4.455E+00	PA233
300.18	12.	243.05	1.11	2.320E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.123E+01	PA231
					300.18	6.200	4.456E+00	PA233
302.65	12.	246.05	1.11	2.306E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.521E+00	BA133
302.85	12.	249.48	1.11	2.304E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.521E+00	BA133
304.85	10.	294.05	1.11	2.293E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	8.601E-01	BI210M
333.44	15.	104.19	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
351.69	222.	7.91	1.16	2.056E-02	351.93	37.600	1.540E+01	PB214
383.84	10.	108.30	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	10.	116.68	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
453.88	7.	172.02	1.26	1.692E-02	453.88	65.000	PBC<MDA	pm146
468.06	3.	427.40	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	10.	92.29	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	53.	31.16	2.56	1.546E-02	511.86	20.000	9.465E+00	RH106
531.00	7.	153.42	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
569.47	3.	420.71	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.202E+00	PA234
					569.70	97.740	1.009E-01	BI207
569.70	5.	198.17	1.37	1.427E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.452E+00	PA234
					569.70	97.740	2.058E-01	BI207
583.29	59.	16.86	0.41	1.403E-02	583.02	84.500	2.764E+00	TL208
600.50	11.	207.35	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	211.43	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
609.22	145.	10.35	1.03	1.359E-02	609.31	46.090	1.285E+01	BI214
					610.30	5.750	1.031E+02	RU103
614.28	11.	213.69	1.41	1.350E-02	614.28	89.850	PBC<MDA	AG108M
636.97	8.	102.98	1.43	1.315E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	82.31	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
702.63	7.	130.32	1.49	1.224E-02	702.63	97.900	PBC<MDA	NB94
722.79	11.	79.12	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.361E-01	AG108M
					723.36	20.220	2.410E+00	EU154
722.94	7.	130.27	1.51	1.199E-02	722.79	10.810	3.065E+00	SB124
					722.94	90.840	3.648E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	1.640E+00	EU154
727.17	6.	178.69	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
763.94	11.	75.81	1.55	1.152E-02	763.94	22.280	PBC<MDA	AG110M
765.79	5.	174.27	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.581E+01	PA234M
778.92	8.	105.33	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
846.77	6.	147.67	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
871.10	12.	39.09	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
889.28	8.	100.38	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
898.04	4.	180.85	1.67	1.025E-02	898.04	93.700	PBC<MDA	y88
910.65	45.	14.91	1.58	1.015E-02	911.07	29.000	8.496E+00	AC228
937.49	8.	89.66	1.71	9.939E-03	937.49	34.360	PBC<MDA	AG110M
946.02	8.	89.29	1.72	9.873E-03	946.02	13.400	PBC<MDA	PA234
964.11	6.	130.39	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
969.00	10.	80.85	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
996.33	4.	229.46	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1004.77	9.	87.34	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	7.	107.76	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1077.40	9.	88.84	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	6.	90.53	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	200.00	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1119.89	58.	13.13	1.76	8.722E-03	1120.29	15.100	2.447E+01	BI214
					1120.55	99.987	3.543E+00	Sc46
1173.24	5.	44.72	1.92	8.426E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	3.	302.33	1.96	8.175E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	112.49	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	1.	972.11	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	4.	137.50	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	7.	85.05	2.10	7.423E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	5.	126.49	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.58	214.	6.84	1.94	7.112E-03	1460.83	10.670	1.567E+02	K40
1596.21	8.	35.36	2.27	6.616E-03	1596.21	95.400	7.042E-01	La140
1764.74	10.	88.38	2.40	6.075E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.33	74.68	65.	102.	3.070E+03	14.89	0.880	- sD
307.98	77.09	97.	153.	4.514E+03	12.22	0.882	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.91	46.57	82.	14.	0.008	106.73	0.735s
TH-227	200.18	50.14	228.	-17.	-0.009	127.48	0.855s
AM-241	237.74	59.54	308.	19.	0.011	129.49	0.865s
Sn-126	256.71	64.28	206.	7.	0.004	378.87	0.869s
BA-133	323.50	80.99	147.	3.	0.002	648.85	0.887s
Np-237	345.49	86.49	518.	12.	0.006	277.53	0.892s
EU-155	345.70	86.54	530.	0.	0.000	1000.00	0.892s
Sn-126	347.29	86.94	530.	0.	0.000	1000.00	0.892s
Sn-126	349.81	87.57	530.	0.	0.000	1000.00	0.893s
Cd-109	351.68	88.04	530.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	530.	0.	0.000	1000.00	0.897s
TH-234	369.87	92.59	489.	-12.	-0.007	264.29	0.898
AC-228	371.01	92.87	104.	85.	0.047	25.41	1.568s
Np-239	397.50	99.50	378.	-19.	-0.011	145.60	0.905
Gd-153	412.29	103.20	381.	-19.	-0.011	145.46	0.909s
Np-239	414.29	103.70	407.	4.	0.002	713.79	0.909s
EU-155	420.73	105.31	216.	16.	0.009	133.78	0.911
Np-239	424.00	106.13	244.	17.	0.009	131.79	0.912
EU-152	486.55	121.78	107.	-9.	-0.005	171.92	0.928s
CO-57	487.69	122.06	117.	3.	0.002	486.66	0.928s
EU-154	491.84	123.10	114.	16.	0.009	94.90	0.929s
PA-234	524.60	131.29	270.	-20.	-0.011	121.01	0.938s
HF-181	531.51	133.02	548.	-20.	-0.011	163.93	0.939s
CE-144	533.57	133.54	473.	-20.	-0.011	158.62	0.940s
HF-181	544.61	136.30	493.	-20.	-0.011	161.33	0.943s
CO-57	545.30	136.47	513.	-20.	-0.011	164.46	0.943s
Tc-99m	561.44	140.51	532.	-19.	-0.010	174.76	0.947
U-235	574.53	143.79	590.	15.	0.009	225.64	0.950
CE-141	581.15	145.44	453.	18.	0.010	173.56	0.952s
Ba-140	649.99	162.66	171.	11.	0.006	170.80	0.969s
U-235	652.87	163.38	182.	0.	0.000	1000.00	0.970s
CE-139	662.76	165.85	160.	-4.	-0.002	513.09	0.973s
Cf-251	705.72	176.60	114.	-18.	-0.010	115.38	0.983s
U-235	743.33	186.01	50.	34.	0.019	38.60	1.078
TH-229	773.32	193.51	73.	-7.	-0.004	221.56	1.000s
U-235	820.59	205.33	84.	-17.	-0.009	104.72	1.012s
TH-229	842.65	210.85	92.	-12.	-0.006	156.30	1.018
Cf-251	907.22	227.00	103.	-18.	-0.010	109.90	1.034s
PB-212	953.73	238.63	52.	130.	0.072	11.81	1.045D
PB-214	967.18	242.00	56.	56.	0.031	23.30	1.049D
EU-152	977.96	244.69	392.	-19.	-0.010	152.15	1.051s
TH-227	1024.13	256.24	51.	14.	0.008	101.74	1.063
Cd-113m	1053.96	263.70	68.	13.	0.007	94.69	1.070s
BI-210M	1062.48	265.83	53.	11.	0.006	102.32	1.072s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.27	277.28	35.	33.	0.019	30.40	1.084
Hg-203	1115.93	279.20	78.	2.	0.001	754.98	1.086s
I-131	1136.32	284.30	59.	-6.	-0.003	256.34	1.091s
PB-214	1179.31	295.05	29.	160.	0.089	10.20	1.480s
TL-210	1183.11	296.00	354.	11.	0.006	233.49	1.102s
PB-212	1199.22	300.03	366.	12.	0.006	236.35	1.106
PA-231	1199.38	300.07	377.	12.	0.006	239.99	1.106s
PA-233	1199.82	300.18	387.	12.	0.006	243.05	1.107s
PA-231	1209.70	302.65	399.	12.	0.006	246.05	1.109s
BA-133	1210.50	302.85	410.	12.	0.006	249.48	1.109s
Ba-140	1218.49	304.85	422.	10.	0.006	294.05	1.111s
BI-210M	1218.68	304.90	432.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	432.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	432.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	432.	0.	0.000	1000.00	1.123
La-140	1314.10	328.76	102.	-15.	-0.008	98.66	1.135s
Cf-249	1332.81	333.44	120.	15.	0.009	104.19	1.139s
AC-228	1352.33	338.32	138.	-14.	-0.008	117.34	1.144s
Cs-136	1361.32	340.57	152.	0.	0.000	1000.00	1.146
EU-152	1376.18	344.29	142.	-8.	-0.004	228.04	1.150s
HF-181	1382.35	345.83	184.	-17.	-0.009	115.56	1.151s
PB-214	1405.80	351.69	28.	214.	0.119	8.33	1.159
BA-133	1423.02	356.00	304.	-13.	-0.007	186.33	1.162
I-131	1456.95	364.48	68.	-17.	-0.009	99.36	1.170s
BA-133	1534.35	383.84	55.	10.	0.006	108.30	1.189s
Cf-249	1550.79	387.95	65.	10.	0.006	116.68	1.193s
SN-113	1565.74	391.69	95.	-8.	-0.004	177.10	1.196s
SB-125	1710.45	427.88	44.	-4.	-0.002	328.51	1.232s
AG-108M	1734.69	433.94	40.	-5.	-0.003	251.66	1.238s
pm-146	1814.45	453.88	36.	7.	0.004	172.02	1.257s
SB-125	1852.39	463.37	47.	-6.	-0.003	175.59	1.266s
Ir-192	1871.16	468.06	56.	3.	0.001	427.40	1.271s
BE-7	1909.29	477.60	114.	-15.	-0.008	105.47	1.280s
HF-181	1926.90	482.00	128.	-15.	-0.008	111.34	1.284s
La-140	1946.98	487.02	164.	-16.	-0.009	114.81	1.289s
RU-103	1987.11	497.05	20.	10.	0.006	92.29	1.298s
RH-106	2046.35	511.86	33.	53.	0.029	31.16	2.563s
Nd-147	2122.88	531.00	26.	7.	0.004	153.42	1.331s
Ba-140	2147.92	537.26	39.	-8.	-0.004	163.22	1.337s
CS-134	2251.82	563.24	39.	-11.	-0.006	119.74	1.362s
CS-134	2276.15	569.32	43.	-15.	-0.008	67.08	1.367s
PA-234	2276.75	569.47	56.	3.	0.001	420.71	1.368s
BI-207	2277.68	569.70	50.	5.	0.003	198.17	1.368s
TL-208	2332.02	583.29	8.	59.	0.033	16.86	0.408s
SB-125	2400.87	600.50	248.	11.	0.006	207.35	1.397s
SB-124	2409.79	602.73	259.	11.	0.006	211.43	1.399s
BI-214	2435.77	609.22	24.	145.	0.080	10.35	1.033s
RU-103	2440.06	610.30	250.	11.	0.006	206.86	1.406s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2455.99	614.28	261.	11.	0.006	213.69	1.410s
PM-144	2471.12	618.06	272.	0.	0.000	1000.00	1.414s
RH-106	2486.54	621.92	242.	-11.	-0.006	201.91	1.417s
SB-125	2542.43	635.89	32.	-2.	-0.001	535.41	1.430s
I-131	2546.77	636.97	27.	8.	0.004	102.98	1.432
AG-110M	2629.92	657.76	22.	9.	0.005	82.31	1.451s
CS-137	2645.51	661.66	58.	-13.	-0.007	84.82	1.455
NB-94	2809.41	702.63	19.	7.	0.004	130.32	1.493s
SB-124	2890.04	722.79	29.	11.	0.006	79.12	1.512s
AG-108M	2890.65	722.94	40.	7.	0.004	130.27	1.512s
EU-154	2892.32	723.36	47.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	90.	-18.	-0.010	77.12	1.513s
BI-212	2907.58	727.17	47.	6.	0.003	178.69	1.516s
pm-146	2941.78	735.72	23.	-1.	-0.001	773.39	1.524
ZR-95	3025.83	756.73	28.	-10.	-0.006	116.62	1.543s
AG-110M	3054.69	763.94	28.	11.	0.006	75.81	1.550s
NB-95	3062.08	765.79	39.	5.	0.003	174.27	1.552s
PA-234M	3064.57	766.41	54.	-13.	-0.007	84.62	1.552s
EU-152	3114.61	778.92	14.	8.	0.004	105.33	1.564s
BI-212	3140.62	785.42	19.	-3.	-0.001	349.11	1.570s
CS-134	3182.42	795.87	60.	-15.	-0.008	79.53	1.579s
TL-210	3197.35	799.60	74.	-2.	-0.001	621.44	1.583s
CO-58	3242.06	810.78	38.	-8.	-0.004	114.56	1.593s
La-140	3262.05	815.77	46.	0.	0.000	1000.00	1.598s
MN-54	3338.38	834.85	42.	-10.	-0.006	141.07	1.615s
Co-56	3386.08	846.77	15.	6.	0.003	147.67	1.626s
TL-208	3441.27	860.56	30.	-3.	-0.002	405.52	1.638s
NB-94	3483.41	871.10	5.	12.	0.007	39.09	1.648s
EU-154	3491.95	873.23	32.	-6.	-0.003	150.48	1.650s
PA-234	3521.16	880.53	42.	-8.	-0.004	119.90	1.657s
PA-234	3532.00	883.24	50.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	50.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	30.	8.	0.005	100.38	1.664s
y-88	3591.22	898.04	10.	4.	0.002	180.85	1.672s
AC-228	3641.69	910.65	0.	45.	0.025	14.91	1.583s
AG-110M	3749.09	937.49	10.	8.	0.005	89.66	1.708s
PA-234	3783.21	946.02	10.	8.	0.005	89.29	1.716s
EU-152	3855.60	964.11	28.	6.	0.003	130.39	1.732s
AC-228	3875.05	968.97	31.	10.	0.006	80.85	1.736s
EU-154	3984.54	996.33	30.	4.	0.002	229.46	1.761s
PA-234M	4003.22	1001.00	34.	0.	0.000	1000.00	1.765s
EU-154	4018.33	1004.77	24.	9.	0.005	87.34	1.768s
Co-56	4150.66	1037.84	11.	7.	0.004	107.76	1.798s
Cs-136	4191.60	1048.07	25.	-10.	-0.006	75.58	1.807s
RH-106	4200.76	1050.36	38.	0.	0.000	1000.00	1.809s
Ga-68	4308.98	1077.40	11.	9.	0.005	88.84	1.833s
FE-59	4396.44	1099.25	5.	6.	0.004	90.53	1.852s
EU-152	4447.76	1112.07	69.	6.	0.003	200.00	1.863s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.66	1115.55	75.	0.	0.000	1000.00	1.866s
BI-214	4479.05	1119.89	0.	58.	0.032	13.13	1.761
Sc-46	4481.68	1120.55	77.	-2.	-0.001	635.02	1.870s
CO-60	4692.57	1173.24	0.	5.	0.003	44.72	1.916s
Ta-182	4885.39	1221.41	11.	3.	0.001	302.33	1.957
Co-56	4952.92	1238.28	17.	9.	0.005	112.49	1.972
NA-22	5098.03	1274.53	17.	-2.	-0.001	300.00	2.003s
EU-154	5098.09	1274.54	19.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	17.	1.	0.001	972.11	2.017s
TL-210	5252.04	1313.00	6.	4.	0.002	137.50	2.036s
CO-60	5330.11	1332.50	11.	-1.	-0.001	598.44	2.052s
AG-110M	5537.48	1384.30	6.	7.	0.004	85.05	2.096s
EU-152	5632.39	1408.00	6.	5.	0.003	126.49	2.115s
K-40	5842.89	1460.58	0.	214.	0.119	6.84	1.942
La-140	6386.02	1596.21	0.	8.	0.004	35.36	2.269s
SB-124	6765.58	1690.98	6.	-3.	-0.002	195.32	2.345s
BI-214	7060.00	1764.49	30.	10.	0.005	88.38	2.403s
Co-56	7087.48	1771.35	42.	-2.	-0.001	463.68	2.408s
y-88	7346.69	1836.06	13.	-7.	-0.004	132.21	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.7848E+00					5.31E+01
			477.60	-4.785E+00	?(	1.699E+01	1.05E+02 1.05E+01 G
NA-22	C	-1.4048E-01					9.50E+02
			1274.53	-1.405E-01	?(	1.540E+00	3.00E+02 9.99E+01 G
K-40	N	1.5667E+02					4.66E+11
			1460.83	1.567E+02	(	5.395E+00	6.84E+00 1.07E+01 G
Sc-46	F	4.4051E-01					8.38E+01
			889.28	4.405E-01	&(	1.512E+00	1.00E+02 1.00E+02 G
			1120.55	-1.521E-01	- P	2.785E+00	6.35E+02 1.00E+02 G
CR-51	F	3.7940E-01					2.77E+01
			320.08	3.794E-01	%(	2.514E+01	1.96E+03 9.94E+00 G
MN-54	C	-5.1412E-01					3.12E+02
			834.85	-5.141E-01	?(	1.692E+00	1.41E+02 1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	7.1593E-01					4.45E+01	
			1099.25	7.159E-01	?(	1.498E+00	9.05E+01	5.65E+01 G
			1291.60	1.642E-01	-	3.599E+00	9.72E+02	4.32E+01 G
Co-56	C	7.6115E-01					7.73E+01	
			846.77	3.118E-01	?(	1.079E+00	1.48E+02	9.99E+01 G
			1238.28	9.354E-01	?(	2.279E+00	1.12E+02	6.61E+01 G
			1037.84	3.124E+00	?(	7.639E+00	1.08E+02	1.41E+01 G
			1771.35	-1.185E+00	+	1.951E+01	4.64E+02	1.55E+01 A
CO-57	C	5.5188E-02					2.72E+02	
			122.06	5.519E-02	*(	9.263E-01	4.87E+02	8.56E+01 G
			136.47	-2.800E+00	+	1.542E+01	1.64E+02	1.07E+01 G
CO-58	C	-4.0481E-01					7.09E+01	
			810.78	-4.048E-01	?(	1.591E+00	1.15E+02	9.95E+01 G
CO-60	F	1.1646E-01					1.93E+03	
			1332.50	-9.689E-02	?(	1.337E+00	5.98E+02	1.00E+02 G
			1173.24	3.300E-01	?(	4.864E-01	4.47E+01	9.99E+01 G
NB-94	I	4.8983E-01					7.41E+06	
			702.63	3.399E-01	&(	1.059E+00	1.30E+02	9.79E+01 G
			871.10	6.367E-01	&(	6.967E-01	3.91E+01	9.99E+01 G
ZR-95	I	-8.7922E-01					6.40E+01	
			756.73	-8.792E-01	?(	2.406E+00	1.17E+02	5.45E+01 G
			724.20	-1.915E+00	+	4.921E+00	7.71E+01	4.42E+01 G
NB-95	I	2.5268E-01					6.40E+01	
			765.79	2.527E-01	?(	1.536E+00	1.74E+02	9.98E+01 G
RU-103	I	3.9038E-01					3.93E+01	
			497.05	3.904E-01	(	9.109E-01	9.23E+01	9.09E+01 G
			610.30	7.786E+00	?	5.443E+01	2.07E+02	5.75E+00 GA
RH-106	I	-4.6072E+00					3.74E+02	
			621.92	-4.607E+00	?(	3.144E+01	2.02E+02	9.93E+00 G
			1050.36	0.000E+00	+	1.219E+02	1.00E+03	1.56E+00 G
			511.86	9.465E+00	?	5.322E+00	3.12E+01	2.00E+01 GA
AG-108M	C	2.2766E-01					1.53E+05	
			433.94	-1.753E-01	?(	1.129E+00	2.52E+02	9.05E+01 G
			722.94	3.648E-01	?(	1.638E+00	1.30E+02	9.08E+01 G
			614.28	4.948E-01	?(	3.573E+00	2.14E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	7.7058E-01					2.50E+02	
			884.68	0.000E+00	?(	2.630E+00	1.00E+03	7.27E+01 G
			657.76	3.994E-01	?(	1.111E+00	8.23E+01	9.46E+01 G
			937.49	1.367E+00	?(	2.838E+00	8.97E+01	3.44E+01 G
			1384.30	2.247E+00	?(	4.253E+00	8.51E+01	2.43E+01 G
			763.94	2.332E+00	?(	5.922E+00	7.58E+01	2.23E+01 G
SN-113	F	-3.6411E-01					1.15E+02	
			391.69	-3.641E-01	?(	2.206E+00	1.77E+02	6.40E+01 G
SB-124	F	8.5110E-01					6.02E+01	
			602.73	4.492E-01	&(	3.209E+00	2.11E+02	9.83E+01 G
			1690.98	-6.148E-01	+	2.663E+00	1.95E+02	4.78E+01 G
			722.79	4.505E+00	?(	1.198E+01	7.91E+01	1.08E+01 G
SB-125	I	6.6142E-01					1.01E+03	
			427.88	-4.242E-01	?(	3.566E+00	3.29E+02	2.96E+01 G
			600.50	2.461E+00	?(	1.725E+01	2.07E+02	1.79E+01 G
			635.89	-5.597E-01	&	1.077E+01	5.35E+02	1.13E+01 G
			463.37	-1.805E+00	+	1.100E+01	1.76E+02	1.05E+01 G
I-131	I	-1.5930E-01					8.02E+00	
			364.48	-5.698E-01	?(	1.398E+00	9.94E+01	8.17E+01 G
			284.30	-2.122E+00	+	1.438E+01	2.56E+02	6.14E+00 G
			636.97	4.518E+00	?(	1.595E+01	1.03E+02	7.17E+00 G
Gd-153	F	6.7047E-02					2.42E+02	
			97.50	6.705E-02	%(	2.774E+00	1.50E+03	3.00E+01 G
			103.20	-1.317E+00	+	6.420E+00	1.45E+02	2.18E+01 G
Ga-68	C	1.9683E+01					4.71E-02	
			1077.40	1.968E+01	?(	3.915E+01	8.88E+01	3.30E+00 G
Tc-99m	I	-3.3294E-01					2.51E-01	
			140.51	-3.329E-01	&(	1.948E+00	1.75E+02	8.93E+01 G
BA-133	F	-1.0736E-01					3.85E+03	
			356.00	-5.884E-01	&(	3.693E+00	1.86E+02	6.20E+01 G
			302.85	1.521E+00	?(	1.277E+01	2.49E+02	1.83E+01 G
			383.84	3.270E+00	?	1.204E+01	1.08E+02	8.94E+00 GA
			80.99	1.569E-01	&	2.784E+00	6.49E+02	3.41E+01 GA
CS-134	I	8.7267E-02					7.54E+02	
			604.71	8.727E-02	%(	3.303E+00	1.11E+03	9.76E+01 G
			795.87	-8.435E-01	+	2.244E+00	7.95E+01	8.55E+01 G
			569.32	-3.803E+00	+	8.445E+00	6.71E+01	1.54E+01 G
			801.95	3.831E-01	%	2.526E+01	1.88E+03	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-5.084E+00	&	1.470E+01	1.20E+02	8.35E+00 G
CS-137	I	-6.8224E-01					1.10E+04	
			661.66	-6.822E-01	?(	1.943E+00	8.48E+01	8.52E+01 G
CE-139	F	-7.1467E-02					1.38E+02	
			165.85	-7.147E-02	?(	1.257E+00	5.13E+02	7.99E+01 G
Ba-140	I	3.4547E-01					1.28E+01	
			537.26	-1.222E+00	(	4.861E+00	1.63E+02	2.44E+01 G
			162.66	2.860E+00	?(	1.655E+01	1.71E+02	6.22E+00 G
			304.85	5.613E+00	?(	5.560E+01	2.94E+02	4.29E+00 G
La-140	I	7.0417E-01					1.28E+01	
			1596.21	7.042E-01	?(	6.487E-01	3.54E+01	9.54E+01 G
			487.02	-1.229E+00	-	4.746E+00	1.15E+02	4.55E+01 G
			328.76	-1.896E+00	&	6.291E+00	9.87E+01	2.03E+01 G
			815.77	0.000E+00	-	7.452E+00	1.00E+03	2.33E+01 G
CE-141	I	5.6255E-01					3.25E+01	
			145.44	5.626E-01	?(	3.274E+00	1.74E+02	4.82E+01 G
CE-144	I	-2.6748E+00					2.85E+02	
			133.54	-2.675E+00	?(	1.421E+01	1.59E+02	1.11E+01 G
PM-144	C	-4.5549E-02					3.63E+02	
			696.54	-4.555E-02	&(	1.247E+00	1.13E+03	9.90E+01 G
			618.06	0.000E+00	+	3.318E+00	1.00E+03	9.91E+01 G
EU-152	F	1.3525E+00					4.94E+03	
			344.29	-7.523E-01	?(	5.851E+00	2.28E+02	2.65E+01 G
			1112.07	2.786E+00	?(	1.923E+01	2.00E+02	1.36E+01 G
			121.78	-4.523E-01	+	2.653E+00	1.72E+02	2.86E+01 G
			778.92	3.023E+00	?(	7.612E+00	1.05E+02	1.29E+01 G
			964.11	2.353E+00	?(	1.066E+01	1.30E+02	1.46E+01 G
			244.69	-5.067E+00	+	2.584E+01	1.52E+02	7.58E+00 G
			1408.00	1.806E+00	?	5.101E+00	1.26E+02	2.10E+01 GA
EU-154	I	1.0366E+00					3.14E+03	
			873.23	-2.380E+00	?(	1.249E+01	1.50E+02	1.23E+01 G
			123.10	6.027E-01	+	1.919E+00	9.49E+01	4.08E+01 G
			1274.54	0.000E+00	+	4.593E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	7.944E+00	1.00E+03	2.02E+01 G
			1004.77	2.839E+00	&(	8.414E+00	8.73E+01	1.80E+01 G
			996.33	1.929E+00	?(	1.568E+01	2.29E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.1134E+00					1.81E+03	
			105.31	1.113E+00	(	5.011E+00	1.34E+02	2.12E+01 G
			86.54	0.000E+00	&	5.591E+00	1.00E+03	3.07E+01 G
HF-181	F	-6.3177E-01					4.24E+01	
			482.00	-6.318E-01	?(	2.369E+00	1.11E+02	8.05E+01 G
			133.02	-7.121E-01	+	3.906E+00	1.64E+02	4.33E+01 G
			345.83	-3.005E+00	+	1.167E+01	1.16E+02	1.51E+01 G
			136.30	-5.110E+00	+	2.760E+01	1.61E+02	5.85E+00 G
Ta-182	F	3.4426E-01					1.14E+02	
			1121.30	9.132E-02	%(	7.890E+00	2.46E+03	3.49E+01 G
			1221.41	6.712E-01	(	4.631E+00	3.02E+02	2.70E+01 G
			1189.05	2.741E-01	%	9.962E+00	1.58E+03	1.62E+01 G
Hg-203	F	4.6410E-02					4.66E+01	
			279.20	4.641E-02	?(	1.224E+00	7.55E+02	8.15E+01 G
TL-208	N	2.7645E+00					6.98E+02	
			583.02	2.764E+00	(	7.446E-01	1.69E+01	8.45E+01 G
			277.28	1.192E+01	+	1.078E+01	3.04E+01	6.31E+00 G
			860.56	-1.269E+00	-	1.194E+01	4.06E+02	1.24E+01 G
pm-146	C	2.1616E-01					2.02E+03	
			747.16	-4.651E-02	%(	3.519E+00	3.08E+03	3.40E+01 G
			735.72	-2.780E-01	+	5.259E+00	7.73E+02	2.25E+01 G
			453.88	3.536E-01	(	1.549E+00	1.72E+02	6.50E+01 G
y-88	F	2.3131E-01					1.07E+02	
			898.04	2.313E-01	?(	1.009E+00	1.81E+02	9.37E+01 G
			1836.06	-7.001E-01	+	1.883E+00	1.32E+02	9.92E+01 G
Cd-113m		4.6711E+03					5.33E+03	
			263.70	4.671E+03	(	1.491E+04	9.47E+01	6.00E-03 K
Cf-251	T	-1.7482E+00					3.28E+05	
			176.60	-1.748E+00	&(	5.184E+00	1.15E+02	1.70E+01 G
			227.00	-5.488E+00	+	1.551E+01	1.10E+02	6.30E+00 GA
Cf-249	T	8.5092E-01					1.28E+05	
			387.95	4.482E-01	?(	1.779E+00	1.17E+02	6.60E+01 G
			333.44	2.565E+00	&(	8.990E+00	1.04E+02	1.55E+01 G
Sn-126		1.2878E+00					3.65E+07	
			87.57	0.000E+00	-	4.558E+00	1.00E+03	3.75E+01 GA
			64.28	1.288E+00	?(	1.323E+01	3.79E+02	9.70E+00 G
			86.94	0.000E+00	-	1.896E+01	1.00E+03	9.04E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N 1.0102E+01					8.14E+03	
		46.54	1.010E+01	(P	3.253E+01	1.07E+02	4.25E+00 G
PB-212	N 6.0869E+00					6.98E+02	
		238.63	6.087E+00	(P	1.695E+00	1.18E+01	4.33E+01 G
		300.03	8.418E+00	+	6.703E+01	2.36E+02	3.28E+00 GA
PB-214	N 1.5396E+01					5.84E+05	
		351.93	1.540E+01	(P	1.963E+00	8.33E+00	3.76E+01 G
		295.09	1.965E+01	+ P	3.385E+00	1.02E+01	1.93E+01 G
		242.00	1.533E+01		1.037E+01	2.33E+01	7.43E+00 GA
BI-207	C 2.0575E-01					1.18E+04	
		569.70	2.058E-01	?(	1.418E+00	1.98E+02	9.77E+01 G
		1063.66	-5.485E-02	&	2.203E+00	1.76E+03	7.45E+01 G
BI-212	N 3.4255E+00					6.98E+02	
		727.17	3.425E+00	?(	2.126E+01	1.79E+02	7.55E+00 G
		785.42	-1.025E+01	+	8.778E+01	3.49E+02	1.28E+00 GA
U-235	N 2.1594E+00					2.57E+11	
		143.79	2.159E+00	?(P	1.633E+01	2.26E+02	1.10E+01 G
		205.33	-6.174E+00	+	1.665E+01	1.05E+02	5.01E+00 G
		163.38	0.000E+00	-	2.092E+01	1.00E+03	5.08E+00 G
		185.72	1.085E+00	P	1.142E+00	3.86E+01	5.40E+01 GA
BI-214	N 1.2852E+01					5.84E+05	
		609.31	1.285E+01	(P	2.273E+00	1.03E+01	4.61E+01 G
		1120.29	2.447E+01	+	3.109E+00	1.31E+01	1.51E+01 G
		1764.49	5.641E+00	-	1.689E+01	8.84E+01	1.54E+01 G
BI-210M	T 4.6123E-01					1.10E+09	
		265.83	4.612E-01	?(	1.601E+00	1.02E+02	5.00E+01 G
		304.90	0.000E+00	&	8.616E+00	1.00E+03	2.80E+01 G
AC-228	N 8.4961E+00					2.10E+03	
		911.07	8.496E+00	(	1.391E+00	1.49E+01	2.90E+01 G
		968.97	3.430E+00	-	9.331E+00	8.08E+01	1.75E+01 G
		338.32	-3.166E+00	-	1.252E+01	1.17E+02	1.20E+01 G
		93.35	2.329E+01	+	1.377E+01	2.54E+01	5.56E+00 XA
TH-227	N -9.4000E-01					7.95E+03	
		50.14	-5.402E+00	(	2.314E+01	1.27E+02	8.00E+00 G
		256.24	4.159E+00	(	1.099E+01	1.02E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-2.9485E+00					2.68E+06	
			193.51	-2.948E+00	?(	1.713E+01	2.22E+02	4.40E+00 G
			210.85	-7.275E+00	+	2.951E+01	1.56E+02	2.99E+00 G
TH-234	N	-1.1859E+00					1.63E+12	
			63.29	-1.186E+00	%(P	4.399E+01	1.09E+03	3.81E+00 G
			92.59	-3.224E+00	+ P	2.894E+01	2.64E+02	5.58E+00 G
PA-231	N	1.0389E+01					1.20E+07	
			302.65	9.674E+00	?(	8.014E+01	2.46E+02	2.88E+00 G
			300.07	1.123E+01	*(	9.074E+01	2.40E+02	2.46E+00 G
PA-233	C	6.5470E-01					7.82E+08	
			312.01	0.000E+00	&(	6.820E+00	1.00E+03	3.60E+01 G
			300.18	4.456E+00	(	3.647E+01	2.43E+02	6.20E+00 G
PA-234	N	7.0334E-01					1.63E+12	
			131.29	-1.638E+00	?(	6.644E+00	1.21E+02	1.80E+01 G
			946.02	3.543E+00	?(	7.326E+00	8.93E+01	1.34E+01 G
			569.47	1.202E+00	?(	1.776E+01	4.21E+02	8.20E+00 G
			883.24	0.000E+00	-	1.989E+01	1.00E+03	9.60E+00 G
			880.53	-7.122E+00	+	2.930E+01	1.20E+02	6.00E+00 GA
AM-241	T	1.0694E+00					1.58E+05	
			59.54	1.069E+00	&(	4.641E+00	1.29E+02	3.59E+01 G
Np-237	F	1.3901E+00					2.14E+06	
			86.49	1.390E+00	&(	1.296E+01	2.78E+02	1.31E+01 G
Ir-192	F	6.0531E-02					7.40E+01	
			316.49	0.000E+00	?(	2.851E+00	1.00E+03	8.70E+01 G
			468.06	1.623E-01	&(	2.437E+00	4.27E+02	5.18E+01 G
			308.44	0.000E+00	-	7.665E+00	1.00E+03	3.18E+01 G
Cs-136	F	-1.6891E-02					1.30E+01	
			818.50	-1.689E-02	%(	1.762E+00	2.92E+03	1.00E+02 G
			1048.07	-7.832E-01	+	1.983E+00	7.56E+01	8.00E+01 G
			340.57	0.000E+00	+	3.382E+00	1.00E+03	4.69E+01 G
Np-239	T	1.1201E+00					2.36E+00	
			103.70	2.494E-01	&	6.020E+00	7.14E+02	2.40E+01 X
			106.13	1.120E+00	(	4.959E+00	1.32E+02	2.27E+01 G
			99.50	-1.917E+00	+	9.353E+00	1.46E+02	1.50E+01 X
Nd-147		1.9892E+00					1.11E+01	
			531.00	1.989E+00	?(	7.522E+00	1.53E+02	1.30E+01 G
			91.10	0.000E+00	-	5.964E+00	1.00E+03	2.83E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210 N	9.7849E-02					5.84E+05	
		799.60	-9.924E-02	?(	2.155E+00	6.21E+02	9.90E+01 G
		296.00	3.447E-01	?(	2.712E+00	2.33E+02	7.90E+01 G
		1313.00	1.482E+00	?	4.721E+00	1.37E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	228.	-17.	-0.009	127.48	-5.402E+00	
AM-241	59.54	308.	19.	0.011	129.49	1.069E+00	
Sn-126	64.28	206.	7.	0.004	378.87	1.288E+00	
BA-133	80.99	147.	3.	0.002	648.85	1.569E-01	
Np-237	86.49	518.	12.	0.006	277.53	1.390E+00	
TH-234	92.59	489.	-12.	-0.007	264.29	-3.224E+00	P
Gd-153	103.20	381.	-19.	-0.011	145.46	-1.317E+00	
EU-155	105.31	216.	16.	0.009	133.78	1.113E+00	
EU-152	121.78	107.	-9.	-0.005	171.92	-4.523E-01	
CO-57	122.06	117.	3.	0.002	486.66	5.519E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	114.	16.	0.009	94.90	6.027E-01	
PA-234	131.29	270.	-20.	-0.011	121.01	-1.638E+00	
HF-181	133.02	548.	-20.	-0.011	163.93	-7.121E-01	
CE-144	133.54	473.	-20.	-0.011	158.62	-2.675E+00	
HF-181	136.30	493.	-20.	-0.011	161.33	-5.110E+00	
CO-57	136.47	513.	-20.	-0.011	164.46	-2.800E+00	
Tc-99m	140.51	532.	-19.	-0.010	174.76	-3.329E-01	
CE-141	145.44	453.	18.	0.010	173.56	5.626E-01	
Ba-140	162.66	171.	11.	0.006	170.80	2.860E+00	
CE-139	165.85	160.	-4.	-0.002	513.09	-7.147E-02	
Cf-251	176.60	114.	-18.	-0.010	115.38	-1.748E+00	
TH-229	193.51	73.	-7.	-0.004	221.56	-2.948E+00	
TH-229	210.85	92.	-12.	-0.006	156.30	-7.275E+00	
Cf-251	227.00	103.	-18.	-0.010	109.90	-5.488E+00	
EU-152	244.69	392.	-19.	-0.010	152.15	-5.067E+00	
TH-227	256.24	51.	14.	0.008	101.74	4.159E+00	
Cd-113m	263.70	68.	13.	0.007	94.69	4.671E+03	
BI-210M	265.83	53.	11.	0.006	102.32	4.612E-01	
Hg-203	279.20	78.	2.	0.001	754.98	4.641E-02	
I-131	284.30	59.	-6.	-0.003	256.34	-2.122E+00	
TL-210	296.00	354.	11.	0.006	233.49	3.447E-01	
PA-231	300.07	377.	12.	0.006	239.99	1.123E+01	
PA-233	300.18	387.	12.	0.006	243.05	4.456E+00	
PA-231	302.65	399.	12.	0.006	246.05	9.674E+00	
BA-133	302.85	410.	12.	0.006	249.48	1.521E+00	
Ba-140	304.85	422.	10.	0.006	294.05	5.613E+00	
Cf-249	333.44	120.	15.	0.009	104.19	2.565E+00	
EU-152	344.29	142.	-8.	-0.004	228.04	-7.523E-01	
HF-181	345.83	184.	-17.	-0.009	115.56	-3.005E+00	
BA-133	356.00	304.	-13.	-0.007	186.33	-5.884E-01	
I-131	364.48	68.	-17.	-0.009	99.36	-5.698E-01	
BA-133	383.84	55.	10.	0.006	108.30	3.270E+00	
Cf-249	387.95	65.	10.	0.006	116.68	4.482E-01	
SN-113	391.69	95.	-8.	-0.004	177.10	-3.641E-01	
SB-125	427.88	44.	-4.	-0.002	328.51	-4.242E-01	
AG-108M	433.94	40.	-5.	-0.003	251.66	-1.753E-01	
pm-146	453.88	36.	7.	0.004	172.02	3.536E-01	
SB-125	463.37	47.	-6.	-0.003	175.59	-1.805E+00	
Ir-192	468.06	56.	3.	0.001	427.40	1.623E-01	
BE-7	477.60	114.	-15.	-0.008	105.47	-4.785E+00	
HF-181	482.00	128.	-15.	-0.008	111.34	-6.318E-01	
RU-103	497.05	20.	10.	0.006	92.29	3.904E-01	
RH-106	511.86	33.	53.	0.029	31.16	9.465E+00	
Nd-147	531.00	26.	7.	0.004	153.42	1.989E+00	
Ba-140	537.26	39.	-8.	-0.004	163.22	-1.222E+00	
CS-134	563.24	39.	-11.	-0.006	119.74	-5.084E+00	
CS-134	569.32	43.	-15.	-0.008	67.08	-3.803E+00	
PA-234	569.47	56.	3.	0.001	420.71	1.202E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-207	569.70	50.	5.	0.003	198.17	2.058E-01		
SB-125	600.50	248.	11.	0.006	207.35	2.461E+00		
SB-124	602.73	259.	11.	0.006	211.43	4.492E-01		
RU-103	610.30	250.	11.	0.006	206.86	7.786E+00		
AG-108M	614.28	261.	11.	0.006	213.69	4.948E-01		
RH-106	621.92	242.	-11.	-0.006	201.91	-4.607E+00		
SB-125	635.89	32.	-2.	-0.001	535.41	-5.597E-01		
I-131	636.97	27.	8.	0.004	102.98	4.518E+00		
AG-110M	657.76	22.	9.	0.005	82.31	3.994E-01		
CS-137	661.66	58.	-13.	-0.007	84.82	-6.822E-01		
NB-94	702.63	19.	7.	0.004	130.32	3.399E-01		
SB-124	722.79	29.	11.	0.006	79.12	4.505E+00		
AG-108M	722.94	40.	7.	0.004	130.27	3.648E-01		
ZR-95	724.20	90.	-18.	-0.010	77.12	-1.915E+00		
BI-212	727.17	47.	6.	0.003	178.69	3.425E+00		
pm-146	735.72	23.	-1.	-0.001	773.39	-2.780E-01		
ZR-95	756.73	28.	-10.	-0.006	116.62	-8.792E-01		
AG-110M	763.94	28.	11.	0.006	75.81	2.332E+00		
NB-95	765.79	39.	5.	0.003	174.27	2.527E-01		
PA-234M	766.41	54.	-13.	-0.007	84.62	-2.137E+02		
EU-152	778.92	14.	8.	0.004	105.33	3.023E+00		
BI-212	785.42	19.	-3.	-0.001	349.11	-1.025E+01		
CS-134	795.87	60.	-15.	-0.008	79.53	-8.435E-01		
TL-210	799.60	74.	-2.	-0.001	621.44	-9.924E-02		
CO-58	810.78	38.	-8.	-0.004	114.56	-4.048E-01		
MN-54	834.85	42.	-10.	-0.006	141.07	-5.141E-01		
Co-56	846.77	15.	6.	0.003	147.67	3.118E-01		
NB-94	871.10	5.	12.	0.007	39.09	6.367E-01		
EU-154	873.23	32.	-6.	-0.003	150.48	-2.380E+00		
PA-234	880.53	42.	-8.	-0.004	119.90	-7.122E+00		
Sc-46	889.28	30.	8.	0.005	100.38	4.405E-01		
y-88	898.04	10.	4.	0.002	180.85	2.313E-01		
AG-110M	937.49	10.	8.	0.005	89.66	1.367E+00		
PA-234	946.02	10.	8.	0.005	89.29	3.543E+00		
EU-152	964.11	28.	6.	0.003	130.39	2.353E+00		
EU-154	996.33	30.	4.	0.002	229.46	1.929E+00		
EU-154	1004.77	24.	9.	0.005	87.34	2.839E+00		
Co-56	1037.84	11.	7.	0.004	107.76	3.124E+00		
Cs-136	1048.07	25.	-10.	-0.006	75.58	-7.832E-01		
Ga-68	1077.40	11.	9.	0.005	88.84	1.968E+01		
FE-59	1099.25	5.	6.	0.004	90.53	7.159E-01		
EU-152	1112.07	69.	6.	0.003	200.00	2.786E+00		
Sc-46	1120.55	77.	-2.	-0.001	635.02	-1.521E-01		P
CO-60	1173.24	0.	5.	0.003	44.72	3.300E-01		
Ta-182	1221.41	11.	3.	0.001	302.33	6.712E-01		
Co-56	1238.28	17.	9.	0.005	112.49	9.354E-01		
NA-22	1274.53	17.	-2.	-0.001	300.00	-1.405E-01		
FE-59	1291.60	17.	1.	0.001	972.11	1.642E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	1313.00	6.	4.	0.002	137.50	1.482E+00	
CO-60	1332.50	11.	-1.	-0.001	598.44	-9.689E-02	
AG-110M	1384.30	6.	7.	0.004	85.05	2.247E+00	
EU-152	1408.00	6.	5.	0.003	126.49	1.806E+00	
SB-124	1690.98	6.	-3.	-0.002	195.32	-6.148E-01	
Co-56	1771.35	42.	-2.	-0.001	463.68	-1.185E+00	
y-88	1836.06	13.	-7.	-0.004	132.21	-7.001E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.7848E+00	-4.7848E+00	1.055E+02%	1.70E+01
NA-22	#A	-1.4048E-01	-1.4048E-01	3.000E+02%	1.54E+00
K-40		1.5667E+02	1.5667E+02	6.836E+00%	5.40E+00
Sc-46	#A	4.4051E-01	4.4051E-01	1.004E+02%	1.51E+00
CR-51	#A	3.7940E-01	3.7940E-01	1.958E+03%	2.51E+01
MN-54	#A	-5.1412E-01	-5.1412E-01	1.411E+02%	1.69E+00
FE-59	#A	7.1593E-01	7.1593E-01	9.053E+01%	1.50E+00
Co-56	#A	7.6115E-01	7.6115E-01	7.155E+01%	1.08E+00
CO-57	#A	5.5188E-02	5.5188E-02	4.867E+02%	9.26E-01
CO-58	#A	-4.0481E-01	-4.0481E-01	1.146E+02%	1.59E+00
CO-60	#A	1.1646E-01	1.1646E-01	4.472E+01%	1.34E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.40E+00
NB-94	#A	4.8983E-01	4.8983E-01	3.909E+01%	1.06E+00
ZR-95	#A	-8.7922E-01	-8.7922E-01	1.166E+02%	2.41E+00
NB-95	#A	2.5267E-01	2.5268E-01	1.743E+02%	1.54E+00
RU-103	#A	3.9038E-01	3.9038E-01	9.229E+01%	9.11E-01
RH-106	#A	-4.6072E+00	-4.6072E+00	2.019E+02%	3.14E+01
AG-108M	#A	2.2766E-01	2.2766E-01	1.183E+02%	1.13E+00
AG-110M	#A	7.7058E-01	7.7058E-01	7.581E+01%	2.63E+00
SN-113	#A	-3.6411E-01	-3.6411E-01	1.771E+02%	2.21E+00
SB-124	#A	8.5110E-01	8.5110E-01	7.912E+01%	3.21E+00
SB-125	#A	6.6142E-01	6.6142E-01	1.942E+02%	3.57E+00
I-131	#A	-1.5929E-01	-1.5930E-01	7.155E+01%	1.40E+00
Gd-153	#A	6.7047E-02	6.7047E-02	1.505E+03%	2.77E+00
Ga-68	#A	1.9629E+01	1.9683E+01	8.884E+01%	3.92E+01
Tc-99m	#A	-3.3277E-01	-3.3294E-01	1.748E+02%	1.95E+00
BA-133	#A	-1.0736E-01	-1.0736E-01	1.557E+02%	3.69E+00
CS-134	#A	8.7267E-02	8.7267E-02	1.111E+03%	3.30E+00
CS-137	#A	-6.8224E-01	-6.8224E-01	8.482E+01%	1.94E+00
CE-139	#A	-7.1467E-02	-7.1467E-02	5.131E+02%	1.26E+00
Ba-140	#A	3.4547E-01	3.4547E-01	1.257E+02%	4.86E+00
La-140	#	7.0416E-01	7.0417E-01	3.536E+01%	6.49E-01
CE-141	#A	5.6255E-01	5.6255E-01	1.736E+02%	3.27E+00

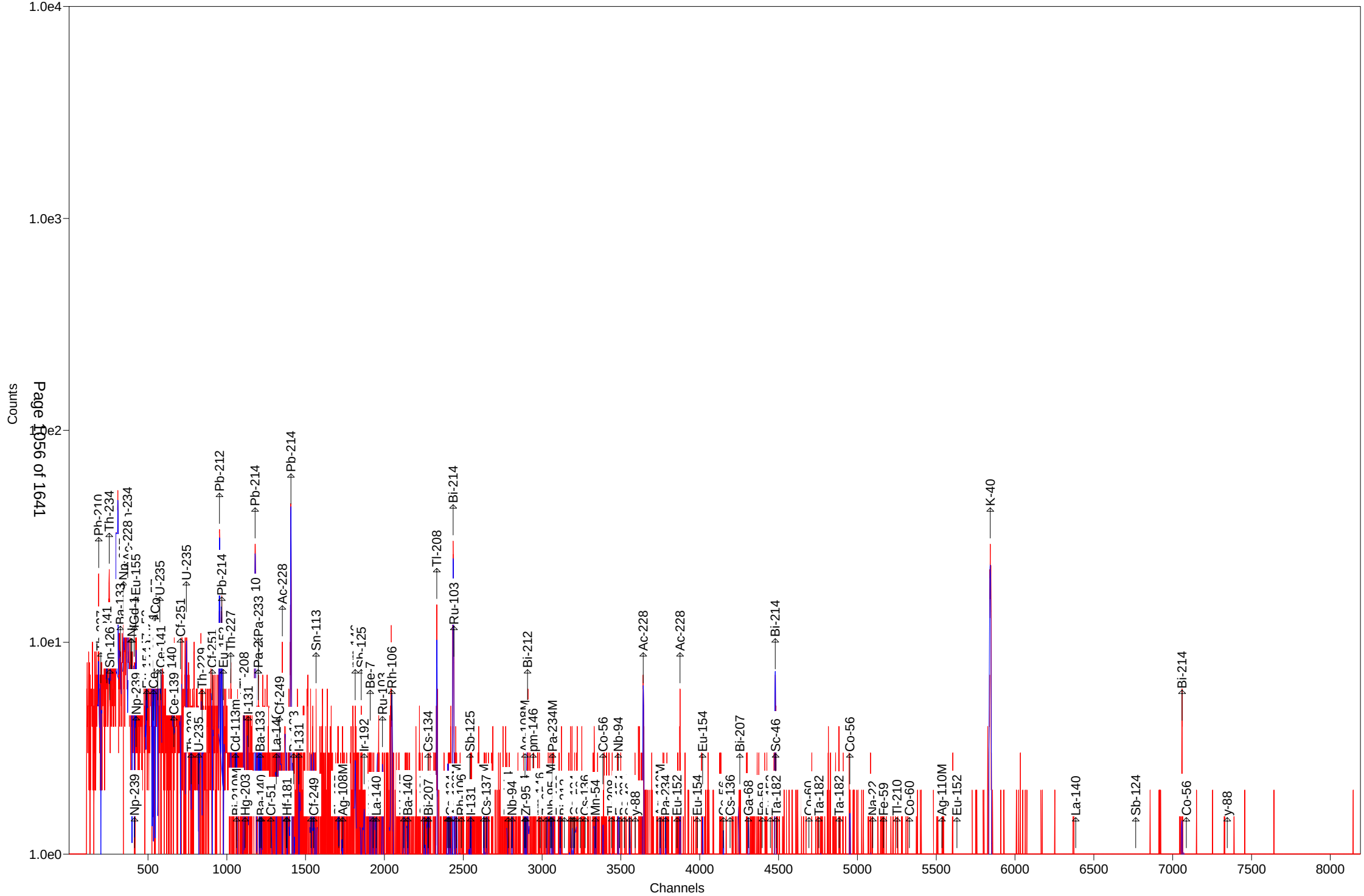
CE-144 #A	-2.6748E+00	-2.6748E+00	1.586E+02%	1.42E+01
PM-144 #A	-4.5549E-02	-4.5549E-02	1.127E+03%	1.25E+00
EU-152 #A	1.3525E+00	1.3525E+00	8.664E+01%	5.85E+00
EU-154 #A	1.0366E+00	1.0366E+00	8.734E+01%	1.25E+01
EU-155 #A	1.1134E+00	1.1134E+00	1.338E+02%	5.01E+00
HF-181 #A	-6.3177E-01	-6.3177E-01	1.113E+02%	2.37E+00
Ta-182 #A	3.4426E-01	3.4426E-01	3.023E+02%	7.89E+00
Hg-203 #A	4.6410E-02	4.6410E-02	7.550E+02%	1.22E+00
TL-208	2.7645E+00	2.7645E+00	1.686E+01%	7.45E-01
pm-146 #A	2.1616E-01	2.1616E-01	1.720E+02%	3.52E+00
y-88 #A	2.3131E-01	2.3131E-01	1.809E+02%	1.01E+00
Cd-113m#A	4.6711E+03	4.6711E+03	9.469E+01%	1.49E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	4.50E+01
Cf-251 #A	-1.7482E+00	-1.7482E+00	1.154E+02%	5.18E+00
Cf-249 #A	8.5092E-01	8.5092E-01	7.821E+01%	1.78E+00
Sn-126 #A	1.2878E+00	1.2878E+00	3.789E+02%	1.32E+01
PB-210 #A	1.0102E+01	1.0102E+01	1.067E+02%	3.25E+01
PB-212	6.0869E+00	6.0869E+00	1.181E+01%	1.69E+00
PB-214	1.5396E+01	1.5396E+01	8.327E+00%	1.96E+00
BI-207 #A	2.0575E-01	2.0575E-01	1.982E+02%	1.42E+00
BI-212 #A	3.4255E+00	3.4255E+00	1.787E+02%	2.13E+01
U-235 A	2.1594E+00	2.1594E+00	2.256E+02%	1.63E+01
BI-214	1.2852E+01	1.2852E+01	1.035E+01%	2.27E+00
BI-210M#A	4.6123E-01	4.6123E-01	1.023E+02%	1.60E+00
AC-228 #	8.4961E+00	8.4961E+00	1.491E+01%	1.39E+00
TH-227 #A	-9.4000E-01	-9.4000E-01	8.155E+01%	2.31E+01
TH-229 #A	-2.9485E+00	-2.9485E+00	2.216E+02%	1.71E+01
TH-234 #A	-1.1859E+00	-1.1859E+00	1.092E+03%	4.40E+01
PA-231 #A	1.0389E+01	1.0389E+01	1.719E+02%	8.01E+01
PA-233 #A	6.5470E-01	6.5470E-01	2.431E+02%	6.82E+00
PA-234 #A	7.0334E-01	7.0334E-01	8.929E+01%	6.64E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%	2.09E+02
AM-241 #A	1.0694E+00	1.0694E+00	1.295E+02%	4.64E+00
Np-237 #A	1.3901E+00	1.3901E+00	2.775E+02%	1.30E+01
Ir-192 #A	6.0531E-02	6.0531E-02	4.274E+02%	2.85E+00
Cs-136 #A	-1.6891E-02	-1.6891E-02	2.924E+03%	1.76E+00
Np-239 A	1.1201E+00	1.1201E+00	1.318E+02%	4.96E+00
Nd-147 #A	1.9892E+00	1.9892E+00	1.534E+02%	7.52E+00
TL-210 #A	9.7849E-02	9.7849E-02	2.335E+02%	2.16E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 2.023E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.0226015E+02 Bq/Sample

376765_Gamma_160-29521-A-10-C. 12_Gamma_20181355.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20183008

Sample Description: 376765_Gamma_160-29521-A-11-C
Detector: Detector #14
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-A-11-C

Decay to Time: 8/9/2018 18:09 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:09:56 Real Time: 1802 sec
Analysis Time: 8/9/2018 18:40 Dead Time: 0.13 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-07-14_1759.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.293E+00	99.3	1.285E+00	1.286E+00	4.523E+00
NA-22	-6.738E-01	77.3	5.206E-01	5.217E-01	1.749E+00
K-40	1.464E+02	7.3	1.073E+01	1.309E+01	8.720E+00
Sc-46	4.060E-01	99.5	4.041E-01	4.047E-01	1.385E+00
CR-51	-6.582E-02	6174.0	4.064E+00	4.064E+00	9.959E+00
MN-54	-3.403E-02	1380.2	4.697E-01	4.698E-01	1.166E+00
FE-59	-1.244E+00	104.4	1.298E+00	1.300E+00	2.941E+00
Co-56	3.825E-01	125.1	4.783E-01	4.787E-01	8.852E-01
CO-57	-1.452E-02	86.7	1.260E-02	1.262E-02	7.696E-01
CO-58	2.564E-01	96.0	2.461E-01	2.465E-01	8.556E-01
CO-60	3.288E-01	99.5	3.272E-01	3.276E-01	1.024E+00
ZN-65	1.077E+00	99.2	1.069E+00	1.070E+00	3.648E+00
NB-94	1.839E-02	78.5	1.444E-02	1.448E-02	1.004E+00
ZR-95	-7.502E-01	114.8	8.610E-01	8.619E-01	2.112E+00
NB-95	1.094E-01	281.6	3.080E-01	3.081E-01	1.116E+00
RU-103	-1.852E-01	180.7	3.346E-01	3.348E-01	8.721E-01
RH-106	2.607E+00	186.4	4.857E+00	4.859E+00	1.674E+01
AG-108M	2.786E-01	72.2	2.013E-01	2.018E-01	6.172E-01
AG-110M	7.986E-01	35.4	2.824E-01	2.853E-01	2.200E+00
SN-113	1.658E-01	181.4	3.007E-01	3.008E-01	1.068E+00
SB-124	-1.547E-01	87.9	1.360E-01	1.362E-01	2.259E+00
SB-125	1.142E+00	80.3	9.170E-01	9.189E-01	2.116E+00
I-131	1.546E-01	183.7	2.839E-01	2.840E-01	5.113E-01
Gd-153	-1.705E-01	350.0	5.967E-01	5.968E-01	2.062E+00
Ga-68	-8.931E+00	218.7	1.953E+01	1.954E+01	4.635E+01
Tc-99m	1.668E-01	158.6	2.646E-01	2.647E-01	8.972E-01
BA-133	5.558E-02	1019.2	5.665E-01	5.665E-01	1.973E+00
CS-134	2.135E-01	76.3	1.629E-01	1.633E-01	2.197E+00
CS-137	3.279E-01	116.6	3.822E-01	3.825E-01	1.322E+00
CE-139	7.394E-02	356.8	2.638E-01	2.639E-01	9.097E-01
Ba-140	5.505E-01	118.6	6.528E-01	6.534E-01	3.750E+00
La-140	3.118E-01	53.7	1.673E-01	1.681E-01	1.258E+00
CE-141	-2.906E-01	172.9	5.024E-01	5.026E-01	1.704E+00

CE-144	0.000E+00	1.#INF	8.446E-01	8.446E-01	8.431E+00
PM-144	1.667E-01	174.2	2.904E-01	2.906E-01	9.847E-01
EU-152	1.940E+00	75.6	1.467E+00	1.470E+00	3.764E+00
EU-154	1.284E+00	96.3	1.237E+00	1.239E+00	7.925E+00
EU-155	6.796E-01	105.6	7.176E-01	7.186E-01	3.746E+00
HF-181	1.674E-01	125.4	2.098E-01	2.100E-01	7.462E-01
Ta-182	-1.892E+00	107.1	2.025E+00	2.028E+00	6.885E+00
Hg-203	-1.839E-01	164.8	3.030E-01	3.032E-01	1.043E+00
TL-208	6.135E-01	97.4	5.975E-01	5.983E-01	1.303E+00
pm-146	-1.711E+00	64.7	1.107E+00	1.110E+00	3.902E+00
y-88	-8.606E-02	284.7	2.450E-01	2.450E-01	1.182E+00
Cd-113m	2.275E+03	144.9	3.296E+03	3.300E+03	1.139E+04
Cd-109	0.000E+00	1.#INF	4.419E+00	4.419E+00	2.823E+01
Cf-251	9.789E-01	110.1	1.078E+00	1.081E+00	2.955E+00
Cf-249	4.132E-01	98.4	4.067E-01	4.072E-01	1.111E+00
Sn-126	4.673E-01	681.2	3.184E+00	3.184E+00	9.244E+00
PB-210	4.029E+00	213.9	8.619E+00	8.622E+00	2.582E+01
PB-212	1.681E+00	27.9	4.689E-01	4.813E-01	1.369E+00
PB-214	3.420E+00	19.8	6.775E-01	7.005E-01	1.449E+00
BI-207	-1.472E-01	168.1	2.473E-01	2.474E-01	8.805E-01
BI-212	4.869E+00	99.8	4.858E+00	4.864E+00	1.660E+01
U-235	1.666E+00	127.9	2.131E+00	2.133E+00	6.930E+00
BI-214	3.225E+00	21.3	6.877E-01	7.078E-01	1.528E+00
BI-210M	-1.167E-01	390.6	4.560E-01	4.561E-01	1.597E+00
AC-228	4.346E+00	20.9	9.062E-01	9.329E-01	1.393E+00
TH-227	3.260E+00	117.9	3.842E+00	3.846E+00	1.107E+01
TH-229	-6.758E-01	740.3	5.004E+00	5.004E+00	1.497E+01
TH-234	1.539E-01	380.0	5.849E-01	5.849E-01	2.451E+01
PA-231	4.191E+00	177.0	7.419E+00	7.422E+00	4.878E+01
PA-233	1.001E-01	691.7	6.924E-01	6.924E-01	3.996E+00
PA-234	3.690E-01	81.2	2.997E-01	3.003E-01	4.846E+00
PA-234M	-1.580E+00	3857.4	6.094E+01	6.094E+01	2.201E+02
AM-241	2.524E-01	327.7	8.273E-01	8.274E-01	2.406E+00
Np-237	1.311E+00	161.5	2.118E+00	2.119E+00	7.149E+00
Ir-192	-2.078E-01	149.3	3.102E-01	3.105E-01	1.065E+00
Cs-136	2.581E-01	131.0	3.381E-01	3.384E-01	1.185E+00
Np-239	7.661E-01	117.9	9.034E-01	9.046E-01	3.049E+00
Nd-147	-1.365E+00	180.7	2.466E+00	2.467E+00	6.427E+00
TL-210	-4.021E-01	96.1	3.865E-01	3.872E-01	1.320E+00
Total	2.473E+03				

Analyst: Morgan Reichert

TestAmerica Inc Spectrum name: 14_Gamma_20183008.An1

Sample description
376765_Gamma_160-29521-A-11-C

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183008.An1

Acquisition information
Start time: 8/9/2018 6:09:56 PM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:09:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-07-14_1759.PBC 7/14/2018 5:59:49 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2291

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	7.	213.92	0.75	2.171E-02	46.54	4.250	PBC<MDA	PB210
50.14	11.	117.87	0.75	2.439E-02	50.14	8.000	PBC<MDA	TH227
59.54	5.	327.72	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
64.28	3.	681.24	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
74.75	37.	31.14	0.78	3.813E-02				
77.13	73.	18.18	0.78	3.899E-02				
86.16	13.	166.34	0.79	4.164E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.595E-01	EU155
86.49	13.	161.53	0.79	4.163E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.593E-01	EU155
92.70	3.	379.98	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.46	14.	156.81	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
99.50	12.	112.84	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
105.85	14.	130.15	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	7.967E-01	Np239
106.13	14.	117.92	0.81	4.406E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	7.661E-01	Np239
121.78	13.	110.11	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.855E-01	CO57
123.10	12.	107.80	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
136.47	13.	139.31	0.84	4.243E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.642E+00	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
140.78	11.	158.62	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
144.06	11.	157.50	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
162.66	12.	118.58	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140
163.70	11.	127.93	0.87	3.841E-02	163.38	5.080	PBC<MDA	U235
165.85	4.	356.83	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	110.12	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
185.63	25.	54.26	1.08	3.553E-02	185.72	54.000	PBC<MDA	U235
205.57	3.	387.16	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
227.00	24.	38.94	0.93	3.046E-02	227.00	6.300	6.947E+00	Cf251
238.63	38.	27.89	0.94	2.931E-02	238.63	43.300	1.681E+00	PB212
242.00	18.	46.54	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
263.70	7.	144.91	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	2.	597.00	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
284.30	3.	290.29	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.59	5.	315.08	1.00	2.487E-02	295.09	19.300	PBC<MDA	PB214
296.00	10.	167.41	1.00	2.481E-02	296.00	79.000	PBC<MDA	TL210
300.07	10.	177.30	1.01	2.455E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.18	2.	955.86	1.01	2.454E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.717E+00	PA231
					300.18	6.200	6.814E-01	PA233
328.76	15.	53.66	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	8.	137.01	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
337.41	10.	120.33	1.04	2.235E-02	338.32	12.010	PBC<MDA	AC228
344.29	9.	123.97	1.05	2.205E-02	344.29	26.500	PBC<MDA	EU152
351.53	50.	19.81	1.21	2.167E-02	351.93	37.600	3.420E+00	PB214
364.48	2.	225.07	1.07	2.109E-02	364.48	81.700	PBC<MDA	I131
383.84	8.	86.35	1.09	2.025E-02	383.84	8.940	PBC<MDA	BA133
387.95	5.	141.31	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
391.69	4.	181.35	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
427.88	7.	107.77	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
433.94	6.	106.03	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
463.37	3.	262.68	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
477.60	4.	99.33	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
482.00	4.	125.36	1.18	1.691E-02	482.00	80.500	PBC<MDA	HF181
487.02	3.	208.71	1.18	1.677E-02	487.02	45.500	PBC<MDA	La140
511.86	55.	27.49	2.46	1.612E-02	511.86	20.000	9.550E+00	RH106
563.24	5.	124.98	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	254.95	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	9.149E-01	PA234
					569.70	97.740	7.678E-02	BI207
583.02	8.	133.16	1.27	1.453E-02	583.02	84.500	PBC<MDA	TL208
609.13	38.	21.33	1.03	1.403E-02	609.31	46.090	3.225E+00	BI214
618.06	6.	174.17	1.30	1.387E-02	618.06	99.100	PBC<MDA	PM144
621.92	6.	186.35	1.31	1.380E-02	621.92	9.930	PBC<MDA	RH106
635.89	6.	80.28	1.32	1.356E-02	635.89	11.310	PBC<MDA	SB125
661.66	7.	116.56	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
696.54	2.	515.75	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
722.79	5.	87.86	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.478E-01	AG108M
					723.36	20.220	1.114E+00	EU154
722.94	7.	98.17	1.40	1.223E-02	722.79	10.810	2.886E+00	SB124
					722.94	90.840	3.434E-01	AG108M
					723.36	20.220	1.544E+00	EU154
723.36	5.	134.22	1.40	1.222E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.429E-01	AG108M
					723.36	20.220	1.092E+00	EU154
727.17	8.	99.76	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	120.71	1.41	1.206E-02	735.72	22.500	PBC<MDA	pm146
763.94	7.	80.82	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
765.79	2.	281.64	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	742.74	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
795.87	5.	91.91	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
801.95	5.	104.12	1.46	1.124E-02	801.95	8.690	PBC<MDA	CS134
810.78	5.	95.99	1.47	1.115E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	114.26	1.48	1.109E-02	815.77	23.280	PBC<MDA	La140
818.50	5.	130.98	1.48	1.106E-02	818.50	100.000	PBC<MDA	Cs136
846.77	2.	277.16	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
860.56	5.	97.39	1.51	1.062E-02	860.56	12.420	PBC<MDA	TL208
871.10	5.	78.53	1.52	1.052E-02	871.10	99.890	PBC<MDA	NB94
873.23	4.	138.25	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
889.28	8.	99.54	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
911.11	23.	20.85	1.22	1.014E-02	911.07	29.000	4.346E+00	AC228
946.02	6.	93.56	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
966.20	3.	224.50	1.60	9.642E-03	968.97	17.460	PBC<MDA	AC228
1037.84	2.	354.73	1.65	9.116E-03	1037.84	14.130	PBC<MDA	Co56
1112.07	8.	86.54	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	8.	99.18	1.71	8.592E-03	1115.55	50.600	PBC<MDA	ZN65
1120.36	3.	288.70	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	5.	152.59	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	4.	232.74	1.79	7.975E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	6.	125.06	1.80	7.886E-03	1238.28	66.070	PBC<MDA	Co56
1332.50	4.	127.82	1.87	7.423E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	8.	35.36	1.91	7.192E-03	1384.30	24.290	2.544E+00	AG110M
1461.03	193.	7.33	2.03	6.879E-03	1460.83	10.670	1.464E+02	K40
1764.52	11.	37.48	2.14	5.878E-03	1764.49	15.400	6.477E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.38	74.82	49.	37.	9.812E+02	31.14	0.777	- D
307.88	77.20	50.	73.	1.863E+03	18.18	0.780	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.58	46.54	74.	7.	0.004	213.92	0.750s
TH-227	199.98	50.14	60.	11.	0.006	117.87	0.751s
AM-241	237.55	59.54	93.	5.	0.003	327.72	0.761s
Sn-126	256.52	64.28	120.	3.	0.002	681.24	0.766s
BA-133	323.33	80.99	99.	-6.	-0.003	282.11	0.784s
Np-237	345.33	86.49	210.	13.	0.007	161.53	0.789s
EU-155	345.54	86.54	223.	13.	0.007	166.34	0.790s
Sn-126	349.65	87.57	281.	0.	0.000	1000.00	0.791s
Cd-109	351.53	88.04	281.	0.	0.000	1000.00	0.791s
Nd-147	363.77	91.10	278.	-15.	-0.008	161.02	0.794s
TH-234	369.72	92.59	57.	3.	0.002	379.98	0.796D
AC-228	372.76	93.35	229.	14.	0.008	156.81	0.797s
Gd-153	389.36	97.50	96.	-4.	-0.002	350.00	0.801s
Np-239	397.36	99.50	91.	12.	0.007	112.84	0.803s
Gd-153	412.15	103.20	168.	-14.	-0.008	130.77	0.807s
Np-239	414.15	103.70	153.	-5.	-0.003	329.09	0.807s
EU-155	420.60	105.31	167.	14.	0.008	130.15	0.809s
Np-239	423.87	106.13	125.	14.	0.008	117.92	0.810s
EU-152	486.43	121.78	89.	13.	0.007	110.11	0.826s
CO-57	487.58	122.06	112.	-15.	-0.008	103.35	0.826s
EU-154	491.73	123.10	80.	12.	0.007	107.80	0.828s
PA-234	524.50	131.29	194.	-15.	-0.008	132.81	0.836s
HF-181	531.42	133.02	209.	-12.	-0.007	167.14	0.838s
CE-144	533.47	133.54	221.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	221.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	168.	13.	0.007	139.31	0.841s
Tc-99m	561.35	140.51	144.	11.	0.006	158.62	0.845s
U-235	574.45	143.79	134.	11.	0.006	157.50	0.849s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	581.07	145.44	156.	-10.	-0.006	172.90	0.850s
Ba-140	649.93	162.66	90.	12.	0.006	118.58	0.868s
U-235	652.81	163.38	95.	11.	0.006	127.93	0.869s
CE-139	662.70	165.85	106.	4.	0.002	356.83	0.871
Cf-251	705.68	176.60	43.	11.	0.006	110.12	0.882s
U-235	741.79	185.63	45.	25.	0.014	54.26	1.077s
TH-229	773.30	193.51	67.	-2.	-0.001	740.33	0.899s
U-235	820.58	205.33	38.	3.	0.002	387.16	0.912s
TH-229	842.65	210.85	57.	-4.	-0.002	299.94	0.917s
Cf-251	907.23	227.00	20.	24.	0.013	38.94	0.933s
PB-212	953.75	238.63	38.	38.	0.021	27.89	0.945D
PB-214	967.21	242.00	27.	18.	0.010	46.54	0.948D
EU-152	977.99	244.69	174.	-12.	-0.007	153.59	0.951s
TH-227	1024.17	256.24	40.	-4.	-0.002	285.77	0.962s
Cd-113m	1054.01	263.70	43.	7.	0.004	144.91	0.970s
BI-210M	1062.53	265.83	60.	-3.	-0.002	390.63	0.972
TL-208	1108.33	277.28	56.	2.	0.001	597.00	0.983s
Hg-203	1115.99	279.20	63.	-7.	-0.004	164.75	0.985s
I-131	1136.39	284.30	26.	3.	0.002	290.29	0.990s
PB-214	1179.54	295.09	126.	5.	0.003	315.08	1.001s
TL-210	1183.18	296.00	131.	10.	0.005	167.41	1.002s
PB-212	1199.30	300.03	139.	10.	0.005	177.30	1.006s
PA-231	1199.46	300.07	148.	10.	0.005	177.02	1.006s
PA-233	1199.90	300.18	158.	2.	0.001	955.86	1.006s
PA-231	1209.78	302.65	160.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	160.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	160.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	160.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	160.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	160.	0.	0.000	1000.00	1.018s
Ir-192	1265.13	316.49	62.	-8.	-0.004	149.29	1.022s
La-140	1314.21	328.76	15.	15.	0.008	53.66	1.034s
Cf-249	1332.92	333.44	29.	8.	0.004	137.01	1.039s
AC-228	1352.44	338.32	62.	10.	0.005	120.33	1.043s
EU-152	1376.30	344.29	63.	9.	0.005	123.97	1.049s
HF-181	1382.47	345.83	38.	-7.	-0.004	155.96	1.050
PB-214	1405.29	351.53	16.	50.	0.028	19.81	1.210s
I-131	1457.08	364.48	8.	2.	0.001	225.07	1.069s
BA-133	1534.50	383.84	18.	8.	0.004	86.35	1.087s
Cf-249	1550.94	387.95	26.	5.	0.003	141.31	1.091s
SN-113	1565.90	391.69	22.	4.	0.002	181.35	1.095s
SB-125	1710.63	427.88	15.	7.	0.004	107.77	1.129s
AG-108M	1734.87	433.94	11.	6.	0.004	106.03	1.135
SB-125	1852.59	463.37	37.	3.	0.002	262.68	1.163s
Ir-192	1871.36	468.06	45.	-8.	-0.005	119.40	1.167s
BE-7	1909.50	477.60	6.	4.	0.002	99.33	1.176s
HF-181	1927.10	482.00	11.	4.	0.002	125.36	1.180s
La-140	1947.19	487.02	8.	3.	0.002	208.71	1.185s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	1987.33	497.05	20.	-5.	-0.003	180.74	1.194s
RH-106	2046.57	511.86	28.	55.	0.031	27.49	2.458
Nd-147	2123.11	531.00	20.	-5.	-0.003	180.74	1.225s
Ba-140	2148.15	537.26	24.	0.	0.000	1000.00	1.231s
CS-134	2252.06	563.24	8.	5.	0.003	124.98	1.255s
CS-134	2276.40	569.32	12.	2.	0.001	254.95	1.260
BI-207	2277.92	569.70	19.	-4.	-0.002	168.05	1.261
TL-208	2331.20	583.02	31.	8.	0.005	133.16	1.273s
SB-125	2401.12	600.50	119.	-3.	-0.002	377.98	1.289s
SB-124	2410.04	602.73	134.	-10.	-0.006	165.90	1.291s
CS-134	2417.96	604.71	123.	-7.	-0.004	213.60	1.292s
BI-214	2435.64	609.13	10.	38.	0.021	21.33	1.030s
RU-103	2440.31	610.30	116.	0.	0.000	1000.00	1.297s
AG-108M	2456.25	614.28	116.	0.	0.000	1000.00	1.301s
PM-144	2471.37	618.06	59.	6.	0.004	174.17	1.304s
RH-106	2486.79	621.92	69.	6.	0.004	186.35	1.308s
SB-125	2542.69	635.89	10.	6.	0.004	80.28	1.320s
AG-110M	2630.18	657.76	47.	-12.	-0.007	83.42	1.339s
CS-137	2645.77	661.66	26.	7.	0.004	116.56	1.343s
PM-144	2785.32	696.54	17.	2.	0.001	515.75	1.374s
NB-94	2809.67	702.63	17.	-5.	-0.003	149.06	1.379s
SB-124	2890.31	722.79	7.	5.	0.003	87.86	1.396s
AG-108M	2890.91	722.94	19.	7.	0.004	98.17	1.397s
EU-154	2892.59	723.36	19.	5.	0.003	134.22	1.397s
ZR-95	2895.96	724.20	46.	-11.	-0.006	72.84	1.398s
BI-212	2907.84	727.17	28.	8.	0.004	99.76	1.400s
pm-146	2942.05	735.72	9.	5.	0.003	120.71	1.408s
pm-146	2987.81	747.16	30.	-12.	-0.007	64.67	1.417s
ZR-95	3026.09	756.73	22.	-9.	-0.005	114.77	1.426s
AG-110M	3054.96	763.94	13.	7.	0.004	80.82	1.432s
NB-95	3062.34	765.79	20.	2.	0.001	281.64	1.433s
EU-152	3114.87	778.92	13.	1.	0.001	742.74	1.444s
BI-212	3140.88	785.42	26.	-7.	-0.004	93.69	1.450s
CS-134	3182.67	795.87	8.	5.	0.003	91.91	1.459s
TL-210	3197.61	799.60	26.	-8.	-0.004	96.13	1.462s
CS-134	3207.01	801.95	12.	5.	0.003	104.12	1.464s
CO-58	3242.31	810.77	10.	5.	0.003	95.99	1.471s
La-140	3262.30	815.77	15.	5.	0.003	114.26	1.475s
Cs-136	3273.22	818.50	20.	5.	0.003	130.98	1.478s
Co-56	3386.32	846.77	10.	2.	0.001	277.16	1.501s
TL-208	3441.51	860.56	5.	5.	0.003	97.39	1.513s
NB-94	3483.65	871.10	6.	5.	0.003	78.53	1.522s
EU-154	3492.19	873.23	11.	4.	0.002	138.25	1.523s
PA-234	3521.39	880.53	30.	-4.	-0.002	229.46	1.529s
PA-234	3532.24	883.24	34.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	34.	0.	0.000	1000.00	1.533s
Sc-46	3556.40	889.28	24.	8.	0.004	99.54	1.536s
y-88	3591.45	898.04	14.	-1.	-0.001	284.65	1.543s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	3643.74	911.11	0.	23.	0.013	20.85	1.218
AG-110M	3749.30	937.49	9.	-3.	-0.002	201.99	1.576s
PA-234	3783.42	946.02	5.	6.	0.003	93.56	1.582s
EU-152	3855.80	964.11	17.	-3.	-0.002	213.23	1.597s
AC-228	3875.25	968.97	26.	3.	0.002	224.50	1.601s
EU-154	3984.71	996.33	32.	-5.	-0.003	166.13	1.622s
EU-154	4018.51	1004.77	10.	-2.	-0.001	481.89	1.629s
Co-56	4150.81	1037.84	10.	2.	0.001	354.73	1.655s
Cs-136	4191.74	1048.07	18.	-3.	-0.002	208.17	1.663s
RH-106	4200.91	1050.36	29.	-6.	-0.003	133.33	1.665s
Ga-68	4309.10	1077.40	15.	-4.	-0.002	218.66	1.685s
FE-59	4396.54	1099.25	25.	-11.	-0.006	104.38	1.702s
EU-152	4447.85	1112.07	22.	8.	0.005	86.54	1.712s
ZN-65	4461.74	1115.55	31.	8.	0.005	99.18	1.714s
BI-214	4480.72	1120.29	39.	3.	0.002	288.70	1.718s
Ta-182	4484.77	1121.30	54.	-10.	-0.006	107.07	1.719
CO-60	4692.60	1173.24	10.	5.	0.003	152.59	1.757s
Ta-182	4755.88	1189.05	30.	-9.	-0.005	137.89	1.769s
Ta-182	4885.38	1221.41	16.	4.	0.002	232.74	1.792s
Co-56	4952.89	1238.28	11.	6.	0.003	125.06	1.805s
NA-22	5097.96	1274.53	21.	-9.	-0.005	77.26	1.831s
EU-154	5098.01	1274.54	31.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	17.	-8.	-0.004	104.67	1.843s
CO-60	5329.96	1332.50	6.	4.	0.002	127.82	1.871s
AG-110M	5537.26	1384.30	0.	8.	0.004	35.36	1.907s
EU-152	5632.13	1408.00	11.	-5.	-0.003	165.68	1.923
K-40	5844.39	1461.03	4.	193.	0.107	7.33	2.030
La-140	6385.44	1596.21	6.	-2.	-0.001	343.80	2.044s
SB-124	6764.81	1690.98	6.	-3.	-0.001	218.12	2.102s
BI-214	7059.07	1764.49	2.	11.	0.006	37.48	2.145
Co-56	7086.53	1771.35	24.	-7.	-0.004	99.02	2.149s
y-88	7345.59	1836.06	12.	-9.	-0.005	98.76	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.2932E+00				5.31E+01	
			477.60	1.293E+00	?(	4.523E+00	9.93E+01 1.05E+01 G
NA-22	C	-6.7378E-01				9.50E+02	
			1274.53	-6.738E-01	?(	1.749E+00	7.73E+01 9.99E+01 G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	1.4641E+02					4.66E+11	
			1460.83	1.464E+02	(P	8.720E+00	7.33E+00	1.07E+01 G
Sc-46	F	4.0600E-01					8.38E+01	
			889.28	4.060E-01	&(	1.385E+00	9.95E+01	1.00E+02 G
			1120.55	-1.238E-07	&	2.136E+00	4.81E+08	1.00E+02 G
CR-51	F	-6.5822E-02					2.77E+01	
			320.08	-6.582E-02	&(P	9.959E+00	6.17E+03	9.94E+00 G
MN-54	C	-3.4034E-02					3.12E+02	
			834.85	-3.403E-02	%(	1.166E+00	1.38E+03	1.00E+02 G
FE-59	F	-1.2437E+00					4.45E+01	
			1099.25	-1.244E+00	?(	2.941E+00	1.04E+02	5.65E+01 G
			1291.60	-1.279E+00	+ P	3.661E+00	1.05E+02	4.32E+01 G
Co-56	C	3.8247E-01					7.73E+01	
			846.77	1.251E-01	?(P	8.852E-01	2.77E+02	9.99E+01 G
			1238.28	6.691E-01	?(P	1.916E+00	1.25E+02	6.61E+01 G
			1037.84	8.626E-01	?(	7.525E+00	3.55E+02	1.41E+01 G
			1771.35	-4.579E+00	+	1.555E+01	9.90E+01	1.55E+01 A
CO-57	C	-1.4522E-02					2.72E+02	
			122.06	-2.213E-01	(	7.696E-01	1.03E+02	8.56E+01 G
			136.47	1.642E+00	?(	7.726E+00	1.39E+02	1.07E+01 G
CO-58	C	2.5639E-01					7.09E+01	
			810.78	2.564E-01	?(	8.556E-01	9.60E+01	9.95E+01 G
CO-60	F	3.2875E-01					1.93E+03	
			1332.50	3.338E-01	?(P	1.024E+00	1.28E+02	1.00E+02 G
			1173.24	3.237E-01	?(P	1.187E+00	1.53E+02	9.99E+01 G
ZN-65	F	1.0774E+00					2.44E+02	
			1115.55	1.077E+00	?(	3.648E+00	9.92E+01	5.06E+01 G
NB-94	I	1.8394E-02					7.41E+06	
			702.63	-2.443E-01	?(P	1.004E+00	1.49E+02	9.79E+01 G
			871.10	2.758E-01	?(P	7.340E-01	7.85E+01	9.99E+01 G
ZR-95	I	-7.5016E-01					6.40E+01	
			756.73	-7.502E-01	?(	2.112E+00	1.15E+02	5.45E+01 G
			724.20	-1.142E+00	+ P	3.538E+00	7.28E+01	4.42E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-95	I	1.0937E-01					6.40E+01	
			765.79	1.094E-01	&(	1.116E+00	2.82E+02	9.98E+01 G
RU-103	I	-1.8515E-01					3.93E+01	
			497.05	-1.852E-01	?(	8.721E-01	1.81E+02	9.09E+01 G
			610.30	0.000E+00	+	3.648E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.6066E+00					3.74E+02	
			621.92	2.607E+00	?(	1.674E+01	1.86E+02	9.93E+00 G
			1050.36	-2.367E+01	+	1.097E+02	1.33E+02	1.56E+00 G
			511.86	9.550E+00	P	4.682E+00	2.75E+01	2.00E+01 GA
AG-108M	C	2.7856E-01					1.53E+05	
			433.94	2.134E-01	&(P	6.172E-01	1.06E+02	9.05E+01 G
			722.94	3.434E-01	?(	1.159E+00	9.82E+01	9.08E+01 G
			614.28	0.000E+00	-	2.347E+00	1.00E+03	8.98E+01 G
AG-110M	F	7.9863E-01					2.50E+02	
			884.68	0.000E+00	?(	2.200E+00	1.00E+03	7.27E+01 G
			657.76	-5.482E-01	+	1.537E+00	8.34E+01	9.46E+01 G
			937.49	-5.441E-01	+	2.766E+00	2.02E+02	3.44E+01 G
			1384.30	2.544E+00	?(	2.344E+00	3.54E+01	2.43E+01 G
			763.94	1.501E+00	?(	4.114E+00	8.08E+01	2.23E+01 G
SN-113	F	1.6579E-01					1.15E+02	
			391.69	1.658E-01	(	1.068E+00	1.81E+02	6.40E+01 G
SB-124	F	-1.5473E-01					6.02E+01	
			602.73	-4.008E-01	?(	2.259E+00	1.66E+02	9.83E+01 G
			1690.98	-5.090E-01	+	2.634E+00	2.18E+02	4.78E+01 G
			722.79	2.082E+00	?(	6.320E+00	8.79E+01	1.08E+01 G
SB-125	I	1.1423E+00					1.01E+03	
			427.88	7.257E-01	&(P	2.116E+00	1.08E+02	2.96E+01 G
			600.50	-6.459E-01	& P	1.173E+01	3.78E+02	1.79E+01 G
			635.89	2.352E+00	?(	6.409E+00	8.03E+01	1.13E+01 G
			463.37	1.014E+00	&(	9.404E+00	2.63E+02	1.05E+01 G
I-131	I	1.5458E-01					8.02E+00	
			364.48	7.778E-02	?(P	5.113E-01	2.25E+02	8.17E+01 G
			284.30	1.177E+00	?(P	9.304E+00	2.90E+02	6.14E+00 G
			636.97	2.910E-01	%	1.238E+01	1.14E+03	7.17E+00 G
Gd-153	F	-1.7050E-01					2.42E+02	
			97.50	-1.705E-01	?(	2.062E+00	3.50E+02	3.00E+01 G
			103.20	-8.296E-01	+	3.658E+00	1.31E+02	2.18E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C -8.9311E+00					4.71E-02	
		1077.40	-8.931E+00	?(	4.635E+01	2.19E+02	3.30E+00 G
Tc-99m	I 1.6679E-01					2.51E-01	
		140.51	1.668E-01	&(	8.972E-01	1.59E+02	8.93E+01 G
BA-133	F 5.5580E-02					3.85E+03	
		356.00	5.558E-02	%(	1.973E+00	1.02E+03	6.20E+01 G
		302.85	0.000E+00	&	7.668E+00	1.00E+03	1.83E+01 G
		383.84	2.368E+00	?	6.956E+00	8.63E+01	8.94E+00 GA
		80.99	-2.435E-01	+	1.991E+00	2.82E+02	3.41E+01 GA
CS-134	I 2.1348E-01					7.54E+02	
		604.71	-3.011E-01	?(	2.197E+00	2.14E+02	9.76E+01 G
		795.87	2.912E-01	?(	9.278E-01	9.19E+01	8.55E+01 G
		569.32	4.877E-01	&(	4.597E+00	2.55E+02	1.54E+01 G
		801.95	2.894E+00	?(	1.053E+01	1.04E+02	8.69E+00 G
		563.24	2.138E+00	?(P	7.149E+00	1.25E+02	8.35E+00 G
CS-137	I 3.2786E-01					1.10E+04	
		661.66	3.279E-01	?(	1.322E+00	1.17E+02	8.52E+01 G
CE-139	F 7.3938E-02					1.38E+02	
		165.85	7.394E-02	&(	9.097E-01	3.57E+02	7.99E+01 G
Ba-140	I 5.5050E-01					1.28E+01	
		537.26	0.000E+00	?(	3.750E+00	1.00E+03	2.44E+01 G
		162.66	2.709E+00	?(	1.089E+01	1.19E+02	6.22E+00 G
		304.85	0.000E+00	-	3.293E+01	1.00E+03	4.29E+00 G
La-140	I 3.1176E-01					1.28E+01	
		1596.21	-1.519E-01	?(	1.258E+00	3.44E+02	9.54E+01 G
		487.02	2.033E-01	?(P	1.169E+00	2.09E+02	4.55E+01 G
		328.76	1.825E+00	?(P	2.468E+00	5.37E+01	2.03E+01 G
		815.77	1.104E+00	?(	4.417E+00	1.14E+02	2.33E+01 G
CE-141	I -2.9055E-01					3.25E+01	
		145.44	-2.906E-01	?(	1.704E+00	1.73E+02	4.82E+01 G
PM-144	C 1.6675E-01					3.63E+02	
		696.54	7.423E-02	&(	9.847E-01	5.16E+02	9.90E+01 G
		618.06	2.592E-01	?(	1.558E+00	1.74E+02	9.91E+01 G
EU-152	F 1.9403E+00					4.94E+03	
		344.29	8.905E-01	?(P	3.764E+00	1.24E+02	2.65E+01 G
		1112.07	3.979E+00	?(	1.169E+01	8.65E+01	1.36E+01 G
		121.78	5.553E-01	-	2.068E+00	1.10E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	3.729E-01	-	7.276E+00	7.43E+02	1.29E+01 G
			964.11	-1.113E+00	-	8.577E+00	2.13E+02	1.46E+01 G
			244.69	-3.153E+00	&	1.637E+01	1.54E+02	7.58E+00 G
			1408.00	-1.740E+00	+	6.687E+00	1.66E+02	2.10E+01 GA
EU-154	I	1.2838E+00						3.14E+03
			873.23	1.600E+00	?(	7.925E+00	1.38E+02	1.23E+01 G
			123.10	3.802E-01	&	1.386E+00	1.08E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.846E+00	1.00E+03	3.52E+01 G
			723.36	1.092E+00	&(	5.154E+00	1.34E+02	2.02E+01 G
			1004.77	-4.943E-01	-	5.869E+00	4.82E+02	1.80E+01 G
			996.33	-2.780E+00	+	1.617E+01	1.66E+02	1.06E+01 G
EU-155	I	6.7956E-01						1.81E+03
			105.31	8.535E-01	&(	3.746E+00	1.30E+02	2.12E+01 G
			86.54	5.595E-01	?(	3.141E+00	1.66E+02	3.07E+01 G
HF-181	F	1.6740E-01						4.24E+01
			482.00	1.674E-01	?(	7.462E-01	1.25E+02	8.05E+01 G
			133.02	-3.715E-01	+	2.098E+00	1.67E+02	4.33E+01 G
			345.83	-1.253E+00	+ P	5.304E+00	1.56E+02	1.51E+01 G
			136.30	0.000E+00	-	1.610E+01	1.00E+03	5.85E+00 G
Ta-182	F	-1.8915E+00						1.14E+02
			1121.30	-1.892E+00	(	6.885E+00	1.07E+02	3.49E+01 G
			1221.41	1.032E+00	+	5.508E+00	2.33E+02	2.70E+01 G
			1189.05	-3.785E+00	&	1.188E+01	1.38E+02	1.62E+01 G
Hg-203	F	-1.8389E-01						4.66E+01
			279.20	-1.839E-01	?(	1.043E+00	1.65E+02	8.15E+01 G
TL-208	N	6.1349E-01						6.98E+02
			583.02	3.769E-01	@(P	1.303E+00	1.33E+02	8.45E+01 G
			277.28	6.044E-01	?(P	1.270E+01	5.97E+02	6.31E+00 G
			860.56	2.228E+00	?(P	5.418E+00	9.74E+01	1.24E+01 G
pm-146	C	-1.7112E+00						2.02E+03
			747.16	-1.711E+00	?(P	3.902E+00	6.47E+01	3.40E+01 G
			735.72	1.092E+00	+	3.365E+00	1.21E+02	2.25E+01 G
			453.88	3.560E-02	% P	1.141E+00	1.20E+03	6.50E+01 G
y-88	F	-8.6065E-02						1.07E+02
			898.04	-8.606E-02	?(P	1.182E+00	2.85E+02	9.37E+01 G
			1836.06	-8.864E-01	+	1.857E+00	9.88E+01	9.92E+01 G
Cd-113m		2.2748E+03						5.33E+03
			263.70	2.275E+03	?(	1.139E+04	1.45E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	9.7890E-01					3.28E+05	
			176.60	9.789E-01	*(	2.955E+00	1.10E+02	1.70E+01 G
			227.00	6.947E+00		6.817E+00	3.89E+01	6.30E+00 GA
Cf-249	T	4.1324E-01					1.28E+05	
			387.95	2.249E-01	?(	1.111E+00	1.41E+02	6.60E+01 G
			333.44	1.215E+00	?(	4.428E+00	1.37E+02	1.55E+01 G
Sn-126		4.6734E-01					3.65E+07	
			87.57	0.000E+00	-	2.860E+00	1.00E+03	3.75E+01 GA
			64.28	4.673E-01	?(	9.244E+00	6.81E+02	9.70E+00 G
			86.94	2.217E-01	%	1.187E+01	1.57E+03	9.04E+00 GA
PB-210	N	4.0291E+00					8.14E+03	
			46.54	4.029E+00	@(P	2.582E+01	2.14E+02	4.25E+00 G
PB-212	N	1.6811E+00					6.98E+02	
			238.63	1.681E+00	(P	1.369E+00	2.79E+01	4.33E+01 G
			300.03	6.594E+00	+ P	3.973E+01	1.77E+02	3.28E+00 GA
PB-214	N	3.4201E+00					5.84E+05	
			351.93	3.420E+00	*(P	1.449E+00	1.98E+01	3.76E+01 G
			295.09	5.904E-01	& P	6.366E+00	3.15E+02	1.93E+01 G
			242.00	4.695E+00		6.918E+00	4.65E+01	7.43E+00 GA
BI-207	C	-1.4717E-01					1.18E+04	
			569.70	-1.472E-01	?(	8.805E-01	1.68E+02	9.77E+01 G
			1063.66	3.284E-02	% P	1.763E+00	2.19E+03	7.45E+01 G
BI-212	N	4.8694E+00					6.98E+02	
			727.17	4.869E+00	?(P	1.660E+01	9.98E+01	7.55E+00 G
			785.42	-2.681E+01	+ P	1.006E+02	9.37E+01	1.28E+00 GA
U-235	N	1.6661E+00					2.57E+11	
			143.79	1.297E+00	?(P	6.930E+00	1.57E+02	1.10E+01 G
			205.33	9.624E-01	?(P	1.061E+01	3.87E+02	5.01E+00 G
			163.38	3.156E+00	?(P	1.369E+01	1.28E+02	5.08E+00 G
			185.72	7.264E-01	* P	9.829E-01	5.43E+01	5.40E+01 GA
BI-214	N	3.2246E+00					5.84E+05	
			609.31	3.225E+00	(P	1.528E+00	2.13E+01	4.61E+01 G
			1120.29	1.339E+00	- P	1.365E+01	2.89E+02	1.51E+01 G
			1764.49	6.477E+00	+ P	6.136E+00	3.75E+01	1.54E+01 G
BI-210M	T	-1.1674E-01					1.10E+09	
			265.83	-1.167E-01	&(	1.597E+00	3.91E+02	5.00E+01 G
			304.90	0.000E+00	+	5.046E+00	1.00E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	4.3459E+00					2.10E+03	
			911.07	4.346E+00	(	1.393E+00	2.09E+01	2.90E+01 G
			968.97	1.100E+00	&	8.786E+00	2.24E+02	1.75E+01 G
			338.32	1.985E+00	&	8.144E+00	1.20E+02	1.20E+01 G
			93.35	3.223E+00	?	1.704E+01	1.57E+02	5.56E+00 XA
TH-227	N	3.2596E+00					7.95E+03	
			50.14	3.260E+00	?(P	1.107E+01	1.18E+02	8.00E+00 G
			256.24	-1.144E+00	-	9.206E+00	2.86E+02	7.00E+00 G
TH-229	N	-6.7585E-01					2.68E+06	
			193.51	-6.758E-01	&(P	1.497E+01	7.40E+02	4.40E+00 G
			210.85	-2.129E+00	+ P	2.178E+01	3.00E+02	2.99E+00 G
TH-234	N	1.5392E-01					1.63E+12	
			63.29	-6.036E-01	%(P	2.451E+01	1.17E+03	3.81E+00 G
			92.59	6.708E-01	(P	8.836E+00	3.80E+02	5.58E+00 G
PA-231	N	4.1909E+00					1.20E+07	
			302.65	0.000E+00	&(	4.878E+01	1.00E+03	2.88E+00 G
			300.07	9.097E+00	?(	5.470E+01	1.77E+02	2.46E+00 G
PA-233	C	1.0011E-01					7.82E+08	
			312.01	0.000E+00	?(	3.996E+00	1.00E+03	3.60E+01 G
			300.18	6.814E-01	?(	2.239E+01	9.56E+02	6.20E+00 G
PA-234	N	3.6902E-01					1.63E+12	
			131.29	-1.084E+00	&(	4.846E+00	1.33E+02	1.80E+01 G
			946.02	2.320E+00	?(	5.388E+00	9.36E+01	1.34E+01 G
			569.47	-2.287E-01	%	9.357E+00	1.09E+03	8.20E+00 G
			883.24	0.000E+00	-	1.663E+01	1.00E+03	9.60E+00 G
			880.53	-3.109E+00	+	2.527E+01	2.29E+02	6.00E+00 GA
PA-234M	N	-1.5799E+00					1.63E+12	
			1001.00	-1.580E+00	%(P	2.201E+02	3.86E+03	8.37E-01 G
			766.41	1.008E+01	& P	3.929E+02	1.06E+03	2.94E-01 G
AM-241	T	2.5244E-01					1.58E+05	
			59.54	2.524E-01	?(	2.406E+00	3.28E+02	3.59E+01 G
Np-237	F	1.3110E+00					2.14E+06	
			86.49	1.311E+00	?(	7.149E+00	1.62E+02	1.31E+01 G
Ir-192	F	-2.0781E-01					7.40E+01	
			316.49	-2.078E-01	?(	1.065E+00	1.49E+02	8.70E+01 G
			468.06	-5.168E-01	+	2.114E+00	1.19E+02	5.18E+01 G
			308.44	0.000E+00	+	4.490E+00	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.5812E-01                                      1.30E+01
                          818.50 2.581E-01 ?(  1.185E+00 1.31E+02 1.00E+02 G
                         1048.07-2.304E-01 +   1.726E+00 2.08E+02 8.00E+01 G
                          340.57 3.053E-02 %   2.242E+00 2.09E+03 4.69E+01 G

Np-239   T   7.6615E-01                                      2.36E+00
                          103.70-2.828E-01 -   3.183E+00 3.29E+02 2.40E+01 X
                          106.13 7.661E-01 ?(  3.049E+00 1.18E+02 2.27E+01 G
                           99.50 1.047E+00 &   3.996E+00 1.13E+02 1.50E+01 X

Nd-147      -1.3645E+00                                       1.11E+01
                          531.00-1.365E+00 *(  6.427E+00 1.81E+02 1.30E+01 G
                           91.10-6.845E-01 +   3.709E+00 1.61E+02 2.83E+01 G

TL-210   N  -4.0207E-01                                       5.84E+05
                          799.60-4.021E-01 ?(  1.320E+00 9.61E+01 9.90E+01 G
                          296.00 2.792E-01 +   1.589E+00 1.67E+02 7.90E+01 G
                         1313.00 1.174E-01 %   6.313E+00 2.23E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	74.	7.	0.004	213.92	4.029E+00	P
TH-227	50.14	60.	11.	0.006	117.87	3.260E+00	P
AM-241	59.54	93.	5.	0.003	327.72	2.524E-01	
Sn-126	64.28	120.	3.	0.002	681.24	4.673E-01	
BA-133	80.99	99.	-6.	-0.003	282.11	-2.435E-01	
Np-237	86.49	210.	13.	0.007	161.53	1.311E+00	
Nd-147	91.10	278.	-15.	-0.008	161.02	-6.845E-01	
Gd-153	97.50	96.	-4.	-0.002	350.00	-1.705E-01	
Np-239	99.50	91.	12.	0.007	112.84	1.047E+00	
Gd-153	103.20	168.	-14.	-0.008	130.77	-8.296E-01	
Np-239	103.70	153.	-5.	-0.003	329.09	-2.828E-01	
Np-239	106.13	125.	14.	0.008	117.92	7.661E-01	
EU-152	121.78	89.	13.	0.007	110.11	5.553E-01	
CO-57	122.06	112.	-15.	-0.008	103.35	-2.213E-01	
EU-154	123.10	80.	12.	0.007	107.80	3.802E-01	
PA-234	131.29	194.	-15.	-0.008	132.81	-1.084E+00	
HF-181	133.02	209.	-12.	-0.007	167.14	-3.715E-01	
CO-57	136.47	168.	13.	0.007	139.31	1.642E+00	
CE-141	145.44	156.	-10.	-0.006	172.90	-2.906E-01	
Ba-140	162.66	90.	12.	0.006	118.58	2.709E+00	
CE-139	165.85	106.	4.	0.002	356.83	7.394E-02	
Cf-251	176.60	43.	11.	0.006	110.12	9.789E-01	
TH-229	193.51	67.	-2.	-0.001	740.33	-6.758E-01	P
TH-229	210.85	57.	-4.	-0.002	299.94	-2.129E+00	P
Cf-251	227.00	20.	24.	0.013	38.94	6.947E+00	
EU-152	244.69	174.	-12.	-0.007	153.59	-3.153E+00	
TH-227	256.24	40.	-4.	-0.002	285.77	-1.144E+00	
Cd-113m	263.70	43.	7.	0.004	144.91	2.275E+03	
BI-210M	265.83	60.	-3.	-0.002	390.63	-1.167E-01	
TL-208	277.28	56.	2.	0.001	597.00	6.044E-01	P
Hg-203	279.20	63.	-7.	-0.004	164.75	-1.839E-01	
I-131	284.30	26.	3.	0.002	290.29	1.177E+00	P
TL-210	296.00	131.	10.	0.005	167.41	2.792E-01	
PA-231	300.07	148.	10.	0.005	177.02	9.097E+00	
PA-233	300.18	158.	2.	0.001	955.86	6.814E-01	
Ir-192	316.49	62.	-8.	-0.004	149.29	-2.078E-01	
La-140	328.76	15.	15.	0.008	53.66	1.825E+00	P
Cf-249	333.44	29.	8.	0.004	137.01	1.215E+00	
EU-152	344.29	63.	9.	0.005	123.97	8.905E-01	P
HF-181	345.83	38.	-7.	-0.004	155.96	-1.253E+00	P
I-131	364.48	8.	2.	0.001	225.07	7.778E-02	P
BA-133	383.84	18.	8.	0.004	86.35	2.368E+00	
Cf-249	387.95	26.	5.	0.003	141.31	2.249E-01	
SN-113	391.69	22.	4.	0.002	181.35	1.658E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	427.88	15.	7.	0.004	107.77	7.257E-01	P
AG-108M	433.94	11.	6.	0.004	106.03	2.134E-01	P
SB-125	463.37	37.	3.	0.002	262.68	1.014E+00	
Ir-192	468.06	45.	-8.	-0.005	119.40	-5.168E-01	
BE-7	477.60	6.	4.	0.002	99.33	1.293E+00	
HF-181	482.00	11.	4.	0.002	125.36	1.674E-01	
La-140	487.02	8.	3.	0.002	208.71	2.033E-01	P
RU-103	497.05	20.	-5.	-0.003	180.74	-1.852E-01	
RH-106	511.86	28.	55.	0.031	27.49	9.550E+00	P
Nd-147	531.00	20.	-5.	-0.003	180.74	-1.365E+00	
CS-134	563.24	8.	5.	0.003	124.98	2.138E+00	P
CS-134	569.32	12.	2.	0.001	254.95	4.877E-01	
BI-207	569.70	19.	-4.	-0.002	168.05	-1.472E-01	
TL-208	583.02	31.	8.	0.005	133.16	3.769E-01	P
SB-125	600.50	119.	-3.	-0.002	377.98	-6.459E-01	P
SB-124	602.73	134.	-10.	-0.006	165.90	-4.008E-01	
CS-134	604.71	123.	-7.	-0.004	213.60	-3.011E-01	
PM-144	618.06	59.	6.	0.004	174.17	2.592E-01	
RH-106	621.92	69.	6.	0.004	186.35	2.607E+00	
SB-125	635.89	10.	6.	0.004	80.28	2.352E+00	
AG-110M	657.76	47.	-12.	-0.007	83.42	-5.482E-01	
CS-137	661.66	26.	7.	0.004	116.56	3.279E-01	
PM-144	696.54	17.	2.	0.001	515.75	7.423E-02	
NB-94	702.63	17.	-5.	-0.003	149.06	-2.443E-01	P
SB-124	722.79	7.	5.	0.003	87.86	2.082E+00	
AG-108M	722.94	19.	7.	0.004	98.17	3.434E-01	
EU-154	723.36	19.	5.	0.003	134.22	1.092E+00	
ZR-95	724.20	46.	-11.	-0.006	72.84	-1.142E+00	P
BI-212	727.17	28.	8.	0.004	99.76	4.869E+00	P
pm-146	735.72	9.	5.	0.003	120.71	1.092E+00	
pm-146	747.16	30.	-12.	-0.007	64.67	-1.711E+00	P
ZR-95	756.73	22.	-9.	-0.005	114.77	-7.502E-01	
AG-110M	763.94	13.	7.	0.004	80.82	1.501E+00	
NB-95	765.79	20.	2.	0.001	281.64	1.094E-01	
EU-152	778.92	13.	1.	0.001	742.74	3.729E-01	
BI-212	785.42	26.	-7.	-0.004	93.69	-2.681E+01	P
CS-134	795.87	8.	5.	0.003	91.91	2.912E-01	
TL-210	799.60	26.	-8.	-0.004	96.13	-4.021E-01	
CS-134	801.95	12.	5.	0.003	104.12	2.894E+00	
CO-58	810.77	10.	5.	0.003	95.99	2.564E-01	
La-140	815.77	15.	5.	0.003	114.26	1.104E+00	
Cs-136	818.50	20.	5.	0.003	130.98	2.581E-01	
Co-56	846.77	10.	2.	0.001	277.16	1.251E-01	P
TL-208	860.56	5.	5.	0.003	97.39	2.228E+00	P
NB-94	871.10	6.	5.	0.003	78.53	2.758E-01	P
EU-154	873.23	11.	4.	0.002	138.25	1.600E+00	
PA-234	880.53	30.	-4.	-0.002	229.46	-3.109E+00	
Sc-46	889.28	24.	8.	0.004	99.54	4.060E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	898.04	14.	-1.	-0.001	284.65	-8.606E-02	P
AG-110M	937.49	9.	-3.	-0.002	201.99	-5.441E-01	
PA-234	946.02	5.	6.	0.003	93.56	2.320E+00	
EU-152	964.11	17.	-3.	-0.002	213.23	-1.113E+00	
EU-154	996.33	32.	-5.	-0.003	166.13	-2.780E+00	
EU-154	1004.77	10.	-2.	-0.001	481.89	-4.943E-01	
Co-56	1037.84	10.	2.	0.001	354.73	8.626E-01	
Cs-136	1048.07	18.	-3.	-0.002	208.17	-2.304E-01	
RH-106	1050.36	29.	-6.	-0.003	133.33	-2.367E+01	
Ga-68	1077.40	15.	-4.	-0.002	218.66	-8.931E+00	
FE-59	1099.25	25.	-11.	-0.006	104.38	-1.244E+00	
EU-152	1112.07	22.	8.	0.005	86.54	3.979E+00	
ZN-65	1115.55	31.	8.	0.005	99.18	1.077E+00	
Ta-182	1121.30	54.	-10.	-0.006	107.07	-1.892E+00	
CO-60	1173.24	10.	5.	0.003	152.59	3.237E-01	P
Ta-182	1189.05	30.	-9.	-0.005	137.89	-3.785E+00	
Ta-182	1221.41	16.	4.	0.002	232.74	1.032E+00	
Co-56	1238.28	11.	6.	0.003	125.06	6.691E-01	P
NA-22	1274.53	21.	-9.	-0.005	77.26	-6.738E-01	
FE-59	1291.60	17.	-8.	-0.004	104.67	-1.279E+00	P
CO-60	1332.50	6.	4.	0.002	127.82	3.338E-01	P
AG-110M	1384.30	0.	8.	0.004	35.36	2.544E+00	
EU-152	1408.00	11.	-5.	-0.003	165.68	-1.740E+00	
La-140	1596.21	6.	-2.	-0.001	343.80	-1.519E-01	
SB-124	1690.98	6.	-3.	-0.001	218.12	-5.090E-01	
Co-56	1771.35	24.	-7.	-0.004	99.02	-4.579E+00	
y-88	1836.06	12.	-9.	-0.005	98.76	-8.864E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.2932E+00	1.2932E+00	9.933E+01%	4.52E+00
NA-22	#A	-6.7378E-01	-6.7378E-01	7.726E+01%	1.75E+00
K-40		1.4641E+02	1.4641E+02	7.328E+00%	8.72E+00
Sc-46	#A	4.0600E-01	4.0600E-01	9.954E+01%	1.39E+00
CR-51	#A	-6.5821E-02	-6.5822E-02	6.174E+03%	9.96E+00
MN-54	#A	-3.4034E-02	-3.4034E-02	1.380E+03%	1.17E+00
FE-59	#A	-1.2437E+00	-1.2437E+00	1.044E+02%	2.94E+00
Co-56	#A	3.8247E-01	3.8247E-01	1.251E+02%	8.85E-01
CO-57	#A	-1.4522E-02	-1.4522E-02	8.673E+01%	7.70E-01
CO-58	#A	2.5639E-01	2.5639E-01	9.599E+01%	8.56E-01
CO-60	#A	3.2875E-01	3.2875E-01	9.953E+01%	1.02E+00
ZN-65	#A	1.0774E+00	1.0774E+00	9.918E+01%	3.65E+00
NB-94	#A	1.8394E-02	1.8394E-02	7.853E+01%	1.00E+00

ZR-95	#A	-7.5016E-01	-7.5016E-01	1.148E+02%	2.11E+00
NB-95	#A	1.0937E-01	1.0937E-01	2.816E+02%	1.12E+00
RU-103	#A	-1.8515E-01	-1.8515E-01	1.807E+02%	8.72E-01
RH-106	#A	2.6066E+00	2.6066E+00	1.864E+02%	1.67E+01
AG-108M	#A	2.7856E-01	2.7856E-01	7.225E+01%	6.17E-01
AG-110M	#A	7.9863E-01	7.9863E-01	3.536E+01%	2.20E+00
SN-113	#A	1.6579E-01	1.6579E-01	1.814E+02%	1.07E+00
SB-124	#A	-1.5473E-01	-1.5473E-01	8.786E+01%	2.26E+00
SB-125	#A	1.1423E+00	1.1423E+00	8.028E+01%	2.12E+00
I-131	#A	1.5457E-01	1.5458E-01	1.837E+02%	5.11E-01
Gd-153	#A	-1.7049E-01	-1.7050E-01	3.500E+02%	2.06E+00
Ga-68	#A	-8.8463E+00	-8.9311E+00	2.187E+02%	4.63E+01
Tc-99m	#A	1.6649E-01	1.6679E-01	1.586E+02%	8.97E-01
BA-133	#A	5.5580E-02	5.5580E-02	1.019E+03%	1.97E+00
CS-134	#A	2.1348E-01	2.1348E-01	7.630E+01%	2.20E+00
CS-137	#A	3.2786E-01	3.2786E-01	1.166E+02%	1.32E+00
CE-139	#A	7.3938E-02	7.3938E-02	3.568E+02%	9.10E-01
Ba-140	#A	5.5048E-01	5.5050E-01	1.186E+02%	3.75E+00
La-140	#A	3.1175E-01	3.1176E-01	5.366E+01%	1.26E+00
CE-141	#A	-2.9055E-01	-2.9055E-01	1.729E+02%	1.70E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.43E+00
PM-144	#A	1.6675E-01	1.6675E-01	1.742E+02%	9.85E-01
EU-152	#A	1.9403E+00	1.9403E+00	7.560E+01%	3.76E+00
EU-154	#A	1.2838E+00	1.2838E+00	9.634E+01%	7.93E+00
EU-155	#A	6.7956E-01	6.7956E-01	1.056E+02%	3.75E+00
HF-181	#A	1.6739E-01	1.6740E-01	1.254E+02%	7.46E-01
Ta-182	#A	-1.8915E+00	-1.8915E+00	1.071E+02%	6.89E+00
Hg-203	#A	-1.8389E-01	-1.8389E-01	1.648E+02%	1.04E+00
TL-208	#A	6.1349E-01	6.1349E-01	9.739E+01%	1.30E+00
pm-146	#A	-1.7112E+00	-1.7112E+00	6.467E+01%	3.90E+00
y-88	#A	-8.6064E-02	-8.6065E-02	2.847E+02%	1.18E+00
Cd-113m	#A	2.2748E+03	2.2748E+03	1.449E+02%	1.14E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.82E+01
Cf-251	#A	9.7890E-01	9.7890E-01	1.101E+02%	2.96E+00
Cf-249	#A	4.1324E-01	4.1324E-01	9.841E+01%	1.11E+00
Sn-126	#A	4.6734E-01	4.6734E-01	6.812E+02%	9.24E+00
PB-210	#A	4.0291E+00	4.0291E+00	2.139E+02%	2.58E+01
PB-212	#	1.6811E+00	1.6811E+00	2.789E+01%	1.37E+00
PB-214		3.4201E+00	3.4201E+00	1.981E+01%	1.45E+00
BI-207	#A	-1.4717E-01	-1.4717E-01	1.681E+02%	8.80E-01
BI-212	#A	4.8693E+00	4.8694E+00	9.976E+01%	1.66E+01
U-235	#A	1.6661E+00	1.6661E+00	1.279E+02%	6.93E+00
BI-214	#	3.2246E+00	3.2246E+00	2.133E+01%	1.53E+00
BI-210M	#A	-1.1674E-01	-1.1674E-01	3.906E+02%	1.60E+00
AC-228		4.3459E+00	4.3459E+00	2.085E+01%	1.39E+00
TH-227	#A	3.2596E+00	3.2596E+00	1.179E+02%	1.11E+01
TH-229	#A	-6.7585E-01	-6.7585E-01	7.403E+02%	1.50E+01
TH-234	A	1.5392E-01	1.5392E-01	3.800E+02%	2.45E+01
PA-231	#A	4.1909E+00	4.1909E+00	1.770E+02%	4.88E+01

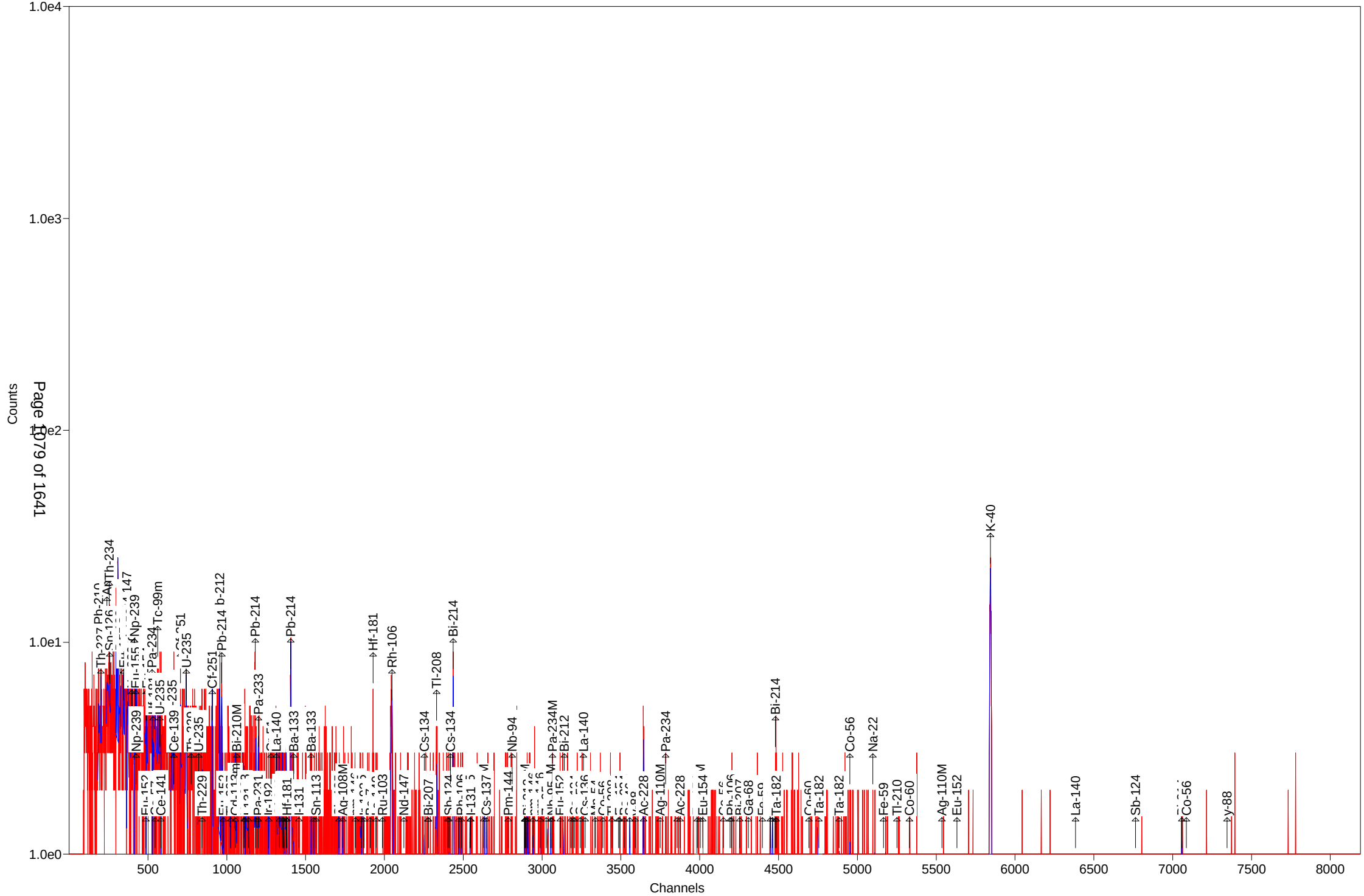
PA-233 #A	1.0011E-01	1.0011E-01	6.917E+02%	4.00E+00
PA-234 #A	3.6902E-01	3.6902E-01	8.123E+01%	4.85E+00
PA-234M#A	-1.5799E+00	-1.5799E+00	3.857E+03%	2.20E+02
AM-241 #A	2.5244E-01	2.5244E-01	3.277E+02%	2.41E+00
Np-237 #A	1.3110E+00	1.3110E+00	1.615E+02%	7.15E+00
Ir-192 #A	-2.0781E-01	-2.0781E-01	1.493E+02%	1.07E+00
Cs-136 #A	2.5811E-01	2.5812E-01	1.310E+02%	1.19E+00
Np-239 #A	7.6600E-01	7.6615E-01	1.179E+02%	3.05E+00
Nd-147 #A	-1.3645E+00	-1.3645E+00	1.807E+02%	6.43E+00
TL-210 #A	-4.0207E-01	-4.0207E-01	9.613E+01%	1.32E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.591E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.5907977E+02 Bq/Sample

376765_Gamma_160-29521-A-11-C. 14_Gamma_20183008.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20182610

Sample Description: 376765_Gamma_160-29521-B-12-B
Detector: Detector #15
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-B-12-B

Decay to Time: 8/9/2018 18:10 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:11:08 Real Time: 1801 sec
Analysis Time: 8/9/2018 18:41 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-07-21_1011.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.317E+00	176.8	4.097E+00	4.098E+00	1.278E+01
NA-22	2.817E-02	1396.4	3.933E-01	3.933E-01	1.515E+00
K-40	1.648E+02	7.5	1.231E+01	1.492E+01	9.037E+00
Sc-46	2.535E-02	2281.5	5.783E-01	5.783E-01	2.068E+00
CR-51	-2.806E+00	162.6	4.562E+00	4.564E+00	1.885E+01
MN-54	-1.171E-01	403.1	4.719E-01	4.719E-01	1.179E+00
FE-59	-3.938E-01	308.5	1.215E+00	1.215E+00	2.802E+00
Co-56	3.321E-01	92.1	3.057E-01	3.062E-01	7.572E-01
CO-57	2.630E-01	148.5	3.905E-01	3.908E-01	8.086E-01
CO-58	3.163E-01	91.7	2.899E-01	2.903E-01	1.001E+00
CO-60	1.393E-01	47.0	6.545E-02	6.582E-02	1.878E+00
ZN-65	-1.884E+00	103.1	1.943E+00	1.945E+00	6.564E+00
NB-94	1.495E-02	74.9	1.120E-02	1.122E-02	1.196E+00
ZR-95	3.700E-01	136.3	5.045E-01	5.048E-01	1.324E+00
NB-95	-2.998E-01	134.2	4.024E-01	4.027E-01	1.405E+00
RU-103	-6.975E-02	575.3	4.013E-01	4.013E-01	1.021E+00
RH-106	-4.609E+00	164.4	7.578E+00	7.581E+00	2.575E+01
AG-108M	-1.508E-01	263.8	3.977E-01	3.978E-01	1.032E+00
AG-110M	2.740E-01	103.9	2.847E-01	2.851E-01	2.814E+00
SN-113	-6.138E-02	934.3	5.735E-01	5.735E-01	1.283E+00
SB-124	0.000E+00	1.#INF	4.533E-02	4.533E-02	2.368E+00
SB-125	4.777E-01	113.0	5.398E-01	5.403E-01	3.118E+00
I-131	-4.454E-01	95.1	4.237E-01	4.243E-01	1.320E+00
Gd-153	0.000E+00	1.#INF	5.341E-01	5.342E-01	5.373E+00
Ga-68	-7.783E+00	332.8	2.590E+01	2.591E+01	6.110E+01
Tc-99m	0.000E+00	1.#INF	1.480E-01	1.480E-01	1.345E+00
BA-133	-1.742E-01	128.4	2.238E-01	2.240E-01	2.455E+00
CS-134	3.336E-01	103.7	3.459E-01	3.464E-01	2.390E+00
CS-137	-5.365E-01	105.5	5.661E-01	5.668E-01	1.928E+00
CE-139	2.377E-01	116.0	2.758E-01	2.767E-01	9.348E-01
Ba-140	1.939E+00	93.0	1.804E+00	1.806E+00	2.744E+00
La-140	4.804E-01	113.2	5.439E-01	5.445E-01	1.494E+00
CE-141	-4.142E-01	129.3	5.355E-01	5.359E-01	1.389E+00

CE-144	1.780E+00	158.9	2.829E+00	2.830E+00	9.544E+00
PM-144	-4.655E-01	92.5	4.307E-01	4.314E-01	1.392E+00
EU-152	1.186E-01	83.8	9.932E-02	9.952E-02	8.242E+00
EU-154	-3.788E-01	174.7	6.618E-01	6.621E-01	1.132E+01
EU-155	0.000E+00	1.#INF	5.817E-01	5.817E-01	7.512E+00
HF-181	3.059E-01	154.2	4.715E-01	4.718E-01	1.775E+00
Ta-182	3.402E+00	44.3	1.507E+00	1.517E+00	1.067E+01
Hg-203	1.285E-01	262.8	3.376E-01	3.377E-01	1.174E+00
TL-208	8.512E-01	69.8	5.942E-01	5.958E-01	1.134E+00
pm-146	-2.476E-01	82.6	2.045E-01	2.049E-01	3.157E+00
y-88	-9.653E-01	64.9	6.264E-01	6.283E-01	1.890E+00
Cd-113m	-3.018E+03	140.7	4.247E+03	4.252E+03	1.458E+04
Cd-109	0.000E+00	1.#INF	4.369E+00	4.369E+00	4.394E+01
Cf-251	-8.741E-01	168.8	1.475E+00	1.477E+00	3.873E+00
Cf-249	3.218E-01	147.3	4.741E-01	4.744E-01	1.806E+00
Sn-126	-2.636E+00	148.0	3.900E+00	3.903E+00	1.316E+01
PB-210	-1.156E+01	86.0	9.945E+00	9.968E+00	4.110E+01
PB-212	2.364E+00	21.0	4.964E-01	5.194E-01	1.293E+00
PB-214	4.925E+00	12.9	6.376E-01	6.871E-01	1.133E+00
BI-207	-2.900E-02	1039.2	3.014E-01	3.014E-01	1.104E+00
BI-212	4.713E+00	128.0	6.032E+00	6.037E+00	2.084E+01
U-235	1.833E+00	99.7	1.827E+00	1.829E+00	1.078E+01
BI-214	5.172E+00	17.9	9.240E-01	9.623E-01	1.604E+00
BI-210M	-7.302E-01	70.0	5.115E-01	5.133E-01	2.105E+00
AC-228	1.459E+00	90.7	1.324E+00	1.327E+00	2.855E+00
TH-227	3.274E+00	151.9	4.973E+00	4.976E+00	1.690E+01
TH-229	1.806E+00	301.9	5.452E+00	5.454E+00	1.454E+01
TH-234	-1.596E+00	587.1	9.370E+00	9.370E+00	3.220E+01
PA-231	7.834E+00	153.7	1.204E+01	1.205E+01	5.527E+01
PA-233	4.937E-01	217.5	1.074E+00	1.074E+00	4.842E+00
PA-234	1.089E+00	149.5	1.627E+00	1.628E+00	5.491E+00
PA-234M	0.000E+00	1.#INF	1.155E+01	1.155E+01	2.408E+02
AM-241	-1.979E-01	513.1	1.015E+00	1.015E+00	3.481E+00
Np-237	-1.922E+00	191.8	3.686E+00	3.688E+00	1.236E+01
Ir-192	1.610E-01	131.6	2.119E-01	2.121E-01	2.025E+00
Cs-136	1.611E-01	162.0	2.609E-01	2.611E-01	1.047E+00
Np-239	0.000E+00	1.#INF	6.621E-01	6.621E-01	6.982E+00
Nd-147	0.000E+00	1.#INF	7.564E-01	7.564E-01	6.025E+00
TL-210	1.155E-01	200.5	2.315E-01	2.316E-01	1.703E+00
Total	2.124E+02				

Analyst: Morgan Reichert

Sample description
376765_Gamma_160-29521-B-12-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182610.An1

Acquisition information
Start time: 8/9/2018 6:11:08 PM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:10:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-07-21_1011.PBC 7/21/2018 10:11:36 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1158

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	10.	151.89	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
63.29	-3.	587.07	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
121.78	14.	93.49	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.382E-01	CO57
122.06	7.	202.84	1.02	3.846E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.162E-01	CO57
131.29	13.	149.45	1.02	3.775E-02	131.29	18.000	PBC<MDA	PA234
133.02	13.	154.16	1.03	3.759E-02	133.02	43.300	PBC<MDA	HF181
133.54	13.	158.88	1.03	3.754E-02	133.54	11.090	PBC<MDA	CE144
136.30	13.	163.14	1.03	3.725E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.868E+00	CO57
136.47	10.	217.01	1.03	3.723E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.439E+00	CO57
162.66	13.	102.37	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	13.	109.46	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	12.	116.02	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
185.72	31.	42.75	1.07	3.123E-02	185.72	54.000	PBC<MDA	U235
193.51	4.	301.92	1.08	3.030E-02	193.51	4.400	PBC<MDA	TH229
205.33	10.	99.65	1.09	2.900E-02	205.33	5.010	PBC<MDA	U235
227.00	11.	97.70	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.74	48.	20.99	1.12	2.592E-02	238.63	43.300	2.364E+00	PB212
244.69	10.	112.21	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.20	4.	262.78	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
284.30	3.	439.48	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.29	44.	20.35	0.78	2.205E-02	295.09	19.300	5.788E+00	PB214
296.00	8.	200.54	1.17	2.200E-02	296.00	79.000	PBC<MDA	TL210
300.03	8.	214.48	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	8.	211.85	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	8.466E+00	PA231
					300.18	6.200	3.360E+00	PA233
300.18	8.	217.51	1.17	2.176E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	8.467E+00	PA231
					300.18	6.200	3.360E+00	PA233
302.65	8.	222.67	1.18	2.162E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.147E+00	BA133
302.85	8.	228.10	1.18	2.161E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.147E+00	BA133
304.85	8.	237.40	1.18	2.150E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	7.416E-01	BI210M
328.76	8.	143.23	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	8.	147.32	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.32	8.	154.71	1.21	1.983E-02	338.32	12.010	PBC<MDA	AC228
340.57	8.	161.98	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
351.91	58.	16.01	1.24	1.923E-02	351.93	37.600	4.482E+00	PB214
383.84	10.	106.53	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
453.88	2.	412.43	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	7.	113.00	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	131.57	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
511.86	18.	104.35	2.60	1.426E-02	511.86	20.000	PBC<MDA	RH106
537.26	6.	105.02	1.37	1.371E-02	537.26	24.390	PBC<MDA	Ba140
569.32	6.	112.07	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.937E+00	PA234
					569.70	97.740	2.465E-01	BI207
583.02	10.	92.42	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
600.50	3.	447.66	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
609.16	47.	17.86	1.70	1.236E-02	609.31	46.090	4.612E+00	BI214
727.17	7.	128.00	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	127.25	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
756.73	4.	136.33	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
763.94	5.	103.93	1.55	1.024E-02	763.94	22.280	PBC<MDA	AG110M
778.92	1.	800.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
795.87	8.	103.71	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
810.78	6.	91.66	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
815.77	5.	113.22	1.59	9.682E-03	815.77	23.280	PBC<MDA	La140
846.77	6.	92.05	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.56	7.	104.64	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	6.	74.89	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
911.07	6.	94.89	1.66	8.811E-03	911.07	29.000	PBC<MDA	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
937.49	1.	702.38	1.68	8.598E-03	937.49	34.360	PBC<MDA	AG110M
964.11	5.	175.84	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
996.33	2.	400.00	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1117.06	2.	586.41	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1121.30	14.	104.43	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.032E+00	Ta182
1173.24	14.	46.98	1.84	7.076E-03	1173.24	99.900	1.074E+00	CO60
1189.05	15.	44.30	1.85	6.994E-03	1189.05	16.200	7.192E+00	Ta182
1221.41	5.	145.77	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1313.00	6.	40.82	1.93	6.408E-03	1313.00	21.000	PBC<MDA	TL210
1461.08	184.	7.47	1.21	5.827E-03	1460.83	10.670	1.648E+02	K40
1596.21	1.	427.57	2.09	5.382E-03	1596.21	95.400	PBC<MDA	La140
1764.55	9.	41.43	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	159.	-17.	-0.010	85.99	0.946s
TH-227	200.23	50.14	118.	10.	0.006	151.89	0.950s
AM-241	237.79	59.54	160.	-4.	-0.002	513.09	0.958s
TH-234	252.78	63.29	176.	-3.	-0.002	587.07	0.962
Sn-126	256.75	64.28	198.	-14.	-0.008	147.98	0.963
BA-133	323.54	80.99	96.	-2.	-0.001	964.88	0.978
Np-237	345.53	86.49	503.	-17.	-0.009	191.81	0.983s
EU-155	345.74	86.54	519.	0.	0.000	1000.00	0.983s
Sn-126	347.33	86.94	522.	-19.	-0.010	174.13	0.984s
Cd-109	351.72	88.04	541.	0.	0.000	1000.00	0.985s
Nd-147	363.95	91.10	541.	0.	0.000	1000.00	0.987s
TH-234	369.91	92.59	559.	-18.	-0.010	109.82	0.989s
AC-228	372.95	93.35	541.	0.	0.000	1000.00	0.990s
Gd-153	389.54	97.50	541.	0.	0.000	1000.00	0.993s
Np-239	397.53	99.50	541.	0.	0.000	1000.00	0.995s
Gd-153	412.32	103.20	541.	0.	0.000	1000.00	0.998s
Np-239	414.32	103.70	541.	0.	0.000	1000.00	0.999s
EU-155	420.77	105.31	541.	0.	0.000	1000.00	1.001
Np-239	424.03	106.13	536.	0.	0.000	1000.00	1.001
EU-152	486.57	121.78	80.	14.	0.008	93.49	1.016s
CO-57	487.72	122.06	94.	7.	0.004	202.84	1.016s
EU-154	491.87	123.10	98.	-6.	-0.003	257.45	1.017s
PA-234	524.63	131.29	191.	13.	0.007	149.45	1.024s
HF-181	531.54	133.02	205.	13.	0.007	154.16	1.026s
CE-144	533.60	133.54	218.	13.	0.007	158.88	1.026s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	544.63	136.30	231.	13.	0.007	163.14	1.029
CO-57	545.33	136.47	245.	10.	0.006	217.01	1.029
Tc-99m	561.46	140.51	255.	0.	0.000	1000.00	1.032s
CE-141	581.17	145.44	77.	-13.	-0.007	129.29	1.037s
Ba-140	650.01	162.66	84.	13.	0.007	102.37	1.053s
U-235	652.88	163.38	98.	13.	0.007	109.46	1.053s
CE-139	662.77	165.85	85.	12.	0.006	116.02	1.055s
Cf-251	705.73	176.60	59.	-9.	-0.005	168.79	1.065s
U-235	742.19	185.72	40.	31.	0.017	42.75	1.073s
TH-229	773.33	193.51	48.	4.	0.002	301.92	1.080s
U-235	820.60	205.33	26.	10.	0.006	99.65	1.091s
TH-229	842.65	210.85	70.	-8.	-0.004	206.85	1.096s
Cf-251	907.22	227.00	29.	11.	0.006	97.70	1.110s
PB-212	953.72	238.63	25.	48.	0.027	20.99	1.120D
EU-152	977.95	244.69	32.	10.	0.005	112.21	1.126s
Cd-113m	1053.94	263.70	57.	-8.	-0.004	140.72	1.142s
BI-210M	1062.46	265.83	83.	-16.	-0.009	70.05	1.144s
TL-208	1108.25	277.28	52.	-4.	-0.002	259.81	1.154s
Hg-203	1115.91	279.20	63.	4.	0.002	262.78	1.156s
I-131	1136.30	284.30	36.	3.	0.002	439.48	1.160s
PB-214	1180.23	295.29	8.	44.	0.025	20.35	0.782s
TL-210	1183.08	296.00	129.	8.	0.005	200.54	1.170s
PB-212	1199.19	300.03	137.	8.	0.004	214.48	1.174
PA-231	1199.35	300.07	145.	8.	0.005	211.85	1.174s
PA-233	1199.79	300.18	153.	8.	0.005	217.51	1.174s
PA-231	1209.66	302.65	162.	8.	0.005	222.67	1.176
BA-133	1210.47	302.85	170.	8.	0.005	228.10	1.176
Ba-140	1218.46	304.85	178.	8.	0.004	237.40	1.178s
BI-210M	1218.64	304.90	186.	0.	0.000	1000.00	1.178s
Ir-192	1232.81	308.44	186.	0.	0.000	1000.00	1.181
PA-233	1247.09	312.01	186.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	186.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	207.	-10.	-0.006	162.57	1.191s
La-140	1314.06	328.76	64.	8.	0.005	143.23	1.199s
Cf-249	1332.77	333.44	72.	8.	0.005	147.32	1.203s
AC-228	1352.28	338.32	80.	8.	0.005	154.71	1.207
Cs-136	1361.28	340.57	88.	8.	0.005	161.98	1.209s
EU-152	1376.13	344.29	253.	-16.	-0.009	140.22	1.212s
HF-181	1382.30	345.83	232.	-16.	-0.009	138.78	1.213s
PB-214	1406.60	351.91	7.	58.	0.032	16.01	1.237
BA-133	1422.97	356.00	113.	-12.	-0.007	128.43	1.222s
I-131	1456.89	364.48	52.	-15.	-0.009	95.13	1.229s
BA-133	1534.29	383.84	48.	10.	0.005	106.53	1.246s
SN-113	1565.67	391.69	25.	-1.	-0.001	934.27	1.253s
SB-125	1710.36	427.88	28.	-4.	-0.002	263.79	1.283s
AG-108M	1734.60	433.94	28.	-4.	-0.002	263.79	1.288s
pm-146	1814.35	453.88	22.	2.	0.001	412.43	1.304s
SB-125	1852.29	463.37	31.	7.	0.004	113.00	1.312s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1871.05	468.06	30.	6.	0.003	131.57	1.316s
BE-7	1909.18	477.60	53.	-7.	-0.004	176.78	1.324s
HF-181	1926.79	482.00	59.	0.	0.000	1000.00	1.328s
RU-103	1987.00	497.05	22.	-2.	-0.001	575.33	1.340s
RH-106	2046.22	511.86	49.	18.	0.010	104.35	2.602s
Nd-147	2122.75	531.00	13.	0.	0.000	1000.00	1.368s
Ba-140	2147.78	537.26	9.	6.	0.003	105.02	1.373s
CS-134	2251.67	563.24	17.	-4.	-0.002	201.91	1.394s
CS-134	2276.00	569.32	17.	6.	0.003	112.07	1.399
TL-208	2330.79	583.02	17.	10.	0.005	92.42	1.410s
SB-125	2400.69	600.50	110.	3.	0.002	447.66	1.424
SB-124	2409.62	602.73	113.	0.	0.000	1000.00	1.425s
CS-134	2417.53	604.71	113.	0.	0.000	1000.00	1.427s
BI-214	2435.31	609.16	9.	47.	0.026	17.86	1.696
RU-103	2439.88	610.30	113.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	113.	0.	0.000	1000.00	1.435s
PM-144	2470.93	618.06	110.	0.	0.000	1000.00	1.437s
RH-106	2486.35	621.92	130.	-10.	-0.006	164.40	1.440s
SB-125	2542.23	635.89	26.	-7.	-0.004	109.73	1.451s
I-131	2546.57	636.97	43.	-4.	-0.002	228.32	1.452s
AG-110M	2629.71	657.76	32.	-2.	-0.001	328.63	1.469s
CS-137	2645.30	661.66	46.	-10.	-0.005	105.53	1.472s
PM-144	2784.82	696.54	28.	-9.	-0.005	92.53	1.499s
NB-94	2809.17	702.63	19.	-6.	-0.003	138.02	1.503s
SB-124	2889.79	722.79	31.	-11.	-0.006	81.04	1.519s
AG-108M	2890.40	722.94	42.	-2.	-0.001	521.52	1.519s
EU-154	2892.07	723.36	44.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	44.	0.	0.000	1000.00	1.520s
BI-212	2907.33	727.17	35.	7.	0.004	128.00	1.522s
pm-146	2941.53	735.72	10.	5.	0.003	127.25	1.529s
pm-146	2987.29	747.16	14.	-8.	-0.004	105.33	1.537s
ZR-95	3025.56	756.73	5.	4.	0.002	136.33	1.544s
AG-110M	3054.42	763.94	13.	5.	0.003	103.93	1.550s
NB-95	3061.80	765.79	24.	-6.	-0.003	134.23	1.551s
PA-234M	3064.30	766.41	32.	-11.	-0.006	77.81	1.552s
EU-152	3114.33	778.92	14.	1.	0.001	800.00	1.561s
BI-212	3140.33	785.42	14.	-1.	-0.001	800.00	1.566s
CS-134	3182.12	795.87	26.	8.	0.004	103.71	1.574s
TL-210	3197.05	799.60	34.	0.	0.000	1000.00	1.577s
CO-58	3241.75	810.78	10.	6.	0.003	91.66	1.585
La-140	3261.74	815.77	16.	5.	0.003	113.22	1.589
Cs-136	3272.66	818.50	11.	0.	0.000	1000.00	1.591s
MN-54	3338.05	834.85	14.	-2.	-0.001	403.11	1.603s
Co-56	3385.75	846.77	5.	6.	0.003	92.05	1.612s
TL-208	3440.93	860.56	9.	7.	0.004	104.64	1.622s
NB-94	3483.06	871.10	6.	6.	0.003	74.89	1.629
EU-154	3491.60	873.23	19.	-4.	-0.002	174.71	1.631s
PA-234	3520.80	880.53	32.	-10.	-0.005	87.22	1.636

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3531.64	883.24	42.	-1.	-0.001	803.25	1.638s
AG-110M	3537.42	884.68	43.	0.	0.000	1000.00	1.639s
y-88	3590.85	898.04	30.	-15.	-0.008	64.89	1.649s
AC-228	3642.98	911.07	5.	6.	0.003	94.89	1.658s
AG-110M	3748.69	937.49	10.	1.	0.001	702.38	1.677s
PA-234	3782.81	946.02	25.	-10.	-0.006	114.38	1.683s
EU-152	3855.18	964.11	31.	5.	0.003	175.84	1.696s
AC-228	3874.63	968.97	46.	-8.	-0.005	120.60	1.699
EU-154	3984.09	996.33	31.	2.	0.001	400.00	1.718s
PA-234M	4002.77	1001.00	33.	0.	0.000	1000.00	1.722s
EU-154	4017.88	1004.77	34.	0.	0.000	1000.00	1.724s
Co-56	4150.18	1037.84	15.	-7.	-0.004	128.24	1.747s
Cs-136	4191.11	1048.07	25.	-7.	-0.004	103.85	1.754s
RH-106	4200.27	1050.36	46.	-12.	-0.006	87.55	1.755s
BI-207	4253.49	1063.66	10.	-2.	-0.001	354.73	1.765s
Ga-68	4308.47	1077.40	20.	-3.	-0.002	332.78	1.774s
FE-59	4395.90	1099.25	16.	-3.	-0.002	308.52	1.789s
EU-152	4447.22	1112.07	70.	-15.	-0.009	81.40	1.797s
ZN-65	4461.11	1115.55	79.	-13.	-0.007	103.14	1.800s
BI-214	4480.08	1120.29	96.	2.	0.001	586.41	1.803s
Sc-46	4481.13	1120.55	113.	-18.	-0.010	88.03	1.803s
Ta-182	4484.13	1121.30	100.	14.	0.008	104.43	1.803s
CO-60	4691.97	1173.24	5.	14.	0.008	46.98	1.838s
Ta-182	4755.25	1189.05	5.	15.	0.008	44.30	1.848s
Ta-182	4884.75	1221.41	11.	5.	0.003	145.77	1.869s
Co-56	4952.26	1238.28	16.	-4.	-0.002	339.53	1.879s
EU-154	5097.40	1274.54	11.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	5.	-1.	-0.001	403.11	1.913s
TL-210	5251.31	1313.00	0.	6.	0.003	40.82	1.926s
CO-60	5329.36	1332.50	16.	-9.	-0.005	154.14	1.938s
AG-110M	5536.68	1384.30	0.	0.	0.000	1000.00	1.970s
K-40	5844.01	1461.08	3.	184.	0.102	7.47	1.209s
La-140	6384.98	1596.21	6.	1.	0.001	427.57	2.092s
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	3.	9.	0.005	41.43	2.181s
Co-56	7086.23	1771.35	12.	0.	0.000	1000.00	2.184s
y-88	7345.35	1836.06	0.	0.	0.000	1000.00	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C  -2.3173E+00                                     5.31E+01
                          477.60-2.317E+00 ?(P 1.278E+01 1.77E+02 1.05E+01 G

NA-22    C   2.8165E-02                                     9.50E+02
                         1274.53 2.817E-02 %(  1.515E+00 1.40E+03 9.99E+01 G

K-40     N   1.6482E+02                                     4.66E+11
                         1460.83 1.648E+02  (P 9.037E+00 7.47E+00 1.07E+01 G

Sc-46    F   2.5347E-02                                     8.38E+01
                          889.28 2.535E-02 %(P 2.068E+00 2.28E+03 1.00E+02 G
                         1120.55-1.338E+00 &   3.941E+00 8.80E+01 1.00E+02 G

CR-51    F  -2.8060E+00                                     2.77E+01
                          320.08-2.806E+00  (P 1.885E+01 1.63E+02 9.94E+00 G

MN-54    C  -1.1706E-01                                     3.12E+02
                          834.85-1.171E-01 ?(  1.179E+00 4.03E+02 1.00E+02 G

FE-59    F  -3.9379E-01                                     4.45E+01
                         1099.25-3.938E-01 ?(  2.802E+00 3.09E+02 5.65E+01 G
                         1291.60-2.637E-01 +   2.665E+00 4.03E+02 4.32E+01 G

Co-56    C   3.3208E-01                                     7.73E+01
                          846.77 3.321E-01 ?(  7.572E-01 9.21E+01 9.99E+01 G
                         1238.28-5.114E-01 + P 2.668E+00 3.40E+02 6.61E+01 G
                         1037.84-3.688E+00 + P 1.048E+01 1.28E+02 1.41E+01 G
                         1771.35 0.000E+00 -   1.381E+01 1.00E+03 1.55E+01  A

CO-57    C   2.6295E-01                                     2.72E+02
                          122.06 1.162E-01 ?(  8.086E-01 2.03E+02 8.56E+01 G
                          136.47 1.439E+00 &(  1.056E+01 2.17E+02 1.07E+01 G

CO-58    C   3.1626E-01                                     7.09E+01
                          810.78 3.163E-01 ?(  1.001E+00 9.17E+01 9.95E+01 G

CO-60    F   1.3932E-01                                     1.93E+03
                         1332.50-7.947E-01 ?(P 1.878E+00 1.54E+02 1.00E+02 G
                         1173.24 1.074E+00 ?(  1.059E+00 4.70E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.8839E+00					2.44E+02	
			1115.55	-1.884E+00	?(	6.564E+00	1.03E+02	5.06E+01 G
NB-94	I	1.4949E-02					7.41E+06	
			702.63	-3.209E-01	?(P	1.196E+00	1.38E+02	9.79E+01 G
			871.10	3.441E-01	?(	8.675E-01	7.49E+01	9.99E+01 G
ZR-95	I	3.7002E-01					6.40E+01	
			756.73	3.700E-01	?(P	1.324E+00	1.36E+02	5.45E+01 G
			724.20	0.000E+00	-	3.938E+00	1.00E+03	4.42E+01 G
NB-95	I	-2.9978E-01					6.40E+01	
			765.79	-2.998E-01	?(	1.405E+00	1.34E+02	9.98E+01 G
RU-103	I	-6.9754E-02					3.93E+01	
			497.05	-6.975E-02	?(	1.021E+00	5.75E+02	9.09E+01 G
			610.30	0.000E+00	+	4.089E+01	1.00E+03	5.75E+00 GA
RH-106	I	-4.6094E+00					3.74E+02	
			621.92	-4.609E+00	&(	2.575E+01	1.64E+02	9.93E+00 G
			1050.36	-5.331E+01	+	1.573E+02	8.76E+01	1.56E+00 G
			511.86	3.506E+00	?	6.882E+00	1.04E+02	2.00E+01 GA
AG-108M	C	-1.5077E-01					1.53E+05	
			433.94	-1.508E-01	?(	1.032E+00	2.64E+02	9.05E+01 G
			722.94	-1.012E-01	+	1.875E+00	5.22E+02	9.08E+01 G
			614.28	0.000E+00	+	2.631E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.7395E-01					2.50E+02	
			884.68	0.000E+00	&(	2.814E+00	1.00E+03	7.27E+01 G
			657.76	-1.265E-01	+	1.481E+00	3.29E+02	9.46E+01 G
			937.49	1.881E-01	?(	3.281E+00	7.02E+02	3.44E+01 G
			1384.30	0.000E+00	-	2.757E+00	1.00E+03	2.43E+01 G
			763.94	1.300E+00	?(P	4.700E+00	1.04E+02	2.23E+01 G
SN-113	F	-6.1382E-02					1.15E+02	
			391.69	-6.138E-02	&(P	1.283E+00	9.34E+02	6.40E+01 G
SB-125	I	4.7770E-01					1.01E+03	
			427.88	-4.557E-01	?(	3.118E+00	2.64E+02	2.96E+01 G
			600.50	8.287E-01	&(	1.281E+01	4.48E+02	1.79E+01 G
			635.89	-2.882E+00	+	1.090E+01	1.10E+02	1.13E+01 G
			463.37	2.518E+00	?(	9.790E+00	1.13E+02	1.05E+01 G
I-131	I	-4.4539E-01					8.02E+00	
			364.48	-5.600E-01	?(	1.320E+00	9.51E+01	8.17E+01 G
			284.30	1.080E+00	?(P	1.228E+01	4.39E+02	6.14E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			636.97	-2.710E+00	+	2.167E+01	2.28E+02	7.17E+00 G
Ga-68	C	-7.7834E+00					4.71E-02	
			1077.40	-7.783E+00	?(	6.110E+01	3.33E+02	3.30E+00 G
BA-133	F	-1.7424E-01					3.85E+03	
			356.00	-5.644E-01	?(	2.455E+00	1.28E+02	6.20E+01 G
			302.85	1.147E+00	?(	8.896E+00	2.28E+02	1.83E+01 G
			383.84	3.350E+00	?	1.215E+01	1.07E+02	8.94E+00 GA
			80.99	-8.953E-02	& P	2.217E+00	9.65E+02	3.41E+01 GA
CS-134	I	3.3357E-01					7.54E+02	
			604.71	0.000E+00	?(	2.390E+00	1.00E+03	9.76E+01 G
			795.87	4.927E-01	?(	1.754E+00	1.04E+02	8.55E+01 G
			569.32	1.566E+00	(	6.110E+00	1.12E+02	1.54E+01 G
			801.95	3.254E-01	%	1.932E+01	1.64E+03	8.69E+00 G
			563.24	-2.186E+00	+	1.115E+01	2.02E+02	8.35E+00 G
CS-137	I	-5.3648E-01					1.10E+04	
			661.66	-5.365E-01	?(	1.928E+00	1.06E+02	8.52E+01 G
CE-139	F	2.3773E-01					1.38E+02	
			165.85	2.377E-01	?(	9.348E-01	1.16E+02	7.99E+01 G
Ba-140	I	1.9390E+00					1.28E+01	
			537.26	1.034E+00	&(P	2.744E+00	1.05E+02	2.44E+01 G
			162.66	3.487E+00	&(	1.204E+01	1.02E+02	6.22E+00 G
			304.85	4.840E+00	&(	3.907E+01	2.37E+02	4.29E+00 G
La-140	I	4.8039E-01					1.28E+01	
			1596.21	1.443E-01	?(	1.494E+00	4.28E+02	9.54E+01 G
			487.02	1.371E-02	%	3.188E+00	6.57E+03	4.55E+01 G
			328.76	1.096E+00	?(P	5.379E+00	1.43E+02	2.03E+01 G
			815.77	1.321E+00	?(P	5.216E+00	1.13E+02	2.33E+01 G
CE-141	I	-4.1418E-01					3.25E+01	
			145.44	-4.142E-01	?(	1.389E+00	1.29E+02	4.82E+01 G
CE-144	I	1.7805E+00					2.85E+02	
			133.54	1.780E+00	?(	9.544E+00	1.59E+02	1.11E+01 G
PM-144	C	-4.6552E-01					3.63E+02	
			696.54	-4.655E-01	?(P	1.392E+00	9.25E+01	9.90E+01 G
			618.06	0.000E+00	+	2.367E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1855E-01					4.94E+03	
			344.29	-1.748E+00	?(	8.242E+00	1.40E+02	2.65E+01 G
			1112.07	-8.407E+00	+	2.290E+01	8.14E+01	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			121.78	7.130E-01	+	2.243E+00	9.35E+01	2.86E+01 G
			778.92	4.264E-01	+	8.590E+00	8.00E+02	1.29E+01 G
			964.11	2.115E+00	?(	1.305E+01	1.76E+02	1.46E+01 G
			244.69	2.799E+00	?(P	8.324E+00	1.12E+02	7.58E+00 G
			1408.00	1.464E-01	%	6.062E+00	1.68E+03	2.10E+01 GA
EU-154	I	-3.7880E-01					3.14E+03	
			873.23	-1.816E+00	?(	1.132E+01	1.75E+02	1.23E+01 G
			123.10	-1.951E-01	&	1.728E+00	2.57E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.359E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.590E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	&	1.138E+01	1.00E+03	1.80E+01 G
			996.33	1.285E+00	?(	1.841E+01	4.00E+02	1.06E+01 G
HF-181	F	3.0587E-01					4.24E+01	
			482.00	0.000E+00	&(	1.775E+00	1.00E+03	8.05E+01 G
			133.02	4.552E-01	?(	2.368E+00	1.54E+02	4.33E+01 G
			345.83	-2.984E+00	&	1.393E+01	1.39E+02	1.51E+01 G
			136.30	3.409E+00	?(	1.876E+01	1.63E+02	5.85E+00 G
Ta-182	F	3.4022E+00					1.14E+02	
			1121.30	3.032E+00	&(	1.067E+01	1.04E+02	3.49E+01 G
			1221.41	1.607E+00	&(	5.401E+00	1.46E+02	2.70E+01 G
			1189.05	7.192E+00	?(	6.606E+00	4.43E+01	1.62E+01 G
Hg-203	F	1.2846E-01					4.66E+01	
			279.20	1.285E-01	?(	1.174E+00	2.63E+02	8.15E+01 G
TL-208	N	8.5123E-01					6.98E+02	
			583.02	5.026E-01	(	1.134E+00	9.24E+01	8.45E+01 G
			277.28	-1.523E+00	+	1.382E+01	2.60E+02	6.31E+00 G
			860.56	3.223E+00	?(	8.193E+00	1.05E+02	1.24E+01 G
pm-146	C	-2.4765E-01					2.02E+03	
			747.16	-1.253E+00	?(	3.157E+00	1.05E+02	3.40E+01 G
			735.72	1.272E+00	&(P	4.000E+00	1.27E+02	2.25E+01 G
			453.88	1.269E-01	+	1.327E+00	4.12E+02	6.50E+01 G
y-88	F	-9.6529E-01					1.07E+02	
			898.04	-9.653E-01	?(P	1.890E+00	6.49E+01	9.37E+01 G
			1836.06	0.000E+00	+	8.706E-01	1.00E+03	9.92E+01 G
Cd-113m		-3.0183E+03					5.33E+03	
			263.70	-3.018E+03	?(	1.458E+04	1.41E+02	6.00E-03 K
Cf-251	T	-8.7405E-01					3.28E+05	
			176.60	-8.741E-01	?(	3.873E+00	1.69E+02	1.70E+01 G
			227.00	3.575E+00	&	9.158E+00	9.77E+01	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	3.2183E-01					1.28E+05	
			387.95	4.660E-02	%(	1.806E+00	1.10E+03	6.60E+01 G
			333.44	1.493E+00	&(	7.529E+00	1.47E+02	1.55E+01 G
Sn-126		-2.6357E+00					3.65E+07	
			87.57	-2.476E-02	%	4.448E+00	5.32E+03	3.75E+01 GA
			64.28	-2.636E+00	&(	1.316E+01	1.48E+02	9.70E+00 G
			86.94	-3.120E+00	&	1.820E+01	1.74E+02	9.04E+00 GA
PB-210	N	-1.1565E+01					8.14E+03	
			46.54	-1.156E+01	(P	4.110E+01	8.60E+01	4.25E+00 G
PB-212	N	2.3644E+00					6.98E+02	
			238.63	2.364E+00	(P	1.293E+00	2.10E+01	4.33E+01 G
			300.03	6.102E+00	+ P	4.462E+01	2.14E+02	3.28E+00 GA
PB-214	N	4.9253E+00					5.84E+05	
			351.93	4.482E+00	(	1.133E+00	1.60E+01	3.76E+01 G
			295.09	5.788E+00	(	2.038E+00	2.03E+01	1.93E+01 G
			242.00	-3.297E-01	%	1.738E+01	1.53E+03	7.43E+00 GA
BI-207	C	-2.9002E-02					1.18E+04	
			569.70	-2.900E-02	%(	1.104E+00	1.04E+03	9.77E+01 G
			1063.66	-1.935E-01	+	1.688E+00	3.55E+02	7.45E+01 G
BI-212	N	4.7129E+00					6.98E+02	
			727.17	4.713E+00	?(	2.084E+01	1.28E+02	7.55E+00 G
			785.42	-4.341E+00	+	8.746E+01	8.00E+02	1.28E+00 GA
U-235	N	1.8335E+00					2.57E+11	
			143.79	-2.178E-01	%(P	1.078E+01	1.29E+03	1.10E+01 G
			205.33	3.834E+00	&(	1.006E+01	9.97E+01	5.01E+00 G
			163.38	4.286E+00	?(	1.584E+01	1.09E+02	5.08E+00 G
			185.72	1.010E+00		1.064E+00	4.27E+01	5.40E+01 GA
BI-214	N	5.1724E+00					5.84E+05	
			609.31	4.612E+00	(P	1.604E+00	1.79E+01	4.61E+01 G
			1120.29	1.185E+00	& P	2.411E+01	5.86E+02	1.51E+01 G
			1764.49	6.849E+00	?(P	7.573E+00	4.14E+01	1.54E+01 G
BI-210M	T	-7.3020E-01					1.10E+09	
			265.83	-7.302E-01	(P	2.105E+00	7.00E+01	5.00E+01 G
			304.90	0.000E+00	&	6.115E+00	1.00E+03	2.80E+01 G
AC-228	N	1.4594E+00					2.10E+03	
			911.07	1.253E+00	&(	2.855E+00	9.49E+01	2.90E+01 G
			968.97	-3.173E+00	+	1.311E+01	1.21E+02	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	1.957E+00	?(	1.036E+01	1.55E+02	1.20E+01 G
			93.35	0.000E+00	-	2.932E+01	1.00E+03	5.56E+00 XA
TH-227	N	3.2741E+00					7.95E+03	
			50.14	3.274E+00	(	1.690E+01	1.52E+02	8.00E+00 G
			256.24	-3.231E-01	%	1.086E+01	1.24E+03	7.00E+00 G
TH-229	N	1.8057E+00					2.68E+06	
			193.51	1.806E+00	&(	1.454E+01	3.02E+02	4.40E+00 G
			210.85	-5.010E+00	+	2.719E+01	2.07E+02	2.99E+00 G
TH-234	N	-1.5960E+00					1.63E+12	
			63.29	-1.596E+00	(P	3.220E+01	5.87E+02	3.81E+00 G
			92.59	-4.802E+00	+ P	2.975E+01	1.10E+02	5.58E+00 G
PA-231	N	7.8336E+00					1.20E+07	
			302.65	7.294E+00	?(	5.527E+01	2.23E+02	2.88E+00 G
			300.07	8.466E+00	?(	6.109E+01	2.12E+02	2.46E+00 G
PA-233	C	4.9372E-01					7.82E+08	
			312.01	0.000E+00	?(	4.842E+00	1.00E+03	3.60E+01 G
			300.18	3.360E+00	?(	2.489E+01	2.18E+02	6.20E+00 G
PA-234	N	1.0885E+00					1.63E+12	
			131.29	1.089E+00	(	5.491E+00	1.49E+02	1.80E+01 G
			946.02	-4.860E+00	+	1.264E+01	1.14E+02	1.34E+01 G
			569.47	-3.456E-01	%	1.316E+01	1.04E+03	8.20E+00 G
			883.24	-7.334E-01	+	2.101E+01	8.03E+02	9.60E+00 G
			880.53	-1.006E+01	+	2.967E+01	8.72E+01	6.00E+00 GA
AM-241	T	-1.9789E-01					1.58E+05	
			59.54	-1.979E-01	?(	3.481E+00	5.13E+02	3.59E+01 G
Np-237	F	-1.9217E+00					2.14E+06	
			86.49	-1.922E+00	?(	1.236E+01	1.92E+02	1.31E+01 G
Ir-192	F	1.6102E-01					7.40E+01	
			316.49	0.000E+00	@(	2.025E+00	1.00E+03	8.70E+01 G
			468.06	4.318E-01	(	1.972E+00	1.32E+02	5.18E+01 G
			308.44	0.000E+00	-	5.442E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.6107E-01					1.30E+01	
			818.50	0.000E+00	?(	1.047E+00	1.00E+03	1.00E+02 G
			1048.07	-6.522E-01	+	2.327E+00	1.04E+02	8.00E+01 G
			340.57	5.045E-01	?(	2.794E+00	1.62E+02	4.69E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210 N	1.1545E-01					5.84E+05	
		799.60	0.000E+00	?(	1.703E+00	1.00E+03	9.90E+01 G
		296.00	2.601E-01	?(	1.779E+00	2.01E+02	7.90E+01 G
		1313.00	2.477E+00	?	3.043E+00	4.08E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	159.	-17.	-0.010	85.99	-1.156E+01	P
TH-227	50.14	118.	10.	0.006	151.89	3.274E+00	
AM-241	59.54	160.	-4.	-0.002	513.09	-1.979E-01	
TH-234	63.29	176.	-3.	-0.002	587.07	-1.596E+00	P
Sn-126	64.28	198.	-14.	-0.008	147.98	-2.636E+00	
BA-133	80.99	96.	-2.	-0.001	964.88	-8.953E-02	P
Np-237	86.49	503.	-17.	-0.009	191.81	-1.922E+00	
Sn-126	86.94	522.	-19.	-0.010	174.13	-3.120E+00	
TH-234	92.59	559.	-18.	-0.010	109.82	-4.802E+00	P
EU-152	121.78	80.	14.	0.008	93.49	7.130E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	122.06	94.	7.	0.004	202.84	1.162E-01	
EU-154	123.10	98.	-6.	-0.003	257.45	-1.951E-01	
PA-234	131.29	191.	13.	0.007	149.45	1.089E+00	
HF-181	133.02	205.	13.	0.007	154.16	4.552E-01	
CE-144	133.54	218.	13.	0.007	158.88	1.780E+00	
HF-181	136.30	231.	13.	0.007	163.14	3.409E+00	
CO-57	136.47	245.	10.	0.006	217.01	1.439E+00	
CE-141	145.44	77.	-13.	-0.007	129.29	-4.142E-01	
Ba-140	162.66	84.	13.	0.007	102.37	3.487E+00	
U-235	163.38	98.	13.	0.007	109.46	4.286E+00	
CE-139	165.85	85.	12.	0.006	116.02	2.377E-01	
Cf-251	176.60	59.	-9.	-0.005	168.79	-8.741E-01	
U-235	185.72	40.	31.	0.017	42.75	1.010E+00	
TH-229	193.51	48.	4.	0.002	301.92	1.806E+00	
U-235	205.33	26.	10.	0.006	99.65	3.834E+00	
TH-229	210.85	70.	-8.	-0.004	206.85	-5.010E+00	
Cf-251	227.00	29.	11.	0.006	97.70	3.575E+00	
EU-152	244.69	32.	10.	0.005	112.21	2.799E+00	P
Cd-113m	263.70	57.	-8.	-0.004	140.72	-3.018E+03	
BI-210M	265.83	83.	-16.	-0.009	70.05	-7.302E-01	P
TL-208	277.28	52.	-4.	-0.002	259.81	-1.523E+00	
Hg-203	279.20	63.	4.	0.002	262.78	1.285E-01	
I-131	284.30	36.	3.	0.002	439.48	1.080E+00	P
TL-210	296.00	129.	8.	0.005	200.54	2.601E-01	
PA-231	300.07	145.	8.	0.005	211.85	8.466E+00	
PA-233	300.18	153.	8.	0.005	217.51	3.360E+00	
PA-231	302.65	162.	8.	0.005	222.67	7.294E+00	
BA-133	302.85	170.	8.	0.005	228.10	1.147E+00	
Ba-140	304.85	178.	8.	0.004	237.40	4.840E+00	
CR-51	320.08	207.	-10.	-0.006	162.57	-2.806E+00	P
La-140	328.76	64.	8.	0.005	143.23	1.096E+00	P
Cf-249	333.44	72.	8.	0.005	147.32	1.493E+00	
AC-228	338.32	80.	8.	0.005	154.71	1.957E+00	
Cs-136	340.57	88.	8.	0.005	161.98	5.045E-01	
EU-152	344.29	253.	-16.	-0.009	140.22	-1.748E+00	
HF-181	345.83	232.	-16.	-0.009	138.78	-2.984E+00	
BA-133	356.00	113.	-12.	-0.007	128.43	-5.644E-01	
I-131	364.48	52.	-15.	-0.009	95.13	-5.600E-01	
BA-133	383.84	48.	10.	0.005	106.53	3.350E+00	
SN-113	391.69	25.	-1.	-0.001	934.27	-6.138E-02	P
SB-125	427.88	28.	-4.	-0.002	263.79	-4.557E-01	
AG-108M	433.94	28.	-4.	-0.002	263.79	-1.508E-01	
pm-146	453.88	22.	2.	0.001	412.43	1.269E-01	
SB-125	463.37	31.	7.	0.004	113.00	2.518E+00	
Ir-192	468.06	30.	6.	0.003	131.57	4.318E-01	
BE-7	477.60	53.	-7.	-0.004	176.78	-2.317E+00	P
RU-103	497.05	22.	-2.	-0.001	575.33	-6.975E-02	
RH-106	511.86	49.	18.	0.010	104.35	3.506E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	537.26	9.	6.	0.003	105.02	1.034E+00	P
CS-134	563.24	17.	-4.	-0.002	201.91	-2.186E+00	
CS-134	569.32	17.	6.	0.003	112.07	1.566E+00	
TL-208	583.02	17.	10.	0.005	92.42	5.026E-01	
SB-125	600.50	110.	3.	0.002	447.66	8.287E-01	
RH-106	621.92	130.	-10.	-0.006	164.40	-4.609E+00	
SB-125	635.89	26.	-7.	-0.004	109.73	-2.882E+00	
I-131	636.97	43.	-4.	-0.002	228.32	-2.710E+00	
AG-110M	657.76	32.	-2.	-0.001	328.63	-1.265E-01	
CS-137	661.66	46.	-10.	-0.005	105.53	-5.365E-01	
PM-144	696.54	28.	-9.	-0.005	92.53	-4.655E-01	P
NB-94	702.63	19.	-6.	-0.003	138.02	-3.209E-01	P
SB-124	722.79	31.	-11.	-0.006	81.04	-5.061E+00	
AG-108M	722.94	42.	-2.	-0.001	521.52	-1.012E-01	
BI-212	727.17	35.	7.	0.004	128.00	4.713E+00	
pm-146	735.72	10.	5.	0.003	127.25	1.272E+00	P
pm-146	747.16	14.	-8.	-0.004	105.33	-1.253E+00	
ZR-95	756.73	5.	4.	0.002	136.33	3.700E-01	P
AG-110M	763.94	13.	5.	0.003	103.93	1.300E+00	P
NB-95	765.79	24.	-6.	-0.003	134.23	-2.998E-01	
PA-234M	766.41	32.	-11.	-0.006	77.81	-2.067E+02	
EU-152	778.92	14.	1.	0.001	800.00	4.264E-01	
BI-212	785.42	14.	-1.	-0.001	800.00	-4.341E+00	
CS-134	795.87	26.	8.	0.004	103.71	4.927E-01	
CO-58	810.78	10.	6.	0.003	91.66	3.163E-01	
La-140	815.77	16.	5.	0.003	113.22	1.321E+00	P
MN-54	834.85	14.	-2.	-0.001	403.11	-1.171E-01	
Co-56	846.77	5.	6.	0.003	92.05	3.321E-01	
TL-208	860.56	9.	7.	0.004	104.64	3.223E+00	
NB-94	871.10	6.	6.	0.003	74.89	3.441E-01	
EU-154	873.23	19.	-4.	-0.002	174.71	-1.816E+00	
PA-234	880.53	32.	-10.	-0.005	87.22	-1.006E+01	
PA-234	883.24	42.	-1.	-0.001	803.25	-7.334E-01	
y-88	898.04	30.	-15.	-0.008	64.89	-9.653E-01	P
AC-228	911.07	5.	6.	0.003	94.89	1.253E+00	
AG-110M	937.49	10.	1.	0.001	702.38	1.881E-01	
PA-234	946.02	25.	-10.	-0.006	114.38	-4.860E+00	
EU-152	964.11	31.	5.	0.003	175.84	2.115E+00	
AC-228	968.97	46.	-8.	-0.005	120.60	-3.173E+00	
EU-154	996.33	31.	2.	0.001	400.00	1.285E+00	
Co-56	1037.84	15.	-7.	-0.004	128.24	-3.688E+00	P
Cs-136	1048.07	25.	-7.	-0.004	103.85	-6.522E-01	
RH-106	1050.36	46.	-12.	-0.006	87.55	-5.331E+01	
BI-207	1063.66	10.	-2.	-0.001	354.73	-1.935E-01	
Ga-68	1077.40	20.	-3.	-0.002	332.78	-7.783E+00	
FE-59	1099.25	16.	-3.	-0.002	308.52	-3.938E-01	
EU-152	1112.07	70.	-15.	-0.009	81.40	-8.407E+00	
ZN-65	1115.55	79.	-13.	-0.007	103.14	-1.884E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sc-46	1120.55	113.	-18.	-0.010	88.03	-1.338E+00		
Ta-182	1121.30	100.	14.	0.008	104.43	3.032E+00		
CO-60	1173.24	5.	14.	0.008	46.98	1.074E+00		
Ta-182	1189.05	5.	15.	0.008	44.30	7.192E+00		
Ta-182	1221.41	11.	5.	0.003	145.77	1.607E+00		
Co-56	1238.28	16.	-4.	-0.002	339.53	-5.114E-01	P	
FE-59	1291.60	5.	-1.	-0.001	403.11	-2.637E-01		
TL-210	1313.00	0.	6.	0.003	40.82	2.477E+00		
CO-60	1332.50	16.	-9.	-0.005	154.14	-7.947E-01	P	
La-140	1596.21	6.	1.	0.001	427.57	1.443E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

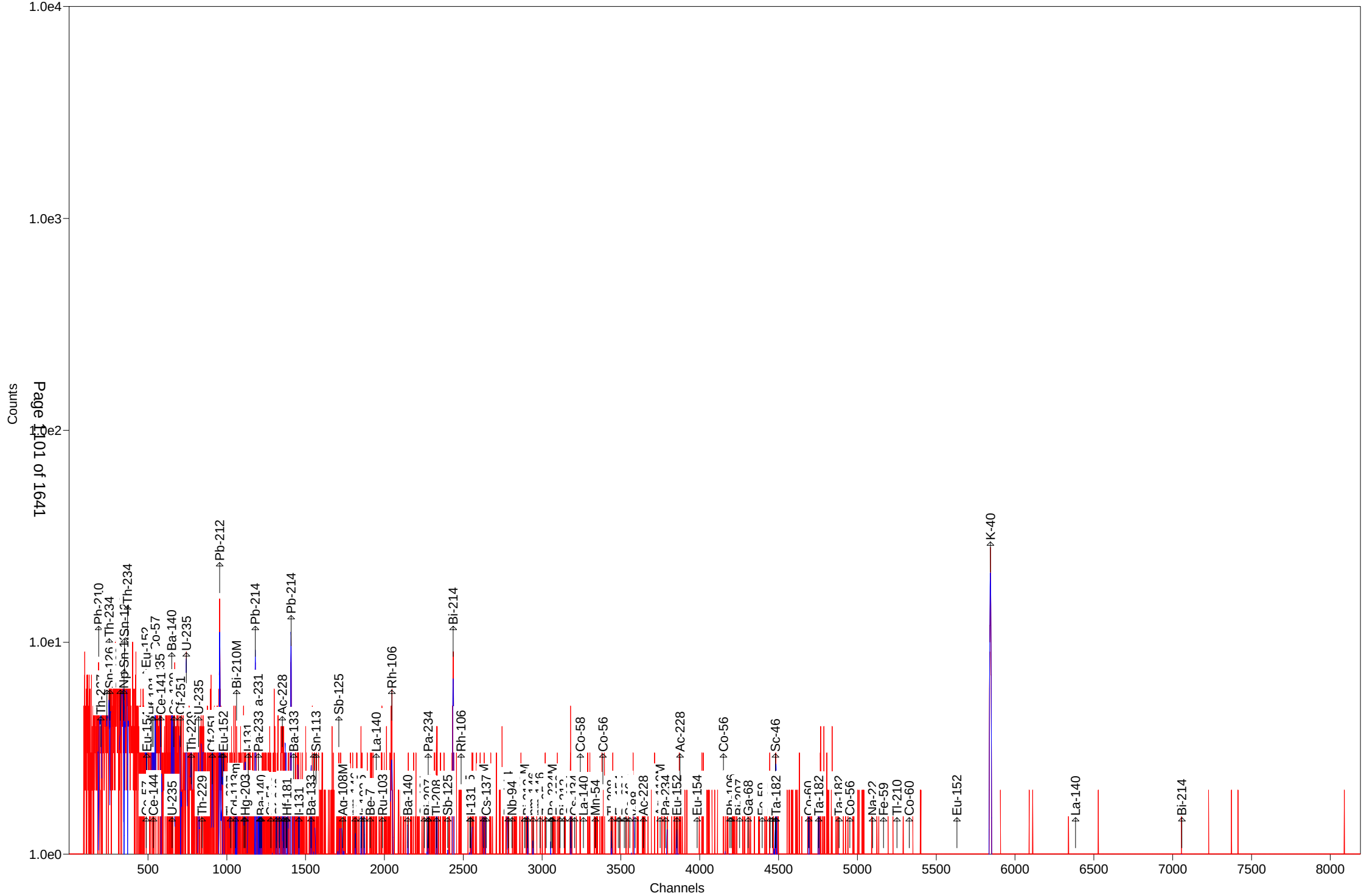
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-2.3173E+00	-2.3173E+00	1.768E+02%	1.28E+01
NA-22	#A	2.8165E-02	2.8165E-02	1.396E+03%	1.51E+00
K-40		1.6482E+02	1.6482E+02	7.471E+00%	9.04E+00
Sc-46	#A	2.5347E-02	2.5347E-02	2.282E+03%	2.07E+00
CR-51	#A	-2.8059E+00	-2.8060E+00	1.626E+02%	1.89E+01
MN-54	#A	-1.1706E-01	-1.1706E-01	4.031E+02%	1.18E+00
FE-59	#A	-3.9379E-01	-3.9379E-01	3.085E+02%	2.80E+00
Co-56	#A	3.3208E-01	3.3208E-01	9.205E+01%	7.57E-01
CO-57	#A	2.6295E-01	2.6295E-01	1.485E+02%	8.09E-01
CO-58	#A	3.1626E-01	3.1626E-01	9.166E+01%	1.00E+00
CO-60	#A	1.3932E-01	1.3932E-01	4.698E+01%	1.88E+00
ZN-65	#A	-1.8839E+00	-1.8839E+00	1.031E+02%	6.56E+00
NB-94	#A	1.4949E-02	1.4949E-02	7.489E+01%	1.20E+00
ZR-95	#A	3.7002E-01	3.7002E-01	1.363E+02%	1.32E+00
NB-95	#A	-2.9978E-01	-2.9978E-01	1.342E+02%	1.40E+00
RU-103	#A	-6.9753E-02	-6.9754E-02	5.753E+02%	1.02E+00
RH-106	#A	-4.6094E+00	-4.6094E+00	1.644E+02%	2.58E+01
AG-108M	#A	-1.5077E-01	-1.5077E-01	2.638E+02%	1.03E+00
AG-110M	#A	2.7395E-01	2.7395E-01	1.039E+02%	2.81E+00
SN-113	#A	-6.1382E-02	-6.1382E-02	9.343E+02%	1.28E+00
SB-124	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.37E+00
SB-125	#A	4.7770E-01	4.7770E-01	1.130E+02%	3.12E+00
I-131	#A	-4.4536E-01	-4.4539E-01	9.513E+01%	1.32E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.37E+00
Ga-68	#A	-7.6938E+00	-7.7834E+00	3.328E+02%	6.11E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.35E+00
BA-133	#A	-1.7424E-01	-1.7424E-01	1.284E+02%	2.45E+00
CS-134	#A	3.3357E-01	3.3357E-01	1.037E+02%	2.39E+00
CS-137	#A	-5.3648E-01	-5.3648E-01	1.055E+02%	1.93E+00
CE-139	#A	2.3773E-01	2.3773E-01	1.160E+02%	9.35E-01

Ba-140 #A	1.9390E+00	1.9390E+00	9.302E+01%		2.74E+00
La-140 #A	4.8037E-01	4.8039E-01	1.132E+02%		1.49E+00
CE-141 #A	-4.1417E-01	-4.1418E-01	1.293E+02%		1.39E+00
CE-144 #A	1.7805E+00	1.7805E+00	1.589E+02%		9.54E+00
PM-144 #A	-4.6552E-01	-4.6552E-01	9.253E+01%		1.39E+00
EU-152 #A	1.1855E-01	1.1855E-01	8.378E+01%		8.24E+00
EU-154 #A	-3.7880E-01	-3.7880E-01	1.747E+02%		1.13E+01
EU-155 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.51E+00
HF-181 #A	3.0586E-01	3.0587E-01	1.542E+02%		1.77E+00
Ta-182 #A	3.4022E+00	3.4022E+00	4.430E+01%		1.07E+01
Hg-203 #A	1.2846E-01	1.2846E-01	2.628E+02%		1.17E+00
TL-208 #A	8.5123E-01	8.5123E-01	6.980E+01%		1.13E+00
pm-146 #A	-2.4765E-01	-2.4765E-01	8.259E+01%		3.16E+00
y-88 #A	-9.6528E-01	-9.6529E-01	6.489E+01%		1.89E+00
Cd-113m#A	-3.0183E+03	-3.0183E+03	1.407E+02%		1.46E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.39E+01
Cf-251 #A	-8.7405E-01	-8.7405E-01	1.688E+02%		3.87E+00
Cf-249 #A	3.2183E-01	3.2183E-01	1.473E+02%		1.81E+00
Sn-126 #A	-2.6357E+00	-2.6357E+00	1.480E+02%		1.32E+01
PB-210 #A	-1.1565E+01	-1.1565E+01	8.599E+01%		4.11E+01
PB-212	2.3644E+00	2.3644E+00	2.099E+01%		1.29E+00
PB-214	4.9253E+00	4.9253E+00	1.295E+01%		1.13E+00
BI-207 #A	-2.9002E-02	-2.9002E-02	1.039E+03%		1.10E+00
BI-212 #A	4.7129E+00	4.7129E+00	1.280E+02%		2.08E+01
U-235 #A	1.8335E+00	1.8335E+00	9.965E+01%		1.08E+01
BI-214	5.1724E+00	5.1724E+00	1.786E+01%		1.60E+00
BI-210M#A	-7.3020E-01	-7.3020E-01	7.005E+01%		2.11E+00
AC-228 #A	1.4594E+00	1.4594E+00	9.075E+01%		2.85E+00
TH-227 #A	3.2741E+00	3.2741E+00	1.519E+02%		1.69E+01
TH-229 #A	1.8057E+00	1.8057E+00	3.019E+02%		1.45E+01
TH-234 #A	-1.5960E+00	-1.5960E+00	5.871E+02%		3.22E+01
PA-231 #A	7.8336E+00	7.8336E+00	1.537E+02%		5.53E+01
PA-233 #A	4.9372E-01	4.9372E-01	2.175E+02%		4.84E+00
PA-234 #A	1.0885E+00	1.0885E+00	1.495E+02%		5.49E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		2.41E+02
AM-241 #A	-1.9789E-01	-1.9789E-01	5.131E+02%		3.48E+00
Np-237 #A	-1.9217E+00	-1.9217E+00	1.918E+02%		1.24E+01
Ir-192 #A	1.6102E-01	1.6102E-01	1.316E+02%		2.02E+00
Cs-136 #A	1.6106E-01	1.6107E-01	1.620E+02%		1.05E+00
Np-239 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.98E+00
Nd-147 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.03E+00
TL-210 #A	1.1545E-01	1.1545E-01	2.005E+02%		1.70E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   25.1 to  1999.5 keV)     1.773E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 1.7727740E+02  Bq/Sample
```

376765_Gamma_160-29521-B-12-B. 15_Gamma_20182610.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20182717

Sample Description: 376765_Gamma_160-29521-B-13-B
Detector: Detector #17
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-B-13-B

Decay to Time: 8/9/2018 18:07 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:08:00 Real Time: 1863 sec
Analysis Time: 8/9/2018 18:39 Dead Time: 3.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev14.lib
Bkgd Correction File: 17_2018-07-14_1832.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.153E+00	215.1	2.480E+00	2.481E+00	8.730E+00
NA-22	-5.277E-01	85.7	4.522E-01	4.530E-01	1.535E+00
K-40	1.728E+02	6.4	1.101E+01	1.412E+01	1.046E+01
Sc-46	-4.805E-01	103.9	4.994E-01	5.000E-01	1.698E+00
CR-51	-1.338E+00	184.2	2.465E+00	2.466E+00	8.536E+00
MN-54	-7.079E-01	92.5	6.551E-01	6.561E-01	1.508E+00
FE-59	-6.995E-01	161.5	1.130E+00	1.130E+00	2.599E+00
Co-56	3.230E-01	92.6	2.992E-01	2.996E-01	9.334E-01
CO-57	-8.602E-02	255.5	2.198E-01	2.198E-01	7.555E-01
CO-58	-3.304E-01	123.5	4.080E-01	4.083E-01	1.405E+00
CO-60	-6.552E-01	96.3	6.307E-01	6.316E-01	1.399E+00
ZN-65	0.000E+00	1.#INF	3.192E-01	3.192E-01	3.794E+00
NB-94	-5.758E-01	94.9	5.464E-01	5.472E-01	1.308E+00
ZR-95	-1.034E+00	57.1	5.906E-01	5.931E-01	2.224E+00
NB-95	3.322E-01	141.8	4.710E-01	4.713E-01	1.618E+00
RU-103	2.404E-01	118.1	2.839E-01	2.842E-01	7.333E-01
RH-106	5.697E+00	87.9	5.009E+00	5.017E+00	2.267E+01
AG-108M	2.684E-01	99.7	2.674E-01	2.678E-01	7.104E-01
AG-110M	3.943E-01	101.7	4.011E-01	4.016E-01	2.070E+00
SN-113	-5.708E-01	85.8	4.896E-01	4.905E-01	2.319E+00
SB-124	2.262E-01	97.2	2.198E-01	2.201E-01	2.361E+00
SB-125	1.740E+00	30.6	5.332E-01	5.405E-01	2.145E+00
I-131	2.974E-01	141.0	4.195E-01	4.198E-01	8.050E-01
Gd-153	1.758E-01	355.3	6.248E-01	6.249E-01	2.157E+00
Ga-68	-1.788E+01	126.6	2.264E+01	2.266E+01	5.167E+01
Tc-99m	-1.273E-01	234.4	2.984E-01	2.985E-01	1.015E+00
BA-133	-6.317E-02	140.3	8.861E-02	8.867E-02	2.214E+00
CS-134	3.019E-01	102.3	3.090E-01	3.094E-01	2.382E+00
CS-137	-4.615E-01	73.6	3.396E-01	3.404E-01	1.752E+00
CE-139	-2.687E-01	111.9	3.006E-01	3.017E-01	1.013E+00
Ba-140	1.414E+00	99.1	1.402E+00	1.404E+00	2.554E+00
La-140	3.420E-02	510.3	1.745E-01	1.745E-01	5.828E-01
CE-141	4.017E-01	127.2	5.110E-01	5.114E-01	1.724E+00

CE-144	1.551E+00	128.7	1.996E+00	1.998E+00	6.746E+00
PM-144	1.482E-01	237.6	3.520E-01	3.521E-01	8.935E-01
EU-152	5.848E-02	214.8	1.256E-01	1.256E-01	5.442E+00
EU-154	3.685E+00	66.2	2.440E+00	2.447E+00	1.174E+01
EU-155	2.582E-01	259.5	6.701E-01	6.702E-01	3.869E+00
HF-181	2.655E-01	120.4	3.196E-01	3.199E-01	1.103E+00
Ta-182	-2.195E+00	89.1	1.955E+00	1.958E+00	6.576E+00
Hg-203	-1.314E-01	247.0	3.246E-01	3.247E-01	1.121E+00
TL-208	8.892E-01	31.2	2.773E-01	2.811E-01	6.791E-01
pm-146	1.662E-01	110.9	1.843E-01	1.845E-01	3.025E+00
y-88	-9.746E-02	308.6	3.008E-01	3.009E-01	1.316E+00
Cd-113m	1.991E+03	163.3	3.252E+03	3.255E+03	1.128E+04
Cd-109	-6.380E+00	159.4	1.017E+01	1.017E+01	3.411E+01
Cf-251	-1.188E+00	124.9	1.484E+00	1.487E+00	4.032E+00
Cf-249	2.245E-01	220.5	4.949E-01	4.950E-01	1.708E+00
Sn-126	-3.430E+00	112.6	3.862E+00	3.866E+00	1.294E+01
PB-210	1.247E+01	56.4	7.029E+00	7.067E+00	2.156E+01
PB-212	2.636E+00	18.2	4.789E-01	5.083E-01	1.223E+00
PB-214	5.038E+00	13.6	6.843E-01	7.327E-01	1.200E+00
BI-207	3.411E-01	79.9	2.726E-01	2.731E-01	9.177E-01
BI-212	-5.911E+00	90.8	5.364E+00	5.373E+00	1.814E+01
U-235	3.458E-01	193.6	6.694E-01	6.696E-01	8.367E+00
BI-214	5.799E+00	16.4	9.505E-01	9.971E-01	1.680E+00
BI-210M	-3.329E-02	1410.9	4.697E-01	4.697E-01	1.452E+00
AC-228	4.665E+00	26.7	1.245E+00	1.267E+00	2.589E+00
TH-227	1.148E+00	152.8	1.754E+00	1.755E+00	1.316E+01
TH-229	-5.447E+00	105.7	5.756E+00	5.772E+00	1.560E+01
TH-234	9.030E+00	44.7	4.039E+00	4.067E+00	2.181E+01
PA-231	7.052E+00	151.4	1.067E+01	1.068E+01	4.890E+01
PA-233	4.323E-01	214.3	9.264E-01	9.267E-01	4.260E+00
PA-234	-2.775E-01	130.2	3.613E-01	3.616E-01	4.582E+00
PA-234M	8.618E+00	192.2	1.657E+01	1.657E+01	1.807E+02
AM-241	-3.663E-01	256.1	9.384E-01	9.386E-01	2.711E+00
Np-237	1.656E+00	161.0	2.666E+00	2.667E+00	8.961E+00
Ir-192	2.621E-01	97.3	2.551E-01	2.555E-01	8.660E-01
Cs-136	-9.560E-02	129.5	1.238E-01	1.239E-01	1.703E+00
Np-239	0.000E+00	1.#INF	4.354E-01	4.354E-01	3.608E+00
Nd-147	1.260E+00	180.7	2.277E+00	2.278E+00	5.935E+00
TL-210	1.040E-01	198.1	2.060E-01	2.061E-01	1.442E+00
Total	2.245E+03				

Analyst: Morgan Reichert

Sample description
376765_Gamma_160-29521-B-13-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20182717.An1

Acquisition information
Start time: 8/9/2018 6:08:00 PM
Live time: 1800
Real time: 1863
Dead time: 3.38 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:07:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-07-14_1832.PBC 7/14/2018 6:32:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1334

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.67	20.	56.36	0.58	2.110E-02	46.54	4.250	PBC<MDA	PB210
63.52	26.	63.36	1.16	3.164E-02	63.29	3.810	PBC<MDA	TH234
77.13	52.	27.59	0.60	3.762E-02				
86.49	16.	160.98	0.81	4.026E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.064E-01	EU155
86.54	10.	259.47	0.81	4.027E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.470E-01	EU155
					86.94	9.040	1.515E+00	Sn126
92.81	70.	24.43	0.95	4.148E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.671E+01	AC228
97.16	4.	355.32	0.82	4.213E-02	97.50	30.000	PBC<MDA	Gd153
123.10	14.	109.31	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
133.54	13.	128.71	0.86	4.192E-02	133.54	11.090	PBC<MDA	CE144
145.44	14.	127.20	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
163.38	5.	272.90	0.88	3.802E-02	163.38	5.080	PBC<MDA	U235
185.72	30.	53.32	0.91	3.545E-02	185.72	54.000	PBC<MDA	U235
205.33	4.	353.95	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
227.00	6.	167.50	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.57	64.	18.78	0.88	2.989E-02	238.63	43.300	2.726E+00	PB212
241.84	29.	32.53	0.96	2.960E-02	242.00	7.430	7.254E+00	PB214
256.24	8.	152.83	0.97	2.846E-02	256.24	7.000	PBC<MDA	TH227
263.70	6.	163.30	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
294.98	45.	25.43	0.79	2.580E-02	295.09	19.300	5.064E+00	PB214
296.00	9.	198.13	1.01	2.574E-02	296.00	79.000	PBC<MDA	TL210
300.03	8.	220.63	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	9.	208.84	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.622E+00	PA231
					300.18	6.200	3.025E+00	PA233
300.18	9.	214.29	1.01	2.549E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.624E+00	PA231
					300.18	6.200	3.026E+00	PA233
302.65	9.	219.15	1.01	2.534E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.032E+00	BA133
302.85	9.	224.38	1.01	2.533E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.032E+00	BA133
304.85	7.	268.72	1.02	2.522E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	5.788E-01	BI210M
316.49	7.	141.25	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
351.79	78.	13.58	1.35	2.280E-02	351.93	37.600	5.025E+00	PB214
364.48	5.	182.91	1.07	2.223E-02	364.48	81.700	PBC<MDA	I131
383.84	10.	123.77	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
387.95	6.	220.47	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
427.88	5.	177.78	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
433.94	9.	99.65	1.13	1.963E-02	433.94	90.480	PBC<MDA	AG108M
453.88	7.	110.89	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
463.37	19.	30.65	1.16	1.872E-02	463.37	10.470	5.358E+00	SB125
468.06	7.	133.87	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	4.	215.06	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
482.00	7.	120.37	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
487.02	2.	510.34	1.18	1.806E-02	487.02	45.500	PBC<MDA	La140
497.05	7.	118.09	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	60.	27.86	2.45	1.742E-02	511.86	20.000	9.515E+00	RH106
531.00	5.	180.74	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
537.26	7.	99.12	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
569.70	10.	79.91	1.25	1.611E-02	569.32	15.380	2.167E+00	CS134
					569.47	8.200	4.064E+00	PA234
					569.70	97.740	3.411E-01	BI207
582.83	21.	31.18	0.80	1.584E-02	583.02	84.500	8.892E-01	TL208
609.46	67.	16.39	1.24	1.533E-02	609.31	46.090	5.264E+00	BI214
621.92	9.	195.05	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
635.89	5.	136.92	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125
636.97	3.	214.76	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
696.54	4.	237.58	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
722.79	6.	97.18	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.716E-01	AG108M
					723.36	20.220	1.221E+00	EU154
765.79	8.	141.77	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	5.	192.24	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	528.83	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
785.42	3.	185.30	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
795.87	5.	177.21	1.45	1.257E-02	795.87	85.530	PBC<MDA	CS134
801.95	8.	102.33	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
859.94	11.	50.85	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
873.23	9.	99.17	1.51	1.172E-02	873.23	12.270	PBC<MDA	EU154
880.53	7.	118.67	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
911.07	28.	26.68	1.55	1.135E-02	911.07	29.000	4.665E+00	AC228
946.02	2.	403.11	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	3.	272.85	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
996.33	8.	87.73	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1001.00	-2.	338.91	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1048.07	3.	217.72	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	87.92	1.66	1.019E-02	1050.36	1.560	PBC<MDA	RH106
1120.20	7.	127.28	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	173.55	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.969E-01	Sc46
					1121.30	34.900	8.509E-01	Ta182
1173.24	7.	127.38	1.76	9.359E-03	1173.24	99.900	PBC<MDA	CO60
1189.09	3.	238.82	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	3.	308.52	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	92.63	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1313.00	11.	30.15	1.87	8.579E-03	1313.00	21.000	3.392E+00	TL210
1384.30	6.	101.72	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1460.68	262.	6.37	1.44	7.895E-03	1460.83	10.670	1.728E+02	K40
1764.96	14.	32.28	2.21	6.804E-03	1764.49	15.400	7.401E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.92	77.13	58.	52.	1.380E+03	27.59	0.596	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.16	46.67	47.	20.	0.011	56.36	0.577
AM-241	237.59	59.54	111.	-7.	-0.004	256.15	0.787s
TH-234	253.52	63.52	92.	26.	0.015	63.36	1.161s
Sn-126	256.56	64.28	226.	-19.	-0.011	112.60	0.792
BA-133	323.36	80.99	121.	-19.	-0.010	77.19	0.807s
Np-237	345.35	86.49	312.	16.	0.009	160.98	0.813s
EU-155	345.56	86.54	328.	10.	0.006	259.47	0.813s
Sn-126	347.15	86.94	338.	0.	0.000	1000.00	0.813s
Sn-126	349.67	87.57	338.	0.	0.000	1000.00	0.814s
Cd-109	351.55	88.04	388.	-18.	-0.010	159.38	0.814s
Nd-147	363.79	91.10	370.	-18.	-0.010	155.26	0.817s
TH-234	370.63	92.81	103.	29.	0.016	63.17	0.954s
AC-228	372.78	93.35	276.	15.	0.008	160.90	0.819s
Gd-153	389.37	97.50	99.	4.	0.002	355.32	0.823s
Np-239	397.37	99.50	111.	-5.	-0.003	283.12	0.825s
Gd-153	412.16	103.20	170.	-16.	-0.009	119.64	0.828s
Np-239	414.16	103.70	160.	-8.	-0.005	219.85	0.829s
Np-239	423.88	106.13	168.	0.	0.000	1000.00	0.831s
EU-152	486.43	121.78	117.	-7.	-0.004	232.38	0.846
CO-57	487.57	122.06	102.	-6.	-0.003	255.53	0.846s
EU-154	491.73	123.10	112.	14.	0.008	109.31	0.847s
PA-234	524.49	131.29	165.	-14.	-0.008	130.21	0.855
CE-144	533.46	133.54	133.	13.	0.007	128.71	0.857s
HF-181	544.50	136.30	153.	-6.	-0.004	273.11	0.859s
CO-57	545.20	136.47	160.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	179.	-8.	-0.005	234.42	0.863s
U-235	574.43	143.79	192.	-5.	-0.003	370.74	0.866s
CE-141	581.05	145.44	155.	14.	0.008	127.20	0.868s
Ba-140	649.90	162.66	138.	-15.	-0.008	115.73	0.884
U-235	652.78	163.38	94.	5.	0.003	272.90	0.885s
CE-139	662.67	165.85	129.	-15.	-0.008	111.85	0.887s
Cf-251	705.64	176.60	83.	-13.	-0.007	124.87	0.897s
U-235	742.10	185.72	77.	30.	0.017	53.32	0.905s
TH-229	773.25	193.51	73.	-15.	-0.008	105.67	0.913s
U-235	820.52	205.33	61.	4.	0.002	353.95	0.924s
TH-229	842.58	210.85	87.	-15.	-0.008	115.93	0.929s
Cf-251	907.16	227.00	30.	6.	0.003	167.50	0.944s
PB-212	953.67	238.63	31.	61.	0.034	18.17	0.954D
PB-214	967.13	242.00	29.	29.	0.016	32.53	0.957D
EU-152	977.91	244.69	202.	-11.	-0.006	186.19	0.960
TH-227	1024.08	256.24	40.	8.	0.004	152.83	0.971s
Cd-113m	1053.91	263.70	45.	6.	0.003	163.30	0.978s
TL-208	1108.23	277.28	52.	-6.	-0.003	211.66	0.990
Hg-203	1115.89	279.20	79.	-5.	-0.003	246.98	0.992s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.28	284.30	33.	0.	0.000	1000.00	0.996s
PB-214	1178.98	294.98	23.	45.	0.025	25.43	0.787s
TL-210	1183.07	296.00	140.	9.	0.005	198.13	1.007s
PB-212	1199.19	300.03	149.	8.	0.004	220.63	1.011
PA-231	1199.35	300.07	157.	9.	0.005	208.84	1.011s
PA-233	1199.79	300.18	166.	9.	0.005	214.29	1.011s
PA-231	1209.66	302.65	174.	9.	0.005	219.15	1.013s
BA-133	1210.47	302.85	183.	9.	0.005	224.38	1.013s
Ba-140	1218.46	304.85	192.	7.	0.004	268.72	1.015s
BI-210M	1218.64	304.90	199.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	199.	0.	0.000	1000.00	1.019s
Ir-192	1265.01	316.49	43.	7.	0.004	141.25	1.026s
CR-51	1279.38	320.08	55.	-6.	-0.003	184.24	1.029s
La-140	1314.07	328.76	37.	-3.	-0.002	630.42	1.037s
Cf-249	1332.79	333.44	51.	-14.	-0.008	102.64	1.041
AC-228	1352.30	338.32	125.	-15.	-0.009	115.43	1.046
Cs-136	1361.30	340.57	137.	-14.	-0.008	124.58	1.048s
EU-152	1376.16	344.29	152.	-7.	-0.004	247.09	1.051s
HF-181	1382.33	345.83	181.	-15.	-0.008	117.36	1.053s
PB-214	1406.16	351.79	11.	78.	0.043	13.58	1.351s
BA-133	1423.00	356.00	130.	-10.	-0.005	168.42	1.062s
I-131	1456.93	364.48	26.	5.	0.003	182.91	1.070s
BA-133	1534.34	383.84	66.	10.	0.005	123.77	1.087s
Cf-249	1550.77	387.95	75.	6.	0.003	220.47	1.091s
SN-113	1565.73	391.69	133.	-14.	-0.008	85.77	1.094s
SB-125	1710.44	427.88	18.	5.	0.003	177.78	1.127s
AG-108M	1734.69	433.94	18.	9.	0.005	99.65	1.132s
pm-146	1814.44	453.88	12.	7.	0.004	110.89	1.150s
SB-125	1852.38	463.37	7.	19.	0.011	30.65	1.158s
Ir-192	1871.15	468.06	40.	7.	0.004	133.87	1.163s
BE-7	1909.29	477.59	35.	4.	0.002	215.06	1.171s
HF-181	1926.89	482.00	32.	7.	0.004	120.37	1.175s
La-140	1946.98	487.02	16.	2.	0.001	510.34	1.180s
RU-103	1987.11	497.05	16.	7.	0.004	118.09	1.188s
RH-106	2046.35	511.86	33.	60.	0.033	27.86	2.452
Nd-147	2122.88	531.00	20.	5.	0.003	180.74	1.219s
Ba-140	2147.92	537.26	12.	7.	0.004	99.12	1.224s
CS-134	2251.82	563.24	28.	-10.	-0.006	78.73	1.247
CS-134	2276.15	569.32	29.	-2.	-0.001	358.99	1.252s
PA-234	2276.75	569.47	32.	-1.	-0.001	697.23	1.253s
BI-207	2277.67	569.70	25.	10.	0.005	79.91	1.253s
TL-208	2330.17	582.83	9.	21.	0.012	31.18	0.803s
SB-125	2400.86	600.50	184.	-8.	-0.005	228.58	1.280s
SB-124	2409.78	602.73	176.	0.	0.000	1000.00	1.282s
CS-134	2417.70	604.71	176.	0.	0.000	1000.00	1.284s
BI-214	2436.71	609.46	16.	67.	0.037	16.39	1.238
RU-103	2440.05	610.30	176.	0.	0.000	1000.00	1.288s
AG-108M	2455.98	614.28	176.	0.	0.000	1000.00	1.292s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2471.11	618.06	176.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	158.	9.	0.005	195.05	1.299s
SB-125	2542.41	635.89	25.	5.	0.003	136.92	1.311s
I-131	2546.75	636.97	27.	3.	0.002	214.76	1.312s
AG-110M	2629.90	657.76	41.	-11.	-0.006	85.31	1.330s
CS-137	2645.49	661.66	60.	-10.	-0.006	73.58	1.333s
PM-144	2785.03	696.54	17.	4.	0.002	237.58	1.363s
NB-94	2809.38	702.63	39.	-14.	-0.008	94.90	1.368s
SB-124	2890.01	722.79	14.	6.	0.003	97.18	1.386s
AG-108M	2890.61	722.94	20.	0.	0.000	1000.00	1.386s
EU-154	2892.29	723.36	20.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	20.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	43.	-11.	-0.006	90.76	1.390s
pm-146	2941.74	735.72	26.	-6.	-0.003	178.21	1.397s
ZR-95	3025.79	756.73	31.	-13.	-0.007	57.11	1.415s
AG-110M	3054.64	763.94	60.	-16.	-0.009	71.52	1.421s
NB-95	3062.03	765.79	56.	8.	0.004	141.77	1.423s
PA-234M	3064.52	766.41	45.	5.	0.003	192.24	1.423s
EU-152	3114.56	778.92	9.	1.	0.001	528.83	1.434s
BI-212	3140.56	785.42	10.	3.	0.002	185.30	1.440s
CS-134	3182.35	795.87	35.	5.	0.003	177.21	1.448
TL-210	3197.29	799.60	40.	0.	0.000	1000.00	1.451s
CS-134	3206.69	801.95	31.	8.	0.005	102.33	1.454s
CO-58	3241.99	810.78	37.	-7.	-0.004	123.48	1.461s
La-140	3261.97	815.77	45.	0.	0.000	1000.00	1.465s
Cs-136	3272.90	818.50	56.	-8.	-0.004	140.33	1.467s
MN-54	3338.30	834.85	42.	-15.	-0.009	92.54	1.481s
Co-56	3385.99	846.77	14.	0.	0.000	1000.00	1.491s
TL-208	3441.18	860.56	5.	11.	0.006	50.85	1.503
NB-94	3483.32	871.10	33.	-11.	-0.006	81.73	1.512
EU-154	3491.85	873.23	35.	9.	0.005	99.17	1.514s
PA-234	3521.06	880.53	31.	7.	0.004	118.67	1.520s
PA-234	3531.90	883.24	38.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	38.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	49.	-10.	-0.006	103.92	1.527s
y-88	3591.11	898.04	24.	-2.	-0.001	308.64	1.534s
AC-228	3643.24	911.07	7.	28.	0.015	26.68	1.545
AG-110M	3748.95	937.49	23.	-6.	-0.004	166.60	1.567s
PA-234	3783.07	946.02	14.	2.	0.001	403.11	1.574s
EU-152	3855.45	964.11	32.	3.	0.002	272.85	1.589s
EU-154	3984.36	996.33	20.	8.	0.004	87.73	1.616s
PA-234M	4003.04	1001.00	31.	-2.	-0.001	338.91	1.620s
EU-154	4018.15	1004.77	40.	-10.	-0.005	97.10	1.623s
Co-56	4150.45	1037.84	15.	0.	0.000	1000.00	1.650s
Cs-136	4191.39	1048.07	25.	3.	0.002	217.72	1.658s
RH-106	4200.55	1050.36	10.	6.	0.003	87.92	1.661s
BI-207	4253.77	1063.66	16.	-4.	-0.002	207.20	1.671s
Ga-68	4308.74	1077.40	25.	-9.	-0.005	126.60	1.683s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.18	1099.25	25.	-7.	-0.004	161.52	1.700s
EU-152	4447.49	1112.07	51.	-7.	-0.004	145.03	1.711s
ZN-65	4461.38	1115.55	44.	0.	0.000	1000.00	1.713s
BI-214	4480.35	1120.29	40.	7.	0.004	127.28	1.717
Sc-46	4481.41	1120.55	38.	5.	0.003	173.55	1.717
Ta-182	4484.41	1121.30	64.	-13.	-0.007	89.08	1.718s
CO-60	4692.24	1173.24	15.	7.	0.004	127.38	1.760s
Ta-182	4755.52	1189.05	10.	3.	0.002	238.82	1.772s
Ta-182	4885.02	1221.41	16.	3.	0.002	308.52	1.798
Co-56	4952.53	1238.28	11.	9.	0.005	92.63	1.812s
NA-22	5097.60	1274.53	21.	-8.	-0.005	85.70	1.840
EU-154	5097.66	1274.54	30.	0.	0.000	1000.00	1.840
FE-59	5165.90	1291.60	16.	-8.	-0.004	119.02	1.854s
TL-210	5251.56	1313.00	0.	11.	0.006	30.15	1.870s
CO-60	5329.61	1332.50	16.	-10.	-0.006	96.26	1.886s
AG-110M	5536.92	1384.30	5.	6.	0.003	101.72	1.926s
K-40	5842.62	1460.68	8.	262.	0.146	6.37	1.437s
La-140	6385.15	1596.21	0.	0.	0.000	1000.00	2.087s
SB-124	6764.55	1690.98	6.	-1.	-0.001	600.00	2.157s
BI-214	7058.84	1764.49	3.	14.	0.008	32.28	2.211s
Co-56	7086.31	1771.35	28.	-8.	-0.004	102.72	2.216s
y-88	7345.39	1836.06	0.	0.	0.000	1000.00	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.1532E+00				5.31E+01	
			477.60	1.153E+00	?(	8.730E+00 2.15E+02 1.05E+01	G
NA-22	C	-5.2768E-01				9.50E+02	
			1274.53	-5.277E-01	?(	1.535E+00 8.57E+01 9.99E+01	G
K-40	N	1.7283E+02				4.66E+11	
			1460.83	1.728E+02	(P	1.046E+01 6.37E+00 1.07E+01	G
Sc-46	F	-4.8052E-01				8.38E+01	
			889.28	-4.805E-01	?(	1.698E+00 1.04E+02 1.00E+02	G
			1120.55	2.969E-01	+	1.798E+00 1.74E+02 1.00E+02	G
CR-51	F	-1.3379E+00				2.77E+01	
			320.08	-1.338E+00	?(	8.536E+00 1.84E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-7.0793E-01					3.12E+02	
			834.85	-7.079E-01	?(	1.508E+00	9.25E+01	1.00E+02 G
FE-59	F	-6.9953E-01					4.45E+01	
			1099.25	-6.995E-01	?(	2.599E+00	1.62E+02	5.65E+01 G
			1291.60	-1.184E+00	+	3.160E+00	1.19E+02	4.32E+01 G
Co-56	C	3.2297E-01					7.73E+01	
			846.77	0.000E+00	?(	9.334E-01	1.00E+03	9.99E+01 G
			1238.28	8.115E-01	?(P	1.696E+00	9.26E+01	6.61E+01 G
			1037.84	0.000E+00	-	7.938E+00	1.00E+03	1.41E+01 G
			1771.35	-4.079E+00	+	1.436E+01	1.03E+02	1.55E+01 A
CO-57	C	-8.6018E-02					2.72E+02	
			122.06	-8.602E-02	&(	7.555E-01	2.56E+02	8.56E+01 G
			136.47	0.000E+00	&	7.696E+00	1.00E+03	1.07E+01 G
CO-58	C	-3.3040E-01					7.09E+01	
			810.78	-3.304E-01	?(	1.405E+00	1.23E+02	9.95E+01 G
CO-60	F	-6.5520E-01					1.93E+03	
			1332.50	-6.552E-01	?(	1.399E+00	9.63E+01	1.00E+02 G
			1173.24	4.159E-01	+	1.233E+00	1.27E+02	9.99E+01 G
NB-94	I	-5.7577E-01					7.41E+06	
			702.63	-5.758E-01	?(	1.308E+00	9.49E+01	9.79E+01 G
			871.10	-5.051E-01	+	1.389E+00	8.17E+01	9.99E+01 G
ZR-95	I	-1.0342E+00					6.40E+01	
			756.73	-1.034E+00	?(P	2.224E+00	5.71E+01	5.45E+01 G
			724.20	0.000E+00	+	2.197E+00	1.00E+03	4.42E+01 G
NB-95	I	3.3220E-01					6.40E+01	
			765.79	3.322E-01	?(	1.618E+00	1.42E+02	9.98E+01 G
RU-103	I	2.4043E-01					3.93E+01	
			497.05	2.404E-01	(	7.333E-01	1.18E+02	9.09E+01 G
			610.30	0.000E+00	-	4.071E+01	1.00E+03	5.75E+00 GA
RH-106	I	5.6970E+00					3.74E+02	
			621.92	3.421E+00	?(P	2.267E+01	1.95E+02	9.93E+00 G
			1050.36	2.018E+01	?(	6.098E+01	8.79E+01	1.56E+00 G
			511.86	9.515E+00		4.723E+00	2.79E+01	2.00E+01 GA
AG-108M	C	2.6836E-01					1.53E+05	
			433.94	2.684E-01	?(P	7.104E-01	9.97E+01	9.05E+01 G
			722.94	0.000E+00	-	1.066E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	-	2.618E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.9433E-01					2.50E+02	
			884.68	0.000E+00	&(	2.070E+00	1.00E+03	7.27E+01 G
			657.76	-4.587E-01	+	1.319E+00	8.53E+01	9.46E+01 G
			937.49	-9.217E-01	+	3.670E+00	1.67E+02	3.44E+01 G
			1384.30	1.574E+00	?(	3.743E+00	1.02E+02	2.43E+01 G
			763.94	-3.152E+00	+	7.493E+00	7.15E+01	2.23E+01 G
SN-113	F	-5.7084E-01					1.15E+02	
			391.69	-5.708E-01	?(P	2.319E+00	8.58E+01	6.40E+01 G
SB-124	F	2.2620E-01					6.02E+01	
			602.73	0.000E+00	?(	2.361E+00	1.00E+03	9.83E+01 G
			1690.98	-1.652E-01	+	2.333E+00	6.00E+02	4.78E+01 G
			722.79	2.282E+00	?(	7.663E+00	9.72E+01	1.08E+01 G
SB-125	I	1.7396E+00					1.01E+03	
			427.88	4.417E-01	?(	2.145E+00	1.78E+02	2.96E+01 G
			600.50	-1.706E+00	+	1.325E+01	2.29E+02	1.79E+01 G
			635.89	1.787E+00	?(P	8.537E+00	1.37E+02	1.13E+01 G
			463.37	5.358E+00	&(	4.345E+00	3.06E+01	1.05E+01 G
I-131	I	2.9743E-01					8.02E+00	
			364.48	1.631E-01	?(	8.050E-01	1.83E+02	8.17E+01 G
			284.30	0.000E+00	-	1.008E+01	1.00E+03	6.14E+00 G
			636.97	1.828E+00	&(	1.394E+01	2.15E+02	7.17E+00 G
Gd-153	F	1.7584E-01					2.42E+02	
			97.50	1.758E-01	?(	2.157E+00	3.55E+02	3.00E+01 G
			103.20	-9.419E-01	+	3.792E+00	1.20E+02	2.18E+01 G
Ga-68	C	-1.7879E+01					4.71E-02	
			1077.40	-1.788E+01	?(	5.167E+01	1.27E+02	3.30E+00 G
Tc-99m	I	-1.2731E-01					2.51E-01	
			140.51	-1.273E-01	?(	1.015E+00	2.34E+02	8.93E+01 G
BA-133	F	-6.3166E-02					3.85E+03	
			356.00	-3.867E-01	(	2.214E+00	1.68E+02	6.20E+01 G
			302.85	1.032E+00	?(	7.867E+00	2.24E+02	1.83E+01 G
			383.84	2.784E+00	? P	1.174E+01	1.24E+02	8.94E+00 GA
			80.99	-7.835E-01	+ P	2.266E+00	7.72E+01	3.41E+01 GA
CS-134	I	3.0195E-01					7.54E+02	
			604.71	0.000E+00	?(	2.382E+00	1.00E+03	9.76E+01 G
			795.87	2.529E-01	?(P	1.567E+00	1.77E+02	8.55E+01 G
			569.32	-4.856E-01	+	6.248E+00	3.59E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	4.177E+00	?(	1.462E+01	1.02E+02	8.69E+00 G
			563.24	-4.181E+00	+ P	1.125E+01	7.87E+01	8.35E+00 G
CS-137	I	-4.6151E-01					1.10E+04	
			661.66	-4.615E-01	?(P	1.752E+00	7.36E+01	8.52E+01 G
CE-139	F	-2.6873E-01					1.38E+02	
			165.85	-2.687E-01	?(	1.013E+00	1.12E+02	7.99E+01 G
Ba-140	I	1.4141E+00					1.28E+01	
			537.26	9.985E-01	?(	2.554E+00	9.91E+01	2.44E+01 G
			162.66	-3.451E+00	+	1.346E+01	1.16E+02	6.22E+00 G
			304.85	3.777E+00	?(	3.452E+01	2.69E+02	4.29E+00 G
La-140	I	3.4199E-02					1.28E+01	
			1596.21	0.000E+00	?(	5.828E-01	1.00E+03	9.54E+01 G
			487.02	1.059E-01	?(P	1.460E+00	5.10E+02	4.55E+01 G
			328.76	-3.187E-01	+ P	3.545E+00	6.30E+02	2.03E+01 G
			815.77	0.000E+00	-	6.547E+00	1.00E+03	2.33E+01 G
CE-141	I	4.0174E-01					3.25E+01	
			145.44	4.017E-01	?(	1.724E+00	1.27E+02	4.82E+01 G
CE-144	I	1.5507E+00					2.85E+02	
			133.54	1.551E+00	?(	6.746E+00	1.29E+02	1.11E+01 G
PM-144	C	1.4816E-01					3.63E+02	
			696.54	1.482E-01	?(	8.935E-01	2.38E+02	9.90E+01 G
			618.06	0.000E+00	-	2.384E+00	1.00E+03	9.91E+01 G
EU-152	F	5.8479E-02					4.94E+03	
			344.29	-6.496E-01	&(P	5.442E+00	2.47E+02	2.65E+01 G
			1112.07	-3.015E+00	+	1.506E+01	1.45E+02	1.36E+01 G
			121.78	-3.030E-01	&	2.411E+00	2.32E+02	2.86E+01 G
			778.92	3.903E-01	?(P	5.566E+00	5.29E+02	1.29E+01 G
			964.11	1.049E+00	?(	1.017E+01	2.73E+02	1.46E+01 G
			244.69	-2.729E+00	+	1.720E+01	1.86E+02	7.58E+00 G
			1408.00	-2.613E-01	% P	5.868E+00	1.00E+03	2.10E+01 GA
EU-154	I	3.6848E+00					3.14E+03	
			873.23	3.476E+00	&(	1.174E+01	9.92E+01	1.23E+01 G
			123.10	4.503E-01	-	1.659E+00	1.09E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.052E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	4.792E+00	1.00E+03	2.02E+01 G
			1004.77	-2.861E+00	-	9.437E+00	9.71E+01	1.80E+01 G
			996.33	3.927E+00	?(	1.172E+01	8.77E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.5825E-01					1.81E+03	
			105.31	-1.504E-02	&(P	3.869E+00	7.44E+03	2.12E+01 G
			86.54	4.470E-01	&(	3.915E+00	2.59E+02	3.07E+01 G
HF-181	F	2.6550E-01					4.24E+01	
			482.00	2.655E-01	?(	1.103E+00	1.20E+02	8.05E+01 G
			133.02	-4.865E-02	%	1.989E+00	1.19E+03	4.33E+01 G
			345.83	-2.414E+00	+ P	1.045E+01	1.17E+02	1.51E+01 G
			136.30	-1.477E+00	&	1.377E+01	2.73E+02	5.85E+00 G
Ta-182	F	-2.1946E+00					1.14E+02	
			1121.30	-2.195E+00	?(	6.576E+00	8.91E+01	3.49E+01 G
			1221.41	6.804E-01	+	4.842E+00	3.09E+02	2.70E+01 G
			1189.05	1.111E+00	+	6.459E+00	2.39E+02	1.62E+01 G
Hg-203	F	-1.3142E-01					4.66E+01	
			279.20	-1.314E-01	?(	1.121E+00	2.47E+02	8.15E+01 G
TL-208	N	8.8919E-01					6.98E+02	
			583.02	8.892E-01	(P	6.791E-01	3.12E+01	8.45E+01 G
			277.28	-1.838E+00	- P	1.183E+01	2.12E+02	6.31E+00 G
			860.56	4.235E+00	+ P	4.866E+00	5.09E+01	1.24E+01 G
pm-146	C	1.6620E-01					2.02E+03	
			747.16	-8.265E-02	%(	3.025E+00	1.43E+03	3.40E+01 G
			735.72	-1.111E+00	+	4.902E+00	1.78E+02	2.25E+01 G
			453.88	2.964E-01	?(P	8.579E-01	1.11E+02	6.50E+01 G
y-88	F	-9.7465E-02					1.07E+02	
			898.04	-9.746E-02	?(P	1.316E+00	3.09E+02	9.37E+01 G
			1836.06	0.000E+00	+	6.260E-01	1.00E+03	9.92E+01 G
Cd-113m		1.9915E+03					5.33E+03	
			263.70	1.991E+03	?(	1.128E+04	1.63E+02	6.00E-03 K
Cd-109	F	-6.3796E+00					4.53E+02	
			88.04	-6.380E+00	?(	3.411E+01	1.59E+02	3.79E+00 G
Cf-251	T	-1.1881E+00					3.28E+05	
			176.60	-1.188E+00	&(	4.032E+00	1.25E+02	1.70E+01 G
			227.00	1.711E+00	?	8.049E+00	1.67E+02	6.30E+00 GA
Cf-249	T	2.2446E-01					1.28E+05	
			387.95	2.245E-01	?(	1.708E+00	2.20E+02	6.60E+01 G
			333.44	-2.049E+00	+	5.461E+00	1.03E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-3.4297E+00					3.65E+07	
			87.57	0.000E+00	+	3.233E+00	1.00E+03	3.75E+01 GA
			64.28	-3.430E+00	?(	1.294E+01	1.13E+02	9.70E+00 G
			86.94	0.000E+00	+	1.346E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.2471E+01					8.14E+03	
			46.54	1.247E+01	(P	2.156E+01	5.64E+01	4.25E+00 G
PB-212	N	2.6358E+00					6.98E+02	
			238.63	2.636E+00	(P	1.223E+00	1.82E+01	4.33E+01 G
			300.03	5.272E+00	+ P	3.961E+01	2.21E+02	3.28E+00 GA
PB-214	N	5.0383E+00					5.84E+05	
			351.93	5.025E+00	(P	1.200E+00	1.36E+01	3.76E+01 G
			295.09	5.064E+00	(P	2.775E+00	2.54E+01	1.93E+01 G
			242.00	7.254E+00	+	7.054E+00	3.25E+01	7.43E+00 GA
BI-207	C	3.4108E-01					1.18E+04	
			569.70	3.411E-01	*(	9.177E-01	7.99E+01	9.77E+01 G
			1063.66	-2.831E-01	- P	1.570E+00	2.07E+02	7.45E+01 G
BI-212	N	-5.9107E+00					6.98E+02	
			727.17	-5.911E+00	&(	1.814E+01	9.08E+01	7.55E+00 G
			785.42	1.187E+01	? P	5.843E+01	1.85E+02	1.28E+00 GA
U-235	N	3.4582E-01					2.57E+11	
			143.79	-6.244E-01	&(P	8.367E+00	3.71E+02	1.10E+01 G
			205.33	1.326E+00	&(P	1.310E+01	3.54E+02	5.01E+00 G
			163.38	1.473E+00	&(P	1.378E+01	2.73E+02	5.08E+00 G
			185.72	8.638E-01	P	1.267E+00	5.33E+01	5.40E+01 GA
BI-214	N	5.7990E+00					5.84E+05	
			609.31	5.264E+00	(P	1.680E+00	1.64E+01	4.61E+01 G
			1120.29	2.796E+00	- P	1.221E+01	1.27E+02	1.51E+01 G
			1764.49	7.401E+00	?(P	5.746E+00	3.23E+01	1.54E+01 G
BI-210M	T	-3.3293E-02					1.10E+09	
			265.83	-3.329E-02	&(P	1.452E+00	1.41E+03	5.00E+01 G
			304.90	0.000E+00	+	5.386E+00	1.00E+03	2.80E+01 G
AC-228	N	4.6654E+00					2.10E+03	
			911.07	4.665E+00	?(P	2.589E+00	2.67E+01	2.90E+01 G
			968.97	-1.020E-01	& P	8.932E+00	2.14E+03	1.75E+01 G
			338.32	-3.022E+00	- P	1.083E+01	1.15E+02	1.20E+01 G
			93.35	3.555E+00	?	1.925E+01	1.61E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	1.1479E+00					7.95E+03	
			50.14	2.947E-01	%(	1.316E+01	1.52E+03	8.00E+00 G
			256.24	2.123E+00	?(P	9.015E+00	1.53E+02	7.00E+00 G
TH-229	N	-5.4472E+00					2.68E+06	
			193.51	-5.447E+00	?(	1.560E+01	1.06E+02	4.40E+00 G
			210.85	-8.377E+00	&	2.633E+01	1.16E+02	2.99E+00 G
TH-234	N	9.0299E+00					1.63E+12	
			63.29	1.211E+01	*(P	2.181E+01	6.34E+01	3.81E+00 G
			92.59	6.930E+00	@(P	1.201E+01	6.32E+01	5.58E+00 G
PA-231	N	7.0523E+00					1.20E+07	
			302.65	6.566E+00	?(	4.890E+01	2.19E+02	2.88E+00 G
			300.07	7.622E+00	*(	5.415E+01	2.09E+02	2.46E+00 G
PA-233	C	4.3230E-01					7.82E+08	
			312.01	-1.433E-02	%(P	4.260E+00	7.62E+03	3.60E+01 G
			300.18	3.026E+00	*(	2.204E+01	2.14E+02	6.20E+00 G
PA-234	N	-2.7750E-01					1.63E+12	
			131.29	-1.044E+00	?(	4.582E+00	1.30E+02	1.80E+01 G
			946.02	7.515E-01	?(	7.570E+00	4.03E+02	1.34E+01 G
			569.47	-4.905E-01	+	1.231E+01	6.97E+02	8.20E+00 G
			883.24	0.000E+00	+	1.565E+01	1.00E+03	9.60E+00 G
			880.53	5.563E+00	?	2.277E+01	1.19E+02	6.00E+00 GA
PA-234M	N	8.6178E+00					1.63E+12	
			1001.00	-1.448E+01	?(P	1.807E+02	3.39E+02	8.37E-01 G
			766.41	7.437E+01	?(P	4.976E+02	1.92E+02	2.94E-01 G
AM-241	T	-3.6634E-01					1.58E+05	
			59.54	-3.663E-01	*(	2.711E+00	2.56E+02	3.59E+01 G
Np-237	F	1.6560E+00					2.14E+06	
			86.49	1.656E+00	&(	8.961E+00	1.61E+02	1.31E+01 G
Ir-192	F	2.6211E-01					7.40E+01	
			316.49	1.776E-01	?(	8.660E-01	1.41E+02	8.70E+01 G
			468.06	4.043E-01	(	1.867E+00	1.34E+02	5.18E+01 G
			308.44	0.000E+00	-	4.789E+00	1.00E+03	3.18E+01 G
Cs-136	F	-9.5600E-02					1.30E+01	
			818.50	-3.535E-01	?(	1.703E+00	1.40E+02	1.00E+02 G
			1048.07	2.268E-01	?(	1.759E+00	2.18E+02	8.00E+01 G
			340.57	-6.920E-01	+	2.910E+00	1.25E+02	4.69E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	1.2600E+00					1.11E+01	
		531.00	1.260E+00	?(	5.935E+00	1.81E+02	1.30E+01 G
		91.10	-8.450E-01	+	4.401E+00	1.55E+02	2.83E+01 G
TL-210 N	1.0398E-01					5.84E+05	
		799.60	0.000E+00	?(	1.442E+00	1.00E+03	9.90E+01 G
		296.00	2.342E-01	?(	1.580E+00	1.98E+02	7.90E+01 G
		1313.00	3.392E+00	?	2.273E+00	3.02E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	111.	-7.	-0.004	256.15	-3.663E-01	
Sn-126	64.28	226.	-19.	-0.011	112.60	-3.430E+00	
BA-133	80.99	121.	-19.	-0.010	77.19	-7.835E-01	P
Np-237	86.49	312.	16.	0.009	160.98	1.656E+00	
EU-155	86.54	328.	10.	0.006	259.47	4.470E-01	
Cd-109	88.04	388.	-18.	-0.010	159.38	-6.380E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	91.10	370.	-18.	-0.010	155.26	-8.450E-01	
Np-239	99.50	111.	-5.	-0.003	283.12	-4.666E-01	
Np-239	103.70	160.	-8.	-0.005	219.85	-4.467E-01	
EU-152	121.78	117.	-7.	-0.004	232.38	-3.030E-01	
CO-57	122.06	102.	-6.	-0.003	255.53	-8.602E-02	
EU-154	123.10	112.	14.	0.008	109.31	4.503E-01	
PA-234	131.29	165.	-14.	-0.008	130.21	-1.044E+00	
CE-144	133.54	133.	13.	0.007	128.71	1.551E+00	
HF-181	136.30	153.	-6.	-0.004	273.11	-1.477E+00	
Tc-99m	140.51	179.	-8.	-0.005	234.42	-1.273E-01	
U-235	143.79	192.	-5.	-0.003	370.74	-6.244E-01	P
CE-141	145.44	155.	14.	0.008	127.20	4.017E-01	
Ba-140	162.66	138.	-15.	-0.008	115.73	-3.451E+00	
U-235	163.38	94.	5.	0.003	272.90	1.473E+00	P
CE-139	165.85	129.	-15.	-0.008	111.85	-2.687E-01	
Cf-251	176.60	83.	-13.	-0.007	124.87	-1.188E+00	
U-235	185.72	77.	30.	0.017	53.32	8.638E-01	P
TH-229	193.51	73.	-15.	-0.008	105.67	-5.447E+00	
U-235	205.33	61.	4.	0.002	353.95	1.326E+00	P
TH-229	210.85	87.	-15.	-0.008	115.93	-8.377E+00	
Cf-251	227.00	30.	6.	0.003	167.50	1.711E+00	
EU-152	244.69	202.	-11.	-0.006	186.19	-2.729E+00	
TH-227	256.24	40.	8.	0.004	152.83	2.123E+00	P
Cd-113m	263.70	45.	6.	0.003	163.30	1.991E+03	
Hg-203	279.20	79.	-5.	-0.003	246.98	-1.314E-01	
TL-210	296.00	140.	9.	0.005	198.13	2.342E-01	
PA-231	300.07	157.	9.	0.005	208.84	7.622E+00	
PA-233	300.18	166.	9.	0.005	214.29	3.026E+00	
PA-231	302.65	174.	9.	0.005	219.15	6.566E+00	
BA-133	302.85	183.	9.	0.005	224.38	1.032E+00	
Ba-140	304.85	192.	7.	0.004	268.72	3.777E+00	
Ir-192	316.49	43.	7.	0.004	141.25	1.776E-01	
CR-51	320.08	55.	-6.	-0.003	184.24	-1.338E+00	
La-140	328.76	37.	-3.	-0.002	630.42	-3.187E-01	P
Cf-249	333.44	51.	-14.	-0.008	102.64	-2.049E+00	
Cs-136	340.57	137.	-14.	-0.008	124.58	-6.920E-01	
EU-152	344.29	152.	-7.	-0.004	247.09	-6.496E-01	P
HF-181	345.83	181.	-15.	-0.008	117.36	-2.414E+00	P
BA-133	356.00	130.	-10.	-0.005	168.42	-3.867E-01	
I-131	364.48	26.	5.	0.003	182.91	1.631E-01	
BA-133	383.84	66.	10.	0.005	123.77	2.784E+00	P
Cf-249	387.95	75.	6.	0.003	220.47	2.245E-01	
SN-113	391.69	133.	-14.	-0.008	85.77	-5.708E-01	P
SB-125	427.88	18.	5.	0.003	177.78	4.417E-01	
AG-108M	433.94	18.	9.	0.005	99.65	2.684E-01	P
pm-146	453.88	12.	7.	0.004	110.89	2.964E-01	P
SB-125	463.37	7.	19.	0.011	30.65	5.358E+00	
Ir-192	468.06	40.	7.	0.004	133.87	4.043E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	477.59	35.	4.	0.002	215.06	1.153E+00	
HF-181	482.00	32.	7.	0.004	120.37	2.655E-01	
La-140	487.02	16.	2.	0.001	510.34	1.059E-01	P
RU-103	497.05	16.	7.	0.004	118.09	2.404E-01	
RH-106	511.86	33.	60.	0.033	27.86	9.515E+00	
Nd-147	531.00	20.	5.	0.003	180.74	1.260E+00	
Ba-140	537.26	12.	7.	0.004	99.12	9.985E-01	
CS-134	563.24	28.	-10.	-0.006	78.73	-4.181E+00	P
CS-134	569.32	29.	-2.	-0.001	358.99	-4.856E-01	
PA-234	569.47	32.	-1.	-0.001	697.23	-4.905E-01	
BI-207	569.70	25.	10.	0.005	79.91	3.411E-01	
SB-125	600.50	184.	-8.	-0.005	228.58	-1.706E+00	
RH-106	621.92	158.	9.	0.005	195.05	3.421E+00	P
SB-125	635.89	25.	5.	0.003	136.92	1.787E+00	P
I-131	636.97	27.	3.	0.002	214.76	1.828E+00	
AG-110M	657.76	41.	-11.	-0.006	85.31	-4.587E-01	
CS-137	661.66	60.	-10.	-0.006	73.58	-4.615E-01	P
PM-144	696.54	17.	4.	0.002	237.58	1.482E-01	
NB-94	702.63	39.	-14.	-0.008	94.90	-5.758E-01	
SB-124	722.79	14.	6.	0.003	97.18	2.282E+00	
BI-212	727.17	43.	-11.	-0.006	90.76	-5.911E+00	
pm-146	735.72	26.	-6.	-0.003	178.21	-1.111E+00	
ZR-95	756.73	31.	-13.	-0.007	57.11	-1.034E+00	P
AG-110M	763.94	60.	-16.	-0.009	71.52	-3.152E+00	
NB-95	765.79	56.	8.	0.004	141.77	3.322E-01	
PA-234M	766.41	45.	5.	0.003	192.24	7.437E+01	P
EU-152	778.92	9.	1.	0.001	528.83	3.903E-01	P
BI-212	785.42	10.	3.	0.002	185.30	1.187E+01	P
CS-134	795.87	35.	5.	0.003	177.21	2.529E-01	P
CS-134	801.95	31.	8.	0.005	102.33	4.177E+00	
CO-58	810.78	37.	-7.	-0.004	123.48	-3.304E-01	
Cs-136	818.50	56.	-8.	-0.004	140.33	-3.535E-01	
MN-54	834.85	42.	-15.	-0.009	92.54	-7.079E-01	
NB-94	871.10	33.	-11.	-0.006	81.73	-5.051E-01	
EU-154	873.23	35.	9.	0.005	99.17	3.476E+00	
PA-234	880.53	31.	7.	0.004	118.67	5.563E+00	
Sc-46	889.28	49.	-10.	-0.006	103.92	-4.805E-01	
y-88	898.04	24.	-2.	-0.001	308.64	-9.746E-02	P
AG-110M	937.49	23.	-6.	-0.004	166.60	-9.217E-01	
PA-234	946.02	14.	2.	0.001	403.11	7.515E-01	
EU-152	964.11	32.	3.	0.002	272.85	1.049E+00	
EU-154	996.33	20.	8.	0.004	87.73	3.927E+00	
PA-234M	1001.00	31.	-2.	-0.001	338.91	-1.448E+01	P
EU-154	1004.77	40.	-10.	-0.005	97.10	-2.861E+00	
Cs-136	1048.07	25.	3.	0.002	217.72	2.268E-01	
RH-106	1050.36	10.	6.	0.003	87.92	2.018E+01	
BI-207	1063.66	16.	-4.	-0.002	207.20	-2.831E-01	P
Ga-68	1077.40	25.	-9.	-0.005	126.60	-1.788E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
FE-59	1099.25	25.	-7.	-0.004	161.52	-6.995E-01		
EU-152	1112.07	51.	-7.	-0.004	145.03	-3.015E+00		
Sc-46	1120.55	38.	5.	0.003	173.55	2.969E-01		
CO-60	1173.24	15.	7.	0.004	127.38	4.159E-01		
Co-56	1238.28	11.	9.	0.005	92.63	8.115E-01		P
NA-22	1274.53	21.	-8.	-0.005	85.70	-5.277E-01		
FE-59	1291.60	16.	-8.	-0.004	119.02	-1.184E+00		
TL-210	1313.00	0.	11.	0.006	30.15	3.392E+00		
CO-60	1332.50	16.	-10.	-0.006	96.26	-6.552E-01		
AG-110M	1384.30	5.	6.	0.003	101.72	1.574E+00		
SB-124	1690.98	6.	-1.	-0.001	600.00	-1.652E-01		
Co-56	1771.35	28.	-8.	-0.004	102.72	-4.079E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

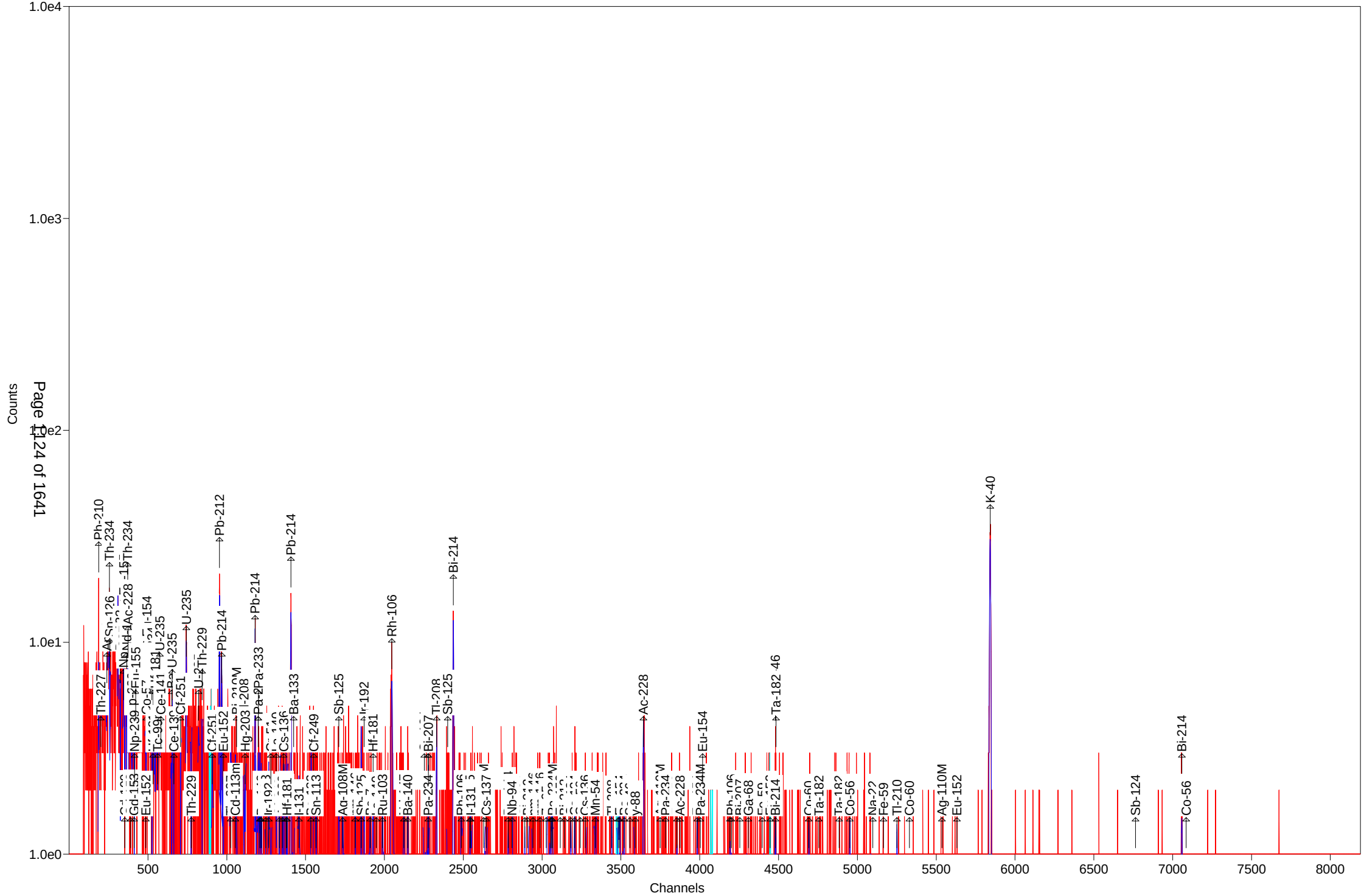
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.1532E+00	1.1532E+00	2.151E+02%	8.73E+00
NA-22	#A	-5.2768E-01	-5.2768E-01	8.570E+01%	1.53E+00
K-40		1.7283E+02	1.7283E+02	6.368E+00%	1.05E+01
Sc-46	#A	-4.8052E-01	-4.8052E-01	1.039E+02%	1.70E+00
CR-51	#A	-1.3379E+00	-1.3379E+00	1.842E+02%	8.54E+00
MN-54	#A	-7.0793E-01	-7.0793E-01	9.254E+01%	1.51E+00
FE-59	#A	-6.9953E-01	-6.9953E-01	1.615E+02%	2.60E+00
Co-56	#A	3.2297E-01	3.2297E-01	9.263E+01%	9.33E-01
CO-57	#A	-8.6017E-02	-8.6018E-02	2.555E+02%	7.56E-01
CO-58	#A	-3.3040E-01	-3.3040E-01	1.235E+02%	1.40E+00
CO-60	#A	-6.5520E-01	-6.5520E-01	9.626E+01%	1.40E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.79E+00
NB-94	#A	-5.7577E-01	-5.7577E-01	9.490E+01%	1.31E+00
ZR-95	#A	-1.0342E+00	-1.0342E+00	5.711E+01%	2.22E+00
NB-95	#A	3.3220E-01	3.3220E-01	1.418E+02%	1.62E+00
RU-103	#A	2.4042E-01	2.4043E-01	1.181E+02%	7.33E-01
RH-106	#A	5.6970E+00	5.6970E+00	8.792E+01%	2.27E+01
AG-108M	#A	2.6836E-01	2.6836E-01	9.965E+01%	7.10E-01
AG-110M	#A	3.9433E-01	3.9433E-01	1.017E+02%	2.07E+00
SN-113	#A	-5.7083E-01	-5.7084E-01	8.577E+01%	2.32E+00
SB-124	#A	2.2620E-01	2.2620E-01	9.718E+01%	2.36E+00
SB-125	#A	1.7396E+00	1.7396E+00	3.065E+01%	2.15E+00
I-131	#A	2.9741E-01	2.9743E-01	1.410E+02%	8.05E-01
Gd-153	#A	1.7584E-01	1.7584E-01	3.553E+02%	2.16E+00
Ga-68	#A	-1.7697E+01	-1.7879E+01	1.266E+02%	5.17E+01
Tc-99m	#A	-1.2707E-01	-1.2731E-01	2.344E+02%	1.01E+00
BA-133	#A	-6.3166E-02	-6.3166E-02	1.403E+02%	2.21E+00
CS-134	#A	3.0195E-01	3.0195E-01	1.023E+02%	2.38E+00

CS-137	#A	-4.6151E-01	-4.6151E-01	7.358E+01%	1.75E+00
CE-139	#A	-2.6873E-01	-2.6873E-01	1.119E+02%	1.01E+00
Ba-140	#A	1.4141E+00	1.4141E+00	9.912E+01%	2.55E+00
La-140	#A	3.4198E-02	3.4199E-02	5.103E+02%	5.83E-01
CE-141	#A	4.0173E-01	4.0174E-01	1.272E+02%	1.72E+00
CE-144	#A	1.5507E+00	1.5507E+00	1.287E+02%	6.75E+00
PM-144	#A	1.4816E-01	1.4816E-01	2.376E+02%	8.93E-01
EU-152	#A	5.8479E-02	5.8479E-02	2.148E+02%	5.44E+00
EU-154	#A	3.6848E+00	3.6848E+00	6.620E+01%	1.17E+01
EU-155	#A	2.5825E-01	2.5825E-01	2.595E+02%	3.87E+00
HF-181	#A	2.6550E-01	2.6550E-01	1.204E+02%	1.10E+00
Ta-182	A	-2.1946E+00	-2.1946E+00	8.908E+01%	6.58E+00
Hg-203	#A	-1.3142E-01	-1.3142E-01	2.470E+02%	1.12E+00
TL-208		8.8919E-01	8.8919E-01	3.118E+01%	6.79E-01
pm-146	#A	1.6620E-01	1.6620E-01	1.109E+02%	3.03E+00
y-88	#A	-9.7464E-02	-9.7465E-02	3.086E+02%	1.32E+00
Cd-113m	#A	1.9915E+03	1.9915E+03	1.633E+02%	1.13E+04
Cd-109	#A	-6.3796E+00	-6.3796E+00	1.594E+02%	3.41E+01
Cf-251	#A	-1.1881E+00	-1.1881E+00	1.249E+02%	4.03E+00
Cf-249	#A	2.2446E-01	2.2446E-01	2.205E+02%	1.71E+00
Sn-126	#A	-3.4297E+00	-3.4297E+00	1.126E+02%	1.29E+01
PB-210	A	1.2471E+01	1.2471E+01	5.636E+01%	2.16E+01
PB-212		2.6358E+00	2.6358E+00	1.817E+01%	1.22E+00
PB-214		5.0383E+00	5.0383E+00	1.358E+01%	1.20E+00
BI-207	#A	3.4108E-01	3.4108E-01	7.991E+01%	9.18E-01
BI-212	#A	-5.9107E+00	-5.9107E+00	9.076E+01%	1.81E+01
U-235	#A	3.4582E-01	3.4582E-01	1.936E+02%	8.37E+00
BI-214		5.7990E+00	5.7990E+00	1.639E+01%	1.68E+00
BI-210M	#A	-3.3293E-02	-3.3293E-02	1.411E+03%	1.45E+00
AC-228	#	4.6654E+00	4.6654E+00	2.668E+01%	2.59E+00
TH-227	#A	1.1479E+00	1.1479E+00	1.528E+02%	1.32E+01
TH-229	#A	-5.4472E+00	-5.4472E+00	1.057E+02%	1.56E+01
TH-234	#A	9.0299E+00	9.0299E+00	4.473E+01%	2.18E+01
PA-231	#A	7.0523E+00	7.0523E+00	1.514E+02%	4.89E+01
PA-233	#A	4.3230E-01	4.3230E-01	2.143E+02%	4.26E+00
PA-234	#A	-2.7750E-01	-2.7750E-01	1.302E+02%	4.58E+00
PA-234M	#A	8.6178E+00	8.6178E+00	1.922E+02%	1.81E+02
AM-241	#A	-3.6634E-01	-3.6634E-01	2.561E+02%	2.71E+00
Np-237	#A	1.6560E+00	1.6560E+00	1.610E+02%	8.96E+00
Ir-192	#A	2.6211E-01	2.6211E-01	9.731E+01%	8.66E-01
Cs-136	#A	-9.5597E-02	-9.5600E-02	1.295E+02%	1.70E+00
Np-239	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.61E+00
Nd-147	#A	1.2599E+00	1.2600E+00	1.807E+02%	5.93E+00
TL-210	#A	1.0398E-01	1.0398E-01	1.981E+02%	1.44E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   25.1 to  1999.5 keV)     2.087E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 2.0869659E+02  Bq/Sample
```

376765_Gamma_160-29521-B-13-B. 17_Gamma_20182717.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20181448

Sample Description: 376765_Gamma_160-29521-A-14-C
Detector: Detector #19
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-A-14-C

Decay to Time: 8/9/2018 18:17 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:17:57 Real Time: 1802 sec
Analysis Time: 8/9/2018 18:48 Dead Time: 0.11 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-07-14_1824.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.770E-01	1053.6	3.972E+00	3.972E+00	1.405E+01
NA-22	5.812E-01	37.8	2.197E-01	2.216E-01	6.119E-01
K-40	1.061E+02	10.5	1.111E+01	1.234E+01	1.669E+01
Sc-46	6.229E-01	93.2	5.803E-01	5.812E-01	1.968E+00
CR-51	2.556E+00	111.5	2.849E+00	2.852E+00	9.726E+00
MN-54	4.413E-01	97.2	4.290E-01	4.296E-01	1.047E+00
FE-59	-8.588E-01	95.0	8.161E-01	8.173E-01	3.191E+00
Co-56	1.395E+00	20.6	2.871E-01	2.958E-01	1.038E+00
CO-57	-1.901E-01	150.9	2.869E-01	2.871E-01	9.760E-01
CO-58	-3.299E-01	146.2	4.824E-01	4.827E-01	1.902E+00
CO-60	-2.865E-01	243.1	6.965E-01	6.966E-01	1.581E+00
ZN-65	0.000E+00	1.#INF	2.960E-01	2.960E-01	4.709E+00
NB-94	-2.171E-01	285.0	6.189E-01	6.190E-01	1.486E+00
ZR-95	5.842E-01	121.8	7.117E-01	7.123E-01	1.747E+00
NB-95	0.000E+00	1.#INF	8.026E-02	8.027E-02	1.868E+00
RU-103	4.575E-02	1135.4	5.194E-01	5.194E-01	1.326E+00
RH-106	3.831E+00	234.7	8.992E+00	8.994E+00	3.060E+01
AG-108M	3.120E-01	94.0	2.933E-01	2.937E-01	9.577E-01
AG-110M	6.047E-02	463.7	2.804E-01	2.804E-01	3.014E+00
SN-113	-2.734E-01	256.9	7.024E-01	7.025E-01	2.424E+00
SB-124	4.229E-01	107.5	4.546E-01	4.551E-01	3.372E+00
SB-125	1.400E+00	89.2	1.249E+00	1.251E+00	2.895E+00
I-131	2.821E-01	81.9	2.311E-01	2.315E-01	1.327E+00
Gd-153	1.144E+00	89.9	1.028E+00	1.031E+00	4.577E+00
Ga-68	-2.592E+00	857.3	2.223E+01	2.223E+01	5.382E+01
Tc-99m	-4.487E-01	157.6	7.073E-01	7.078E-01	2.363E+00
BA-133	1.850E-01	231.5	4.282E-01	4.283E-01	3.686E+00
CS-134	3.685E-01	41.3	1.520E-01	1.532E-01	3.396E+00
CS-137	-7.753E-01	87.4	6.773E-01	6.785E-01	2.278E+00
CE-139	1.518E-02	2795.6	4.245E-01	4.245E-01	1.459E+00
Ba-140	1.168E+00	256.0	2.989E+00	2.989E+00	4.743E+00
La-140	1.418E-01	94.3	1.337E-01	1.339E-01	1.983E+00
CE-141	-2.194E-01	603.4	1.324E+00	1.324E+00	4.448E+00

CE-144	-3.174E+00	155.4	4.934E+00	4.937E+00	1.650E+01
PM-144	3.022E-01	185.6	5.610E-01	5.612E-01	1.345E+00
EU-152	4.733E-01	94.2	4.458E-01	4.464E-01	7.892E+00
EU-154	-5.594E+00	104.8	5.865E+00	5.872E+00	1.989E+01
EU-155	1.240E+00	140.7	1.745E+00	1.746E+00	5.864E+00
HF-181	0.000E+00	1.#INF	7.017E-02	7.017E-02	1.865E+00
Ta-182	1.872E+00	65.8	1.231E+00	1.235E+00	5.836E+00
Hg-203	-5.789E-01	88.6	5.131E-01	5.140E-01	1.717E+00
TL-208	2.625E+00	18.3	4.809E-01	4.991E-01	8.690E-01
pm-146	1.434E-01	702.0	1.007E+00	1.007E+00	3.316E+00
y-88	1.360E-01	354.7	4.823E-01	4.824E-01	1.186E+00
Cd-113m	-4.000E+03	129.6	5.184E+03	5.189E+03	1.767E+04
Cd-109	0.000E+00	1.#INF	1.848E+01	1.848E+01	6.168E+01
Cf-251	-8.492E-01	236.4	2.008E+00	2.008E+00	5.242E+00
Cf-249	5.363E-01	114.0	6.112E-01	6.118E-01	2.077E+00
Sn-126	3.882E+00	122.6	4.758E+00	4.763E+00	1.595E+01
PB-210	2.401E+01	51.5	1.236E+01	1.245E+01	3.388E+01
PB-212	6.341E+00	11.2	7.114E-01	7.845E-01	1.473E+00
PB-214	1.424E+01	10.0	1.421E+00	1.594E+00	2.117E+00
BI-207	3.875E-01	75.2	2.914E-01	2.920E-01	9.782E-01
BI-212	-6.016E-01	1166.5	7.018E+00	7.019E+00	2.498E+01
U-235	-4.565E+00	79.3	3.619E+00	3.626E+00	1.924E+01
BI-214	1.226E+01	12.2	1.490E+00	1.615E+00	2.426E+00
BI-210M	4.663E-01	141.1	6.577E-01	6.582E-01	2.244E+00
AC-228	3.300E+00	63.0	2.081E+00	2.087E+00	5.775E+00
TH-227	3.068E+00	96.5	2.959E+00	2.965E+00	2.283E+01
TH-229	-9.627E+00	99.1	9.539E+00	9.552E+00	2.441E+01
TH-234	1.198E+01	40.2	4.821E+00	4.868E+00	2.636E+01
PA-231	1.101E+01	158.0	1.740E+01	1.741E+01	7.874E+01
PA-233	6.818E-01	223.7	1.525E+00	1.526E+00	6.763E+00
PA-234	1.514E-01	96.8	1.465E-01	1.467E-01	9.720E+00
PA-234M	2.165E+01	140.9	3.051E+01	3.053E+01	3.354E+02
AM-241	2.518E-01	533.0	1.342E+00	1.342E+00	4.565E+00
Np-237	-3.064E+00	144.0	4.411E+00	4.414E+00	1.473E+01
Ir-192	4.406E-01	78.0	3.436E-01	3.445E-01	1.357E+00
Cs-136	-7.139E-01	97.9	6.989E-01	7.000E-01	1.628E+00
Np-239	-1.490E+00	110.4	1.645E+00	1.648E+00	5.507E+00
Nd-147	2.698E+00	96.9	2.613E+00	2.618E+00	6.459E+00
TL-210	1.622E-01	212.9	3.453E-01	3.455E-01	1.789E+00
Total	2.464E+02				

Analyst: Morgan Reichert

Sample description
376765_Gamma_160-29521-A-14-C

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181448.An1

Acquisition information

Start time:	8/9/2018 6:17:57 PM
Live time:	1800
Real time:	1802
Dead time:	0.11 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:17:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-07-14_1824.PBC 7/14/2018 6:24:20 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.90	31.	51.49	1.33	1.709E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	304.41	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
59.54	4.	533.02	0.95	2.613E-02	59.54	35.900	PBC<MDA	AM241
63.18	23.	67.33	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
64.18	19.	122.57	0.95	2.799E-02	64.28	9.700	PBC<MDA	Sn126
77.37	155.	14.36	1.04	3.151E-02				
87.62	25.	55.12	0.97	3.314E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	1.085E+01	Cd109
89.81	29.	36.63	0.97	3.339E-02				
92.83	85.	18.14	0.98	3.368E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.506E+01	AC228
97.50	19.	130.10	0.98	3.401E-02	97.50	30.000	PBC<MDA	Gd153
103.20	17.	124.06	0.99	3.424E-02	103.20	21.800	PBC<MDA	Gd153
103.70	17.	128.62	0.99	3.426E-02	103.70	24.000	PBC<MDA	Np239
105.31	16.	140.72	0.99	3.429E-02	105.31	21.200	PBC<MDA	EU155
121.78	16.	94.18	1.00	3.401E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.047E-01	CO57
123.10	14.	93.47	1.00	3.395E-02	123.10	40.790	PBC<MDA	EU154
185.72	45.	40.88	1.06	2.864E-02	185.72	54.000	PBC<MDA	U235
238.59	109.	13.94	1.09	2.414E-02	238.63	43.300	5.810E+00	PB212
241.92	51.	21.07	1.11	2.388E-02	242.00	7.430	1.583E+01	PB214
256.24	12.	96.47	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
265.83	9.	141.06	1.13	2.224E-02	265.83	50.000	PBC<MDA	BI210M
277.24	12.	105.20	1.14	2.153E-02	277.28	6.310	PBC<MDA	TL208
295.04	92.	13.51	1.00	2.050E-02	295.09	19.300	1.285E+01	PB214
					296.00	79.000	3.146E+00	TL210
299.91	10.	223.07	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	219.48	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
300.18	11.	223.71	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
302.65	11.	227.45	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
302.85	11.	231.49	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
304.85	8.	316.07	1.16	1.998E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	7.887E-01	BI210M
316.49	11.	113.79	1.17	1.940E-02	316.49	87.040	PBC<MDA	Ir192
320.08	9.	111.50	1.18	1.922E-02	320.08	9.940	PBC<MDA	CR51
338.20	14.	138.90	1.19	1.839E-02	338.32	12.010	PBC<MDA	AC228
340.57	9.	220.47	1.19	1.830E-02	340.57	46.900	PBC<MDA	Cs136
351.97	171.	9.98	1.30	1.782E-02	351.93	37.600	1.417E+01	PB214
383.84	10.	105.60	1.23	1.664E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	113.97	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
427.88	6.	151.54	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	10.	94.02	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
463.37	9.	94.16	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.66	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
487.02	8.	94.30	1.32	1.380E-02	487.02	45.500	PBC<MDA	La140
531.00	8.	96.86	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	3.	402.68	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
563.24	6.	41.26	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	1.	501.25	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.381E-01	PA234
					569.70	97.740	6.194E-02	BI207
569.70	8.	75.20	1.39	1.224E-02	569.32	15.380	2.461E+00	CS134
					569.47	8.200	4.617E+00	PA234
					569.70	97.740	3.875E-01	BI207
583.30	48.	18.32	0.82	1.202E-02	583.02	84.500	2.625E+00	TL208
609.46	118.	12.15	1.19	1.163E-02	609.31	46.090	1.226E+01	BI214
					610.30	5.750	9.839E+01	RU103
614.28	4.	449.15	1.42	1.156E-02	614.28	89.850	PBC<MDA	AG108M
621.92	8.	234.72	1.43	1.145E-02	621.92	9.930	PBC<MDA	RH106
636.97	10.	99.39	1.44	1.125E-02	636.97	7.170	PBC<MDA	I131
657.76	2.	463.68	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
696.54	6.	185.64	1.49	1.052E-02	696.54	99.000	PBC<MDA	PM144
722.79	8.	107.50	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.078E-01	AG108M
					723.36	20.220	2.283E+00	EU154
735.72	1.	979.80	1.52	1.010E-02	735.72	22.500	PBC<MDA	pm146
756.73	6.	121.84	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	6.	140.93	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.221E+02	PA234M
795.87	8.	98.43	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
801.95	1.	830.66	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
834.85	7.	97.20	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
846.77	4.	188.70	1.60	9.108E-03	846.77	99.935	PBC<MDA	Co56
860.62	15.	40.42	1.61	9.000E-03	860.56	12.420	7.457E+00	TL208
889.28	10.	93.17	1.63	8.785E-03	889.28	99.984	PBC<MDA	Sc46
898.04	2.	354.73	1.64	8.721E-03	898.04	93.700	PBC<MDA	y88
911.18	13.	90.03	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	6.	122.85	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234
967.51	10.	91.50	1.69	8.244E-03	968.97	17.460	PBC<MDA	AC228
1004.77	9.	125.64	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	5.	146.06	1.74	7.832E-03	1037.84	14.130	PBC<MDA	Co56
1120.20	13.	55.62	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.22	9.	89.86	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.912E+00	Ta182
1221.53	6.	96.10	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	24.	20.59	1.89	6.848E-03	1238.28	66.070	2.934E+00	Co56
1274.53	7.	37.80	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.651E+00	EU154
1408.00	5.	113.28	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1460.88	122.	10.47	1.80	6.004E-03	1460.83	10.670	1.061E+02	K40
1764.26	4.	129.60	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	2.	339.89	2.22	5.095E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.54	77.37	103.	155.	4.930E+03	14.36	1.043	- s
358.38	89.79	59.	36.	1.082E+03	34.33	0.974	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.74	46.90	80.	31.	0.017	51.49	1.334s
TH-227	199.70	50.14	192.	6.	0.004	304.41	0.938
AM-241	237.25	59.54	255.	4.	0.002	533.02	0.946s
TH-234	252.25	63.29	103.	23.	0.013	67.33	0.950D
Sn-126	256.21	64.28	261.	19.	0.011	122.57	0.951s
BA-133	323.00	80.99	564.	-29.	-0.016	52.63	0.966s
Np-237	344.99	86.49	577.	-24.	-0.013	143.96	0.971s
EU-155	345.20	86.54	553.	-24.	-0.013	141.01	0.971s
Sn-126	346.79	86.94	530.	-24.	-0.013	137.94	0.971
Sn-126	349.31	87.57	804.	25.	0.014	55.12	0.972D
Cd-109	351.19	88.04	864.	0.	0.000	182.70	0.972A
Nd-147	363.42	91.10	781.	-23.	-0.013	173.39	0.975D
TH-234	369.37	92.59	138.	41.	0.023	44.04	0.976D
Gd-153	389.00	97.50	305.	19.	0.011	130.10	0.981s
Gd-153	411.78	103.20	217.	17.	0.010	124.06	0.986s
Np-239	413.78	103.70	234.	17.	0.010	128.62	0.986s
EU-155	420.23	105.31	252.	16.	0.009	140.72	0.988
Np-239	423.49	106.13	255.	-21.	-0.012	110.39	0.988s
EU-152	486.04	121.78	105.	16.	0.009	94.18	1.002
CO-57	487.18	122.06	108.	-10.	-0.006	150.89	1.003
EU-154	491.33	123.10	78.	14.	0.008	93.47	1.004s
PA-234	524.09	131.29	486.	-21.	-0.012	149.53	1.011s
HF-181	531.00	133.02	507.	-21.	-0.012	152.44	1.013s
CE-144	533.06	133.54	528.	-21.	-0.012	155.45	1.013s
HF-181	544.09	136.30	549.	-4.	-0.002	896.99	1.015s
CO-57	544.79	136.47	620.	-23.	-0.013	155.39	1.016s
Tc-99m	560.92	140.51	643.	-23.	-0.013	157.63	1.019s
U-235	574.02	143.79	672.	-29.	-0.016	79.28	1.022s
CE-141	580.63	145.44	689.	-6.	-0.003	603.35	1.024s
Ba-140	649.47	162.66	168.	-10.	-0.006	186.01	1.039s
Cf-251	705.19	176.60	92.	-8.	-0.004	236.41	1.051s
U-235	741.65	185.72	90.	45.	0.025	40.88	1.060
TH-229	772.79	193.51	121.	-21.	-0.012	99.08	1.066s
TH-229	842.11	210.85	118.	-22.	-0.012	73.61	1.082s
Cf-251	906.68	227.00	95.	-19.	-0.011	96.78	1.096s
PB-212	953.18	238.63	29.	119.	0.066	11.22	1.106D
PB-214	966.63	242.00	31.	51.	0.028	21.07	1.109D
EU-152	977.41	244.69	351.	-18.	-0.010	148.11	1.111s
TH-227	1023.58	256.24	33.	12.	0.006	96.47	1.122s
Cd-113m	1053.40	263.70	74.	-10.	-0.005	129.62	1.128s
BI-210M	1061.92	265.83	82.	9.	0.005	141.06	1.130s
TL-208	1107.70	277.28	76.	12.	0.007	105.20	1.140s
Hg-203	1115.37	279.20	121.	-18.	-0.010	88.64	1.141s
I-131	1135.76	284.30	80.	-18.	-0.010	101.16	1.146s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1178.90	295.09	148.	102.	0.057	19.50	1.155
TL-210	1182.54	296.00	251.	11.	0.006	212.86	1.156s
PB-212	1198.65	300.03	258.	10.	0.006	223.07	1.159s
PA-231	1198.81	300.07	268.	11.	0.006	219.48	1.159s
PA-233	1199.25	300.18	279.	11.	0.006	223.71	1.159s
PA-231	1209.13	302.65	290.	11.	0.006	227.45	1.162s
BA-133	1209.93	302.85	300.	11.	0.006	231.49	1.162s
Ba-140	1217.92	304.85	311.	8.	0.004	316.07	1.164s
BI-210M	1218.11	304.90	319.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	319.	0.	0.000	1000.00	1.167s
Ir-192	1264.46	316.49	68.	11.	0.006	113.79	1.173s
CR-51	1278.83	320.08	44.	9.	0.005	111.50	1.177s
Cf-249	1332.23	333.44	198.	0.	0.000	1000.00	1.188s
AC-228	1351.74	338.32	175.	14.	0.008	138.90	1.192s
Cs-136	1360.74	340.57	189.	9.	0.005	220.47	1.194s
EU-152	1375.60	344.29	198.	0.	0.000	1000.00	1.197s
HF-181	1381.77	345.83	160.	-10.	-0.006	172.88	1.199s
PB-214	1406.32	351.97	24.	171.	0.095	9.98	1.299
BA-133	1422.43	356.00	226.	-5.	-0.003	457.59	1.207s
I-131	1456.35	364.48	45.	-8.	-0.004	130.23	1.215s
BA-133	1533.76	383.84	56.	10.	0.006	105.60	1.231s
Cf-249	1550.19	387.95	66.	11.	0.006	113.97	1.235s
SN-113	1565.14	391.69	85.	-5.	-0.003	256.90	1.238s
SB-125	1709.84	427.88	20.	6.	0.003	151.54	1.268s
AG-108M	1734.08	433.94	20.	10.	0.005	94.02	1.273s
pm-146	1813.83	453.88	32.	-4.	-0.002	225.37	1.290s
SB-125	1851.76	463.37	30.	9.	0.005	94.16	1.298
Ir-192	1870.53	468.06	31.	8.	0.004	106.66	1.302s
HF-181	1926.26	482.00	56.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	24.	8.	0.004	94.30	1.317s
RH-106	2045.71	511.86	107.	-4.	-0.002	720.02	2.588s
Nd-147	2122.23	531.00	13.	8.	0.005	96.86	1.354s
Ba-140	2147.27	537.26	26.	3.	0.001	402.68	1.359s
CS-134	2251.16	563.24	0.	6.	0.003	41.26	1.380s
CS-134	2275.49	569.32	22.	1.	0.001	501.25	1.385
BI-207	2277.02	569.70	16.	8.	0.005	75.20	1.385
TL-208	2331.39	583.30	8.	48.	0.027	18.32	0.824s
SB-125	2400.20	600.50	218.	-10.	-0.006	106.41	1.410s
SB-124	2409.12	602.73	208.	0.	0.000	1000.00	1.412s
BI-214	2436.02	609.46	20.	118.	0.066	12.15	1.187
RU-103	2439.39	610.30	161.	9.	0.005	213.15	1.418s
AG-108M	2455.31	614.28	170.	4.	0.002	449.15	1.421s
PM-144	2470.44	618.06	182.	-11.	-0.006	133.46	1.424s
RH-106	2485.86	621.92	165.	8.	0.004	234.72	1.427s
SB-125	2541.74	635.89	44.	-15.	-0.008	121.46	1.439s
I-131	2546.08	636.97	44.	10.	0.006	99.39	1.440s
AG-110M	2629.23	657.76	42.	2.	0.001	463.68	1.456s
CS-137	2644.82	661.66	58.	-13.	-0.007	87.37	1.459s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2784.35	696.54	23.	6.	0.003	185.64	1.487s
NB-94	2808.70	702.63	28.	-4.	-0.002	285.04	1.492s
SB-124	2889.33	722.79	38.	8.	0.005	107.50	1.507s
AG-108M	2889.93	722.94	46.	0.	0.000	1000.00	1.507s
EU-154	2891.61	723.36	46.	0.	0.000	1000.00	1.508s
ZR-95	2894.98	724.20	46.	0.	0.000	1000.00	1.508s
pm-146	2941.07	735.72	9.	1.	0.000	979.80	1.518s
ZR-95	3025.11	756.73	9.	6.	0.003	121.84	1.534s
AG-110M	3053.97	763.94	37.	-5.	-0.003	177.76	1.539s
NB-95	3061.35	765.79	42.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	37.	6.	0.004	140.93	1.541s
EU-152	3113.88	778.92	28.	-12.	-0.007	97.89	1.551s
BI-212	3139.88	785.42	24.	-3.	-0.002	299.12	1.556s
CS-134	3181.68	795.87	27.	8.	0.004	98.43	1.564s
TL-210	3196.61	799.60	35.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	34.	1.	0.001	830.66	1.569s
CO-58	3241.32	810.78	40.	-6.	-0.003	146.22	1.575s
Cs-136	3272.22	818.50	28.	-12.	-0.007	97.89	1.581s
MN-54	3337.63	834.85	10.	7.	0.004	97.20	1.594s
Co-56	3385.32	846.77	9.	4.	0.002	188.70	1.603s
TL-208	3440.51	860.56	5.	15.	0.008	40.42	1.614s
NB-94	3482.65	871.10	38.	-13.	-0.007	72.57	1.621s
EU-154	3491.19	873.23	61.	-11.	-0.006	104.84	1.623
PA-234	3520.39	880.53	43.	-5.	-0.003	203.29	1.628s
PA-234	3531.23	883.24	47.	0.	0.000	1000.00	1.630s
AG-110M	3537.01	884.68	47.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	37.	10.	0.005	93.17	1.635s
y-88	3590.45	898.04	10.	2.	0.001	354.73	1.642
AC-228	3642.58	911.07	25.	13.	0.007	90.03	1.651s
AG-110M	3748.30	937.49	15.	0.	0.000	1000.00	1.671s
PA-234	3782.42	946.02	10.	6.	0.003	122.85	1.677s
EU-152	3854.81	964.11	51.	-14.	-0.008	76.93	1.691s
AC-228	3874.26	968.97	38.	10.	0.006	91.50	1.694s
EU-154	3983.73	996.33	52.	-13.	-0.007	81.59	1.714s
PA-234M	4002.41	1001.00	66.	-2.	-0.001	373.64	1.718s
EU-154	4017.53	1004.77	57.	9.	0.005	125.64	1.721s
Co-56	4149.84	1037.84	10.	5.	0.003	146.06	1.745s
Cs-136	4190.78	1048.07	15.	-4.	-0.002	145.77	1.752s
RH-106	4199.94	1050.36	30.	-6.	-0.003	135.40	1.754s
BI-207	4253.17	1063.66	10.	-3.	-0.002	238.82	1.763s
Ga-68	4308.15	1077.40	15.	-1.	-0.001	857.32	1.773s
FE-59	4395.60	1099.25	22.	-7.	-0.004	95.03	1.789s
EU-152	4446.92	1112.07	43.	-4.	-0.002	244.08	1.798s
ZN-65	4460.81	1115.55	39.	0.	0.000	1000.00	1.800s
BI-214	4479.78	1120.29	18.	13.	0.007	55.62	1.803D
Sc-46	4480.84	1120.55	73.	-14.	-0.008	90.17	1.804
Ta-182	4483.84	1121.30	27.	9.	0.005	89.86	1.804s
CO-60	4691.70	1173.24	16.	-3.	-0.002	308.52	1.841

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4754.99	1189.05	21.	-11.	-0.006	61.86	1.852s
Ta-182	4884.51	1221.41	6.	6.	0.003	96.10	1.874s
Co-56	4952.04	1238.28	0.	24.	0.013	20.59	1.886
NA-22	5097.14	1274.53	0.	7.	0.004	37.80	1.910s
EU-154	5097.19	1274.54	7.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	16.	-7.	-0.004	135.27	1.922s
TL-210	5251.13	1313.00	21.	-7.	-0.004	147.85	1.936s
CO-60	5329.19	1332.50	11.	-3.	-0.002	243.10	1.949s
AG-110M	5536.55	1384.30	17.	-11.	-0.006	92.93	1.984s
EU-152	5631.44	1408.00	6.	5.	0.003	113.28	1.999s
K-40	5843.15	1460.88	13.	122.	0.068	10.47	1.796
SB-124	6764.54	1690.98	6.	-3.	-0.002	420.56	2.176s
BI-214	7058.94	1764.49	13.	4.	0.002	129.60	2.219s
Co-56	7086.41	1771.35	29.	2.	0.001	339.89	2.223s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.7696E-01					5.31E+01
			477.60	3.770E-01	%(	1.405E+01	1.05E+03 1.05E+01 G
NA-22	C	5.8117E-01					9.50E+02
			1274.53	5.812E-01	?(	6.119E-01	3.78E+01 9.99E+01 G
K-40	N	1.0614E+02					4.66E+11
			1460.83	1.061E+02	(P	1.669E+01	1.05E+01 1.07E+01 G
Sc-46	F	6.2289E-01					8.38E+01
			889.28	6.229E-01	?(	1.968E+00	9.32E+01 1.00E+02 G
			1120.55	-1.054E+00	+	3.196E+00	9.02E+01 1.00E+02 G
CR-51	F	2.5557E+00					2.77E+01
			320.08	2.556E+00	?(P	9.726E+00	1.11E+02 9.94E+00 G
MN-54	C	4.4131E-01					3.12E+02
			834.85	4.413E-01	?(P	1.047E+00	9.72E+01 1.00E+02 G
FE-59	F	-8.5879E-01					4.45E+01
			1099.25	-8.588E-01	?(P	3.191E+00	9.50E+01 5.65E+01 G
			1291.60	-1.359E+00	+	4.144E+00	1.35E+02 4.32E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	1.3947E+00					7.73E+01	
			846.77	2.190E-01	?(P	1.038E+00	1.89E+02	9.99E+01 G
			1238.28	2.934E+00	?(P	9.050E-01	2.06E+01	6.61E+01 G
			1037.84	2.510E+00	?(	8.758E+00	1.46E+02	1.41E+01 G
			1771.35	1.602E+00	?	1.950E+01	3.40E+02	1.55E+01 A
CO-57	C	-1.9013E-01					2.72E+02	
			122.06	-1.901E-01	&(	9.760E-01	1.51E+02	8.56E+01 G
			136.47	-3.592E+00	+	1.865E+01	1.55E+02	1.07E+01 G
CO-58	C	-3.2992E-01					7.09E+01	
			810.78	-3.299E-01	?(P	1.902E+00	1.46E+02	9.95E+01 G
CO-60	F	-2.8649E-01					1.93E+03	
			1332.50	-2.865E-01	?(	1.581E+00	2.43E+02	1.00E+02 G
			1173.24	-2.337E-01	+	1.663E+00	3.09E+02	9.99E+01 G
NB-94	I	-2.1712E-01					7.41E+06	
			702.63	-2.171E-01	&(	1.486E+00	2.85E+02	9.79E+01 G
			871.10	-8.106E-01	+	1.960E+00	7.26E+01	9.99E+01 G
ZR-95	I	5.8415E-01					6.40E+01	
			756.73	5.842E-01	?(	1.747E+00	1.22E+02	5.45E+01 G
			724.20	0.000E+00	-	4.224E+00	1.00E+03	4.42E+01 G
RU-103	I	4.5748E-02					3.93E+01	
			497.05	4.575E-02	&(P	1.326E+00	1.14E+03	9.09E+01 G
			610.30	7.102E+00	?	5.149E+01	2.13E+02	5.75E+00 GA
RH-106	I	3.8308E+00					3.74E+02	
			621.92	3.831E+00	?(P	3.060E+01	2.35E+02	9.93E+00 G
			1050.36	-2.753E+01	+	1.295E+02	1.35E+02	1.56E+00 G
			511.86	-7.671E-01	-	1.064E+01	7.20E+02	2.00E+01 GA
AG-108M	C	3.1195E-01					1.53E+05	
			433.94	4.024E-01	?(	9.577E-01	9.40E+01	9.05E+01 G
			722.94	0.000E+00	-	2.050E+00	1.00E+03	9.08E+01 G
			614.28	2.209E-01	?(	3.394E+00	4.49E+02	8.98E+01 G
AG-110M	F	6.0474E-02					2.50E+02	
			884.68	0.000E+00	?(	3.014E+00	1.00E+03	7.27E+01 G
			657.76	1.069E-01	?(	1.759E+00	4.64E+02	9.46E+01 G
			937.49	0.000E+00	-	3.973E+00	1.00E+03	3.44E+01 G
			1384.30	-4.012E+00	+	7.995E+00	9.29E+01	2.43E+01 G
			763.94	-1.269E+00	+	7.880E+00	1.78E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-2.7341E-01					1.15E+02	
			391.69	-2.734E-01	?(	2.424E+00	2.57E+02	6.40E+01 G
SB-124	F	4.2291E-01					6.02E+01	
			602.73	0.000E+00	?(	3.372E+00	1.00E+03	9.83E+01 G
			1690.98	-6.687E-01	+ P	3.105E+00	4.21E+02	4.78E+01 G
			722.79	4.267E+00	?(	1.569E+01	1.08E+02	1.08E+01 G
SB-125	I	1.4002E+00					1.01E+03	
			427.88	7.376E-01	?(	2.895E+00	1.52E+02	2.96E+01 G
			600.50	-2.639E+00	+ P	1.892E+01	1.06E+02	1.79E+01 G
			635.89	-6.633E+00	+ P	1.462E+01	1.21E+02	1.13E+01 G
			463.37	3.274E+00	(P	1.047E+01	9.42E+01	1.05E+01 G
I-131	I	2.8212E-01					8.02E+00	
			364.48	-2.976E-01	?(P	1.327E+00	1.30E+02	8.17E+01 G
			284.30	-7.633E+00	+	1.903E+01	1.01E+02	6.14E+00 G
			636.97	6.888E+00	?(P	2.323E+01	9.94E+01	7.17E+00 G
Gd-153	F	1.1440E+00					2.42E+02	
			97.50	1.049E+00	?(	4.577E+00	1.30E+02	3.00E+01 G
			103.20	1.274E+00	?(	5.311E+00	1.24E+02	2.18E+01 G
Ga-68	C	-2.5925E+00					4.71E-02	
			1077.40	-2.592E+00	?(	5.382E+01	8.57E+02	3.30E+00 G
Tc-99m	I	-4.4872E-01					2.51E-01	
			140.51	-4.487E-01	?(	2.363E+00	1.58E+02	8.93E+01 G
BA-133	F	1.8497E-01					3.85E+03	
			356.00	-2.366E-01	?(	3.686E+00	4.58E+02	6.20E+01 G
			302.85	1.612E+00	?(	1.260E+01	2.31E+02	1.83E+01 G
			383.84	3.915E+00	?	1.404E+01	1.06E+02	8.94E+00 GA
			80.99	-1.473E+00	+ P	5.746E+00	5.26E+01	3.41E+01 GA
CS-134	I	3.6847E-01					7.54E+02	
			604.71	-5.677E-02	%(	3.396E+00	1.75E+03	9.76E+01 G
			795.87	5.450E-01	?(	1.834E+00	9.84E+01	8.55E+01 G
			569.32	3.934E-01	?(	7.200E+00	5.01E+02	1.54E+01 G
			801.95	6.743E-01	?(	2.015E+01	8.31E+02	8.69E+00 G
			563.24	3.167E+00	&(	3.973E+00	4.13E+01	8.35E+00 G
CS-137	I	-7.7527E-01					1.10E+04	
			661.66	-7.753E-01	?(	2.278E+00	8.74E+01	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.5183E-02					1.38E+02	
			165.85	1.518E-02	%(	1.459E+00	2.80E+03	7.99E+01 G
Ba-140	I	1.1676E+00					1.28E+01	
			537.26	4.677E-01	?(P	4.743E+00	4.03E+02	2.44E+01 G
			162.66	-2.897E+00	+	1.828E+01	1.86E+02	6.22E+00 G
			304.85	5.147E+00	&(	5.503E+01	3.16E+02	4.29E+00 G
La-140	I	1.4177E-01					1.28E+01	
			1596.21	-1.253E-01	%(P	1.983E+00	1.07E+03	9.54E+01 G
			487.02	7.018E-01	?(	2.260E+00	9.43E+01	4.55E+01 G
			328.76	1.697E-01	%	9.902E+00	1.70E+03	2.03E+01 G
			815.77	-1.841E-02	% P	8.636E+00	1.13E+04	2.33E+01 G
CE-141	I	-2.1936E-01					3.25E+01	
			145.44	-2.194E-01	?(	4.448E+00	6.03E+02	4.82E+01 G
CE-144	I	-3.1740E+00					2.85E+02	
			133.54	-3.174E+00	?(	1.650E+01	1.55E+02	1.11E+01 G
PM-144	C	3.0221E-01					3.63E+02	
			696.54	3.022E-01	?(	1.345E+00	1.86E+02	9.90E+01 G
			618.06	-5.275E-01	+ P	3.197E+00	1.33E+02	9.91E+01 G
EU-152	F	4.7330E-01					4.94E+03	
			344.29	0.000E+00	?(	7.892E+00	1.00E+03	2.65E+01 G
			1112.07	-2.124E+00	+	1.819E+01	2.44E+02	1.36E+01 G
			121.78	9.122E-01	&(	2.884E+00	9.42E+01	2.86E+01 G
			778.92	-5.319E+00	+	1.213E+01	9.79E+01	1.29E+01 G
			964.11	-6.436E+00	+	1.654E+01	7.69E+01	1.46E+01 G
			244.69	-5.604E+00	+	2.784E+01	1.48E+02	7.58E+00 G
			1408.00	2.280E+00	?	5.901E+00	1.13E+02	2.10E+01 GA
EU-154	I	-5.5939E+00					3.14E+03	
			873.23	-5.594E+00	?(	1.989E+01	1.05E+02	1.23E+01 G
			123.10	5.595E-01	+	1.760E+00	9.35E+01	4.08E+01 G
			1274.54	0.000E+00	+	3.546E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	9.215E+00	1.00E+03	2.02E+01 G
			1004.77	3.396E+00	+	1.459E+01	1.26E+02	1.80E+01 G
			996.33	-8.654E+00	+	2.368E+01	8.16E+01	1.06E+01 G
EU-155	I	1.2400E+00					1.81E+03	
			105.31	1.240E+00	&(P	5.864E+00	1.41E+02	2.12E+01 G
			86.54	-1.307E+00	+	6.158E+00	1.41E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	1.8716E+00					1.14E+02	
			1121.30	1.912E+00	?(	5.836E+00	8.99E+01	3.49E+01 G
			1221.41	1.819E+00	?(P	4.123E+00	9.61E+01	2.70E+01 G
			1189.05	-5.522E+00	+ P	1.177E+01	6.19E+01	1.62E+01 G
Hg-203	F	-5.7890E-01					4.66E+01	
			279.20	-5.789E-01	?(	1.717E+00	8.86E+01	8.15E+01 G
TL-208	N	2.6249E+00					6.98E+02	
			583.02	2.625E+00	(	8.690E-01	1.83E+01	8.45E+01 G
			277.28	4.976E+00	+	1.771E+01	1.05E+02	6.31E+00 G
			860.56	7.457E+00	+ P	6.523E+00	4.04E+01	1.24E+01 G
pm-146	C	1.4337E-01					2.02E+03	
			747.16	1.304E-01	%(P	3.316E+00	1.01E+03	3.40E+01 G
			735.72	1.629E-01	?(	4.141E+00	9.80E+02	2.25E+01 G
			453.88	-2.587E-01	+ P	1.715E+00	2.25E+02	6.50E+01 G
y-88	F	1.3597E-01					1.07E+02	
			898.04	1.360E-01	?(	1.186E+00	3.55E+02	9.37E+01 G
			1836.06	-2.289E-02	% P	8.367E-01	2.80E+03	9.92E+01 G
Cd-113m		-3.9995E+03					5.33E+03	
			263.70	-4.000E+03	?(	1.767E+04	1.30E+02	6.00E-03 K
Cf-251	T	-8.4921E-01					3.28E+05	
			176.60	-8.492E-01	?(	5.242E+00	2.36E+02	1.70E+01 G
			227.00	-6.840E+00	+	1.698E+01	9.68E+01	6.30E+00 GA
Cf-249	T	5.3627E-01					1.28E+05	
			387.95	5.363E-01	&(	2.077E+00	1.14E+02	6.60E+01 G
			333.44	0.000E+00	-	1.314E+01	1.00E+03	1.55E+01 G
Sn-126		3.8816E+00					3.65E+07	
			87.57	1.098E+00	}	6.030E+00	5.51E+01	3.75E+01 GA
			64.28	3.882E+00	?(	1.595E+01	1.23E+02	9.70E+00 G
			86.94	-4.434E+00	+	2.044E+01	1.38E+02	9.04E+00 GA
PB-210	N	2.4012E+01					8.14E+03	
			46.54	2.401E+01	(P	3.388E+01	5.15E+01	4.25E+00 G
PB-212	N	6.3413E+00					6.98E+02	
			238.63	6.341E+00	(P	1.473E+00	1.12E+01	4.33E+01 G
			300.03	8.612E+00	+ P	6.494E+01	2.23E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.4244E+01					5.84E+05	
			351.93	1.417E+01	(	2.117E+00	9.98E+00	3.76E+01 G
			295.09	1.438E+01	?(	8.345E+00	1.95E+01	1.93E+01 G
			242.00	1.583E+01		9.028E+00	2.11E+01	7.43E+00 GA
BI-207	C	3.8747E-01					1.18E+04	
			569.70	3.875E-01	?(	9.782E-01	7.52E+01	9.77E+01 G
			1063.66	-2.909E-01	-	1.692E+00	2.39E+02	7.45E+01 G
BI-212	N	-6.0165E-01					6.98E+02	
			727.17	-6.016E-01	%(	2.498E+01	1.17E+03	7.55E+00 G
			785.42	-1.218E+01	+ P	1.145E+02	2.99E+02	1.28E+00 GA
U-235	N	-4.5646E+00					2.57E+11	
			143.79	-4.565E+00	(P	1.924E+01	7.93E+01	1.10E+01 G
			205.33	1.670E-01	% P	1.774E+01	3.99E+03	5.01E+00 G
			163.38	-4.215E-01	& P	2.314E+01	1.96E+03	5.08E+00 G
			185.72	1.624E+00	+ P	1.684E+00	4.09E+01	5.40E+01 GA
BI-214	N	1.2259E+01					5.84E+05	
			609.31	1.226E+01	(P	2.426E+00	1.22E+01	4.61E+01 G
			1120.29	6.280E+00	- P	1.126E+01	5.56E+01	1.51E+01 G
			1764.49	3.053E+00	- P	1.395E+01	1.30E+02	1.54E+01 G
BI-210M	T	4.6627E-01					1.10E+09	
			265.83	4.663E-01	?(	2.244E+00	1.41E+02	5.00E+01 G
			304.90	0.000E+00	&	8.535E+00	1.00E+03	2.80E+01 G
AC-228	N	3.3003E+00					2.10E+03	
			911.07	2.851E+00	?(	5.775E+00	9.00E+01	2.90E+01 G
			968.97	3.939E+00	&(	1.221E+01	9.15E+01	1.75E+01 G
			338.32	3.456E+00	?(	1.620E+01	1.39E+02	1.20E+01 G
			93.35	-2.074E-01	%	3.989E+01	5.72E+03	5.56E+00 XA
TH-227	N	3.0677E+00					7.95E+03	
			50.14	2.203E+00	?(	2.283E+01	3.04E+02	8.00E+00 G
			256.24	4.056E+00	?(	1.023E+01	9.65E+01	7.00E+00 G
TH-229	N	-9.6273E+00					2.68E+06	
			193.51	-9.627E+00	?(	2.441E+01	9.91E+01	4.40E+00 G
			210.85	-1.550E+01	+ P	3.759E+01	7.36E+01	2.99E+00 G
TH-234	N	1.1984E+01					1.63E+12	
			63.29	1.193E+01	(P	2.636E+01	6.73E+01	3.81E+00 G
			92.59	1.202E+01	(P	1.696E+01	4.40E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	1.1011E+01					1.20E+07	
			302.65	1.025E+01	?(	7.874E+01	2.27E+02	2.88E+00 G
			300.07	1.190E+01	?(	8.824E+01	2.19E+02	2.46E+00 G
PA-233	C	6.8183E-01					7.82E+08	
			312.01	-1.407E-02	&(P	6.763E+00	1.28E+04	3.60E+01 G
			300.18	4.723E+00	?(	3.569E+01	2.24E+02	6.20E+00 G
PA-234	N	1.5136E-01					1.63E+12	
			131.29	-1.943E+00	?(	9.720E+00	1.50E+02	1.80E+01 G
			946.02	2.964E+00	?(	8.619E+00	1.23E+02	1.34E+01 G
			569.47	9.226E-02	%	1.409E+01	4.15E+03	8.20E+00 G
			883.24	0.000E+00	-	2.279E+01	1.00E+03	9.60E+00 G
			880.53	-4.883E+00	+	3.469E+01	2.03E+02	6.00E+00 GA
PA-234M	N	2.1649E+01					1.63E+12	
			1001.00	-1.363E+01	?(P	3.354E+02	3.74E+02	8.37E-01 G
			766.41	1.221E+02	?(	5.961E+02	1.41E+02	2.94E-01 G
AM-241	T	2.5182E-01					1.58E+05	
			59.54	2.518E-01	&(	4.565E+00	5.33E+02	3.59E+01 G
Np-237	F	-3.0640E+00					2.14E+06	
			86.49	-3.064E+00	?(	1.473E+01	1.44E+02	1.31E+01 G
Ir-192	F	4.4058E-01					7.40E+01	
			316.49	3.510E-01	?(	1.357E+00	1.14E+02	8.70E+01 G
			468.06	5.912E-01	&(	2.162E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	7.596E+00	1.00E+03	3.18E+01 G
Cs-136	F	-7.1388E-01					1.30E+01	
			818.50	-7.139E-01	?(	1.628E+00	9.79E+01	1.00E+02 G
			1048.07	-3.573E-01	+	1.854E+00	1.46E+02	8.00E+01 G
			340.57	5.777E-01	+	4.324E+00	2.20E+02	4.69E+01 G
Np-239	T	-1.4905E+00					2.36E+00	
			103.70	1.158E+00	+	5.003E+00	1.29E+02	2.40E+01 X
			106.13	-1.490E+00	*(	5.507E+00	1.10E+02	2.27E+01 G
			99.50	4.650E-02	&	9.383E+00	5.93E+03	1.50E+01 X
Nd-147		2.6980E+00					1.11E+01	
			531.00	2.698E+00	?(	6.459E+00	9.69E+01	1.30E+01 G
			91.10	-1.345E+00	-	7.788E+00	1.73E+02	2.83E+01 G
TL-210	N	1.6224E-01					5.84E+05	
			799.60	0.000E+00	?(	1.789E+00	1.00E+03	9.90E+01 G
			296.00	3.655E-01	?(	2.630E+00	2.13E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	-2.966E+00 +	9.801E+00	1.48E+02	2.10E+01	GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	192.	6.	0.004	304.41	2.203E+00	
AM-241	59.54	255.	4.	0.002	533.02	2.518E-01	
BA-133	80.99	564.	-29.	-0.016	52.63	-1.473E+00	P
Np-237	86.49	577.	-24.	-0.013	143.96	-3.064E+00	
EU-155	86.54	553.	-24.	-0.013	141.01	-1.307E+00	
Nd-147	91.10	781.	-23.	-0.013	173.39	-1.345E+00	
Gd-153	97.50	305.	19.	0.011	130.10	1.049E+00	
Gd-153	103.20	217.	17.	0.010	124.06	1.274E+00	
Np-239	103.70	234.	17.	0.010	128.62	1.158E+00	
EU-155	105.31	252.	16.	0.009	140.72	1.240E+00	P
Np-239	106.13	255.	-21.	-0.012	110.39	-1.490E+00	
EU-152	121.78	105.	16.	0.009	94.18	9.122E-01	
CO-57	122.06	108.	-10.	-0.006	150.89	-1.901E-01	
EU-154	123.10	78.	14.	0.008	93.47	5.595E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	131.29	486.	-21.	-0.012	149.53	-1.943E+00	
HF-181	133.02	507.	-21.	-0.012	152.44	-8.117E-01	
CE-144	133.54	528.	-21.	-0.012	155.45	-3.174E+00	
HF-181	136.30	549.	-4.	-0.002	896.99	-1.061E+00	
CO-57	136.47	620.	-23.	-0.013	155.39	-3.592E+00	
Tc-99m	140.51	643.	-23.	-0.013	157.63	-4.487E-01	
U-235	143.79	672.	-29.	-0.016	79.28	-4.565E+00	P
CE-141	145.44	689.	-6.	-0.003	603.35	-2.194E-01	
Ba-140	162.66	168.	-10.	-0.006	186.01	-2.897E+00	
Cf-251	176.60	92.	-8.	-0.004	236.41	-8.492E-01	
U-235	185.72	90.	45.	0.025	40.88	1.624E+00	P
TH-229	193.51	121.	-21.	-0.012	99.08	-9.627E+00	
TH-229	210.85	118.	-22.	-0.012	73.61	-1.550E+01	P
Cf-251	227.00	95.	-19.	-0.011	96.78	-6.840E+00	
EU-152	244.69	351.	-18.	-0.010	148.11	-5.604E+00	
TH-227	256.24	33.	12.	0.006	96.47	4.056E+00	
Cd-113m	263.70	74.	-10.	-0.005	129.62	-4.000E+03	
BI-210M	265.83	82.	9.	0.005	141.06	4.663E-01	
Hg-203	279.20	121.	-18.	-0.010	88.64	-5.789E-01	
I-131	284.30	80.	-18.	-0.010	101.16	-7.633E+00	
TL-210	296.00	251.	11.	0.006	212.86	3.655E-01	
PA-231	300.07	268.	11.	0.006	219.48	1.190E+01	
PA-233	300.18	279.	11.	0.006	223.71	4.723E+00	
PA-231	302.65	290.	11.	0.006	227.45	1.025E+01	
BA-133	302.85	300.	11.	0.006	231.49	1.612E+00	
Ba-140	304.85	311.	8.	0.004	316.07	5.147E+00	
Ir-192	316.49	68.	11.	0.006	113.79	3.510E-01	
CR-51	320.08	44.	9.	0.005	111.50	2.556E+00	P
Cs-136	340.57	189.	9.	0.005	220.47	5.777E-01	
HF-181	345.83	160.	-10.	-0.006	172.88	-2.142E+00	
BA-133	356.00	226.	-5.	-0.003	457.59	-2.366E-01	
I-131	364.48	45.	-8.	-0.004	130.23	-2.976E-01	P
BA-133	383.84	56.	10.	0.006	105.60	3.915E+00	
Cf-249	387.95	66.	11.	0.006	113.97	5.363E-01	
SN-113	391.69	85.	-5.	-0.003	256.90	-2.734E-01	
SB-125	427.88	20.	6.	0.003	151.54	7.376E-01	
AG-108M	433.94	20.	10.	0.005	94.02	4.024E-01	
pm-146	453.88	32.	-4.	-0.002	225.37	-2.587E-01	P
SB-125	463.37	30.	9.	0.005	94.16	3.274E+00	P
Ir-192	468.06	31.	8.	0.004	106.66	5.912E-01	
La-140	487.02	24.	8.	0.004	94.30	7.018E-01	
RH-106	511.86	107.	-4.	-0.002	720.02	-7.671E-01	
Nd-147	531.00	13.	8.	0.005	96.86	2.698E+00	
Ba-140	537.26	26.	3.	0.001	402.68	4.677E-01	P
CS-134	563.24	0.	6.	0.003	41.26	3.167E+00	
CS-134	569.32	22.	1.	0.001	501.25	3.934E-01	
BI-207	569.70	16.	8.	0.005	75.20	3.875E-01	
SB-125	600.50	218.	-10.	-0.006	106.41	-2.639E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RU-103	610.30	161.	9.	0.005	213.15	7.102E+00		
AG-108M	614.28	170.	4.	0.002	449.15	2.209E-01		
PM-144	618.06	182.	-11.	-0.006	133.46	-5.275E-01		P
RH-106	621.92	165.	8.	0.004	234.72	3.831E+00		P
SB-125	635.89	44.	-15.	-0.008	121.46	-6.633E+00		P
I-131	636.97	44.	10.	0.006	99.39	6.888E+00		P
AG-110M	657.76	42.	2.	0.001	463.68	1.069E-01		
CS-137	661.66	58.	-13.	-0.007	87.37	-7.753E-01		
PM-144	696.54	23.	6.	0.003	185.64	3.022E-01		
NB-94	702.63	28.	-4.	-0.002	285.04	-2.171E-01		
SB-124	722.79	38.	8.	0.005	107.50	4.267E+00		
pm-146	735.72	9.	1.	0.000	979.80	1.629E-01		
ZR-95	756.73	9.	6.	0.003	121.84	5.842E-01		
AG-110M	763.94	37.	-5.	-0.003	177.76	-1.269E+00		
PA-234M	766.41	37.	6.	0.004	140.93	1.221E+02		
EU-152	778.92	28.	-12.	-0.007	97.89	-5.319E+00		
BI-212	785.42	24.	-3.	-0.002	299.12	-1.218E+01		P
CS-134	795.87	27.	8.	0.004	98.43	5.450E-01		
CS-134	801.95	34.	1.	0.001	830.66	6.743E-01		
CO-58	810.78	40.	-6.	-0.003	146.22	-3.299E-01		P
Cs-136	818.50	28.	-12.	-0.007	97.89	-7.139E-01		
MN-54	834.85	10.	7.	0.004	97.20	4.413E-01		P
NB-94	871.10	38.	-13.	-0.007	72.57	-8.106E-01		
EU-154	873.23	61.	-11.	-0.006	104.84	-5.594E+00		
PA-234	880.53	43.	-5.	-0.003	203.29	-4.883E+00		
Sc-46	889.28	37.	10.	0.005	93.17	6.229E-01		
y-88	898.04	10.	2.	0.001	354.73	1.360E-01		
PA-234	946.02	10.	6.	0.003	122.85	2.964E+00		
EU-152	964.11	51.	-14.	-0.008	76.93	-6.436E+00		
EU-154	996.33	52.	-13.	-0.007	81.59	-8.654E+00		
PA-234M	1001.00	66.	-2.	-0.001	373.64	-1.363E+01		P
EU-154	1004.77	57.	9.	0.005	125.64	3.396E+00		
Cs-136	1048.07	15.	-4.	-0.002	145.77	-3.573E-01		
RH-106	1050.36	30.	-6.	-0.003	135.40	-2.753E+01		
BI-207	1063.66	10.	-3.	-0.002	238.82	-2.909E-01		
Ga-68	1077.40	15.	-1.	-0.001	857.32	-2.592E+00		
FE-59	1099.25	22.	-7.	-0.004	95.03	-8.588E-01		P
EU-152	1112.07	43.	-4.	-0.002	244.08	-2.124E+00		
Sc-46	1120.55	73.	-14.	-0.008	90.17	-1.054E+00		
CO-60	1173.24	16.	-3.	-0.002	308.52	-2.337E-01		
NA-22	1274.53	0.	7.	0.004	37.80	5.812E-01		
FE-59	1291.60	16.	-7.	-0.004	135.27	-1.359E+00		
TL-210	1313.00	21.	-7.	-0.004	147.85	-2.966E+00		
CO-60	1332.50	11.	-3.	-0.002	243.10	-2.865E-01		
AG-110M	1384.30	17.	-11.	-0.006	92.93	-4.012E+00		
EU-152	1408.00	6.	5.	0.003	113.28	2.280E+00		
SB-124	1690.98	6.	-3.	-0.002	420.56	-6.687E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.7696E-01	3.7696E-01	1.054E+03%	1.40E+01
NA-22	#A	5.8117E-01	5.8117E-01	3.780E+01%	6.12E-01
K-40		1.0614E+02	1.0614E+02	1.047E+01%	1.67E+01
Sc-46	#A	6.2289E-01	6.2289E-01	9.317E+01%	1.97E+00
CR-51	#A	2.5556E+00	2.5557E+00	1.115E+02%	9.73E+00
MN-54	#A	4.4131E-01	4.4131E-01	9.720E+01%	1.05E+00
FE-59	#A	-8.5879E-01	-8.5879E-01	9.503E+01%	3.19E+00
Co-56	#C	1.3946E+00	1.3947E+00	2.059E+01%	1.04E+00
CO-57	#A	-1.9013E-01	-1.9013E-01	1.509E+02%	9.76E-01
CO-58	#A	-3.2992E-01	-3.2992E-01	1.462E+02%	1.90E+00
CO-60	#A	-2.8649E-01	-2.8649E-01	2.431E+02%	1.58E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.71E+00
NB-94	#A	-2.1712E-01	-2.1712E-01	2.850E+02%	1.49E+00
ZR-95	#A	5.8415E-01	5.8415E-01	1.218E+02%	1.75E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.87E+00
RU-103	#A	4.5747E-02	4.5748E-02	1.135E+03%	1.33E+00
RH-106	#A	3.8308E+00	3.8308E+00	2.347E+02%	3.06E+01
AG-108M	#A	3.1195E-01	3.1195E-01	9.402E+01%	9.58E-01
AG-110M	#A	6.0474E-02	6.0474E-02	4.637E+02%	3.01E+00
SN-113	#A	-2.7341E-01	-2.7341E-01	2.569E+02%	2.42E+00
SB-124	#A	4.2290E-01	4.2291E-01	1.075E+02%	3.37E+00
SB-125	#A	1.4002E+00	1.4002E+00	8.920E+01%	2.90E+00
I-131	#A	2.8210E-01	2.8212E-01	8.191E+01%	1.33E+00
Gd-153	#A	1.1440E+00	1.1440E+00	8.988E+01%	4.58E+00
Ga-68	#A	-2.5674E+00	-2.5925E+00	8.573E+02%	5.38E+01
Tc-99m	#A	-4.4791E-01	-4.4872E-01	1.576E+02%	2.36E+00
BA-133	#A	1.8497E-01	1.8497E-01	2.315E+02%	3.69E+00
CS-134	#A	3.6847E-01	3.6847E-01	4.126E+01%	3.40E+00
CS-137	#A	-7.7527E-01	-7.7527E-01	8.737E+01%	2.28E+00
CE-139	#A	1.5183E-02	1.5183E-02	2.796E+03%	1.46E+00
Ba-140	#A	1.1676E+00	1.1676E+00	2.560E+02%	4.74E+00
La-140	#A	1.4177E-01	1.4177E-01	9.430E+01%	1.98E+00
CE-141	#A	-2.1936E-01	-2.1936E-01	6.034E+02%	4.45E+00
CE-144	#A	-3.1740E+00	-3.1740E+00	1.554E+02%	1.65E+01
PM-144	#A	3.0221E-01	3.0221E-01	1.856E+02%	1.34E+00
EU-152	#A	4.7330E-01	4.7330E-01	9.418E+01%	7.89E+00
EU-154	#A	-5.5939E+00	-5.5939E+00	1.048E+02%	1.99E+01
EU-155	#A	1.2400E+00	1.2400E+00	1.407E+02%	5.86E+00
HF-181	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.86E+00
Ta-182	#A	1.8716E+00	1.8716E+00	6.578E+01%	5.84E+00
Hg-203	#A	-5.7890E-01	-5.7890E-01	8.864E+01%	1.72E+00
TL-208		2.6249E+00	2.6249E+00	1.832E+01%	8.69E-01
pm-146	#A	1.4337E-01	1.4337E-01	7.020E+02%	3.32E+00

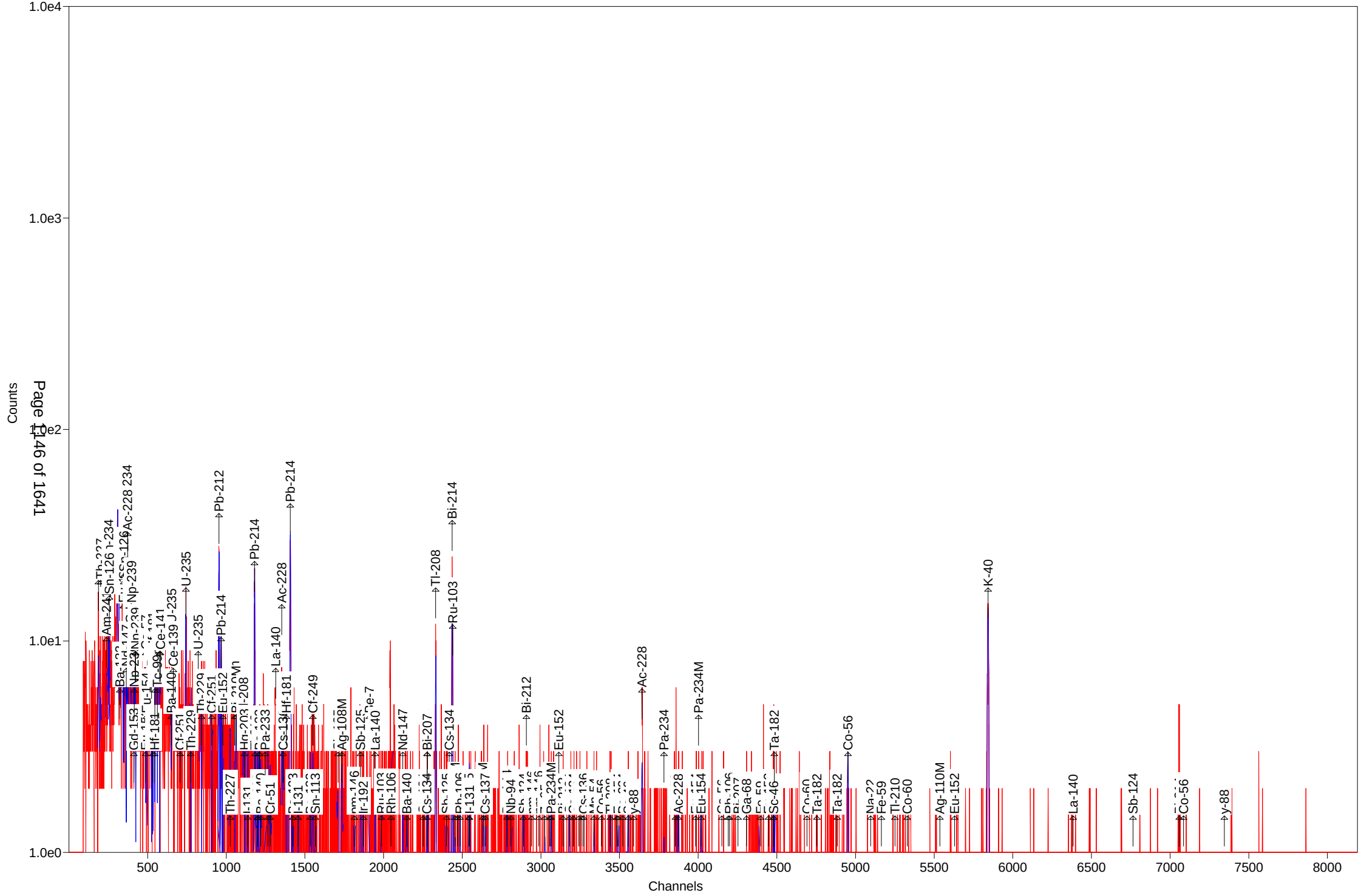
y-88 #A	1.3597E-01	1.3597E-01	3.547E+02%		1.19E+00
Cd-113m#A	-3.9995E+03	-3.9995E+03	1.296E+02%		1.77E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.17E+01
Cf-251 #A	-8.4921E-01	-8.4921E-01	2.364E+02%		5.24E+00
Cf-249 #A	5.3627E-01	5.3627E-01	1.140E+02%		2.08E+00
Sn-126 #A	3.8816E+00	3.8816E+00	1.226E+02%		1.60E+01
PB-210 #A	2.4012E+01	2.4012E+01	5.149E+01%		3.39E+01
PB-212	6.3413E+00	6.3413E+00	1.122E+01%		1.47E+00
PB-214	1.4244E+01	1.4244E+01	9.976E+00%		2.12E+00
BI-207 #A	3.8747E-01	3.8747E-01	7.520E+01%		9.78E-01
BI-212 #A	-6.0165E-01	-6.0165E-01	1.167E+03%		2.50E+01
U-235 #A	-4.5646E+00	-4.5646E+00	7.928E+01%		1.92E+01
BI-214	1.2259E+01	1.2259E+01	1.215E+01%		2.43E+00
BI-210M#A	4.6627E-01	4.6627E-01	1.411E+02%		2.24E+00
AC-228 #A	3.3003E+00	3.3003E+00	6.305E+01%		5.77E+00
TH-227 #A	3.0677E+00	3.0677E+00	9.647E+01%		2.28E+01
TH-229 #A	-9.6273E+00	-9.6273E+00	9.908E+01%		2.44E+01
TH-234 A	1.1984E+01	1.1984E+01	4.023E+01%		2.64E+01
PA-231 #A	1.1011E+01	1.1011E+01	1.580E+02%		7.87E+01
PA-233 #A	6.8183E-01	6.8183E-01	2.237E+02%		6.76E+00
PA-234 #A	1.5136E-01	1.5136E-01	9.676E+01%		9.72E+00
PA-234M#A	2.1649E+01	2.1649E+01	1.409E+02%		3.35E+02
AM-241 #A	2.5182E-01	2.5182E-01	5.330E+02%		4.56E+00
Np-237 #A	-3.0640E+00	-3.0640E+00	1.440E+02%		1.47E+01
Ir-192 #A	4.4058E-01	4.4058E-01	7.798E+01%		1.36E+00
Cs-136 #A	-7.1386E-01	-7.1388E-01	9.789E+01%		1.63E+00
Np-239 #A	-1.4902E+00	-1.4905E+00	1.104E+02%		5.51E+00
Nd-147 #A	2.6979E+00	2.6980E+00	9.686E+01%		6.46E+00
TL-210 #A	1.6224E-01	1.6224E-01	2.129E+02%		1.79E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.689E+02 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 1.6892387E+02 Bq/Sample

376765_Gamma_160-29521-A-14-C. 19_Gamma_20181448.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20183373

Sample Description: 376765_Gamma_160-29521-B-15-C
Detector: Detector # 9
Batch ID: 376765
Work Order Number: Gamma
Lot Number: 160-29521-B-15-C

Decay to Time: 8/9/2018 18:43 Live Time: 1800 sec
Acquisition Time: 8/9/2018 18:43:22 Real Time: 1803 sec
Analysis Time: 8/9/2018 19:13 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev14.lib
Bkgd Correction File: 9_2018-07-14_1810.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.924E+00	103.6	1.992E+00	1.995E+00	6.811E+00
NA-22	2.384E-01	112.0	2.670E-01	2.673E-01	9.397E-01
K-40	1.622E+02	5.9	9.536E+00	1.264E+01	8.205E+00
Sc-46	-3.909E-01	109.8	4.291E-01	4.295E-01	1.459E+00
CR-51	-2.643E+00	94.5	2.496E+00	2.500E+00	8.396E+00
MN-54	-4.395E-01	112.2	4.930E-01	4.935E-01	1.109E+00
FE-59	9.625E-01	29.0	2.794E-01	2.836E-01	5.919E-01
Co-56	6.135E-01	34.9	2.139E-01	2.162E-01	7.690E-01
CO-57	0.000E+00	1.#INF	1.038E-01	1.038E-01	6.259E-01
CO-58	-4.176E-01	82.5	3.446E-01	3.452E-01	1.159E+00
CO-60	3.604E-01	91.3	3.290E-01	3.295E-01	7.463E-01
ZN-65	0.000E+00	1.#INF	2.222E-01	2.222E-01	3.082E+00
NB-94	2.118E-01	72.4	1.533E-01	1.537E-01	1.031E+00
ZR-95	-5.082E-01	111.6	5.671E-01	5.678E-01	1.627E+00
NB-95	1.603E-01	173.2	2.777E-01	2.778E-01	9.748E-01
RU-103	2.187E-01	98.6	2.155E-01	2.158E-01	5.334E-01
RH-106	0.000E+00	1.#INF	2.951E-01	2.951E-01	1.574E+01
AG-108M	4.897E-01	31.2	1.529E-01	1.550E-01	3.090E-01
AG-110M	1.981E-01	96.2	1.906E-01	1.909E-01	1.790E+00
SN-113	3.943E-01	119.1	4.696E-01	4.700E-01	1.589E+00
SB-124	-8.623E-03	3037.4	2.619E-01	2.619E-01	1.556E+00
SB-125	1.318E+00	40.5	5.341E-01	5.384E-01	1.242E+00
I-131	-1.228E-01	93.5	1.149E-01	1.151E-01	7.877E-01
Gd-153	0.000E+00	1.#INF	1.499E-01	1.499E-01	3.659E+00
Ga-68	1.578E+00	914.7	1.443E+01	1.443E+01	3.369E+01
Tc-99m	0.000E+00	1.#INF	1.038E-01	1.038E-01	1.247E+00
BA-133	-2.108E-01	132.1	2.785E-01	2.787E-01	2.082E+00
CS-134	1.807E-01	91.1	1.646E-01	1.649E-01	1.568E+00
CS-137	1.432E-01	174.5	2.500E-01	2.501E-01	8.854E-01
CE-139	-8.564E-02	266.4	2.281E-01	2.283E-01	7.824E-01
Ba-140	-1.007E+00	124.8	1.256E+00	1.257E+00	3.060E+00
La-140	2.733E-01	112.0	3.061E-01	3.065E-01	4.733E-01
CE-141	-4.452E-01	147.6	6.569E-01	6.573E-01	2.201E+00

CE-144	-1.814E+00	150.0	2.720E+00	2.722E+00	9.118E+00
PM-144	9.303E-02	296.6	2.759E-01	2.760E-01	9.772E-01
EU-152	1.191E+00	62.4	7.429E-01	7.455E-01	3.491E+00
EU-154	4.202E-01	97.8	4.112E-01	4.118E-01	4.353E+00
EU-155	-1.643E-02	5389.4	8.853E-01	8.853E-01	5.103E+00
HF-181	-3.589E-01	99.0	3.555E-01	3.559E-01	1.202E+00
Ta-182	1.396E-01	972.1	1.357E+00	1.357E+00	4.555E+00
Hg-203	-8.805E-02	292.8	2.578E-01	2.579E-01	8.931E-01
TL-208	1.450E+00	20.9	3.024E-01	3.116E-01	5.810E-01
pm-146	-1.473E-01	85.8	1.264E-01	1.266E-01	2.708E+00
y-88	3.265E-01	115.2	3.762E-01	3.765E-01	8.852E-01
Cd-113m	3.136E+03	87.9	2.755E+03	2.763E+03	9.287E+03
Cd-109	4.886E+00	186.6	9.116E+00	9.120E+00	3.057E+01
Cf-251	1.010E+00	95.7	9.663E-01	9.704E-01	2.506E+00
Cf-249	-4.774E-01	106.8	5.099E-01	5.105E-01	1.716E+00
Sn-126	2.150E+00	120.5	2.592E+00	2.594E+00	8.731E+00
PB-210	2.537E+00	286.4	7.264E+00	7.265E+00	2.502E+01
PB-212	1.931E+00	20.6	3.977E-01	4.169E-01	1.092E+00
PB-214	4.839E+00	13.8	6.685E-01	7.143E-01	1.170E+00
BI-207	-8.289E-02	257.7	2.136E-01	2.137E-01	7.927E-01
BI-212	-4.861E+00	87.9	4.273E+00	4.280E+00	1.442E+01
U-235	2.265E+00	77.7	1.760E+00	1.763E+00	8.950E+00
BI-214	2.393E+00	22.0	5.265E-01	5.410E-01	1.209E+00
BI-210M	-5.819E-02	640.4	3.726E-01	3.727E-01	1.306E+00
AC-228	1.399E+00	85.9	1.202E+00	1.204E+00	3.181E+00
TH-227	-4.167E+00	104.0	4.333E+00	4.339E+00	1.454E+01
TH-229	-5.478E+00	142.8	7.823E+00	7.835E+00	1.341E+01
TH-234	6.006E+00	114.6	6.880E+00	6.887E+00	2.314E+01
PA-231	8.665E+00	153.6	1.331E+01	1.331E+01	4.483E+01
PA-233	-2.305E-02	4757.0	1.096E+00	1.096E+00	3.823E+00
PA-234	-1.111E+00	95.8	1.064E+00	1.066E+00	5.319E+00
PA-234M	-1.030E+00	4466.3	4.600E+01	4.600E+01	1.489E+02
AM-241	6.807E-01	109.4	7.448E-01	7.457E-01	2.504E+00
Np-237	-1.614E+00	162.7	2.626E+00	2.627E+00	8.796E+00
Ir-192	2.987E-01	152.0	4.541E-01	4.545E-01	1.530E+00
Cs-136	2.969E-01	90.3	2.681E-01	2.686E-01	9.126E-01
Np-239	7.349E-01	167.0	1.227E+00	1.228E+00	4.123E+00
Nd-147	8.024E-01	190.7	1.530E+00	1.531E+00	3.914E+00
TL-210	6.755E-02	320.8	2.167E-01	2.167E-01	9.639E-01
Total	3.352E+03				

Analyst: Morgan Reichert

Sample description
376765_Gamma_160-29521-B-15-C

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20183373.An1

Acquisition information
Start time: 8/9/2018 6:43:22 PM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:43:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-07-14_1810.PBC 7/14/2018 6:10:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2101

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	5.	286.36	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
59.54	16.	109.42	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	16.	114.56	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
64.28	15.	120.53	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
80.99	13.	140.27	1.03	4.830E-02	80.99	34.060	PBC<MDA	BA133
88.04	17.	186.59	1.04	5.051E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	4.886E+00	Cd109
106.13	16.	166.99	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
121.78	12.	119.02	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.469E-01	CO57
123.10	7.	188.98	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
143.79	17.	154.81	1.09	5.039E-02	143.79	10.960	PBC<MDA	U235
163.38	11.	141.09	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
176.69	14.	95.69	1.12	4.549E-02	176.60	17.000	PBC<MDA	Cf251
185.72	14.	120.27	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
205.33	12.	102.28	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
227.00	9.	154.36	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
238.38	56.	20.60	1.18	3.732E-02	238.63	43.300	1.931E+00	PB212
241.75	26.	38.15	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
256.24	5.	225.98	1.20	3.558E-02	256.24	7.000	PBC<MDA	TH227
263.70	12.	87.87	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
277.56	6.	194.37	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.10	9.	244.12	1.23	3.232E-02	295.09	19.300	PBC<MDA	PB214
296.00	7.	320.75	1.23	3.225E-02	296.00	79.000	PBC<MDA	TL210
302.65	14.	153.56	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.362E+00	BA133
302.85	7.	324.43	1.24	3.175E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	6.588E-01	BA133
316.49	14.	152.05	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
328.76	6.	309.89	1.26	2.999E-02	328.76	20.300	PBC<MDA	La140
344.29	10.	143.37	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.53	94.	13.81	1.21	2.860E-02	351.93	37.600	4.839E+00	PB214
391.69	12.	119.10	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
427.88	18.	40.52	1.35	2.491E-02	427.88	29.600	1.376E+00	SB125
433.94	20.	31.23	1.35	2.466E-02	433.94	90.480	4.897E-01	AG108M
463.37	6.	132.65	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
477.60	8.	103.55	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
497.05	8.	98.56	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	70.	26.99	2.67	2.188E-02	511.86	20.000	8.885E+00	RH106
531.00	4.	190.67	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
563.24	6.	150.07	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.32	7.	91.14	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.455E+00	PA234
					569.70	97.740	PBC<MDA	BI207
569.70	-3.	257.73	1.47	2.023E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	PBC<MDA	PA234
					569.70	97.740	PBC<MDA	BI207
582.79	43.	20.85	1.44	1.989E-02	583.02	84.500	1.416E+00	TL208
609.38	40.	22.00	1.07	1.925E-02	609.31	46.090	2.525E+00	BI214
635.89	4.	154.11	1.53	1.864E-02	635.89	11.310	PBC<MDA	SB125
636.97	4.	148.30	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	96.19	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
661.66	4.	174.51	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
696.54	3.	296.61	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
702.63	6.	150.60	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
722.94	8.	84.93	1.60	1.693E-02	722.79	10.810	2.384E+00	SB124
					722.94	90.840	2.838E-01	AG108M
					723.36	20.220	1.276E+00	EU154
723.36	7.	97.85	1.60	1.692E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.580E-01	AG108M
					723.36	20.220	1.160E+00	EU154
735.72	6.	92.23	1.61	1.671E-02	735.72	22.500	PBC<MDA	pm146
763.94	5.	134.16	1.63	1.624E-02	763.94	22.280	PBC<MDA	AG110M
765.79	5.	173.21	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	5.445E+01	PA234M
778.92	6.	95.70	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
815.77	8.	112.00	1.67	1.544E-02	815.77	23.280	PBC<MDA	La140
818.50	8.	90.29	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
860.61	5.	137.74	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
871.10	6.	72.37	1.71	1.468E-02	871.10	99.890	PBC<MDA	NB94

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
880.53	7.	120.37	1.72	1.456E-02	880.53	6.000	PBC<MDA	PA234
898.04	8.	115.20	1.74	1.434E-02	898.04	93.700	PBC<MDA	y88
911.07	12.	85.91	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
946.02	4.	180.85	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
964.11	11.	68.79	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
968.97	4.	207.87	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
1037.84	9.	34.86	1.84	1.281E-02	1037.84	14.130	2.690E+00	Co56
1077.40	1.	914.69	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1099.25	12.	29.03	1.89	1.224E-02	1099.25	56.500	9.625E-01	FE59
1112.07	4.	220.71	1.89	1.213E-02	1112.07	13.644	PBC<MDA	EU152
1119.82	6.	144.44	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1189.05	1.	972.11	1.95	1.150E-02	1189.05	16.200	PBC<MDA	Ta182
1238.28	15.	44.86	1.98	1.114E-02	1238.28	66.070	1.153E+00	Co56
1274.53	5.	112.03	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	6.769E-01	EU154
1291.60	5.	175.40	2.02	1.077E-02	1291.60	43.200	PBC<MDA	FE59
1313.00	2.	480.00	2.03	1.063E-02	1313.00	21.000	PBC<MDA	TL210
1332.50	7.	91.28	2.05	1.050E-02	1332.50	99.980	PBC<MDA	CO60
1460.52	304.	5.88	1.95	9.749E-03	1460.83	10.670	1.622E+02	K40
1764.13	5.	122.93	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	2.	298.73	2.32	8.323E-03	1771.35	15.480	PBC<MDA	Co56

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	100.	5.	0.003	286.36	0.998s
TH-227	200.20	50.14	155.	-17.	-0.010	103.99	1.001s
AM-241	237.77	59.54	147.	16.	0.009	109.42	1.010s
TH-234	252.77	63.29	163.	16.	0.009	114.56	1.014s
Sn-126	256.74	64.28	155.	15.	0.008	120.53	1.015s
BA-133	323.56	80.99	88.	13.	0.007	140.27	1.031
Np-237	345.55	86.49	471.	-19.	-0.011	162.71	1.036s
EU-155	345.76	86.54	490.	-19.	-0.011	165.90	1.036s
Sn-126	347.35	86.94	509.	-10.	-0.006	314.08	1.037s
Sn-126	349.87	87.57	520.	0.	0.000	1000.00	1.037s
Cd-109	351.75	88.04	485.	17.	0.009	186.59	1.038s
Nd-147	363.99	91.10	468.	0.	0.000	1000.00	1.041s
TH-234	369.94	92.59	468.	0.	0.000	1000.00	1.042
AC-228	372.98	93.35	468.	0.	0.000	1000.00	1.043
Gd-153	389.58	97.50	468.	0.	0.000	1000.00	1.047s
Np-239	397.58	99.50	468.	0.	0.000	1000.00	1.049s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	412.37	103.20	468.	0.	0.000	1000.00	1.052
Np-239	414.37	103.70	468.	0.	0.000	1000.00	1.053
Np-239	424.09	106.13	348.	16.	0.009	166.99	1.055s
EU-152	486.65	121.78	96.	12.	0.007	119.02	1.070
CO-57	487.80	122.06	108.	0.	0.000	1000.00	1.070
EU-154	491.95	123.10	84.	7.	0.004	188.98	1.071
PA-234	524.72	131.29	350.	-19.	-0.010	95.76	1.079s
HF-181	531.64	133.02	369.	-19.	-0.010	146.45	1.081s
CE-144	533.69	133.54	388.	-19.	-0.010	149.97	1.081s
HF-181	544.74	136.30	406.	-19.	-0.010	153.12	1.084s
Tc-99m	561.57	140.51	428.	0.	0.000	1000.00	1.088s
U-235	574.67	143.79	343.	17.	0.010	154.81	1.091s
CE-141	581.29	145.44	398.	-19.	-0.011	147.56	1.092s
Ba-140	650.15	162.66	137.	-18.	-0.010	148.35	1.108s
U-235	653.03	163.38	108.	11.	0.006	141.09	1.109s
CE-139	662.92	165.85	118.	-6.	-0.003	266.40	1.111s
Cf-251	705.90	176.60	48.	14.	0.008	95.69	1.122s
U-235	742.37	185.72	77.	14.	0.008	120.27	1.130s
TH-229	773.52	193.51	84.	-19.	-0.010	142.81	1.137
U-235	820.80	205.33	36.	12.	0.007	102.28	1.148s
Cf-251	907.45	227.00	48.	9.	0.005	154.36	1.168
PB-212	953.97	238.63	39.	56.	0.031	20.60	1.179D
PB-214	967.43	242.00	38.	26.	0.015	38.15	1.182D
EU-152	978.21	244.69	239.	-17.	-0.010	127.55	1.185s
TH-227	1024.40	256.24	32.	5.	0.003	225.98	1.195s
Cd-113m	1054.23	263.70	48.	12.	0.007	87.87	1.202s
BI-210M	1062.75	265.83	67.	-2.	-0.001	640.43	1.204s
TL-208	1108.55	277.28	65.	6.	0.003	194.37	1.215s
Hg-203	1116.22	279.20	78.	-4.	-0.002	292.81	1.216s
I-131	1136.61	284.30	64.	-13.	-0.007	123.64	1.221s
PB-214	1179.77	295.09	238.	9.	0.005	244.12	1.231
TL-210	1183.41	296.00	247.	7.	0.004	320.75	1.231
PA-231	1210.00	302.65	233.	14.	0.008	153.56	1.237s
BA-133	1210.81	302.85	247.	7.	0.004	324.43	1.238s
Ba-140	1218.80	304.85	254.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	254.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	254.	0.	0.000	1000.00	1.243s
Ir-192	1265.35	316.49	233.	14.	0.008	152.05	1.250s
CR-51	1279.73	320.08	86.	-14.	-0.008	94.45	1.253s
La-140	1314.43	328.76	142.	6.	0.003	309.89	1.261s
Cf-249	1333.15	333.44	176.	-15.	-0.008	131.26	1.265s
AC-228	1352.66	338.32	180.	-14.	-0.008	134.10	1.270
Cs-136	1361.66	340.57	194.	0.	0.000	1000.00	1.272s
EU-152	1376.53	344.29	96.	10.	0.006	143.37	1.275s
HF-181	1382.70	345.83	184.	-10.	-0.006	196.18	1.276s
PB-214	1405.52	351.53	18.	94.	0.052	13.81	1.207s
BA-133	1423.37	356.00	184.	-15.	-0.008	132.14	1.285s
I-131	1457.31	364.48	40.	-11.	-0.006	114.04	1.293s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1534.73	383.84	109.	-16.	-0.009	80.71	1.310s
Cf-249	1551.17	387.95	123.	-15.	-0.008	106.79	1.314s
SN-113	1566.12	391.69	97.	12.	0.007	119.10	1.317s
SB-125	1710.86	427.88	9.	18.	0.010	40.52	1.349s
AG-108M	1735.10	433.94	4.	20.	0.011	31.23	1.354s
pm-146	1814.87	453.88	26.	-5.	-0.003	212.92	1.372s
SB-125	1852.82	463.37	33.	6.	0.004	132.65	1.380s
Ir-192	1871.59	468.06	44.	-8.	-0.004	130.98	1.384s
BE-7	1909.73	477.60	34.	8.	0.005	103.55	1.392s
HF-181	1927.34	482.00	63.	-12.	-0.007	99.04	1.396s
La-140	1947.43	487.02	67.	-2.	-0.001	466.45	1.400s
RU-103	1987.56	497.05	13.	8.	0.004	98.56	1.409s
RH-106	2046.81	511.86	42.	70.	0.039	26.99	2.672s
Nd-147	2123.35	531.00	13.	4.	0.002	190.67	1.438s
Ba-140	2148.39	537.26	30.	-9.	-0.005	124.82	1.444s
CS-134	2252.30	563.24	19.	6.	0.004	150.07	1.466
CS-134	2276.64	569.32	19.	7.	0.004	91.14	1.471s
PA-234	2277.24	569.47	26.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	30.	-3.	-0.002	257.73	1.471s
TL-208	2330.52	582.79	10.	43.	0.024	20.85	1.437
SB-125	2401.36	600.50	125.	-7.	-0.004	229.02	1.497s
CS-134	2418.21	604.71	118.	0.	0.000	1000.00	1.500
BI-214	2436.90	609.38	13.	40.	0.022	22.00	1.066s
RU-103	2440.56	610.30	118.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	118.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	118.	0.	0.000	1000.00	1.512s
RH-106	2487.04	621.92	118.	0.	0.000	1000.00	1.515s
SB-125	2542.94	635.89	17.	4.	0.002	154.11	1.526s
I-131	2547.28	636.97	15.	4.	0.002	148.30	1.527s
AG-110M	2630.43	657.76	17.	7.	0.004	96.19	1.544s
CS-137	2646.03	661.66	22.	4.	0.002	174.51	1.548s
PM-144	2785.58	696.54	35.	3.	0.002	296.61	1.576s
NB-94	2809.93	702.63	38.	6.	0.003	150.60	1.581s
SB-124	2890.57	722.79	33.	-3.	-0.001	309.23	1.598s
AG-108M	2891.17	722.94	18.	8.	0.004	84.93	1.598s
EU-154	2892.85	723.36	21.	7.	0.004	97.85	1.598s
BI-212	2908.11	727.17	42.	-11.	-0.006	87.90	1.601s
pm-146	2942.31	735.72	5.	6.	0.003	92.23	1.608s
pm-146	2988.08	747.16	28.	-8.	-0.004	144.70	1.617s
ZR-95	3026.36	756.73	25.	-8.	-0.005	111.60	1.625s
AG-110M	3055.23	763.94	20.	5.	0.003	134.16	1.631
NB-95	3062.61	765.79	30.	5.	0.003	173.21	1.632s
PA-234M	3065.10	766.41	43.	-5.	-0.003	190.79	1.633s
EU-152	3115.14	778.92	5.	6.	0.003	95.70	1.643s
BI-212	3141.15	785.42	52.	-13.	-0.007	84.63	1.648
CS-134	3182.95	795.87	27.	0.	0.000	1000.00	1.656s
TL-210	3197.88	799.60	27.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	36.	-8.	-0.004	111.80	1.661s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-58	3242.59	810.78	40.	-12.	-0.006	82.51	1.668s
La-140	3262.58	815.77	37.	8.	0.004	112.00	1.672s
Cs-136	3273.50	818.50	24.	8.	0.005	90.29	1.674s
MN-54	3338.91	834.85	35.	-12.	-0.007	112.17	1.687s
Co-56	3386.61	846.77	15.	-1.	-0.001	857.32	1.696s
TL-208	3441.80	860.56	11.	5.	0.003	137.74	1.707s
NB-94	3483.94	871.10	6.	6.	0.003	72.37	1.715s
EU-154	3492.47	873.23	6.	0.	0.000	1000.00	1.717s
PA-234	3521.68	880.53	32.	7.	0.004	120.37	1.722s
PA-234	3532.53	883.24	49.	-10.	-0.006	103.92	1.724s
AG-110M	3538.30	884.68	45.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	57.	-10.	-0.006	109.75	1.729s
y-88	3591.74	898.04	16.	8.	0.004	115.20	1.736s
AC-228	3643.88	911.07	20.	12.	0.007	85.91	1.746s
AG-110M	3749.60	937.49	20.	-5.	-0.003	201.66	1.766s
PA-234	3783.72	946.02	10.	4.	0.002	180.85	1.772s
EU-152	3856.11	964.11	22.	11.	0.006	68.79	1.786s
AC-228	3875.56	968.97	37.	4.	0.002	207.87	1.790s
EU-154	3985.03	996.33	32.	-1.	-0.001	806.23	1.810s
EU-154	4018.82	1004.77	21.	-2.	-0.001	454.68	1.816s
Co-56	4151.13	1037.84	0.	9.	0.005	34.86	1.841s
Cs-136	4192.07	1048.07	33.	-11.	-0.006	77.93	1.848s
Ga-68	4309.44	1077.40	16.	1.	0.001	914.69	1.870s
FE-59	4396.88	1099.25	0.	12.	0.007	29.03	1.886s
EU-152	4448.20	1112.07	41.	4.	0.002	220.71	1.895s
ZN-65	4462.09	1115.55	45.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	31.	6.	0.003	144.44	1.901s
Sc-46	4482.12	1120.55	47.	-2.	-0.001	579.52	1.901s
CO-60	4692.96	1173.24	22.	-9.	-0.005	93.64	1.938s
Ta-182	4756.25	1189.05	17.	1.	0.001	972.11	1.949s
Ta-182	4885.75	1221.41	23.	-3.	-0.001	423.16	1.972s
Co-56	4953.27	1238.28	6.	15.	0.008	44.86	1.984s
NA-22	5098.35	1274.53	11.	5.	0.003	112.03	2.008s
EU-154	5098.40	1274.54	16.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	11.	5.	0.003	175.40	2.020s
TL-210	5252.32	1313.00	11.	2.	0.001	480.00	2.034s
CO-60	5330.37	1332.50	6.	7.	0.004	91.28	2.047s
K-40	5842.77	1460.52	7.	304.	0.169	5.88	1.947
BI-214	7059.65	1764.49	14.	5.	0.003	122.93	2.314s
Co-56	7087.11	1771.35	19.	2.	0.001	298.73	2.318s
y-88	7346.20	1836.06	6.	-2.	-0.001	232.58	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.9240E+00					5.31E+01	
			477.60	1.924E+00	&(	6.811E+00	1.04E+02 1.05E+01 G	
NA-22	C	2.3836E-01					9.50E+02	
			1274.53	2.384E-01	?(	9.397E-01	1.12E+02 9.99E+01 G	
K-40	N	1.6217E+02					4.66E+11	
			1460.83	1.622E+02	(P	8.205E+00	5.88E+00 1.07E+01 G	
Sc-46	F	-3.9095E-01					8.38E+01	
			889.28	-3.909E-01	?(	1.459E+00	1.10E+02 1.00E+02 G	
			1120.55	-7.751E-02	+	1.592E+00	5.80E+02 1.00E+02 G	
CR-51	F	-2.6430E+00					2.77E+01	
			320.08	-2.643E+00	?(	8.396E+00	9.45E+01 9.94E+00 G	
MN-54	C	-4.3954E-01					3.12E+02	
			834.85	-4.395E-01	?(	1.109E+00	1.12E+02 1.00E+02 G	
FE-59	F	9.6254E-01					4.45E+01	
			1099.25	9.625E-01	?(P	5.919E-01	2.90E+01 5.65E+01 G	
			1291.60	5.573E-01	-	2.197E+00	1.75E+02 4.32E+01 G	
Co-56	C	6.1351E-01					7.73E+01	
			846.77	-3.705E-02	?(	7.690E-01	8.57E+02 9.99E+01 G	
			1238.28	1.153E+00	?(P	1.058E+00	4.49E+01 6.61E+01 G	
			1037.84	2.690E+00	?(P	2.262E+00	3.49E+01 1.41E+01 G	
			1771.35	9.116E-01	?	9.900E+00	2.99E+02 1.55E+01	A
CO-58	C	-4.1762E-01					7.09E+01	
			810.78	-4.176E-01	?(	1.159E+00	8.25E+01 9.95E+01 G	
CO-60	F	3.6041E-01					1.93E+03	
			1332.50	3.604E-01	?(P	7.463E-01	9.13E+01 1.00E+02 G	
			1173.24	-4.238E-01	- P	1.172E+00	9.36E+01 9.99E+01 G	
NB-94	I	2.1182E-01					7.41E+06	
			702.63	1.974E-01	?(P	1.031E+00	1.51E+02 9.79E+01 G	
			871.10	2.259E-01	?(	5.469E-01	7.24E+01 9.99E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-5.0818E-01					6.40E+01	
			756.73	-5.082E-01	?(P	1.627E+00	1.12E+02	5.45E+01 G
			724.20	7.097E-08	%	2.037E+00	7.85E+08	4.42E+01 G
NB-95	I	1.6031E-01					6.40E+01	
			765.79	1.603E-01	?(	9.748E-01	1.73E+02	9.98E+01 G
RU-103	I	2.1870E-01					3.93E+01	
			497.05	2.187E-01	?(	5.334E-01	9.86E+01	9.09E+01 G
			610.30	0.000E+00	-	2.680E+01	1.00E+03	5.75E+00 GA
AG-108M	C	4.8969E-01					1.53E+05	
			433.94	4.897E-01	&(	3.090E-01	3.12E+01	9.05E+01 G
			722.94	2.838E-01	&	8.187E-01	8.49E+01	9.08E+01 G
			614.28	0.000E+00	-	1.724E+00	1.00E+03	8.98E+01 G
AG-110M	F	1.9814E-01					2.50E+02	
			884.68	0.000E+00	?(	1.790E+00	1.00E+03	7.27E+01 G
			657.76	2.162E-01	?(P	7.135E-01	9.62E+01	9.46E+01 G
			937.49	-5.829E-01	+	2.745E+00	2.02E+02	3.44E+01 G
			1384.30	-1.198E-01	% P	1.655E+00	1.18E+03	2.43E+01 G
			763.94	7.679E-01	?(	3.617E+00	1.34E+02	2.23E+01 G
SN-113	F	3.9429E-01					1.15E+02	
			391.69	3.943E-01	?(P	1.589E+00	1.19E+02	6.40E+01 G
SB-124	F	-8.6229E-03					6.02E+01	
			602.73	-8.623E-03	%(P	1.556E+00	3.04E+03	9.83E+01 G
			1690.98	-2.252E-02	% P	9.906E-01	1.07E+04	4.78E+01 G
			722.79	-8.094E-01	&	8.906E+00	3.09E+02	1.08E+01 G
SB-125	I	1.3181E+00					1.01E+03	
			427.88	1.376E+00	?(P	1.242E+00	4.05E+01	2.96E+01 G
			600.50	-1.119E+00	-	8.763E+00	2.29E+02	1.79E+01 G
			635.89	1.054E+00	?(	5.776E+00	1.54E+02	1.13E+01 G
			463.37	1.441E+00	?(P	6.614E+00	1.33E+02	1.05E+01 G
I-131	I	-1.2283E-01					8.02E+00	
			364.48	-2.776E-01	?(P	7.877E-01	1.14E+02	8.17E+01 G
			284.30	-3.548E+00	+	1.091E+01	1.24E+02	6.14E+00 G
			636.97	1.641E+00	?(P	8.652E+00	1.48E+02	7.17E+00 G
Ga-68	C	1.5778E+00					4.71E-02	
			1077.40	1.578E+00	?(	3.369E+01	9.15E+02	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-2.1077E-01					3.85E+03	
			356.00	-4.676E-01	?(	2.082E+00	1.32E+02	6.20E+01 G
			302.85	6.588E-01	?(	7.252E+00	3.24E+02	1.83E+01 G
			383.84	-3.749E+00	+ P	1.188E+01	8.07E+01	8.94E+00 GA
			80.99	4.317E-01	? P	1.570E+00	1.40E+02	3.41E+01 GA
CS-134	I	1.8066E-01					7.54E+02	
			604.71	0.000E+00	?(	1.568E+00	1.00E+03	9.76E+01 G
			795.87	0.000E+00	?(	1.111E+00	1.00E+03	8.55E+01 G
			569.32	1.309E+00	(	4.077E+00	9.11E+01	1.54E+01 G
			801.95	-3.269E+00	+	1.253E+01	1.12E+02	8.69E+00 G
			563.24	2.065E+00	?(	7.450E+00	1.50E+02	8.35E+00 G
CS-137	I	1.4324E-01					1.10E+04	
			661.66	1.432E-01	?(P	8.854E-01	1.75E+02	8.52E+01 G
CE-139	F	-8.5640E-02					1.38E+02	
			165.85	-8.564E-02	?(	7.824E-01	2.66E+02	7.99E+01 G
Ba-140	I	-1.0065E+00					1.28E+01	
			537.26	-1.007E+00	?(	3.060E+00	1.25E+02	2.44E+01 G
			162.66	-3.406E+00	+ P	1.089E+01	1.48E+02	6.22E+00 G
			304.85	0.000E+00	&	3.154E+01	1.00E+03	4.29E+00 G
La-140	I	2.7332E-01					1.28E+01	
			1596.21	-1.407E-02	%(P	4.733E-01	8.16E+03	9.54E+01 G
			487.02	-1.343E-01	+	2.191E+00	4.66E+02	4.55E+01 G
			328.76	5.018E-01	?(	5.323E+00	3.10E+02	2.03E+01 G
			815.77	1.252E+00	?(	4.805E+00	1.12E+02	2.33E+01 G
CE-141	I	-4.4516E-01					3.25E+01	
			145.44	-4.452E-01	?(	2.201E+00	1.48E+02	4.82E+01 G
CE-144	I	-1.8138E+00					2.85E+02	
			133.54	-1.814E+00	?(	9.118E+00	1.50E+02	1.11E+01 G
PM-144	C	9.3029E-02					3.63E+02	
			696.54	9.303E-02	&(P	9.772E-01	2.97E+02	9.90E+01 G
			618.06	0.000E+00	-	1.570E+00	1.00E+03	9.91E+01 G
EU-152	F	1.1907E+00					4.94E+03	
			344.29	7.154E-01	?(	3.491E+00	1.43E+02	2.65E+01 G
			1112.07	1.409E+00	?(P	1.090E+01	2.21E+02	1.36E+01 G
			121.78	4.397E-01	&(	1.772E+00	1.19E+02	2.86E+01 G
			778.92	1.533E+00	?(	3.524E+00	9.57E+01	1.29E+01 G
			964.11	3.015E+00	?(	6.886E+00	6.88E+01	1.46E+01 G
			244.69	-3.489E+00	+	1.494E+01	1.28E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	1.047E-01	% P	3.867E+00	1.46E+03	2.10E+01 GA
EU-154	I	4.2023E-01					3.14E+03	
			873.23	0.000E+00	?(	4.353E+00	1.00E+03	1.23E+01 G
			123.10	1.800E-01	(	1.168E+00	1.89E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.097E+00	1.00E+03	3.52E+01 G
			723.36	1.160E+00	?(	3.895E+00	9.78E+01	2.02E+01 G
			1004.77	-5.478E-01	+	5.689E+00	4.55E+02	1.80E+01 G
			996.33	-3.962E-01	+	1.152E+01	8.06E+02	1.06E+01 G
EU-155	I	-1.6427E-02					1.81E+03	
			105.31	-1.643E-02	%(P	5.103E+00	5.39E+03	2.12E+01 G
			86.54	-6.885E-01	+	3.825E+00	1.66E+02	3.07E+01 G
HF-181	F	-3.5891E-01					4.24E+01	
			482.00	-3.589E-01	?(	1.202E+00	9.90E+01	8.05E+01 G
			133.02	-4.638E-01	+	2.277E+00	1.46E+02	4.33E+01 G
			345.83	-1.262E+00	+	8.395E+00	1.96E+02	1.51E+01 G
			136.30	-3.471E+00	&	1.781E+01	1.53E+02	5.85E+00 G
Ta-182	F	1.3961E-01					1.14E+02	
			1121.30	6.604E-02	%(	4.555E+00	1.93E+03	3.49E+01 G
			1221.41	-4.873E-01	+	4.549E+00	4.23E+02	2.70E+01 G
			1189.05	2.981E-01	?(	6.535E+00	9.72E+02	1.62E+01 G
Hg-203	F	-8.8051E-02					4.66E+01	
			279.20	-8.805E-02	(	8.931E-01	2.93E+02	8.15E+01 G
TL-208	N	1.4503E+00					6.98E+02	
			583.02	1.416E+00	(P	5.810E-01	2.09E+01	8.45E+01 G
			277.28	1.567E+00	?(	1.052E+01	1.94E+02	6.31E+00 G
			860.56	1.626E+00	?(P	5.399E+00	1.38E+02	1.24E+01 G
pm-146	C	-1.4731E-01					2.02E+03	
			747.16	-7.916E-01	&(	2.708E+00	1.45E+02	3.40E+01 G
			735.72	8.263E-01	?(	1.888E+00	9.22E+01	2.25E+01 G
			453.88	-1.790E-01	+	9.476E-01	2.13E+02	6.50E+01 G
y-88	F	3.2652E-01					1.07E+02	
			898.04	3.265E-01	?(P	8.852E-01	1.15E+02	9.37E+01 G
			1836.06	-1.704E-01	- P	1.009E+00	2.33E+02	9.92E+01 G
Cd-113m		3.1359E+03					5.33E+03	
			263.70	3.136E+03	&(	9.287E+03	8.79E+01	6.00E-03 K
Cd-109	F	4.8855E+00					4.53E+02	
			88.04	4.886E+00	?(	3.057E+01	1.87E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.0097E+00					3.28E+05	
			176.60	1.010E+00	?(	2.506E+00	9.57E+01	1.70E+01 G
			227.00	2.057E+00		7.998E+00	1.54E+02	6.30E+00 GA
Cf-249	T	-4.7744E-01					1.28E+05	
			387.95	-4.774E-01	?(	1.716E+00	1.07E+02	6.60E+01 G
			333.44	-1.759E+00	+	7.783E+00	1.31E+02	1.55E+01 G
Sn-126		2.1502E+00					3.65E+07	
			87.57	0.000E+00	-	3.203E+00	1.00E+03	3.75E+01 GA
			64.28	2.150E+00	?(	8.731E+00	1.21E+02	9.70E+00 G
			86.94	-1.250E+00	-	1.321E+01	3.14E+02	9.04E+00 GA
PB-210	N	2.5366E+00					8.14E+03	
			46.54	2.537E+00	(	2.502E+01	2.86E+02	4.25E+00 G
PB-212	N	1.9306E+00					6.98E+02	
			238.63	1.931E+00	(	1.092E+00	2.06E+01	4.33E+01 G
			300.03	1.011E-06	%	4.081E+01	1.18E+09	3.28E+00 GA
PB-214	N	4.8394E+00					5.84E+05	
			351.93	4.839E+00	*(P	1.170E+00	1.38E+01	3.76E+01 G
			295.09	8.050E-01	- P	6.645E+00	2.44E+02	1.93E+01 G
			242.00	5.349E+00	P	6.323E+00	3.82E+01	7.43E+00 GA
BI-207	C	-8.2886E-02					1.18E+04	
			569.70	-8.289E-02	(P	7.927E-01	2.58E+02	9.77E+01 G
			1063.66	-2.624E-02	% P	1.471E+00	2.39E+03	7.45E+01 G
BI-212	N	-4.8608E+00					6.98E+02	
			727.17	-4.861E+00	?(	1.442E+01	8.79E+01	7.55E+00 G
			785.42	-3.498E+01	&	9.948E+01	8.46E+01	1.28E+00 GA
U-235	N	2.2647E+00					2.57E+11	
			143.79	1.723E+00	&(P	8.950E+00	1.55E+02	1.10E+01 G
			205.33	3.220E+00	&(	8.248E+00	1.02E+02	5.01E+00 G
			163.38	2.492E+00	?(	1.194E+01	1.41E+02	5.08E+00 G
			185.72	3.271E-01	-	1.019E+00	1.20E+02	5.40E+01 GA
BI-214	N	2.3932E+00					5.84E+05	
			609.31	2.525E+00	(P	1.209E+00	2.20E+01	4.61E+01 G
			1120.29	1.736E+00	- P	8.697E+00	1.44E+02	1.51E+01 G
			1764.49	1.999E+00	?(P	8.638E+00	1.23E+02	1.54E+01 G
BI-210M	T	-5.8186E-02					1.10E+09	
			265.83	-5.819E-02	&(	1.306E+00	6.40E+02	5.00E+01 G
			304.90	0.000E+00	&	4.834E+00	1.00E+03	2.80E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N 1.3991E+00					2.10E+03	
		911.07	1.640E+00	?(	3.181E+00	8.59E+01	2.90E+01 G
		968.97	9.985E-01	?(	7.288E+00	2.08E+02	1.75E+01 G
		338.32	-2.268E+00	+	1.025E+01	1.34E+02	1.20E+01 G
		93.35	0.000E+00	-	2.000E+01	1.00E+03	5.56E+00 XA
TH-227	N -4.1670E+00					7.95E+03	
		50.14	-4.167E+00	&(	1.454E+01	1.04E+02	8.00E+00 G
		256.24	1.115E+00	+	6.485E+00	2.26E+02	7.00E+00 G
TH-229	N -5.4780E+00					2.68E+06	
		193.51	-5.478E+00	?(P	1.341E+01	1.43E+02	4.40E+00 G
		210.85	-8.033E-01	% P	1.896E+01	1.52E+03	2.99E+00 G
TH-234	N 6.0058E+00					1.63E+12	
		63.29	6.006E+00	?(	2.314E+01	1.15E+02	3.81E+00 G
		92.59	0.000E+00	-	1.998E+01	1.00E+03	5.58E+00 G
PA-231	N 8.6651E+00					1.20E+07	
		302.65	8.665E+00	?(	4.483E+01	1.54E+02	2.88E+00 G
		300.07	-1.348E-06	%	5.441E+01	1.18E+09	2.46E+00 G
PA-233	C -2.3046E-02					7.82E+08	
		312.01	-2.305E-02	%(P	3.823E+00	4.76E+03	3.60E+01 G
		300.18	5.351E-07	%	2.160E+01	1.18E+09	6.20E+00 G
PA-234	N -1.1112E+00					1.63E+12	
		131.29	-1.111E+00	?(P	5.319E+00	9.58E+01	1.80E+01 G
		946.02	1.204E+00	+	5.252E+00	1.81E+02	1.34E+01 G
		569.47	0.000E+00	+	8.863E+00	1.00E+03	8.20E+00 G
		883.24	-3.984E+00	+	1.408E+01	1.04E+02	9.60E+00 G
		880.53	4.451E+00	?	1.849E+01	1.20E+02	6.00E+00 GA
PA-234M	N -1.0299E+00					1.63E+12	
		1001.00	-1.030E+00	%(P	1.489E+02	4.47E+03	8.37E-01 G
		766.41	-5.834E+01	+	3.881E+02	1.91E+02	2.94E-01 G
AM-241	T 6.8070E-01					1.58E+05	
		59.54	6.807E-01	&(	2.504E+00	1.09E+02	3.59E+01 G
Np-237	F -1.6139E+00					2.14E+06	
		86.49	-1.614E+00	?(	8.796E+00	1.63E+02	1.31E+01 G
Ir-192	F 2.9867E-01					7.40E+01	
		316.49	2.987E-01	(	1.530E+00	1.52E+02	8.70E+01 G
		468.06	-3.448E-01	+	1.554E+00	1.31E+02	5.18E+01 G
		308.44	0.000E+00	-	4.297E+00	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F   2.9690E-01                                     1.30E+01
                          818.50 2.969E-01 ?(  9.126E-01 9.03E+01 1.00E+02 G
                         1048.07-6.191E-01 +   1.618E+00 7.79E+01 8.00E+01 G
                          340.57 0.000E+00 -   2.737E+00 1.00E+03 4.69E+01 G

Np-239   T   7.3493E-01                                     2.36E+00
                          103.70 0.000E+00 -   4.516E+00 1.00E+03 2.40E+01 X
                          106.13 7.349E-01 ?(  4.123E+00 1.67E+02 2.27E+01 G
                           99.50 0.000E+00 &   7.281E+00 1.00E+03 1.50E+01 X

Nd-147       8.0240E-01                                     1.11E+01
                          531.00 8.024E-01 ?(  3.914E+00 1.91E+02 1.30E+01 G
                           91.10 0.000E+00 -   3.966E+00 1.00E+03 2.83E+01 G

TL-210   N   6.7553E-02                                     5.84E+05
                          799.60 0.000E+00 &(  9.639E-01 1.00E+03 9.90E+01 G
                          296.00 1.522E-01 ?(  1.656E+00 3.21E+02 7.90E+01 G
                         1313.00 4.149E-01 ?   4.580E+00 4.80E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	100.	5.	0.003	286.36	2.537E+00	
TH-227	50.14	155.	-17.	-0.010	103.99	-4.167E+00	
AM-241	59.54	147.	16.	0.009	109.42	6.807E-01	
TH-234	63.29	163.	16.	0.009	114.56	6.006E+00	
Sn-126	64.28	155.	15.	0.008	120.53	2.150E+00	
BA-133	80.99	88.	13.	0.007	140.27	4.317E-01	P
Np-237	86.49	471.	-19.	-0.011	162.71	-1.614E+00	
EU-155	86.54	490.	-19.	-0.011	165.90	-6.885E-01	
Sn-126	86.94	509.	-10.	-0.006	314.08	-1.250E+00	
Cd-109	88.04	485.	17.	0.009	186.59	4.886E+00	
Np-239	106.13	348.	16.	0.009	166.99	7.349E-01	
EU-152	121.78	96.	12.	0.007	119.02	4.397E-01	
EU-154	123.10	84.	7.	0.004	188.98	1.800E-01	
PA-234	131.29	350.	-19.	-0.010	95.76	-1.111E+00	P
HF-181	133.02	369.	-19.	-0.010	146.45	-4.638E-01	
CE-144	133.54	388.	-19.	-0.010	149.97	-1.814E+00	
HF-181	136.30	406.	-19.	-0.010	153.12	-3.471E+00	
U-235	143.79	343.	17.	0.010	154.81	1.723E+00	P
CE-141	145.44	398.	-19.	-0.011	147.56	-4.452E-01	
Ba-140	162.66	137.	-18.	-0.010	148.35	-3.406E+00	P
U-235	163.38	108.	11.	0.006	141.09	2.492E+00	
CE-139	165.85	118.	-6.	-0.003	266.40	-8.564E-02	
U-235	185.72	77.	14.	0.008	120.27	3.271E-01	
TH-229	193.51	84.	-19.	-0.010	142.81	-5.478E+00	P
U-235	205.33	36.	12.	0.007	102.28	3.220E+00	
EU-152	244.69	239.	-17.	-0.010	127.55	-3.489E+00	
TH-227	256.24	32.	5.	0.003	225.98	1.115E+00	
Cd-113m	263.70	48.	12.	0.007	87.87	3.136E+03	
BI-210M	265.83	67.	-2.	-0.001	640.43	-5.819E-02	
Hg-203	279.20	78.	-4.	-0.002	292.81	-8.805E-02	
I-131	284.30	64.	-13.	-0.007	123.64	-3.548E+00	
TL-210	296.00	247.	7.	0.004	320.75	1.522E-01	
PA-231	302.65	233.	14.	0.008	153.56	8.665E+00	
BA-133	302.85	247.	7.	0.004	324.43	6.588E-01	
Ir-192	316.49	233.	14.	0.008	152.05	2.987E-01	
CR-51	320.08	86.	-14.	-0.008	94.45	-2.643E+00	
La-140	328.76	142.	6.	0.003	309.89	5.018E-01	
Cf-249	333.44	176.	-15.	-0.008	131.26	-1.759E+00	
AC-228	338.32	180.	-14.	-0.008	134.10	-2.268E+00	
EU-152	344.29	96.	10.	0.006	143.37	7.154E-01	
HF-181	345.83	184.	-10.	-0.006	196.18	-1.262E+00	
BA-133	356.00	184.	-15.	-0.008	132.14	-4.676E-01	
I-131	364.48	40.	-11.	-0.006	114.04	-2.776E-01	P
BA-133	383.84	109.	-16.	-0.009	80.71	-3.749E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	387.95	123.	-15.	-0.008	106.79	-4.774E-01	
SN-113	391.69	97.	12.	0.007	119.10	3.943E-01	P
pm-146	453.88	26.	-5.	-0.003	212.92	-1.790E-01	
Ir-192	468.06	44.	-8.	-0.004	130.98	-3.448E-01	
BE-7	477.60	34.	8.	0.005	103.55	1.924E+00	
HF-181	482.00	63.	-12.	-0.007	99.04	-3.589E-01	
La-140	487.02	67.	-2.	-0.001	466.45	-1.343E-01	
RU-103	497.05	13.	8.	0.004	98.56	2.187E-01	
RH-106	511.86	42.	70.	0.039	26.99	8.885E+00	
Nd-147	531.00	13.	4.	0.002	190.67	8.024E-01	
Ba-140	537.26	30.	-9.	-0.005	124.82	-1.007E+00	
CS-134	563.24	19.	6.	0.004	150.07	2.065E+00	
CS-134	569.32	19.	7.	0.004	91.14	1.309E+00	
BI-207	569.70	30.	-3.	-0.002	257.73	-8.289E-02	P
I-131	636.97	15.	4.	0.002	148.30	1.641E+00	P
AG-110M	657.76	17.	7.	0.004	96.19	2.162E-01	P
CS-137	661.66	22.	4.	0.002	174.51	1.432E-01	P
PM-144	696.54	35.	3.	0.002	296.61	9.303E-02	P
NB-94	702.63	38.	6.	0.003	150.60	1.974E-01	P
SB-124	722.79	33.	-3.	-0.001	309.23	-8.094E-01	
EU-154	723.36	21.	7.	0.004	97.85	1.160E+00	
BI-212	727.17	42.	-11.	-0.006	87.90	-4.861E+00	
pm-146	735.72	5.	6.	0.003	92.23	8.263E-01	
pm-146	747.16	28.	-8.	-0.004	144.70	-7.916E-01	
ZR-95	756.73	25.	-8.	-0.005	111.60	-5.082E-01	P
AG-110M	763.94	20.	5.	0.003	134.16	7.679E-01	
NB-95	765.79	30.	5.	0.003	173.21	1.603E-01	
PA-234M	766.41	43.	-5.	-0.003	190.79	-5.834E+01	
EU-152	778.92	5.	6.	0.003	95.70	1.533E+00	
BI-212	785.42	52.	-13.	-0.007	84.63	-3.498E+01	
CS-134	801.95	36.	-8.	-0.004	111.80	-3.269E+00	
CO-58	810.78	40.	-12.	-0.006	82.51	-4.176E-01	
La-140	815.77	37.	8.	0.004	112.00	1.252E+00	
Cs-136	818.50	24.	8.	0.005	90.29	2.969E-01	
MN-54	834.85	35.	-12.	-0.007	112.17	-4.395E-01	
Co-56	846.77	15.	-1.	-0.001	857.32	-3.705E-02	
NB-94	871.10	6.	6.	0.003	72.37	2.259E-01	
PA-234	880.53	32.	7.	0.004	120.37	4.451E+00	
PA-234	883.24	49.	-10.	-0.006	103.92	-3.984E+00	
Sc-46	889.28	57.	-10.	-0.006	109.75	-3.909E-01	
y-88	898.04	16.	8.	0.004	115.20	3.265E-01	P
AC-228	911.07	20.	12.	0.007	85.91	1.640E+00	
AG-110M	937.49	20.	-5.	-0.003	201.66	-5.829E-01	
PA-234	946.02	10.	4.	0.002	180.85	1.204E+00	
EU-152	964.11	22.	11.	0.006	68.79	3.015E+00	
AC-228	968.97	37.	4.	0.002	207.87	9.985E-01	
EU-154	996.33	32.	-1.	-0.001	806.23	-3.962E-01	
EU-154	1004.77	21.	-2.	-0.001	454.68	-5.478E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1037.84	0.	9.	0.005	34.86	2.690E+00		P
Cs-136	1048.07	33.	-11.	-0.006	77.93	-6.191E-01		
Ga-68	1077.40	16.	1.	0.001	914.69	1.578E+00		
EU-152	1112.07	41.	4.	0.002	220.71	1.409E+00		P
Sc-46	1120.55	47.	-2.	-0.001	579.52	-7.751E-02		
CO-60	1173.24	22.	-9.	-0.005	93.64	-4.238E-01		P
Ta-182	1189.05	17.	1.	0.001	972.11	2.981E-01		
Ta-182	1221.41	23.	-3.	-0.001	423.16	-4.873E-01		
Co-56	1238.28	6.	15.	0.008	44.86	1.153E+00		P
NA-22	1274.53	11.	5.	0.003	112.03	2.384E-01		
TL-210	1313.00	11.	2.	0.001	480.00	4.149E-01		
CO-60	1332.50	6.	7.	0.004	91.28	3.604E-01		P
Co-56	1771.35	19.	2.	0.001	298.73	9.116E-01		
y-88	1836.06	6.	-2.	-0.001	232.58	-1.704E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.9240E+00	1.9240E+00	1.036E+02%	6.81E+00
NA-22	#A	2.3836E-01	2.3836E-01	1.120E+02%	9.40E-01
K-40		1.6217E+02	1.6217E+02	5.881E+00%	8.20E+00
Sc-46	#A	-3.9095E-01	-3.9095E-01	1.098E+02%	1.46E+00
CR-51	#A	-2.6430E+00	-2.6430E+00	9.445E+01%	8.40E+00
MN-54	#A	-4.3954E-01	-4.3954E-01	1.122E+02%	1.11E+00
FE-59	#	9.6254E-01	9.6254E-01	2.903E+01%	5.92E-01
Co-56	#A	6.1351E-01	6.1351E-01	3.486E+01%	7.69E-01
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.26E-01
CO-58	#A	-4.1762E-01	-4.1762E-01	8.251E+01%	1.16E+00
CO-60	#A	3.6041E-01	3.6041E-01	9.128E+01%	7.46E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.08E+00
NB-94	#A	2.1182E-01	2.1182E-01	7.237E+01%	1.03E+00
ZR-95	#A	-5.0818E-01	-5.0818E-01	1.116E+02%	1.63E+00
NB-95	#A	1.6031E-01	1.6031E-01	1.732E+02%	9.75E-01
RU-103	#A	2.1870E-01	2.1870E-01	9.856E+01%	5.33E-01
RH-106	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.57E+01
AG-108M	#	4.8969E-01	4.8969E-01	3.123E+01%	3.09E-01
AG-110M	#A	1.9814E-01	1.9814E-01	9.619E+01%	1.79E+00
SN-113	#A	3.9428E-01	3.9429E-01	1.191E+02%	1.59E+00
SB-124	#A	-8.6229E-03	-8.6229E-03	3.037E+03%	1.56E+00
SB-125	#	1.3181E+00	1.3181E+00	4.052E+01%	1.24E+00
I-131	#A	-1.2283E-01	-1.2283E-01	9.354E+01%	7.88E-01
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	3.66E+00
Ga-68	#A	1.5719E+00	1.5778E+00	9.147E+02%	3.37E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+00

BA-133 #A	-2.1077E-01	-2.1077E-01	1.321E+02%	2.08E+00
CS-134 #A	1.8066E-01	1.8066E-01	9.114E+01%	1.57E+00
CS-137 #A	1.4324E-01	1.4324E-01	1.745E+02%	8.85E-01
CE-139 #A	-8.5640E-02	-8.5640E-02	2.664E+02%	7.82E-01
Ba-140 #A	-1.0065E+00	-1.0065E+00	1.248E+02%	3.06E+00
La-140 #A	2.7332E-01	2.7332E-01	1.120E+02%	4.73E-01
CE-141 #A	-4.4516E-01	-4.4516E-01	1.476E+02%	2.20E+00
CE-144 #A	-1.8138E+00	-1.8138E+00	1.500E+02%	9.12E+00
PM-144 #A	9.3029E-02	9.3029E-02	2.966E+02%	9.77E-01
EU-152 #A	1.1907E+00	1.1907E+00	6.239E+01%	3.49E+00
EU-154 #A	4.2023E-01	4.2023E-01	9.785E+01%	4.35E+00
EU-155 #A	-1.6427E-02	-1.6427E-02	5.389E+03%	5.10E+00
HF-181 #A	-3.5890E-01	-3.5891E-01	9.904E+01%	1.20E+00
Ta-182 #A	1.3961E-01	1.3961E-01	9.721E+02%	4.55E+00
Hg-203 #A	-8.8050E-02	-8.8051E-02	2.928E+02%	8.93E-01
TL-208	1.4503E+00	1.4503E+00	2.085E+01%	5.81E-01
pm-146 #A	-1.4731E-01	-1.4731E-01	8.580E+01%	2.71E+00
y-88 #A	3.2652E-01	3.2652E-01	1.152E+02%	8.85E-01
Cd-113m#A	3.1359E+03	3.1359E+03	8.787E+01%	9.29E+03
Cd-109 #A	4.8855E+00	4.8855E+00	1.866E+02%	3.06E+01
Cf-251 A	1.0097E+00	1.0097E+00	9.569E+01%	2.51E+00
Cf-249 #A	-4.7744E-01	-4.7744E-01	1.068E+02%	1.72E+00
Sn-126 #A	2.1502E+00	2.1502E+00	1.205E+02%	8.73E+00
PB-210 #A	2.5366E+00	2.5366E+00	2.864E+02%	2.50E+01
PB-212	1.9306E+00	1.9306E+00	2.060E+01%	1.09E+00
PB-214 #	4.8394E+00	4.8394E+00	1.381E+01%	1.17E+00
BI-207 #A	-8.2886E-02	-8.2886E-02	2.577E+02%	7.93E-01
BI-212 #A	-4.8608E+00	-4.8608E+00	8.790E+01%	1.44E+01
U-235 #A	2.2647E+00	2.2647E+00	7.770E+01%	8.95E+00
BI-214	2.3932E+00	2.3932E+00	2.200E+01%	1.21E+00
BI-210M#A	-5.8186E-02	-5.8186E-02	6.404E+02%	1.31E+00
AC-228 #A	1.3991E+00	1.3991E+00	8.591E+01%	3.18E+00
TH-227 #A	-4.1670E+00	-4.1670E+00	1.040E+02%	1.45E+01
TH-229 #A	-5.4780E+00	-5.4780E+00	1.428E+02%	1.34E+01
TH-234 #A	6.0058E+00	6.0058E+00	1.146E+02%	2.31E+01
PA-231 #A	8.6651E+00	8.6651E+00	1.536E+02%	4.48E+01
PA-233 #A	-2.3046E-02	-2.3046E-02	4.757E+03%	3.82E+00
PA-234 #A	-1.1112E+00	-1.1112E+00	9.576E+01%	5.32E+00
PA-234M#A	-1.0299E+00	-1.0299E+00	4.466E+03%	1.49E+02
AM-241 #A	6.8070E-01	6.8070E-01	1.094E+02%	2.50E+00
Np-237 #A	-1.6139E+00	-1.6139E+00	1.627E+02%	8.80E+00
Ir-192 #A	2.9867E-01	2.9867E-01	1.520E+02%	1.53E+00
Cs-136 #A	2.9690E-01	2.9690E-01	9.029E+01%	9.13E-01
Np-239 #A	7.3488E-01	7.3493E-01	1.670E+02%	4.12E+00
Nd-147 #A	8.0238E-01	8.0240E-01	1.907E+02%	3.91E+00
TL-210 #A	6.7553E-02	6.7553E-02	3.208E+02%	9.64E-01

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   25.1 to  1999.3 keV)     1.728E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.3 keV) 1.7277965E+02  Bq/Sample
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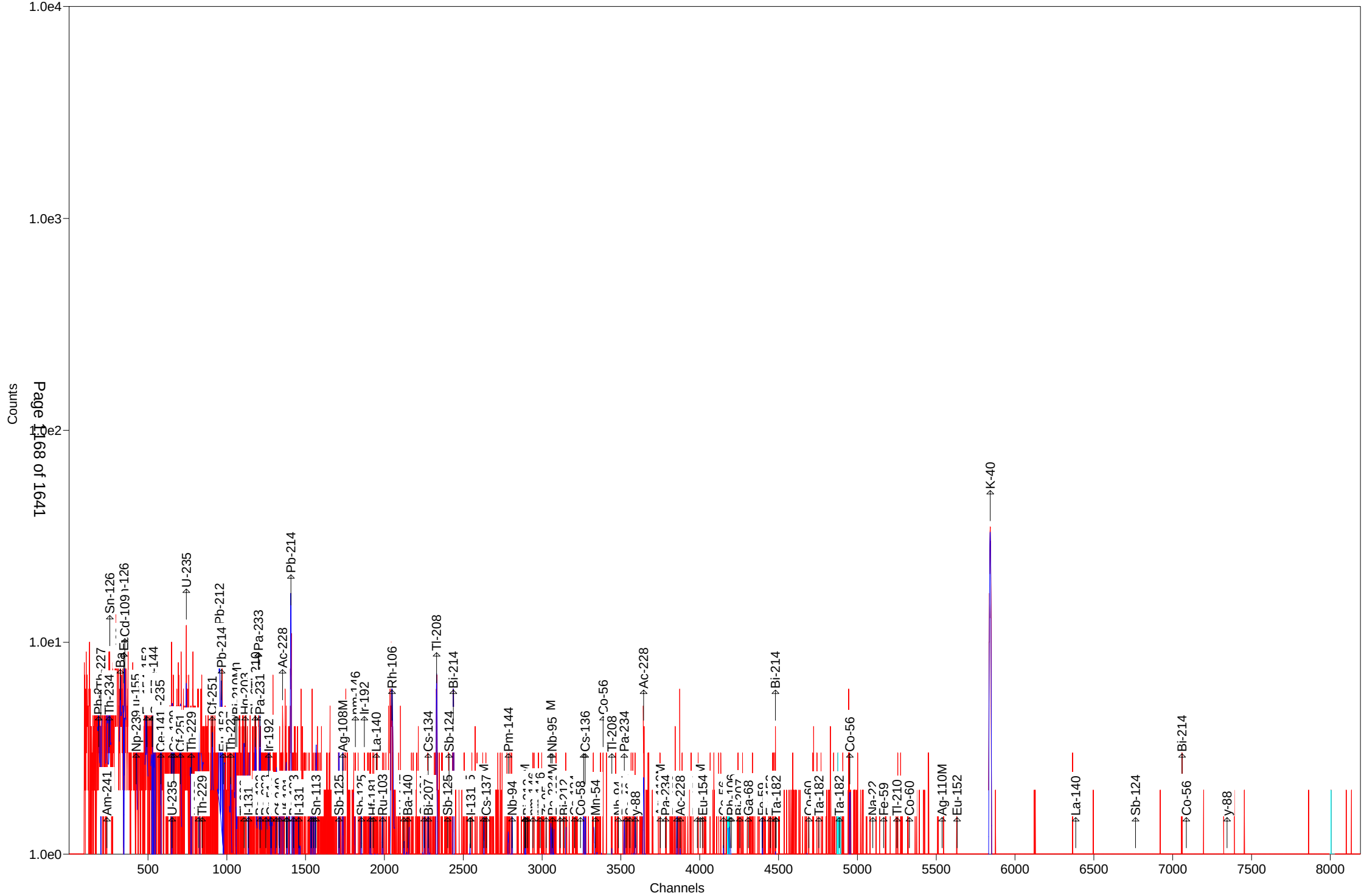
376765_Gamma_160-29521-B-15-C. 9_Gamma_20183373.spc.



Prep Batch: 376766

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: MB 160-376766/1-A Analyzed: 08/09/18 18:41 Ts: 60 Sigma: 2
Client ID: Detector: GV12 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.007379	0.0129	0.0129	U	pCi/g		0.943	381202
Radium-226	-0.1116	0.141	0.141	U	pCi/g	1.00	0.340	381202
Radium-228	0.1581	0.0877	0.0892		pCi/g		0.0966	381202
Thallium-208	-0.008553	0.0778	0.0778	U	pCi/g		0.0967	381202
Thorium-232	0.1581	0.0877	0.0892		pCi/g		0.0966	381202
Thorium-234	0.1703	0.697	0.697	U	pCi/g		1.16	381202
Uranium-235	-0.02816	0.137	0.137	U	pCi/g		0.612	381202
Uranium-238	0.1703	0.697	0.697	U	pCi/g		1.16	381202
Actinium-228	0.1581	0.0877	0.0892		pCi/g		0.0966	381202
Bismuth-212	-0.05670	0.691	0.691	U	pCi/g		1.24	381202
Bismuth-214	-0.1116	0.141	0.141	U	pCi/g		0.340	381202
Lead-210	0.3549	0.868	0.869	U	pCi/g		1.34	381202
Lead-212	0.01741	0.0979	0.0979	U	pCi/g		0.135	381202
Lead-214	0.05431	0.0885	0.0886	U	pCi/g		0.131	381202
Potassium-40	0.1534	1.06	1.06	U	pCi/g		1.15	381202
Protactinium-231	0.0000	0.736	0.736	U	pCi/g		4.06	381202

Lab ID: LCS 160-376766/2-A Analyzed: 08/09/18 18:42 Ts: 60 Sigma: 2
Client ID: Detector: GV14 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	96.39	1.19	10.1		pCi/g		0.833	381203
Cesium-137	29.15	0.686	3.11		pCi/g		0.271	381203
Cobalt-60	21.48	0.481	2.21		pCi/g		0.139	381203

Lab ID: 160-29527-A-1-B DU Analyzed: 08/09/18 20:40 Ts: 60 Sigma: 2
Client ID: Detector: GV12 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.8400	2.74	2.74	U	pCi/g		4.54	381202
Radium-226	42.29	1.16	4.46		pCi/g	1.00	0.553	381202
Radium-228	1.495	0.649	0.667		pCi/g		0.902	381202
Thallium-208	0.5924	0.215	0.224		pCi/g		0.219	381202
Thorium-232	1.495	0.649	0.667		pCi/g		0.902	381202
Thorium-234	0.7887	5.08	5.08	U	pCi/g		8.43	381202
Uranium-235	0.5014	1.08	1.08	U	pCi/g		3.64	381202

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: 160-29527-A-1-B DU | Analyzed: 08/09/18 20:40 | Ts: 60 | Sigma: 2
Client ID: | Detector: GV12 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	0.7887	5.08	5.08	U	pCi/g		8.43	381202
Actinium-228	1.495	0.649	0.667		pCi/g		0.902	381202
Bismuth-212	-1.458	2.78	2.79	U	pCi/g		4.64	381202
Bismuth-214	42.29	1.16	4.46		pCi/g		0.553	381202
Lead-210	25.82	3.88	5.04		pCi/g		4.41	381202
Lead-212	1.212	0.271	0.299		pCi/g		0.397	381202
Lead-214	44.84	0.933	4.64		pCi/g		0.666	381202
Potassium-40	1.094	2.74	2.74	U	pCi/g		2.76	381202
Protactinium-231	0.0000	2.71	2.71	U	pCi/g		27.2	381202

Lab ID: 160-29521-16 | Analyzed: 08/10/18 01:27 | Ts: 60 | Sigma: 2
Client ID: CRC-B18-0204 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.299	0.548	0.549	U	pCi/g		0.944	381549
Radium-226	1.54	0.255	0.301		pCi/g	1.00	0.205	381549
Radium-228	1.08	0.236	0.260		pCi/g		0.169	381549
Thallium-208	0.347	0.0884	0.0955		pCi/g		0.0751	381549
Thorium-232	1.08	0.236	0.260		pCi/g		0.169	381549
Thorium-234	1.11	0.576	0.587	U	pCi/g		1.53	381549
Uranium-235	0.214	0.455	0.455	U	pCi/g		0.812	381549
Uranium-238	1.11	0.576	0.587	U	pCi/g		1.53	381549
Actinium-228	1.08	0.236	0.260		pCi/g		0.169	381549
Bismuth-212	-0.0644	1.04	1.04	U	pCi/g		1.86	381549
Bismuth-214	1.54	0.255	0.301		pCi/g		0.205	381549
Lead-210	1.51	1.08	1.10		pCi/g		1.50	381549
Lead-212	0.863	0.138	0.177		pCi/g		0.154	381549
Lead-214	1.57	0.199	0.257		pCi/g		0.167	381549
Potassium-40	11.4	1.70	2.06		pCi/g		0.889	381549
Protactinium-231	0.000	0.734	0.734	U	pCi/g		6.14	381549

Lab ID: 160-29521-17 | Analyzed: 08/09/18 19:21 | Ts: 30 | Sigma: 2
Client ID: CRC-B18-0608 | Detector: GV8 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.578	1.24	1.24	U	pCi/g		2.08	381210

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: 160-29521-17 Analyzed: 08/09/18 19:21 Ts: 30 Sigma: 2
Client ID: CRC-B18-0608 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.54	0.265	0.310		pCi/g	1.00	0.164	381210
Radium-228	0.758	0.242	0.254		pCi/g		0.414	381210
Thallium-208	0.369	0.0975	0.105		pCi/g		0.0732	381210
Thorium-232	0.758	0.242	0.254		pCi/g		0.414	381210
Thorium-234	0.997	0.989	0.995	U	pCi/g		2.94	381210
Uranium-235	0.221	0.836	0.836	U	pCi/g		1.60	381210
Uranium-238	0.997	0.989	0.995	U	pCi/g		2.94	381210
Actinium-228	0.758	0.242	0.254		pCi/g		0.414	381210
Bismuth-212	0.407	1.21	1.21	U	pCi/g		2.10	381210
Bismuth-214	1.54	0.265	0.310		pCi/g		0.164	381210
Lead-210	-1.68	2.27	2.28	U	pCi/g		5.71	381210
Lead-212	0.932	0.164	0.203		pCi/g		0.172	381210
Lead-214	1.56	0.261	0.307		pCi/g		0.178	381210
Potassium-40	13.4	2.16	2.56		pCi/g		0.947	381210
Protactinium-231	-1.37	5.10	5.10	U	pCi/g		8.56	381210

Lab ID: 160-29521-18 Analyzed: 08/09/18 20:02 Ts: 30 Sigma: 2
Client ID: CRC-B18-0809 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.243	0.647	0.647	U	pCi/g		1.75	381210
Radium-226	0.719	0.190	0.205		pCi/g	1.00	0.159	381210
Radium-228	0.526	0.156	0.165		pCi/g		0.303	381210
Thallium-208	0.231	0.0666	0.0707		pCi/g		0.0475	381210
Thorium-232	0.526	0.156	0.165		pCi/g		0.303	381210
Thorium-234	0.730	0.643	0.648	U	pCi/g		1.90	381210
Uranium-235	-0.0672	0.971	0.971	U	pCi/g		1.02	381210
Uranium-238	0.730	0.643	0.648	U	pCi/g		1.90	381210
Actinium-228	0.526	0.156	0.165		pCi/g		0.303	381210
Bismuth-212	-0.101	1.05	1.05	U	pCi/g		1.90	381210
Bismuth-214	0.719	0.190	0.205		pCi/g		0.159	381210
Lead-210	0.901	1.82	1.82	U	pCi/g		3.05	381210
Lead-212	0.465	0.112	0.127		pCi/g		0.126	381210
Lead-214	1.05	0.171	0.203		pCi/g		0.174	381210
Potassium-40	12.2	1.93	2.30		pCi/g		0.823	381210
Protactinium-231	0.000	0.685	0.685	U	pCi/g		6.21	381210

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: 160-29521-19 Analyzed: 08/09/18 20:33 Ts: 30 Sigma: 2
Client ID: CRC-B19-0204 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.299	0.974	0.975	U	pCi/g		1.50	381208
Radium-226	1.39	0.265	0.302		pCi/g	1.00	0.172	381208
Radium-228	1.02	0.304	0.321		pCi/g		0.279	381208
Thallium-208	0.327	0.0827	0.0893		pCi/g		0.0379	381208
Thorium-232	1.02	0.304	0.321		pCi/g		0.279	381208
Thorium-234	1.16	0.688	0.699	U	pCi/g		2.04	381208
Uranium-235	0.0452	0.168	0.168	U	pCi/g		0.956	381208
Uranium-238	1.16	0.688	0.699	U	pCi/g		2.04	381208
Actinium-228	1.02	0.304	0.321		pCi/g		0.279	381208
Bismuth-212	0.665	1.39	1.39	U	pCi/g		2.36	381208
Bismuth-214	1.39	0.265	0.302		pCi/g		0.172	381208
Lead-210	-0.567	2.06	2.06	U	pCi/g		3.12	381208
Lead-212	0.941	0.156	0.198		pCi/g		0.144	381208
Lead-214	1.44	0.200	0.250		pCi/g		0.175	381208
Potassium-40	11.4	2.25	2.54		pCi/g		1.46	381208
Protactinium-231	1.05	3.27	3.27	U	pCi/g		5.53	381208

Lab ID: 160-29521-20 Analyzed: 08/09/18 20:28 Ts: 30 Sigma: 2
Client ID: CRC-B19-0810 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.294	1.16	1.16	U	pCi/g		1.96	381209
Radium-226	1.78	0.258	0.318		pCi/g	1.00	0.124	381209
Radium-228	1.08	0.274	0.296		pCi/g		0.124	381209
Thallium-208	0.384	0.105	0.113		pCi/g		0.0933	381209
Thorium-232	1.08	0.274	0.296		pCi/g		0.124	381209
Thorium-234	0.230	1.98	1.98	U	pCi/g		3.35	381209
Uranium-235	0.261	0.513	0.514	U	pCi/g		1.01	381209
Uranium-238	0.230	1.98	1.98	U	pCi/g		3.35	381209
Actinium-228	1.08	0.274	0.296		pCi/g		0.124	381209
Bismuth-212	-0.344	1.26	1.26	U	pCi/g		2.17	381209
Bismuth-214	1.78	0.258	0.318		pCi/g		0.124	381209
Lead-210	-0.315	2.41	2.41	U	pCi/g		4.13	381209
Lead-212	0.725	0.144	0.172		pCi/g		0.179	381209
Lead-214	1.97	0.235	0.312		pCi/g		0.188	381209
Potassium-40	15.0	2.09	2.60		pCi/g		0.812	381209

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: 160-29521-20 Analyzed: 08/09/18 20:28 Ts: 30 Sigma: 2
Client ID: CRC-B19-0810 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	0.887	3.15	3.15	U	pCi/g		7.05	381209

Lab ID: 160-29521-21 Analyzed: 08/09/18 20:35 Ts: 30 Sigma: 2
Client ID: CRC-B19-1618 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.181	0.868	0.868	U	pCi/g		1.48	381210
Radium-226	0.362	0.144	0.149		pCi/g	1.00	0.138	381210
Radium-228	0.404	0.231	0.234		pCi/g		0.221	381210
Thallium-208	0.101	0.0642	0.0650		pCi/g		0.0754	381210
Thorium-232	0.404	0.231	0.234		pCi/g		0.221	381210
Thorium-234	1.18	0.806	0.816	U	pCi/g		1.92	381210
Uranium-235	-0.266	0.315	0.316	U	pCi/g		0.973	381210
Uranium-238	1.18	0.806	0.816	U	pCi/g		1.92	381210
Actinium-228	0.404	0.231	0.234		pCi/g		0.221	381210
Bismuth-212	0.379	1.28	1.28	U	pCi/g		2.21	381210
Bismuth-214	0.362	0.144	0.149		pCi/g		0.138	381210
Lead-210	0.681	1.42	1.43	U	pCi/g		2.40	381210
Lead-212	0.257	0.0997	0.105		pCi/g		0.136	381210
Lead-214	0.586	0.125	0.139		pCi/g		0.119	381210
Potassium-40	10.5	1.76	2.06		pCi/g		0.798	381210
Protactinium-231	-0.212	3.22	3.22	U	pCi/g		5.49	381210

Lab ID: 160-29521-22 Analyzed: 08/09/18 20:36 Ts: 30 Sigma: 2
Client ID: CRC-B19-2224 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.169	0.760	0.760	U	pCi/g		1.29	381204
Radium-226	0.524	0.126	0.138		pCi/g	1.00	0.104	381204
Radium-228	0.288	0.175	0.177		pCi/g		0.200	381204
Thallium-208	0.152	0.0601	0.0621		pCi/g		0.0543	381204
Thorium-232	0.288	0.175	0.177		pCi/g		0.200	381204
Thorium-234	0.289	1.25	1.25	U	pCi/g		2.13	381204
Uranium-235	-0.0317	0.0410	0.0411	U	pCi/g		0.971	381204
Uranium-238	0.289	1.25	1.25	U	pCi/g		2.13	381204
Actinium-228	0.288	0.175	0.177		pCi/g		0.200	381204

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Lab ID: 160-29521-22 Analyzed: 08/09/18 20:36 Ts: 30 Sigma: 2
Client ID: CRC-B19-2224 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Bismuth-212	-0.0108	0.697	0.697	U	pCi/g		1.25	381204
Bismuth-214	0.524	0.126	0.138		pCi/g		0.104	381204
Lead-210	0.659	1.42	1.43	U	pCi/g		2.40	381204
Lead-212	0.326	0.0768	0.0876		pCi/g		0.0835	381204
Lead-214	0.488	0.122	0.132		pCi/g		0.101	381204
Potassium-40	13.5	1.60	2.12		pCi/g		0.695	381204
Protactinium-231	0.000	0.504	0.504	U	pCi/g		4.11	381204

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-376766/1-A	Actinium-227			-0.007379	U	pCi/g							-1.14108817
MB 160-376766/1-A	Radium-226			-0.1116	U	pCi/g							-1.58223827
MB 160-376766/1-A	Radium-228			0.1581		pCi/g							3.54680715
MB 160-376766/1-A	Thallium-208			-0.008553	U	pCi/g							-.21984624
MB 160-376766/1-A	Thorium-232			0.1581		pCi/g							3.54680715
MB 160-376766/1-A	Thorium-234			0.1703	U	pCi/g							.48849191
MB 160-376766/1-A	Uranium-235			-0.02816	U	pCi/g							-.41143415
MB 160-376766/1-A	Uranium-238			0.1703	U	pCi/g							.48849191
MB 160-376766/1-A	Actinium-228			0.1581		pCi/g							3.54680715
MB 160-376766/1-A	Bismuth-212			-0.05670	U	pCi/g							-.16411611
MB 160-376766/1-A	Bismuth-214			-0.1116	U	pCi/g							-1.58223827
MB 160-376766/1-A	Lead-210			0.3549	U	pCi/g							.8170798
MB 160-376766/1-A	Lead-212			0.01741	U	pCi/g							.3554617
MB 160-376766/1-A	Lead-214			0.05431	U	pCi/g							1.22541654
MB 160-376766/1-A	Potassium-40			0.1534	U	pCi/g							.28864443
MB 160-376766/1-A	Protactinium-231			0.0000	U	pCi/g							.

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-376766/2-A	Americium-241		100	96.39		pCi/g	96	87 - 116					-1.143082297
LCS 160-376766/2-A	Cesium-137		32.3	29.15		pCi/g	90	87 - 120					-.9367163578
LCS 160-376766/2-A	Cobalt-60		23.3	21.48		pCi/g	92	87 - 115					-1.212835256

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29527-A-1-B DU	Actinium-227	-1.03		0.8400	U	pCi/g			1983	0.32	0.92	1	
160-29527-A-1-B DU	Radium-226	42.4		42.29		pCi/g			0.2	0.01	0.03	1	
160-29527-A-1-B DU	Radium-228	1.51		1.495		pCi/g			1	0.01	0.04	1	
160-29527-A-1-B DU	Thallium-208	0.501		0.5924		pCi/g			17	0.16	0.44	1	
160-29527-A-1-B DU	Thorium-232	1.51		1.495		pCi/g			1	0.01	0.04	1	
160-29527-A-1-B DU	Thorium-234	-0.715		0.7887	U	pCi/g			4099	0.14	0.41	1	
160-29527-A-1-B DU	Uranium-235	0.222		0.5014	U	pCi/g			77	0.15	0.42	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 376766

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29527-A-1-B DU	Uranium-238	-0.715		0.7887	U	pCi/g			4099	0.14	0.41	1	
160-29527-A-1-B DU	Actinium-228	1.51		1.495		pCi/g			1	0.01	0.04	1	
160-29527-A-1-B DU	Bismuth-212	0.000		-1.458	U	pCi/g			200	0.34	0.92	1	
160-29527-A-1-B DU	Bismuth-214	42.4		42.29		pCi/g			0.2	0.01	0.03	1	
160-29527-A-1-B DU	Lead-210	22.8		25.82		pCi/g			12	0.32	0.91	1	
160-29527-A-1-B DU	Lead-212	1.24		1.212		pCi/g			2	0.04	0.12	1	
160-29527-A-1-B DU	Lead-214	45.6		44.84		pCi/g			2	0.08	0.24	1	
160-29527-A-1-B DU	Potassium-40	-0.540		1.094	U	pCi/g			590	0.27	0.75	1	
160-29527-A-1-B DU	Protactinium-231	-3.76		0.0000	U	pCi/g			200	0.18	0.41	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29521-1

SDG No.:

Batch Number: 376766 Batch Start Date: 07/19/18 18:22 Batch Analyst: Small, Sean J

Batch Method: Fill_Geo-21 Batch End Date: 07/19/18 18:42

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-376766/1		Fill_Geo-21, 901.1				146.6 g	7/19/18 18:35	8/9/18	100mL Solid
LCS 160-376766/2		Fill_Geo-21, 901.1				166.06 g	7/19/18 18:35	8/9/18	100mL Solid
160-29527-A-1 DU		Fill_Geo-21, 901.1	T	37.8 g	161.1 g	123.3 g	7/19/18 18:35	8/9/18	100mL Solid
160-29521-A-16-B	CRC-B18-0204	Fill_Geo-21, 901.1	T	38.0 g	188.9 g	150.9 g	7/19/18 18:35	8/9/18	100mL Solid
160-29521-B-17-B	CRC-B18-0608	Fill_Geo-21, 901.1	T	46.6 g	318.9 g	272.3 g	7/19/18 18:35	8/9/18	tuna can
160-29521-A-18-A	CRC-B18-0809	Fill_Geo-21, 901.1	T	46.4 g	359.8 g	313.4 g	7/19/18 18:35	8/9/18	tuna can
160-29521-A-19-A	CRC-B19-0204	Fill_Geo-21, 901.1	T	46.8 g	360.1 g	313.3 g	7/19/18 18:35	8/9/18	tuna can
160-29521-B-20-A	CRC-B19-0810	Fill_Geo-21, 901.1	T	47.0 g	320.5 g	273.5 g	7/19/18 18:35	8/9/18	tuna can
160-29521-A-21-B	CRC-B19-1618	Fill_Geo-21, 901.1	T	46.4 g	369.8 g	323.4 g	7/19/18 18:35	8/9/18	tuna can
160-29521-A-22-A	CRC-B19-2224	Fill_Geo-21, 901.1	T	46.7 g	365.9 g	319.2 g	7/19/18 18:35	8/9/18	tuna can

Lab Sample ID	Client Sample ID	Method Chain	Basis	100mL Solid 00011					
MB 160-376766/1		Fill_Geo-21, 901.1							
LCS 160-376766/2		Fill_Geo-21, 901.1		# mL					
160-29527-A-1 DU		Fill_Geo-21, 901.1	T						
160-29521-A-16-B	CRC-B18-0204	Fill_Geo-21, 901.1	T						
160-29521-B-17-B	CRC-B18-0608	Fill_Geo-21, 901.1	T						
160-29521-A-18-A	CRC-B18-0809	Fill_Geo-21, 901.1	T						
160-29521-A-19-A	CRC-B19-0204	Fill_Geo-21, 901.1	T						
160-29521-B-20-A	CRC-B19-0810	Fill_Geo-21, 901.1	T						
160-29521-A-21-B	CRC-B19-1618	Fill_Geo-21, 901.1	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29521-1

SDG No.:

Batch Number: 376766 Batch Start Date: 07/19/18 18:22 Batch Analyst: Small, Sean J

Batch Method: Fill_Geo-21 Batch End Date: 07/19/18 18:42

Lab Sample ID	Client Sample ID	Method Chain	Basis	100mL Solid 00011					
160-29521-A-22-A	CRC-B19-2224	Fill_Geo-21, 901.1	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 12_Gamma_20181356

Sample Description: 376766_Gamma_MB 160-376766~1-A
Detector: Detector #12
Batch ID: 376766
Work Order Number: Gamma
Lot Number: MB 160-376766~1-A

Decay to Time: 8/9/2018 18:41 Live Time: 3600 sec
Acquisition Time: 8/9/2018 18:41:16 Real Time: 3602 sec
Analysis Time: 8/9/2018 19:41 Dead Time: 0.04 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_100mL.Clb
Efficiency Cal Desc: 12_100mlSolid_108513
Efficiency Cal Date: 4/20/2018 13:00
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-07-14_1810.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.187E+00	107.0	1.271E+00	1.272E+00	4.322E+00
NA-22	1.862E-01	37.8	7.037E-02	7.098E-02	1.960E-01
K-40	8.321E-01	346.4	2.882E+00	2.883E+00	6.235E+00
Sc-46	-1.351E-02	1039.2	1.404E-01	1.404E-01	5.142E-01
CR-51	-1.473E+00	166.8	2.456E+00	2.457E+00	8.250E+00
MN-54	1.085E-01	91.9	9.970E-02	9.985E-02	2.469E-01
FE-59	9.805E-02	324.8	3.185E-01	3.185E-01	7.535E-01
Co-56	1.632E-01	118.5	1.934E-01	1.936E-01	4.602E-01
CO-57	0.000E+00	1.#INF	1.900E-02	1.900E-02	2.877E-01
CO-58	-2.579E-01	83.2	2.146E-01	2.150E-01	7.201E-01
CO-60	1.221E-01	44.7	5.459E-02	5.492E-02	3.799E-01
ZN-65	0.000E+00	1.#INF	4.745E-02	4.745E-02	1.040E+00
NB-94	-5.199E-02	378.6	1.968E-01	1.969E-01	4.743E-01
ZR-95	1.098E-02	2755.0	3.026E-01	3.026E-01	7.528E-01
NB-95	-2.590E-01	70.0	1.814E-01	1.819E-01	6.026E-01
RU-103	2.853E-02	484.8	1.383E-01	1.383E-01	3.643E-01
RH-106	2.582E+00	74.5	1.923E+00	1.928E+00	7.614E+00
AG-108M	1.028E-01	134.2	1.380E-01	1.381E-01	3.517E-01
AG-110M	1.103E-01	82.3	9.081E-02	9.098E-02	6.957E-01
SN-113	-1.449E-01	161.5	2.340E-01	2.341E-01	7.991E-01
SB-124	2.720E-01	37.8	1.028E-01	1.037E-01	7.541E-01
SB-125	7.452E-01	36.7	2.736E-01	2.762E-01	4.672E-01
I-131	1.716E-02	61.8	1.060E-02	1.064E-02	4.640E-01
Gd-153	-1.785E-02	104.7	1.868E-02	1.871E-02	1.202E+00
Ga-68	6.339E-01	796.9	5.051E+00	5.051E+00	1.281E+01
Tc-99m	0.000E+00	1.#INF	3.462E-02	3.462E-02	4.188E-01
BA-133	-6.378E-02	318.2	2.030E-01	2.030E-01	7.036E-01
CS-134	1.450E-01	77.8	1.127E-01	1.130E-01	7.994E-01
CS-137	-2.357E-01	86.1	2.030E-01	2.033E-01	6.829E-01
CE-139	8.368E-02	105.6	8.834E-02	8.844E-02	2.991E-01
Ba-140	6.596E-01	46.7	3.082E-01	3.100E-01	7.017E-01
La-140	8.112E-02	119.3	9.679E-02	9.688E-02	4.710E-01
CE-141	1.170E-01	142.2	1.664E-01	1.665E-01	5.655E-01

CE-144	7.886E-02	1374.8	1.084E+00	1.084E+00	3.695E+00
PM-144	1.703E-02	1126.9	1.919E-01	1.919E-01	4.660E-01
EU-152	5.614E-01	71.2	3.996E-01	4.006E-01	1.696E+00
EU-154	2.964E-01	84.0	2.489E-01	2.494E-01	4.734E+00
EU-155	3.046E-01	35.6	1.086E-01	1.098E-01	4.173E-01
HF-181	8.633E-02	176.0	1.519E-01	1.520E-01	6.175E-01
Ta-182	-7.785E-01	85.2	6.634E-01	6.645E-01	2.235E+00
Hg-203	-1.000E-01	152.0	1.520E-01	1.521E-01	5.169E-01
TL-208	-4.639E-02	454.8	2.110E-01	2.110E-01	5.245E-01
pm-146	-1.917E-01	255.4	4.895E-01	4.896E-01	1.194E+00
y-88	9.624E-02	183.2	1.763E-01	1.763E-01	5.664E-01
Cd-113m	-1.209E+03	123.1	1.488E+03	1.490E+03	5.079E+03
Cd-109	0.000E+00	1.#INF	5.728E-01	5.728E-01	9.970E+00
Cf-251	-1.389E-01	350.4	4.869E-01	4.869E-01	1.294E+00
Cf-249	1.703E-01	129.0	2.197E-01	2.199E-01	6.879E-01
Sn-126	-9.500E-01	130.6	1.241E+00	1.242E+00	4.167E+00
PB-210	1.925E+00	122.2	2.353E+00	2.356E+00	7.257E+00
PB-212	9.441E-02	281.3	2.656E-01	2.656E-01	7.312E-01
PB-214	2.946E-01	81.4	2.399E-01	2.404E-01	7.100E-01
BI-207	7.101E-03	151.5	1.076E-02	1.077E-02	4.616E-01
BI-212	-3.075E-01	609.3	1.874E+00	1.874E+00	6.737E+00
U-235	-1.527E-01	243.0	3.711E-01	3.712E-01	3.322E+00
BI-214	-6.051E-01	63.0	3.812E-01	3.824E-01	1.845E+00
BI-210M	1.649E-01	99.1	1.635E-01	1.637E-01	5.544E-01
AC-228	8.578E-01	27.7	2.379E-01	2.419E-01	5.242E-01
TH-227	-4.002E-02	87.4	3.500E-02	3.507E-02	5.114E+00
TH-229	1.557E+00	107.4	1.672E+00	1.674E+00	4.381E+00
TH-234	9.238E-01	204.6	1.890E+00	1.891E+00	6.284E+00
PA-231	0.000E+00	1.#INF	1.997E+00	1.997E+00	2.200E+01
PA-233	0.000E+00	1.#INF	6.046E-02	6.047E-02	1.804E+00
PA-234	7.096E-01	44.1	3.131E-01	3.152E-01	1.693E+00
PA-234M	2.699E+01	69.7	1.880E+01	1.885E+01	5.689E+01
AM-241	-2.537E-01	127.6	3.237E-01	3.241E-01	1.088E+00
Np-237	-5.689E-01	160.0	9.102E-01	9.108E-01	3.065E+00
Ir-192	0.000E+00	1.#INF	4.131E-02	4.131E-02	7.547E-01
Cs-136	1.456E-02	1217.8	1.773E-01	1.773E-01	4.393E-01
Np-239	-2.937E-01	150.6	4.423E-01	4.426E-01	1.493E+00
Nd-147	-8.758E-01	139.3	1.220E+00	1.221E+00	2.982E+00
TL-210	-1.868E-02	173.6	3.243E-02	3.245E-02	7.032E-01
Total	4.343E+01				

Analyst: Morgan Reichert

Sample description
376766_Gamma_MB 160-376766~1-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181356.An1

Acquisition information

Start time:	8/9/2018 6:41:16 PM
Live time:	3600
Real time:	3602
Dead time:	0.04 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_100mL.Clb

12_100mlSolid_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:00:56 PM
Type:	Polynomial
Uncertainty:	1.293 %
Coefficients:	-0.344181 -4.490960 0.514003
	-0.058777 0.002879 -0.000052

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:41:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-07-14_1810.PBC 7/14/2018 6:10:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1687

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.63	13.	122.23	0.95	4.383E-02	46.54	4.250	PBC<MDA	PB210
63.27	7.	204.63	0.87	5.222E-02	63.29	3.810	PBC<MDA	TH234
80.99	5.	275.85	0.89	5.375E-02	80.99	34.060	PBC<MDA	BA133
86.68	16.	56.83	1.34	5.418E-02	86.49	13.100	6.262E-01	Np237
					86.54	30.700	2.672E-01	EU155
					86.94	9.040	9.069E-01	Sn126
92.57	-50.	46.60	0.90	5.454E-02	92.59	5.584	PBC<MDA	TH234
93.35	14.	135.93	0.90	5.458E-02	93.35	5.561	PBC<MDA	AC228
99.50	12.	140.80	0.91	5.476E-02	99.50	15.000	PBC<MDA	Np239
103.20	12.	145.91	0.91	5.479E-02	103.20	21.800	PBC<MDA	Gd153
103.70	9.	213.59	0.91	5.479E-02	103.70	24.000	PBC<MDA	Np239
105.48	15.	43.03	1.39	5.478E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	3.372E-01	Np239
123.10	11.	102.45	0.93	5.394E-02	123.10	40.790	PBC<MDA	EU154
136.30	11.	175.99	0.94	5.263E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	5.339E-01	CO57
145.44	10.	142.19	0.95	5.150E-02	145.44	48.200	PBC<MDA	CE141
165.85	12.	105.56	0.97	4.863E-02	165.85	79.900	PBC<MDA	CE139
185.69	30.	47.77	1.34	4.570E-02	185.72	54.000	PBC<MDA	U235
193.51	11.	107.40	1.00	4.456E-02	193.51	4.400	PBC<MDA	TH229
205.33	4.	406.20	1.01	4.289E-02	205.33	5.010	PBC<MDA	U235
227.00	7.	181.27	1.03	4.000E-02	227.00	6.300	PBC<MDA	Cf251
238.63	6.	281.28	1.05	3.856E-02	238.63	43.300	PBC<MDA	PB212
242.00	12.	132.41	1.05	3.816E-02	242.00	7.430	PBC<MDA	PB214
244.69	7.	220.83	1.05	3.784E-02	244.69	7.580	PBC<MDA	EU152
256.24	10.	101.80	1.06	3.654E-02	256.24	7.000	PBC<MDA	TH227
265.83	11.	99.14	1.07	3.551E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
284.30	11.	99.32	1.09	3.368E-02	284.30	6.140	PBC<MDA	I131
296.00	8.	280.01	1.10	3.262E-02	296.00	79.000	PBC<MDA	TL210
333.44	6.	206.55	1.14	2.962E-02	333.44	15.510	PBC<MDA	Cf249
338.32	6.	201.47	1.14	2.927E-02	338.32	12.010	PBC<MDA	AC228
351.74	11.	81.45	0.81	2.834E-02	351.93	37.600	PBC<MDA	PB214
383.84	11.	108.86	1.19	2.640E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	154.75	1.19	2.617E-02	387.95	66.000	PBC<MDA	Cf249
427.88	15.	36.72	1.23	2.417E-02	427.88	29.600	5.825E-01	SB125
433.94	8.	134.24	1.24	2.389E-02	433.94	90.480	PBC<MDA	AG108M
463.37	4.	281.23	1.27	2.266E-02	463.37	10.470	PBC<MDA	SB125
477.60	10.	107.01	1.28	2.212E-02	477.60	10.520	PBC<MDA	BE7
482.00	1.	804.86	1.28	2.196E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	119.32	1.29	2.178E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	484.77	1.30	2.142E-02	497.05	90.900	PBC<MDA	RU103
511.86	84.	28.29	2.56	2.093E-02	511.86	20.000	5.552E+00	RH106
537.26	12.	46.73	1.34	2.014E-02	537.26	24.390	PBC<MDA	Ba140
569.32	9.	77.76	1.37	1.925E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.643E+00	PA234
					569.70	97.740	1.379E-01	BI207
600.50	11.	126.08	1.40	1.847E-02	600.50	17.860	PBC<MDA	SB125
602.73	11.	132.99	1.40	1.841E-02	602.73	98.260	PBC<MDA	SB124
604.71	2.	772.96	1.40	1.837E-02	604.71	97.620	PBC<MDA	CS134
609.31	-18.	63.00	1.41	1.826E-02	609.31	46.090	PBC<MDA	BI214
621.92	10.	145.81	1.42	1.797E-02	621.92	9.930	PBC<MDA	RH106
635.89	6.	96.69	1.43	1.767E-02	635.89	11.310	PBC<MDA	SB125
636.97	5.	120.61	1.43	1.765E-02	636.97	7.170	PBC<MDA	I131
657.76	9.	82.31	1.45	1.722E-02	657.76	94.640	PBC<MDA	AG110M
722.79	2.	466.05	1.51	1.602E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.181E-02	AG108M
					723.36	20.220	1.430E-01	EU154
766.41	9.	95.61	1.55	1.533E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	5.762E+01	PA234M
778.92	5.	164.92	1.56	1.515E-02	778.92	12.940	PBC<MDA	EU152
834.85	6.	91.87	1.61	1.438E-02	834.85	99.980	PBC<MDA	MN54
846.77	5.	201.66	1.63	1.423E-02	846.77	99.935	PBC<MDA	Co56
880.53	2.	331.66	1.66	1.382E-02	880.53	6.000	PBC<MDA	PA234
898.04	5.	224.35	1.67	1.361E-02	898.04	93.700	PBC<MDA	y88
911.07	13.	27.74	1.68	1.347E-02	911.07	29.000	9.246E-01	AC228
937.49	2.	354.73	1.71	1.318E-02	937.49	34.360	PBC<MDA	AG110M
946.02	14.	44.13	1.72	1.309E-02	946.02	13.400	2.216E+00	PA234
964.11	6.	71.17	1.73	1.291E-02	964.11	14.605	PBC<MDA	EU152
968.97	6.	97.50	1.74	1.286E-02	968.97	17.460	PBC<MDA	AC228
996.33	6.	83.99	1.76	1.260E-02	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	1.255E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	3.	215.68	1.77	1.252E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	6.	74.49	1.81	1.211E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	3.	229.35	1.82	1.199E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	1.	796.87	1.83	1.188E-02	1077.40	3.300	PBC<MDA	Ga68

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1099.25	2.	324.82	1.85	1.170E-02	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	88.19	1.86	1.160E-02	1112.07	13.644	PBC<MDA	EU152
1173.24	5.	44.72	1.92	1.114E-02	1173.24	99.900	PBC<MDA	CO60
1238.28	7.	124.60	1.97	1.069E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	37.80	2.00	1.045E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	5.288E-01	EU154
1313.00	2.	248.05	2.04	1.021E-02	1313.00	21.000	PBC<MDA	TL210
1332.50	4.	137.50	2.05	1.009E-02	1332.50	99.980	PBC<MDA	CO60
1384.30	2.	248.05	2.10	9.797E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	3.	205.48	2.12	9.666E-03	1408.00	21.005	PBC<MDA	EU152
1460.83	3.	346.41	2.16	9.386E-03	1460.83	10.670	PBC<MDA	K40
1690.98	7.	37.80	2.35	8.321E-03	1690.98	47.790	PBC<MDA	SB124
1771.35	4.	167.91	2.41	7.997E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	2.	289.62	2.46	7.751E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
742.05	185.69	24.	62.	1.357E+03	20.27	1.345	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.16	46.63	97.	13.	0.004	122.23	0.952s
TH-227	200.18	50.14	216.	-15.	-0.004	142.19	0.855s
AM-241	237.74	59.54	227.	-17.	-0.005	127.60	0.865s
TH-234	252.74	63.29	82.	7.	0.002	204.63	0.868D
Sn-126	256.71	64.28	248.	-17.	-0.005	130.59	0.869s
BA-133	323.50	80.99	67.	5.	0.001	275.85	0.887s
Np-237	345.49	86.49	263.	-15.	-0.004	160.00	0.892s
EU-155	346.26	86.68	25.	16.	0.004	56.83	1.342s
Sn-126	347.29	86.94	249.	-15.	-0.004	155.56	0.892s
Cd-109	351.68	88.04	233.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	238.	-15.	-0.004	145.31	0.897s
TH-234	369.87	92.59	291.	-50.	-0.014	46.60	0.898s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	372.91	93.35	182.	14.	0.004	135.93	0.899s
Gd-153	389.50	97.50	215.	-14.	-0.004	150.12	0.903s
Np-239	397.50	99.50	141.	12.	0.003	140.80	0.905s
Gd-153	412.29	103.20	153.	12.	0.003	145.91	0.909s
Np-239	414.29	103.70	165.	9.	0.002	213.59	0.909s
EU-155	421.40	105.48	10.	15.	0.004	43.03	1.386s
Np-239	424.00	106.13	187.	-13.	-0.004	150.58	0.912s
EU-152	486.55	121.78	85.	-9.	-0.002	148.66	0.928s
CO-57	487.69	122.06	94.	0.	0.000	1000.00	0.928s
EU-154	491.84	123.10	55.	11.	0.003	102.45	0.929s
PA-234	524.60	131.29	142.	-14.	-0.004	121.80	0.938s
HF-181	544.61	136.30	175.	11.	0.003	175.99	0.943
CO-57	545.30	136.47	186.	0.	0.000	1000.00	0.943
Tc-99m	561.44	140.51	186.	0.	0.000	1000.00	0.947s
U-235	574.53	143.79	195.	-9.	-0.002	266.82	0.950
CE-141	581.15	145.44	105.	10.	0.003	142.19	0.952s
Ba-140	649.99	162.66	76.	-4.	-0.001	278.89	0.969s
U-235	652.87	163.38	81.	0.	0.000	1000.00	0.970
CE-139	662.76	165.85	70.	12.	0.003	105.56	0.973s
Cf-251	705.72	176.60	55.	-4.	-0.001	350.45	0.983s
U-235	742.18	185.72	178.	-48.	-0.013	53.53	0.992s
TH-229	773.32	193.51	37.	11.	0.003	107.40	1.000s
U-235	820.59	205.33	62.	4.	0.001	406.20	1.012s
TH-229	842.65	210.85	66.	-10.	-0.003	155.24	1.018s
Cf-251	907.22	227.00	44.	7.	0.002	181.27	1.034s
PB-212	953.73	238.63	78.	6.	0.002	281.28	1.046s
PB-214	967.18	242.00	111.	12.	0.003	132.41	1.049
EU-152	977.96	244.69	133.	7.	0.002	220.83	1.051s
TH-227	1024.13	256.24	29.	10.	0.003	101.80	1.063s
Cd-113m	1053.96	263.70	61.	-9.	-0.003	123.10	1.070s
BI-210M	1062.48	265.83	49.	11.	0.003	99.14	1.072s
TL-208	1108.27	277.28	96.	-16.	-0.004	90.25	1.084s
Hg-203	1115.93	279.20	111.	-10.	-0.003	152.00	1.086s
I-131	1136.32	284.30	29.	11.	0.003	99.32	1.091s
TL-210	1183.11	296.00	220.	8.	0.002	280.01	1.102s
PB-212	1199.22	300.03	228.	0.	0.000	1000.00	1.106s
PA-231	1199.38	300.07	228.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	228.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	228.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	228.	0.	0.000	1000.00	1.109
Ba-140	1218.49	304.85	228.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	228.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	228.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	228.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	228.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	354.	-16.	-0.004	166.77	1.126s
La-140	1314.10	328.76	72.	-3.	-0.001	453.11	1.135s
Cf-249	1332.81	333.44	66.	6.	0.002	206.55	1.139s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1352.33	338.32	82.	6.	0.002	201.47	1.144s
Cs-136	1361.32	340.57	89.	0.	0.000	1000.00	1.146s
EU-152	1376.18	344.29	89.	0.	0.000	1000.00	1.150
PB-214	1405.99	351.74	28.	11.	0.003	81.45	0.807s
BA-133	1423.02	356.00	79.	-4.	-0.001	318.20	1.162s
I-131	1456.95	364.48	56.	-15.	-0.004	99.66	1.170s
BA-133	1534.35	383.84	65.	11.	0.003	108.86	1.189s
Cf-249	1550.79	387.95	74.	8.	0.002	154.75	1.193s
SN-113	1565.74	391.69	94.	-9.	-0.002	161.54	1.196s
SB-125	1710.45	427.88	4.	15.	0.004	36.72	1.232s
AG-108M	1734.69	433.94	28.	8.	0.002	134.24	1.238
pm-146	1814.45	453.88	44.	-13.	-0.004	103.68	1.257s
SB-125	1852.39	463.37	51.	4.	0.001	281.23	1.266s
BE-7	1909.29	477.60	52.	10.	0.003	107.01	1.280s
HF-181	1926.90	482.00	62.	1.	0.000	804.86	1.284s
La-140	1946.98	487.02	53.	9.	0.002	119.32	1.289s
RU-103	1987.11	497.05	24.	2.	0.001	484.77	1.298
RH-106	2046.35	511.86	73.	84.	0.023	28.29	2.563
Nd-147	2122.88	531.00	30.	-8.	-0.002	139.28	1.331s
Ba-140	2147.92	537.26	4.	12.	0.003	46.73	1.337s
CS-134	2276.15	569.32	22.	9.	0.003	77.76	1.367s
BI-207	2277.68	569.70	38.	-4.	-0.001	198.14	1.368s
TL-208	2330.96	583.02	35.	-3.	-0.001	454.83	1.381s
SB-125	2400.87	600.50	88.	11.	0.003	126.08	1.397s
SB-124	2409.79	602.73	99.	11.	0.003	132.99	1.399s
CS-134	2417.71	604.71	110.	2.	0.001	772.96	1.401s
BI-214	2436.11	609.31	130.	-18.	-0.005	63.00	1.405s
RU-103	2440.06	610.30	112.	0.	0.000	1000.00	1.406s
AG-108M	2455.99	614.28	112.	0.	0.000	1000.00	1.410s
PM-144	2471.12	618.06	112.	0.	0.000	1000.00	1.414
RH-106	2486.54	621.92	98.	10.	0.003	145.81	1.417s
SB-125	2542.43	635.89	16.	6.	0.002	96.69	1.430s
I-131	2546.77	636.97	17.	5.	0.001	120.61	1.432s
AG-110M	2629.92	657.76	22.	9.	0.002	82.31	1.451s
CS-137	2645.51	661.66	51.	-12.	-0.003	86.12	1.455s
NB-94	2809.41	702.63	28.	-3.	-0.001	378.59	1.493s
SB-124	2890.04	722.79	29.	2.	0.000	466.05	1.512s
AG-108M	2890.65	722.94	31.	0.	0.000	1000.00	1.512s
EU-154	2892.32	723.36	31.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	31.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	32.	-1.	0.000	609.30	1.516s
pm-146	2941.78	735.72	23.	-7.	-0.002	144.53	1.524s
pm-146	2987.55	747.16	19.	-4.	-0.001	255.36	1.535s
AG-110M	3054.69	763.94	16.	-2.	-0.001	291.55	1.550s
NB-95	3062.08	765.79	43.	-14.	-0.004	70.04	1.552s
PA-234M	3064.57	766.41	35.	9.	0.003	95.61	1.552s
EU-152	3114.61	778.92	14.	5.	0.001	164.92	1.564s
BI-212	3140.62	785.42	23.	-4.	-0.001	241.30	1.570s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3182.42	795.87	42.	-12.	-0.003	80.32	1.579s
TL-210	3197.35	799.60	55.	-5.	-0.001	205.21	1.583
CO-58	3242.06	810.78	57.	-14.	-0.004	83.24	1.593s
MN-54	3338.38	834.85	5.	6.	0.002	91.87	1.615
Co-56	3386.08	846.77	20.	5.	0.001	201.66	1.626s
TL-208	3441.27	860.56	25.	-8.	-0.002	141.88	1.638s
NB-94	3483.41	871.10	24.	-6.	-0.002	122.47	1.648s
EU-154	3491.95	873.23	32.	-1.	0.000	806.23	1.650s
PA-234	3521.16	880.53	21.	2.	0.001	331.66	1.657s
PA-234	3532.00	883.24	23.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	23.	0.	0.000	1000.00	1.660s
y-88	3591.22	898.04	25.	5.	0.001	224.35	1.672s
AC-228	3643.36	911.07	0.	13.	0.004	27.74	1.684s
AG-110M	3749.09	937.49	10.	2.	0.001	354.73	1.708s
PA-234	3783.21	946.02	5.	14.	0.004	44.13	1.716s
EU-152	3855.60	964.11	6.	6.	0.002	71.17	1.732s
AC-228	3875.05	968.97	14.	6.	0.002	97.50	1.736s
EU-154	3984.54	996.33	10.	6.	0.002	83.99	1.761
PA-234M	4003.22	1001.00	16.	6.	0.002	101.37	1.765s
EU-154	4018.33	1004.77	23.	3.	0.001	215.68	1.768s
Co-56	4150.66	1037.84	21.	-9.	-0.003	117.15	1.798
Cs-136	4191.60	1048.07	16.	-1.	0.000	574.46	1.807s
RH-106	4200.76	1050.36	8.	6.	0.002	74.49	1.809s
BI-207	4253.99	1063.66	11.	3.	0.001	229.35	1.820s
Ga-68	4308.98	1077.40	5.	1.	0.000	796.87	1.833s
FE-59	4396.44	1099.25	11.	2.	0.001	324.82	1.852s
EU-152	4447.76	1112.07	11.	6.	0.002	88.19	1.863s
ZN-65	4461.66	1115.55	17.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	17.	0.	0.000	1000.00	1.870s
Sc-46	4481.68	1120.55	22.	-5.	-0.001	251.83	1.870s
Ta-182	4484.69	1121.30	40.	-11.	-0.003	85.21	1.871s
CO-60	4692.57	1173.24	0.	5.	0.001	44.72	1.916
Ta-182	4755.86	1189.05	16.	-11.	-0.003	87.98	1.930s
Ta-182	4885.39	1221.41	0.	0.	0.000	1000.00	1.957s
Co-56	4952.92	1238.28	11.	7.	0.002	124.60	1.972s
NA-22	5098.03	1274.53	0.	7.	0.002	37.80	2.003s
EU-154	5098.09	1274.54	7.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	11.	-3.	-0.001	243.10	2.017s
TL-210	5252.04	1313.00	6.	2.	0.001	248.05	2.036s
CO-60	5330.11	1332.50	6.	4.	0.001	137.50	2.052s
AG-110M	5537.48	1384.30	6.	2.	0.001	248.05	2.096s
EU-152	5632.39	1408.00	6.	3.	0.001	205.48	2.115s
K-40	5843.92	1460.83	18.	3.	0.001	346.41	2.159s
La-140	6386.02	1596.21	6.	0.	0.000	1000.00	2.269s
SB-124	6765.58	1690.98	0.	7.	0.002	37.80	2.345s
Co-56	7087.48	1771.35	7.	4.	0.001	167.91	2.408s
y-88	7346.69	1836.06	7.	2.	0.001	289.62	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.1874E+00				5.31E+01	
			477.60	1.187E+00	?(	4.322E+00 1.07E+02 1.05E+01	G
NA-22	C	1.8618E-01				9.50E+02	
			1274.53	1.862E-01	?(	1.960E-01 3.78E+01 9.99E+01	G
K-40	N	8.3209E-01				4.66E+11	
			1460.83	8.321E-01	?(	6.235E+00 3.46E+02 1.07E+01	G
Sc-46	F	-1.3506E-02				8.38E+01	
			889.28	-1.351E-02	%(	5.142E-01 1.04E+03 1.00E+02	G
			1120.55	-1.150E-01	+ P	5.892E-01 2.52E+02 1.00E+02	G
CR-51	F	-1.4728E+00				2.77E+01	
			320.08	-1.473E+00	?(	8.250E+00 1.67E+02 9.94E+00	G
MN-54	C	1.0852E-01				3.12E+02	
			834.85	1.085E-01	&(	2.469E-01 9.19E+01 1.00E+02	G
FE-59	F	9.8054E-02				4.45E+01	
			1099.25	9.805E-02	?(	7.535E-01 3.25E+02 5.65E+01	G
			1291.60	-2.072E-01	+	1.144E+00 2.43E+02 4.32E+01	G
Co-56	C	1.6321E-01				7.73E+01	
			846.77	9.770E-02	?(	4.602E-01 2.02E+02 9.99E+01	G
			1238.28	2.623E-01	?(	7.239E-01 1.25E+02 6.61E+01	G
			1037.84	-1.502E+00	+	3.900E+00 1.17E+02 1.41E+01	G
			1771.35	8.975E-01	?	3.308E+00 1.68E+02 1.55E+01	A
CO-58	C	-2.5786E-01				7.09E+01	
			810.78	-2.579E-01	?(	7.201E-01 8.32E+01 9.95E+01	G
CO-60	F	1.2206E-01				1.93E+03	
			1332.50	1.193E-01	?(	3.799E-01 1.37E+02 1.00E+02	G
			1173.24	1.248E-01	?(	1.840E-01 4.47E+01 9.99E+01	G
NB-94	I	-5.1994E-02				7.41E+06	
			702.63	-5.199E-02	?(	4.743E-01 3.79E+02 9.79E+01	G
			871.10	-1.198E-01	+	5.099E-01 1.22E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	1.0985E-02					6.40E+01	
			756.73	1.098E-02	%(	7.528E-01	2.75E+03	5.45E+01 G
			724.20	0.000E+00	-	1.127E+00	1.00E+03	4.42E+01 G
NB-95	I	-2.5903E-01					6.40E+01	
			765.79	-2.590E-01	&(	6.026E-01	7.00E+01	9.98E+01 G
RU-103	I	2.8528E-02					3.93E+01	
			497.05	2.853E-02	?(	3.643E-01	4.85E+02	9.09E+01 G
			610.30	0.000E+00	-	1.378E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.5819E+00					3.74E+02	
			621.92	1.534E+00	?(	7.614E+00	1.46E+02	9.93E+00 G
			1050.36	9.252E+00	?(	2.317E+01	7.45E+01	1.56E+00 G
			511.86	5.552E+00		2.828E+00	2.83E+01	2.00E+01 GA
AG-108M	C	1.0279E-01					1.53E+05	
			433.94	1.028E-01	?(	3.517E-01	1.34E+02	9.05E+01 G
			722.94	0.000E+00	-	5.469E-01	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	8.864E-01	1.00E+03	8.98E+01 G
AG-110M	F	1.1032E-01					2.50E+02	
			884.68	0.000E+00	?(	6.957E-01	1.00E+03	7.27E+01 G
			657.76	1.490E-01	?(	4.146E-01	8.23E+01	9.46E+01 G
			937.49	1.226E-01	?(	1.070E+00	3.55E+02	3.44E+01 G
			1384.30	2.724E-01	?(	1.611E+00	2.48E+02	2.43E+01 G
			763.94	-1.623E-01	+	1.732E+00	2.92E+02	2.23E+01 G
SN-113	F	-1.4486E-01					1.15E+02	
			391.69	-1.449E-01	(	7.991E-01	1.62E+02	6.40E+01 G
SB-124	F	2.7200E-01					6.02E+01	
			602.73	1.670E-01	?(	7.541E-01	1.33E+02	9.83E+01 G
			1690.98	4.890E-01	?(	5.148E-01	3.78E+01	4.78E+01 G
			722.79	2.673E-01	?(	4.482E+00	4.66E+02	1.08E+01 G
SB-125	I	7.4524E-01					1.01E+03	
			427.88	5.825E-01	(	4.672E-01	3.67E+01	2.96E+01 G
			600.50	9.147E-01	&(	3.917E+00	1.26E+02	1.79E+01 G
			635.89	9.036E-01	?(	3.008E+00	9.67E+01	1.13E+01 G
			463.37	4.293E-01	&	4.226E+00	2.81E+02	1.05E+01 G
I-131	I	1.7163E-02					8.02E+00	
			364.48	-1.878E-01	*(	4.640E-01	9.97E+01	8.17E+01 G
			284.30	1.440E+00	*(	3.754E+00	9.93E+01	6.14E+00 G
			636.97	1.134E+00	?(	4.793E+00	1.21E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-1.7846E-02					2.42E+02	
			97.50	-2.375E-01	&(	1.202E+00	1.50E+02	3.00E+01 G
			103.20	2.844E-01	?(	1.404E+00	1.46E+02	2.18E+01 G
Ga-68	C	6.3387E-01					4.71E-02	
			1077.40	6.339E-01	?(	1.281E+01	7.97E+02	3.30E+00 G
BA-133	F	-6.3781E-02					3.85E+03	
			356.00	-6.378E-02	?(	7.036E-01	3.18E+02	6.20E+01 G
			302.85	0.000E+00	&	3.458E+00	1.00E+03	1.83E+01 G
			383.84	1.286E+00	&	4.752E+00	1.09E+02	8.94E+00 GA
			80.99	8.093E-02	?	6.185E-01	2.76E+02	3.41E+01 GA
CS-134	I	1.4500E-01					7.54E+02	
			604.71	2.987E-02	&(	7.994E-01	7.73E+02	9.76E+01 G
			795.87	-2.676E-01	+	7.211E-01	8.03E+01	8.55E+01 G
			569.32	8.757E-01	&(	2.290E+00	7.78E+01	1.54E+01 G
			801.95	-1.438E-01	%	8.479E+00	1.67E+03	8.69E+00 G
			563.24	-5.713E-02	%	3.789E+00	2.56E+03	8.35E+00 G
CS-137	I	-2.3567E-01					1.10E+04	
			661.66	-2.357E-01	?(	6.829E-01	8.61E+01	8.52E+01 G
CE-139	F	8.3680E-02					1.38E+02	
			165.85	8.368E-02	?(	2.991E-01	1.06E+02	7.99E+01 G
Ba-140	I	6.5962E-01					1.28E+01	
			537.26	6.596E-01	?(	7.017E-01	4.67E+01	2.44E+01 G
			162.66	-4.093E-01	-	3.954E+00	2.79E+02	6.22E+00 G
			304.85	0.000E+00	-	1.486E+01	1.00E+03	4.29E+00 G
La-140	I	8.1122E-02					1.28E+01	
			1596.21	0.000E+00	?(	4.710E-01	1.00E+03	9.54E+01 G
			487.02	2.512E-01	?(	1.024E+00	1.19E+02	4.55E+01 G
			328.76	-1.218E-01	+	1.926E+00	4.53E+02	2.03E+01 G
			815.77	-3.518E-02	%	3.414E+00	2.76E+03	2.33E+01 G
CE-141	I	1.1703E-01					3.25E+01	
			145.44	1.170E-01	?(	5.655E-01	1.42E+02	4.82E+01 G
CE-144	I	7.8856E-02					2.85E+02	
			133.54	7.886E-02	%(	3.695E+00	1.37E+03	1.11E+01 G
PM-144	C	1.7026E-02					3.63E+02	
			696.54	1.703E-02	%(	4.660E-01	1.13E+03	9.90E+01 G
			618.06	0.000E+00	-	8.075E-01	1.00E+03	9.91E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F 5.6141E-01					4.94E+03	
		344.29	0.000E+00	&(	1.696E+00	1.00E+03	2.65E+01 G
		1112.07	1.053E+00	?(	3.189E+00	8.82E+01	1.36E+01 G
		121.78	-1.619E-01	&	8.214E-01	1.49E+02	2.86E+01 G
		778.92	7.087E-01	?(	2.856E+00	1.65E+02	1.29E+01 G
		964.11	9.057E-01	?(	2.150E+00	7.12E+01	1.46E+01 G
		244.69	7.239E-01	?(	5.457E+00	2.21E+02	7.58E+00 G
		1408.00	4.104E-01	?	1.932E+00	2.05E+02	2.10E+01 GA
EU-154	I 2.9640E-01					3.14E+03	
		873.23	-1.628E-01	?(	4.734E+00	8.06E+02	1.23E+01 G
		123.10	1.352E-01	(	4.699E-01	1.02E+02	4.08E+01 G
		1274.54	0.000E+00	-	1.136E+00	1.00E+03	3.52E+01 G
		723.36	0.000E+00	-	2.458E+00	1.00E+03	2.02E+01 G
		1004.77	3.989E-01	?(	3.073E+00	2.16E+02	1.80E+01 G
		996.33	1.274E+00	&(	3.655E+00	8.40E+01	1.06E+01 G
EU-155	I 3.0460E-01					1.81E+03	
		105.31	3.588E-01	(	4.173E-01	4.30E+01	2.12E+01 G
		86.54	2.672E-01	(	4.344E-01	5.68E+01	3.07E+01 G
HF-181	F 8.6328E-02					4.24E+01	
		482.00	2.180E-02	(	6.175E-01	8.05E+02	8.05E+01 G
		133.02	-5.637E-03	%	9.663E-01	5.03E+03	4.33E+01 G
		345.83	-3.206E-02	&	2.969E+00	2.65E+03	1.51E+01 G
		136.30	9.743E-01	?(	5.810E+00	1.76E+02	5.85E+00 G
Ta-182	F -7.7849E-01					1.14E+02	
		1121.30	-7.785E-01	?(	2.235E+00	8.52E+01	3.49E+01 G
		1221.41	0.000E+00	+	7.022E-01	1.00E+03	2.70E+01 G
		1189.05	-1.711E+00	+	3.321E+00	8.80E+01	1.62E+01 G
Hg-203	F -9.9996E-02					4.66E+01	
		279.20	-1.000E-01	&(	5.169E-01	1.52E+02	8.15E+01 G
TL-208	N -4.6394E-02					6.98E+02	
		583.02	-4.639E-02	?(	5.245E-01	4.55E+02	8.45E+01 G
		277.28	-2.047E+00	+	6.197E+00	9.02E+01	6.31E+00 G
		860.56	-1.273E+00	+	4.139E+00	1.42E+02	1.24E+01 G
pm-146	C -1.9169E-01					2.02E+03	
		747.16	-1.917E-01	?(	1.194E+00	2.55E+02	3.40E+01 G
		735.72	-5.726E-01	+	1.969E+00	1.45E+02	2.25E+01 G
		453.88	-2.411E-01	&	6.236E-01	1.04E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	9.6237E-02					1.07E+02	
			898.04	1.089E-01	?(	5.664E-01	2.24E+02	9.37E+01 G
			1836.06	8.429E-02	?(	5.326E-01	2.90E+02	9.92E+01 G
Cd-113m		-1.2091E+03					5.33E+03	
			263.70	-1.209E+03	?(	5.079E+03	1.23E+02	6.00E-03 K
Cf-251	T	-1.3893E-01					3.28E+05	
			176.60	-1.389E-01	&(	1.294E+00	3.50E+02	1.70E+01 G
			227.00	7.716E-01	?	3.706E+00	1.81E+02	6.30E+00 GA
Cf-249	T	1.7028E-01					1.28E+05	
			387.95	1.298E-01	&(	6.879E-01	1.55E+02	6.60E+01 G
			333.44	3.427E-01	?(	2.447E+00	2.07E+02	1.55E+01 G
Sn-126		-9.5001E-01					3.65E+07	
			87.57	-1.486E-02	%	1.010E+00	1.99E+03	3.75E+01 GA
			64.28	-9.500E-01	?(	4.167E+00	1.31E+02	9.70E+00 G
			86.94	-8.244E-01	+	4.319E+00	1.56E+02	9.04E+00 GA
PB-210	N	1.9251E+00					8.14E+03	
			46.54	1.925E+00	*(P	7.257E+00	1.22E+02	4.25E+00 G
PB-212	N	9.4411E-02					6.98E+02	
			238.63	9.441E-02	(P	7.312E-01	2.81E+02	4.33E+01 G
			300.03	0.000E+00	-	1.918E+01	1.00E+03	3.28E+00 GA
PB-214	N	2.9457E-01					5.84E+05	
			351.93	2.946E-01	(P	7.100E-01	8.14E+01	3.76E+01 G
			295.09	-3.430E-02	% P	3.170E+00	2.72E+03	1.93E+01 G
			242.00	1.129E+00		5.068E+00	1.32E+02	7.43E+00 GA
BI-207	C	7.1010E-03					1.18E+04	
			569.70	-6.648E-02	?(	4.616E-01	1.98E+02	9.77E+01 G
			1063.66	1.036E-01	&(	5.574E-01	2.29E+02	7.45E+01 G
BI-212	N	-3.0754E-01					6.98E+02	
			727.17	-3.075E-01	?(	6.737E+00	6.09E+02	7.55E+00 G
			785.42	-6.248E+00	&	3.636E+01	2.41E+02	1.28E+00 GA
U-235	N	-1.5273E-01					2.57E+11	
			143.79	-4.392E-01	?(P	3.322E+00	2.67E+02	1.10E+01 G
			205.33	4.740E-01	?(	5.107E+00	4.06E+02	5.01E+00 G
			163.38	0.000E+00	+	4.983E+00	1.00E+03	5.08E+00 G
			185.72	-5.405E-01	+ P	7.308E-01	5.35E+01	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	-6.0512E-01					5.84E+05	
			609.31	-6.051E-01	?(P	1.845E+00	6.30E+01	4.61E+01 G
			1120.29	0.000E+00	+	3.497E+00	1.00E+03	1.51E+01 G
			1764.49	-7.493E-02	%	5.333E+00	1.92E+03	1.54E+01 G
BI-210M	T	1.6489E-01					1.10E+09	
			265.83	1.649E-01	&(	5.544E-01	9.91E+01	5.00E+01 G
			304.90	0.000E+00	-	2.276E+00	1.00E+03	2.80E+01 G
AC-228	N	8.5782E-01					2.10E+03	
			911.07	9.246E-01	?(	5.242E-01	2.77E+01	2.90E+01 G
			968.97	7.470E-01	?(	2.516E+00	9.75E+01	1.75E+01 G
			338.32	5.137E-01	-	3.559E+00	2.01E+02	1.20E+01 G
			93.35	1.310E+00	?	6.004E+00	1.36E+02	5.56E+00 XA
TH-227	N	-4.0023E-02					7.95E+03	
			50.14	-1.068E+00	&(	5.114E+00	1.42E+02	8.00E+00 G
			256.24	1.135E+00	&(	3.035E+00	1.02E+02	7.00E+00 G
TH-229	N	1.5570E+00					2.68E+06	
			193.51	1.557E+00	?(	4.381E+00	1.07E+02	4.40E+00 G
			210.85	-2.205E+00	+	8.946E+00	1.55E+02	2.99E+00 G
TH-234	N	9.2379E-01					1.63E+12	
			63.29	9.238E-01	(P	6.284E+00	2.05E+02	3.81E+00 G
			92.59	-4.575E+00	+ P	7.496E+00	4.66E+01	5.58E+00 G
PA-234	N	7.0958E-01					1.63E+12	
			131.29	-4.121E-01	?(	1.693E+00	1.22E+02	1.80E+01 G
			946.02	2.216E+00	?(	2.079E+00	4.41E+01	1.34E+01 G
			569.47	2.934E-02	%	5.105E+00	4.79E+03	8.20E+00 G
			883.24	0.000E+00	-	5.260E+00	1.00E+03	9.60E+00 G
			880.53	6.702E-01	?	8.064E+00	3.32E+02	6.00E+00 GA
PA-234M	N	2.6987E+01					1.63E+12	
			1001.00	1.623E+01	&(	5.689E+01	1.01E+02	8.37E-01 G
			766.41	5.762E+01	&(	1.873E+02	9.56E+01	2.94E-01 G
AM-241	T	-2.5369E-01					1.58E+05	
			59.54	-2.537E-01	&(	1.088E+00	1.28E+02	3.59E+01 G
Np-237	F	-5.6888E-01					2.14E+06	
			86.49	-5.689E-01	(	3.065E+00	1.60E+02	1.31E+01 G
Cs-136	F	1.4556E-02					1.30E+01	
			818.50	1.456E-02	&(	4.393E-01	1.22E+03	1.00E+02 G
			1048.07	-2.863E-02	+	6.113E-01	5.74E+02	8.00E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          340.57 0.000E+00 -   9.496E-01 1.00E+03 4.69E+01 G

Np-239   T  -2.9371E-01                                     2.36E+00
                          103.70 1.833E-01 ?   1.331E+00 2.14E+02 2.40E+01 X
                          106.13-2.937E-01 ?(  1.493E+00 1.51E+02 2.27E+01 G
                           99.50 4.144E-01 &   1.975E+00 1.41E+02 1.50E+01 X

Nd-147      -8.7583E-01                                     1.11E+01
                          531.00-8.758E-01 ?(  2.982E+00 1.39E+02 1.30E+01 G
                           91.10-2.751E-01 +   1.345E+00 1.45E+02 2.83E+01 G

TL-210   N  -1.8684E-02                                     5.84E+05
                          799.60-9.869E-02 ?(  7.032E-01 2.05E+02 9.90E+01 G
                          296.00 8.153E-02 &(  7.751E-01 2.80E+02 7.90E+01 G
                         1313.00 3.022E-01 ?   1.788E+00 2.48E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	216.	-15.	-0.004	142.19	-1.068E+00	
AM-241	59.54	227.	-17.	-0.005	127.60	-2.537E-01	
Sn-126	64.28	248.	-17.	-0.005	130.59	-9.500E-01	
BA-133	80.99	67.	5.	0.001	275.85	8.093E-02	
Np-237	86.49	263.	-15.	-0.004	160.00	-5.689E-01	
Sn-126	86.94	249.	-15.	-0.004	155.56	-8.244E-01	
Nd-147	91.10	238.	-15.	-0.004	145.31	-2.751E-01	
Gd-153	97.50	215.	-14.	-0.004	150.12	-2.375E-01	
Np-239	99.50	141.	12.	0.003	140.80	4.144E-01	
Gd-153	103.20	153.	12.	0.003	145.91	2.844E-01	
Np-239	103.70	165.	9.	0.002	213.59	1.833E-01	
Np-239	106.13	187.	-13.	-0.004	150.58	-2.937E-01	
EU-152	121.78	85.	-9.	-0.002	148.66	-1.619E-01	
EU-154	123.10	55.	11.	0.003	102.45	1.352E-01	
PA-234	131.29	142.	-14.	-0.004	121.80	-4.121E-01	
HF-181	136.30	175.	11.	0.003	175.99	9.743E-01	
U-235	143.79	195.	-9.	-0.002	266.82	-4.392E-01	P
CE-141	145.44	105.	10.	0.003	142.19	1.170E-01	
Ba-140	162.66	76.	-4.	-0.001	278.89	-4.093E-01	
CE-139	165.85	70.	12.	0.003	105.56	8.368E-02	
Cf-251	176.60	55.	-4.	-0.001	350.45	-1.389E-01	
U-235	185.72	178.	-48.	-0.013	53.53	-5.405E-01	P
TH-229	193.51	37.	11.	0.003	107.40	1.557E+00	
U-235	205.33	62.	4.	0.001	406.20	4.740E-01	
TH-229	210.85	66.	-10.	-0.003	155.24	-2.205E+00	
Cf-251	227.00	44.	7.	0.002	181.27	7.716E-01	
PB-212	238.63	78.	6.	0.002	281.28	9.441E-02	P
EU-152	244.69	133.	7.	0.002	220.83	7.239E-01	
TH-227	256.24	29.	10.	0.003	101.80	1.135E+00	
Cd-113m	263.70	61.	-9.	-0.003	123.10	-1.209E+03	
BI-210M	265.83	49.	11.	0.003	99.14	1.649E-01	
TL-208	277.28	96.	-16.	-0.004	90.25	-2.047E+00	
Hg-203	279.20	111.	-10.	-0.003	152.00	-1.000E-01	
I-131	284.30	29.	11.	0.003	99.32	1.440E+00	
TL-210	296.00	220.	8.	0.002	280.01	8.153E-02	
CR-51	320.08	354.	-16.	-0.004	166.77	-1.473E+00	
La-140	328.76	72.	-3.	-0.001	453.11	-1.218E-01	
Cf-249	333.44	66.	6.	0.002	206.55	3.427E-01	
BA-133	356.00	79.	-4.	-0.001	318.20	-6.378E-02	
I-131	364.48	56.	-15.	-0.004	99.66	-1.878E-01	
BA-133	383.84	65.	11.	0.003	108.86	1.286E+00	
Cf-249	387.95	74.	8.	0.002	154.75	1.298E-01	
SN-113	391.69	94.	-9.	-0.002	161.54	-1.449E-01	
AG-108M	433.94	28.	8.	0.002	134.24	1.028E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	453.88	44.	-13.	-0.004	103.68	-2.411E-01	
BE-7	477.60	52.	10.	0.003	107.01	1.187E+00	
HF-181	482.00	62.	1.	0.000	804.86	2.180E-02	
La-140	487.02	53.	9.	0.002	119.32	2.512E-01	
RU-103	497.05	24.	2.	0.001	484.77	2.853E-02	
RH-106	511.86	73.	84.	0.023	28.29	5.552E+00	
Nd-147	531.00	30.	-8.	-0.002	139.28	-8.758E-01	
Ba-140	537.26	4.	12.	0.003	46.73	6.596E-01	
CS-134	569.32	22.	9.	0.003	77.76	8.757E-01	
BI-207	569.70	38.	-4.	-0.001	198.14	-6.648E-02	
TL-208	583.02	35.	-3.	-0.001	454.83	-4.639E-02	
SB-124	602.73	99.	11.	0.003	132.99	1.670E-01	
CS-134	604.71	110.	2.	0.001	772.96	2.987E-02	
BI-214	609.31	130.	-18.	-0.005	63.00	-6.051E-01	P
RH-106	621.92	98.	10.	0.003	145.81	1.534E+00	
I-131	636.97	17.	5.	0.001	120.61	1.134E+00	
AG-110M	657.76	22.	9.	0.002	82.31	1.490E-01	
CS-137	661.66	51.	-12.	-0.003	86.12	-2.357E-01	
NB-94	702.63	28.	-3.	-0.001	378.59	-5.199E-02	
SB-124	722.79	29.	2.	0.000	466.05	2.673E-01	
BI-212	727.17	32.	-1.	0.000	609.30	-3.075E-01	
pm-146	735.72	23.	-7.	-0.002	144.53	-5.726E-01	
pm-146	747.16	19.	-4.	-0.001	255.36	-1.917E-01	
AG-110M	763.94	16.	-2.	-0.001	291.55	-1.623E-01	
NB-95	765.79	43.	-14.	-0.004	70.04	-2.590E-01	
PA-234M	766.41	35.	9.	0.003	95.61	5.762E+01	
EU-152	778.92	14.	5.	0.001	164.92	7.087E-01	
BI-212	785.42	23.	-4.	-0.001	241.30	-6.248E+00	
CS-134	795.87	42.	-12.	-0.003	80.32	-2.676E-01	
TL-210	799.60	55.	-5.	-0.001	205.21	-9.869E-02	
CO-58	810.78	57.	-14.	-0.004	83.24	-2.579E-01	
MN-54	834.85	5.	6.	0.002	91.87	1.085E-01	
Co-56	846.77	20.	5.	0.001	201.66	9.770E-02	
TL-208	860.56	25.	-8.	-0.002	141.88	-1.273E+00	
NB-94	871.10	24.	-6.	-0.002	122.47	-1.198E-01	
EU-154	873.23	32.	-1.	0.000	806.23	-1.628E-01	
PA-234	880.53	21.	2.	0.001	331.66	6.702E-01	
y-88	898.04	25.	5.	0.001	224.35	1.089E-01	
AG-110M	937.49	10.	2.	0.001	354.73	1.226E-01	
PA-234	946.02	5.	14.	0.004	44.13	2.216E+00	
EU-152	964.11	6.	6.	0.002	71.17	9.057E-01	
EU-154	996.33	10.	6.	0.002	83.99	1.274E+00	
PA-234M	1001.00	16.	6.	0.002	101.37	1.623E+01	
EU-154	1004.77	23.	3.	0.001	215.68	3.989E-01	
Co-56	1037.84	21.	-9.	-0.003	117.15	-1.502E+00	
Cs-136	1048.07	16.	-1.	0.000	574.46	-2.863E-02	
RH-106	1050.36	8.	6.	0.002	74.49	9.252E+00	
BI-207	1063.66	11.	3.	0.001	229.35	1.036E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ga-68	1077.40	5.	1.	0.000	796.87	6.339E-01		
FE-59	1099.25	11.	2.	0.001	324.82	9.805E-02		
EU-152	1112.07	11.	6.	0.002	88.19	1.053E+00		
Sc-46	1120.55	22.	-5.	-0.001	251.83	-1.150E-01		P
Ta-182	1121.30	40.	-11.	-0.003	85.21	-7.785E-01		
CO-60	1173.24	0.	5.	0.001	44.72	1.248E-01		
Ta-182	1189.05	16.	-11.	-0.003	87.98	-1.711E+00		
Co-56	1238.28	11.	7.	0.002	124.60	2.623E-01		
NA-22	1274.53	0.	7.	0.002	37.80	1.862E-01		
FE-59	1291.60	11.	-3.	-0.001	243.10	-2.072E-01		
TL-210	1313.00	6.	2.	0.001	248.05	3.022E-01		
CO-60	1332.50	6.	4.	0.001	137.50	1.193E-01		
AG-110M	1384.30	6.	2.	0.001	248.05	2.724E-01		
EU-152	1408.00	6.	3.	0.001	205.48	4.104E-01		
K-40	1460.83	18.	3.	0.001	346.41	8.321E-01		
SB-124	1690.98	0.	7.	0.002	37.80	4.890E-01		
Co-56	1771.35	7.	4.	0.001	167.91	8.975E-01		
y-88	1836.06	7.	2.	0.001	289.62	8.429E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.1874E+00	1.1874E+00	1.070E+02%	4.32E+00
NA-22	#A	1.8618E-01	1.8618E-01	3.780E+01%	1.96E-01
K-40	#A	8.3209E-01	8.3209E-01	3.464E+02%	6.24E+00
Sc-46	#A	-1.3506E-02	-1.3506E-02	1.039E+03%	5.14E-01
CR-51	#A	-1.4728E+00	-1.4728E+00	1.668E+02%	8.25E+00
MN-54	#A	1.0852E-01	1.0852E-01	9.187E+01%	2.47E-01
FE-59	#A	9.8053E-02	9.8054E-02	3.248E+02%	7.53E-01
Co-56	#A	1.6321E-01	1.6321E-01	1.185E+02%	4.60E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.88E-01
CO-58	#A	-2.5786E-01	-2.5786E-01	8.324E+01%	7.20E-01
CO-60	#A	1.2206E-01	1.2206E-01	4.472E+01%	3.80E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.04E+00
NB-94	#A	-5.1994E-02	-5.1994E-02	3.786E+02%	4.74E-01
ZR-95	#A	1.0984E-02	1.0985E-02	2.755E+03%	7.53E-01
NB-95	#A	-2.5903E-01	-2.5903E-01	7.004E+01%	6.03E-01
RU-103	#A	2.8528E-02	2.8528E-02	4.848E+02%	3.64E-01
RH-106	#A	2.5819E+00	2.5819E+00	7.449E+01%	7.61E+00
AG-108M	#A	1.0279E-01	1.0279E-01	1.342E+02%	3.52E-01
AG-110M	#A	1.1032E-01	1.1032E-01	8.231E+01%	6.96E-01
SN-113	#A	-1.4486E-01	-1.4486E-01	1.615E+02%	7.99E-01
SB-124	#A	2.7200E-01	2.7200E-01	3.780E+01%	7.54E-01
SB-125	#	7.4524E-01	7.4524E-01	3.672E+01%	4.67E-01

I-131	#A	1.7163E-02	1.7163E-02	6.177E+01%	4.64E-01
Gd-153	#A	-1.7846E-02	-1.7846E-02	1.047E+02%	1.20E+00
Ga-68	#A	6.3215E-01	6.3387E-01	7.969E+02%	1.28E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.19E-01
BA-133	#A	-6.3781E-02	-6.3781E-02	3.182E+02%	7.04E-01
CS-134	#A	1.4500E-01	1.4500E-01	7.776E+01%	7.99E-01
CS-137	#A	-2.3567E-01	-2.3567E-01	8.612E+01%	6.83E-01
CE-139	#A	8.3680E-02	8.3680E-02	1.056E+02%	2.99E-01
Ba-140	#A	6.5961E-01	6.5962E-01	4.673E+01%	7.02E-01
La-140	#A	8.1122E-02	8.1122E-02	1.193E+02%	4.71E-01
CE-141	#A	1.1703E-01	1.1703E-01	1.422E+02%	5.65E-01
CE-144	#A	7.8856E-02	7.8856E-02	1.375E+03%	3.69E+00
PM-144	#A	1.7026E-02	1.7026E-02	1.127E+03%	4.66E-01
EU-152	#A	5.6141E-01	5.6141E-01	7.117E+01%	1.70E+00
EU-154	#A	2.9640E-01	2.9640E-01	8.399E+01%	4.73E+00
EU-155	A	3.0460E-01	3.0460E-01	3.564E+01%	4.17E-01
HF-181	#A	8.6327E-02	8.6328E-02	1.760E+02%	6.17E-01
Ta-182	#A	-7.7849E-01	-7.7849E-01	8.521E+01%	2.24E+00
Hg-203	#A	-9.9995E-02	-9.9996E-02	1.520E+02%	5.17E-01
TL-208	#A	-4.6394E-02	-4.6394E-02	4.548E+02%	5.24E-01
pm-146	#A	-1.9169E-01	-1.9169E-01	2.554E+02%	1.19E+00
y-88	#A	9.6237E-02	9.6237E-02	1.832E+02%	5.66E-01
Cd-113m	#A	-1.2091E+03	-1.2091E+03	1.231E+02%	5.08E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.97E+00
Cf-251	#A	-1.3893E-01	-1.3893E-01	3.504E+02%	1.29E+00
Cf-249	#A	1.7028E-01	1.7028E-01	1.290E+02%	6.88E-01
Sn-126	#A	-9.5001E-01	-9.5001E-01	1.306E+02%	4.17E+00
PB-210	#A	1.9251E+00	1.9251E+00	1.222E+02%	7.26E+00
PB-212	#A	9.4411E-02	9.4411E-02	2.813E+02%	7.31E-01
PB-214	A	2.9457E-01	2.9457E-01	8.145E+01%	7.10E-01
BI-207	#A	7.1010E-03	7.1010E-03	1.515E+02%	4.62E-01
BI-212	#A	-3.0754E-01	-3.0754E-01	6.093E+02%	6.74E+00
U-235	#A	-1.5273E-01	-1.5273E-01	2.430E+02%	3.32E+00
BI-214	#A	-6.0512E-01	-6.0512E-01	6.300E+01%	1.85E+00
BI-210M	#A	1.6489E-01	1.6489E-01	9.914E+01%	5.54E-01
AC-228	#	8.5782E-01	8.5782E-01	2.774E+01%	5.24E-01
TH-227	#A	-4.0023E-02	-4.0023E-02	8.744E+01%	5.11E+00
TH-229	#A	1.5570E+00	1.5570E+00	1.074E+02%	4.38E+00
TH-234	#A	9.2379E-01	9.2379E-01	2.046E+02%	6.28E+00
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.20E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.80E+00
PA-234	#A	7.0958E-01	7.0958E-01	4.413E+01%	1.69E+00
PA-234M	#A	2.6987E+01	2.6987E+01	6.967E+01%	5.69E+01
AM-241	#A	-2.5369E-01	-2.5369E-01	1.276E+02%	1.09E+00
Np-237	#A	-5.6888E-01	-5.6888E-01	1.600E+02%	3.06E+00
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.55E-01
Cs-136	#A	1.4556E-02	1.4556E-02	1.218E+03%	4.39E-01
Np-239	#A	-2.9370E-01	-2.9371E-01	1.506E+02%	1.49E+00
Nd-147	#A	-8.7582E-01	-8.7583E-01	1.393E+02%	2.98E+00

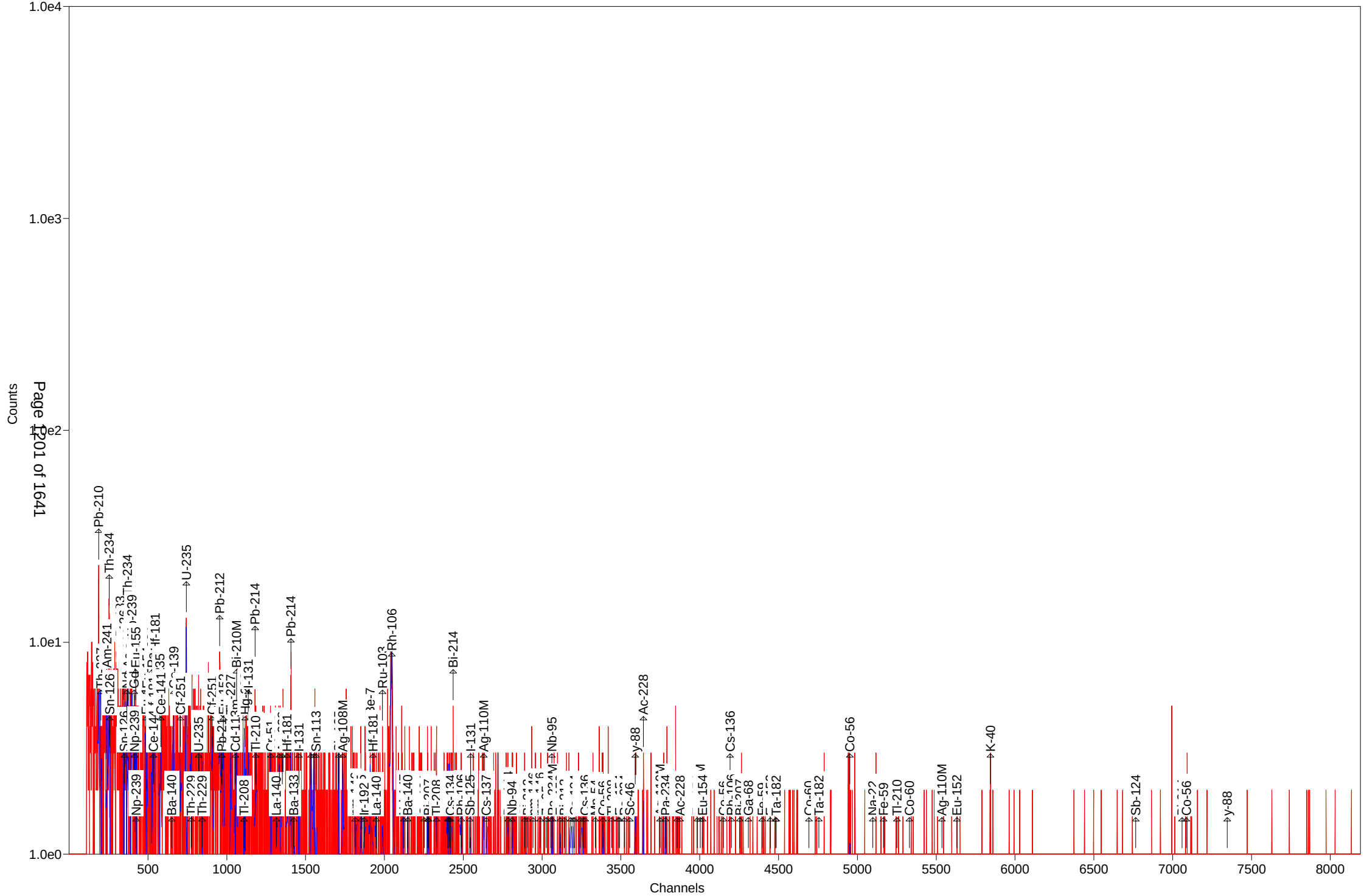
TL-210 #A	-1.8684E-02	-1.8684E-02	1.736E+02%	7.03E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 3.046E-01 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 3.0460298E-01 Bq/Sample

376766_Gamma_MB 160-376766~1-A. 12_Gamma_20181356.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20183009

Sample Description: 376766_Gamma_LCS 160-376766~2-A
Detector: Detector #14
Batch ID: 376766
Work Order Number: Gamma
Lot Number: LCS 160-376766~2-A

Decay to Time: 8/9/2018 18:41 Live Time: 3600 sec
Acquisition Time: 8/9/2018 18:42:05 Real Time: 3614 sec
Analysis Time: 8/9/2018 19:42 Dead Time: 0.39 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_100ml.Clb
Efficiency Cal Desc: 14_100mLSoild_90099_022012
Efficiency Cal Date: 4/12/2012 10:42
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-07-14_1759.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	5.801E+00	93.8	5.441E+00	5.449E+00	1.805E+01
NA-22	-1.548E-01	201.0	3.111E-01	3.112E-01	1.083E+00
K-40	1.041E+00	376.2	3.916E+00	3.916E+00	9.208E+00
Sc-46	-1.109E+00	92.1	1.021E+00	1.022E+00	3.384E+00
CR-51	-4.409E+00	37.7	1.663E+00	1.679E+00	1.467E+01
MN-54	-9.585E-01	90.7	8.692E-01	8.706E-01	1.941E+00
FE-59	7.215E-01	98.0	7.071E-01	7.080E-01	4.078E+00
Co-56	-2.518E-02	2113.6	5.321E-01	5.321E-01	1.810E+00
CO-57	1.519E-01	126.7	1.924E-01	1.926E-01	9.769E-01
CO-58	-5.856E-01	125.9	7.372E-01	7.378E-01	2.458E+00
CO-60	1.320E+02	1.1	1.476E+00	6.788E+00	8.554E-01
ZN-65	2.078E+00	75.9	1.577E+00	1.580E+00	5.225E+00
NB-94	3.831E-01	150.3	5.756E-01	5.760E-01	1.351E+00
ZR-95	-5.557E-01	217.9	1.211E+00	1.211E+00	2.844E+00
NB-95	6.453E-01	73.6	4.748E-01	4.760E-01	1.573E+00
RU-103	-2.295E-01	270.0	6.197E-01	6.198E-01	1.510E+00
RH-106	1.559E+00	385.2	6.005E+00	6.006E+00	2.874E+01
AG-108M	5.543E-01	81.2	4.503E-01	4.511E-01	1.527E+00
AG-110M	4.581E-01	41.9	1.917E-01	1.932E-01	4.101E+00
SN-113	-2.091E-01	435.4	9.104E-01	9.105E-01	3.042E+00
SB-124	1.751E-01	84.8	1.485E-01	1.488E-01	2.865E+00
SB-125	1.390E+00	71.1	9.875E-01	9.900E-01	4.737E+00
I-131	4.028E-01	136.1	5.482E-01	5.486E-01	1.390E+00
Gd-153	7.003E-01	82.2	5.759E-01	5.775E-01	1.712E+00
Ga-68	2.193E+00	1756.8	3.852E+01	3.852E+01	8.455E+01
Tc-99m	2.007E-01	189.6	3.805E-01	3.807E-01	1.266E+00
BA-133	7.413E-01	102.0	7.559E-01	7.569E-01	2.509E+00
CS-134	6.153E-01	82.2	5.057E-01	5.067E-01	2.866E+00
CS-137	1.791E+02	1.2	2.108E+00	9.553E+00	1.666E+00
CE-139	3.216E-01	113.1	3.636E-01	3.649E-01	1.207E+00
Ba-140	1.665E+00	115.8	1.928E+00	1.930E+00	5.295E+00
La-140	3.684E-01	134.3	4.948E-01	4.952E-01	7.281E-01
CE-141	-5.441E-01	110.9	6.032E-01	6.038E-01	1.597E+00

CE-144	0.000E+00	1.#INF	7.333E-01	7.333E-01	1.001E+01
PM-144	1.492E-01	224.9	3.356E-01	3.357E-01	1.388E+00
EU-152	1.842E+00	48.4	8.923E-01	8.975E-01	6.974E+00
EU-154	1.429E+00	85.8	1.227E+00	1.229E+00	1.764E+01
EU-155	4.938E-01	167.1	8.250E-01	8.255E-01	4.741E+00
HF-181	1.086E+00	82.0	8.910E-01	8.927E-01	2.354E+00
Ta-182	2.754E+00	59.3	1.632E+00	1.638E+00	8.119E+00
Hg-203	4.757E-01	95.0	4.520E-01	4.528E-01	1.500E+00
TL-208	2.917E+00	31.9	9.296E-01	9.419E-01	1.436E+00
pm-146	4.320E+00	32.5	1.402E+00	1.420E+00	3.035E+00
y-88	-7.387E-01	38.1	2.818E-01	2.843E-01	2.222E+00
Cd-113m	3.094E+03	208.2	6.441E+03	6.444E+03	2.149E+04
Cd-109	6.770E+00	150.0	1.016E+01	1.016E+01	3.367E+01
Cf-251	9.532E-01	180.7	1.722E+00	1.724E+00	4.582E+00
Cf-249	7.365E-01	114.9	8.465E-01	8.474E-01	2.811E+00
Sn-126	2.414E+00	137.7	3.323E+00	3.326E+00	1.103E+01
PB-210	4.914E+03	0.7	3.365E+01	2.905E+02	6.730E+01
PB-212	1.479E+00	63.7	9.417E-01	9.465E-01	3.102E+00
PB-214	2.517E-01	515.0	1.297E+00	1.297E+00	4.334E+00
BI-207	1.299E-01	214.8	2.790E-01	2.791E-01	1.327E+00
BI-212	4.782E+00	148.3	7.094E+00	7.098E+00	2.377E+01
U-235	1.743E+00	91.6	1.596E+00	1.599E+00	9.920E+00
BI-214	3.567E+00	32.2	1.148E+00	1.163E+00	2.537E+00
BI-210M	0.000E+00	1.#INF	2.986E-01	2.986E-01	2.622E+00
AC-228	2.046E+00	151.7	3.105E+00	3.106E+00	6.978E+00
TH-227	1.748E+02	14.1	2.456E+01	2.635E+01	8.025E+01
TH-229	5.302E+00	105.7	5.607E+00	5.623E+00	1.988E+01
TH-234	-1.287E+01	355.2	4.570E+01	4.570E+01	2.626E+01
PA-231	1.485E+01	162.0	2.405E+01	2.407E+01	7.980E+01
PA-233	-6.549E-01	189.9	1.243E+00	1.244E+00	3.152E+00
PA-234	1.693E+00	135.5	2.295E+00	2.296E+00	6.085E+00
PA-234M	-2.018E+01	315.9	6.375E+01	6.376E+01	3.956E+02
AM-241	5.923E+02	0.6	3.664E+00	3.096E+01	5.120E+00
Np-237	2.006E+00	168.9	3.389E+00	3.391E+00	1.123E+01
Ir-192	2.194E-01	72.4	1.589E-01	1.594E-01	1.484E+00
Cs-136	1.000E+00	55.4	5.544E-01	5.574E-01	2.298E+00
Np-239	1.068E+00	113.9	1.217E+00	1.218E+00	4.037E+00
Nd-147	5.878E-01	150.7	8.857E-01	8.864E-01	1.035E+01
TL-210	3.714E-01	172.5	6.408E-01	6.412E-01	2.148E+00
Total	9.175E+03				

Analyst: Morgan Reichert

Sample description
376766_Gamma_LCS 160-376766~2-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183009.An1

Acquisition information
Start time: 8/9/2018 6:42:05 PM
Live time: 3600
Real time: 3614
Dead time: 0.39 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_100ml.Clb
14_100mLSoild_90099_022012

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 10:42:57 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.272938E-02 + (-4.365475E-01*Log(E)) + (-3.087719E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.54 %
Log(Eff): -1.386068E+01 + (4.872649E+00*Log(E)) + (-5.398101E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 6:41:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-07-14_1759.PBC 7/14/2018 5:59:49 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2236

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
26.51	254.	22.15	0.63	2.484E-02				
32.21	950.	9.23	1.00	3.176E-02				
36.66	762.	12.15	0.93	3.639E-02				
46.66	33537.	0.69	0.75	4.470E-02	46.54	4.250	4.911E+03	PB210
49.73	41.	249.00	0.75	4.671E-02	50.14	8.000	PBC<MDA	TH227
59.62	39542.	0.62	0.91	5.169E-02	59.54	35.900	5.923E+02	AM241
63.69	45.	137.66	0.77	5.335E-02	64.28	9.700	PBC<MDA	Sn126
77.19	170.	27.50	1.05	5.614E-02				
86.49	54.	168.95	0.79	5.691E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.559E-01	EU155
86.54	53.	167.08	0.79	5.691E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.348E-01	EU155
86.98	53.	167.38	0.79	5.692E-02	86.94	9.040	PBC<MDA	Sn126
87.99	916.	7.65	0.92	5.695E-02	87.57	37.500	1.192E+01	Sn126
					88.04	3.790	1.179E+02	Cd109
91.10	53.	150.70	0.79	5.699E-02	91.10	28.300	PBC<MDA	Nd147
92.59	9.	857.56	0.80	5.699E-02	92.59	5.584	PBC<MDA	TH234
94.08	53.	151.10	0.80	5.698E-02	93.35	5.561	PBC<MDA	AC228
97.02	43.	82.24	0.46	5.686E-02	97.50	30.000	PBC<MDA	Gd153
99.50	50.	108.07	0.80	5.676E-02	99.50	15.000	PBC<MDA	Np239
106.13	49.	113.89	0.81	5.629E-02	106.13	22.700	PBC<MDA	Np239
121.43	92.	48.43	1.27	5.448E-02	121.78	28.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
123.10	48.	108.28	0.83	5.430E-02	123.10	40.790	PBC<MDA	EU154
136.47	47.	126.73	0.84	5.221E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.348E+00	CO57
140.51	31.	189.58	0.85	5.153E-02	140.51	89.300	PBC<MDA	Tc99m
163.32	43.	115.81	0.87	4.758E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
163.38	10.	437.80	0.87	4.745E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	PBC<MDA	U235
165.85	44.	113.06	0.87	4.733E-02	165.85	79.900	PBC<MDA	CE139
176.60	26.	180.69	0.88	4.514E-02	176.60	17.000	PBC<MDA	Cf251
185.72	21.	236.88	0.89	4.345E-02	185.72	54.000	PBC<MDA	U235
188.59	54.	54.30	0.58	4.295E-02				
193.51	47.	105.74	0.90	4.212E-02	193.51	4.400	PBC<MDA	TH229
199.05	33.	72.99	0.58	4.122E-02				
205.33	47.	91.57	0.91	4.025E-02	205.33	5.010	PBC<MDA	U235
210.85	11.	438.04	0.92	3.944E-02	210.85	2.990	PBC<MDA	TH229
227.00	45.	101.26	0.93	3.727E-02	227.00	6.300	PBC<MDA	Cf251
238.04	83.	63.67	0.94	3.585E-02	238.63	43.300	PBC<MDA	PB212
242.00	12.	448.12	0.95	3.547E-02	242.00	7.430	PBC<MDA	PB214
256.24	36.	123.72	0.96	3.392E-02	256.24	7.000	PBC<MDA	TH227
263.70	22.	208.20	0.97	3.317E-02	263.70	0.006	PBC<MDA	Cd113m
269.22	40.	61.94	0.70	3.264E-02				
279.20	44.	95.01	0.99	3.172E-02	279.20	81.460	PBC<MDA	Hg203
300.24	4.	628.32	1.01	2.997E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
302.82	46.	161.97	1.01	2.977E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.334E+00	BA133
305.02	32.	231.92	1.01	2.960E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.068E+00	BI210M
327.40	47.	45.52	0.70	2.798E-02				
345.83	42.	133.83	1.05	2.678E-02	345.83	15.070	PBC<MDA	HF181
351.93	9.	515.01	1.06	2.641E-02	351.93	37.600	PBC<MDA	PB214
356.00	43.	101.97	1.06	2.617E-02	356.00	62.050	PBC<MDA	BA133
364.48	30.	136.10	1.07	2.568E-02	364.48	81.700	PBC<MDA	I131
383.84	43.	113.29	1.09	2.464E-02	383.84	8.940	PBC<MDA	BA133
387.95	43.	114.94	1.09	2.443E-02	387.95	66.000	PBC<MDA	Cf249
433.94	23.	189.20	1.13	2.231E-02	433.94	90.480	PBC<MDA	AG108M
468.06	50.	93.55	1.17	2.098E-02	468.06	51.750	PBC<MDA	Ir192
477.60	45.	93.80	1.18	2.064E-02	477.60	10.520	PBC<MDA	BE7
482.00	44.	94.89	1.18	2.048E-02	482.00	80.500	PBC<MDA	HF181
487.02	31.	134.32	1.18	2.031E-02	487.02	45.500	PBC<MDA	La140
510.45	179.	38.38	1.88	1.954E-02	511.86	20.000	1.273E+01	RH106
563.24	8.	417.17	1.25	1.802E-02	563.24	8.350	PBC<MDA	CS134
569.32	26.	92.68	1.26	1.786E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.996E+00	PA234
					569.70	97.740	4.193E-01	BI207
583.02	69.	46.14	1.27	1.751E-02	583.02	84.500	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.44	100.	32.18	1.52	1.688E-02	609.31	46.090	3.567E+00	BI214
610.30	36.	139.10	1.30	1.686E-02	610.30	5.750	PBC<MDA	RU103
614.28	36.	140.72	1.30	1.677E-02	614.28	89.850	PBC<MDA	AG108M
618.06	23.	224.88	1.30	1.668E-02	618.06	99.100	PBC<MDA	PM144
635.89	33.	71.05	1.32	1.629E-02	635.89	11.310	PBC<MDA	SB125
657.76	32.	416.93	1.34	1.584E-02	657.76	94.640	PBC<MDA	AG110M
661.53	8657.	1.18	1.47	1.576E-02	661.66	85.210	1.791E+02	CS137
702.59	20.	150.26	1.38	1.498E-02	702.63	97.900	PBC<MDA	NB94
722.79	19.	145.99	1.40	1.463E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.042E-01	AG108M
					723.36	20.220	1.817E+00	EU154
722.94	33.	81.23	1.40	1.463E-02	722.79	10.810	5.785E+00	SB124
					722.94	90.840	6.885E-01	AG108M
					723.36	20.220	3.095E+00	EU154
723.36	9.	315.08	1.40	1.462E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.826E-01	AG108M
					723.36	20.220	8.207E-01	EU154
727.17	19.	148.34	1.40	1.456E-02	727.17	7.550	PBC<MDA	BI212
735.93	5.	608.55	1.41	1.441E-02	735.72	22.500	PBC<MDA	pm146
747.78	75.	32.45	3.63	1.423E-02	747.16	34.000	4.320E+00	pm146
763.94	35.	70.65	1.43	1.396E-02	763.94	22.280	PBC<MDA	AG110M
765.79	32.	73.58	1.43	1.393E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	20.	157.43	1.44	1.373E-02	778.92	12.940	PBC<MDA	EU152
795.87	36.	82.18	1.46	1.348E-02	795.87	85.530	PBC<MDA	CS134
799.60	18.	172.52	1.46	1.343E-02	799.60	98.960	PBC<MDA	TL210
818.50	36.	90.25	1.48	1.317E-02	818.50	100.000	PBC<MDA	Cs136
860.56	79.	43.98	1.51	1.262E-02	860.56	12.420	1.392E+01	TL208
886.75	44.	50.66	0.64	1.230E-02				
910.66	26.	151.73	1.55	1.202E-02	911.07	29.000	PBC<MDA	AC228
935.00	21.	60.75	0.66	1.175E-02				
937.49	41.	62.72	1.58	1.172E-02	937.49	34.360	PBC<MDA	AG110M
946.02	28.	147.66	1.58	1.163E-02	946.02	13.400	PBC<MDA	PA234
964.80	36.	104.75	1.60	1.145E-02	964.11	14.605	PBC<MDA	EU152
1004.77	42.	85.83	1.63	1.105E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	40.	64.34	1.66	1.065E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	7.	385.15	1.66	1.063E-02	1050.36	1.560	PBC<MDA	RH106
1063.66	13.	268.14	1.67	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	15.	259.34	1.70	1.022E-02	1099.25	56.500	PBC<MDA	FE59
1115.55	38.	75.91	1.71	1.009E-02	1115.55	50.600	PBC<MDA	ZN65
1121.30	38.	81.69	1.72	1.004E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.045E+00	Sc46
					1121.30	34.900	2.996E+00	Ta182
1173.31	4650.	1.56	1.79	9.654E-03	1173.24	99.900	1.339E+02	CO60
1189.05	25.	83.51	1.77	9.542E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	13.	134.03	1.79	9.321E-03	1221.41	27.000	PBC<MDA	Ta182
1291.60	10.	98.00	1.84	8.875E-03	1291.60	43.200	PBC<MDA	FE59
1332.68	4042.	1.60	1.69	8.634E-03	1332.50	99.980	1.301E+02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1408.11	1.	884.59	1.92	8.225E-03	1408.00	21.005	PBC<MDA	EU152
1460.81	3.	376.18	1.96	7.961E-03	1460.83	10.670	PBC<MDA	K40
1596.21	3.	302.33	2.04	7.357E-03	1596.21	95.400	PBC<MDA	La140
1690.98	7.	84.82	2.10	6.988E-03	1690.98	47.790	PBC<MDA	SB124

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
105.48	26.39	1248.	254.	1.022E+04	22.15	0.635	- s
128.29	32.21	1925.	950.	2.992E+04	9.23	1.003	- s
146.08	36.66	2604.	762.	2.094E+04	12.15	0.934	- s
198.72	49.71	5162.	69.	1.475E+03	147.97	0.751	- sc
308.13	77.19	755.	170.	3.025E+03	27.50	1.053	- s
753.64	188.59	328.	54.	1.269E+03	54.30	0.578	- s
795.44	199.05	247.	33.	7.925E+02	72.99	0.582	- sc
1076.10	269.22	236.	40.	1.241E+03	61.94	0.699	- s
1308.78	327.40	179.	47.	1.692E+03	45.52	0.701	- sM
2040.92	510.45	607.	179.	9.148E+03	38.38	1.876	- s
3545.94	886.75	131.	32.	2.570E+03	54.23	1.534	- sD
3739.32	935.00	68.	21.	1.815E+03	60.75	0.656	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.58	46.54	9611.	33557.	9.321	0.68	0.748D
TH-227	199.98	50.14	54002.	2364.	0.657	14.05	0.751
AM-241	237.89	59.62	5296.	39542.	10.984	0.62	0.910s
TH-234	252.55	63.29	1632.	-94.	-0.026	355.16	0.765s
Sn-126	256.52	64.28	1894.	45.	0.012	137.66	0.766s
BA-133	323.33	80.99	1500.	-61.	-0.017	107.81	0.784s
Np-237	345.33	86.49	4109.	54.	0.015	168.95	0.789s
EU-155	345.54	86.54	3821.	53.	0.015	167.08	0.790s
Sn-126	347.13	86.94	3838.	53.	0.015	167.38	0.790s
Sn-126	349.65	87.57	3765.	186.	0.052	29.38	0.791D
Cd-109	351.53	88.04	3088.	53.	0.015	150.03	0.791A

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.77	91.10	3141.	53.	0.015	150.70	0.794s
TH-234	369.72	92.59	3169.	9.	0.003	857.56	0.796s
AC-228	372.76	93.35	3168.	53.	0.015	151.10	0.797s
Gd-153	387.42	97.02	483.	43.	0.012	82.24	0.460s
Np-239	397.36	99.50	1412.	50.	0.014	108.07	0.803
Gd-153	412.15	103.20	1847.	-17.	-0.005	351.50	0.807s
Np-239	414.15	103.70	1865.	0.	0.000	1000.00	0.807
EU-155	420.60	105.31	1865.	0.	0.000	1000.00	0.809
Np-239	423.87	106.13	1522.	49.	0.014	113.89	0.810s
EU-152	485.03	121.43	604.	92.	0.026	48.43	1.272s
CO-57	487.58	122.06	1196.	-20.	-0.006	239.65	0.826s
EU-154	491.73	123.10	1305.	48.	0.013	108.28	0.828s
PA-234	524.50	131.29	1964.	-28.	-0.008	227.31	0.836
HF-181	531.42	133.02	1991.	0.	0.000	1000.00	0.838s
CE-144	533.47	133.54	1991.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	1991.	0.	0.000	1000.00	0.841
CO-57	545.21	136.47	1761.	47.	0.013	126.73	0.841
Tc-99m	561.35	140.51	1749.	31.	0.009	189.58	0.845s
CE-141	581.07	145.44	873.	-48.	-0.013	110.86	0.850
Ba-140	649.93	162.66	1230.	43.	0.012	115.81	0.868s
U-235	652.81	163.38	872.	10.	0.003	437.80	0.869s
CE-139	662.70	165.85	1204.	44.	0.012	113.06	0.871
Cf-251	705.68	176.60	707.	26.	0.007	180.69	0.882s
U-235	742.15	185.72	1212.	21.	0.006	236.88	0.892s
TH-229	773.30	193.51	777.	47.	0.013	105.74	0.899s
U-235	820.58	205.33	583.	47.	0.013	91.57	0.912s
TH-229	842.65	210.85	767.	11.	0.003	438.04	0.917
Cf-251	907.23	227.00	643.	45.	0.013	101.26	0.933s
PB-212	953.75	238.63	1341.	83.	0.023	63.67	0.945s
PB-214	967.21	242.00	1466.	12.	0.003	448.12	0.948s
EU-152	977.99	244.69	1673.	-28.	-0.008	209.92	0.951s
TH-227	1024.17	256.24	627.	36.	0.010	123.72	0.962
Cd-113m	1054.01	263.70	1054.	22.	0.006	208.20	0.970s
BI-210M	1062.53	265.83	1076.	0.	0.000	1000.00	0.972s
TL-208	1108.33	277.28	882.	-29.	-0.008	179.12	0.983s
Hg-203	1115.99	279.20	862.	44.	0.012	95.01	0.985s
I-131	1136.39	284.30	682.	-36.	-0.010	146.36	0.990s
PB-214	1179.54	295.09	2725.	-55.	-0.015	96.36	1.001s
TL-210	1183.18	296.00	2670.	-46.	-0.013	161.15	1.002s
PA-231	1199.46	300.07	2603.	4.	0.001	628.32	1.006D
PA-231	1209.78	302.65	2733.	46.	0.013	161.97	1.008s
Ba-140	1218.57	304.85	2715.	32.	0.009	231.92	1.011s
PA-233	1247.22	312.01	620.	-25.	-0.007	189.87	1.018
Ir-192	1265.13	316.49	789.	-36.	-0.010	110.61	1.022s
CR-51	1279.51	320.08	993.	-45.	-0.012	37.71	1.026s
La-140	1314.21	328.76	672.	-46.	-0.013	36.90	1.034s
Cf-249	1332.92	333.44	623.	-47.	-0.013	100.30	1.039s
AC-228	1352.44	338.32	1503.	-47.	-0.013	118.26	1.043

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	1361.44	340.57	1285.	-47.	-0.013	107.99	1.045s
EU-152	1376.30	344.29	1429.	-21.	-0.006	99.61	1.049
HF-181	1382.47	345.83	1563.	42.	0.012	133.83	1.050s
PB-214	1406.88	351.93	1067.	9.	0.002	515.01	1.056
BA-133	1423.15	356.00	955.	43.	0.012	101.97	1.060s
I-131	1457.08	364.48	482.	30.	0.008	136.10	1.069s
BA-133	1534.50	383.84	1143.	43.	0.012	113.29	1.087
Cf-249	1550.94	387.95	1186.	43.	0.012	114.94	1.091
SN-113	1565.90	391.69	1287.	-12.	-0.003	435.43	1.095s
AG-108M	1734.87	433.94	540.	23.	0.006	189.20	1.135s
pm-146	1814.64	453.88	673.	-13.	-0.003	141.50	1.154s
SB-125	1852.59	463.37	1261.	-5.	-0.001	942.73	1.163s
Ir-192	1871.36	468.06	1048.	50.	0.014	93.55	1.167s
BE-7	1909.50	477.60	882.	45.	0.013	93.80	1.176
HF-181	1927.10	482.00	864.	44.	0.012	94.89	1.180s
La-140	1947.19	487.02	432.	31.	0.008	134.32	1.185s
RU-103	1987.33	497.05	424.	-15.	-0.004	270.01	1.194
RH-106	2046.57	511.86	986.	-80.	-0.022	86.30	2.458s
CS-134	2252.06	563.24	260.	8.	0.002	417.17	1.255
CS-134	2276.40	569.32	285.	26.	0.007	92.68	1.260s
PA-234	2276.99	569.47	311.	0.	0.000	1000.00	1.261s
BI-207	2277.92	569.70	299.	-7.	-0.002	335.69	1.261s
TL-208	2331.20	583.02	251.	69.	0.019	46.14	1.273s
SB-125	2401.12	600.50	1367.	-37.	-0.010	85.94	1.289s
SB-124	2410.04	602.73	1329.	-23.	-0.007	220.42	1.291s
CS-134	2417.96	604.71	1306.	0.	0.000	1000.00	1.292s
BI-214	2436.87	609.44	215.	100.	0.028	32.18	1.517
RU-103	2440.31	610.30	1202.	36.	0.010	139.10	1.297s
AG-108M	2456.25	614.28	1238.	36.	0.010	140.72	1.301s
PM-144	2471.37	618.06	1273.	23.	0.006	224.88	1.304
RH-106	2486.79	621.92	1296.	0.	0.000	1000.00	1.308s
SB-125	2542.69	635.89	260.	33.	0.009	71.05	1.320s
I-131	2547.03	636.97	348.	-36.	-0.010	74.24	1.321s
AG-110M	2630.18	657.76	9033.	32.	0.009	416.93	1.339s
CS-137	2645.26	661.53	279.	8657.	2.405	1.18	1.472
PM-144	2785.32	696.54	238.	-4.	-0.001	728.80	1.374s
NB-94	2809.67	702.63	217.	20.	0.006	150.26	1.379s
SB-124	2890.31	722.79	389.	19.	0.005	145.99	1.396s
AG-108M	2890.91	722.94	341.	33.	0.009	81.23	1.397s
EU-154	2892.59	723.36	374.	9.	0.002	315.08	1.397s
ZR-95	2895.96	724.20	400.	-37.	-0.010	81.27	1.398s
BI-212	2907.84	727.17	384.	19.	0.005	148.34	1.400s
pm-146	2942.05	735.72	221.	5.	0.001	608.55	1.408s
pm-146	2990.30	747.78	116.	75.	0.021	32.45	3.629s
ZR-95	3026.09	756.73	264.	-15.	-0.004	217.94	1.426s
AG-110M	3054.96	763.94	292.	35.	0.010	70.65	1.432s
NB-95	3062.34	765.79	266.	32.	0.009	73.58	1.433s
PA-234M	3064.83	766.41	392.	-37.	-0.010	66.52	1.434

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	3114.87	778.92	225.	20.	0.005	157.43	1.444
BI-212	3140.88	785.42	338.	-45.	-0.012	54.76	1.450s
CS-134	3182.67	795.87	425.	36.	0.010	82.18	1.459
TL-210	3197.61	799.60	461.	18.	0.005	172.52	1.462s
CS-134	3207.01	801.95	606.	-41.	-0.011	86.29	1.464s
CO-58	3242.31	810.77	600.	-28.	-0.008	125.88	1.471s
La-140	3262.30	815.77	628.	0.	0.000	1000.00	1.475s
Cs-136	3273.22	818.50	520.	36.	0.010	90.25	1.478
MN-54	3338.63	834.85	355.	-45.	-0.012	90.68	1.492
TL-208	3441.51	860.56	247.	79.	0.022	43.98	1.513s
NB-94	3483.65	871.10	368.	-8.	-0.002	134.82	1.522s
EU-154	3492.19	873.23	410.	-8.	-0.002	375.40	1.523s
PA-234	3521.39	880.53	817.	-46.	-0.013	88.44	1.529s
PA-234	3532.24	883.24	774.	-46.	-0.013	86.03	1.531s
AG-110M	3538.01	884.68	772.	-48.	-0.013	82.70	1.533s
Sc-46	3556.40	889.28	991.	-49.	-0.014	92.06	1.536s
y-88	3591.45	898.04	360.	-30.	-0.008	38.14	1.543s
AC-228	3643.58	911.07	331.	26.	0.007	151.73	1.554s
AG-110M	3749.30	937.49	316.	41.	0.011	62.72	1.576s
PA-234	3783.42	946.02	383.	28.	0.008	147.66	1.582s
EU-152	3855.80	964.11	308.	36.	0.010	104.75	1.597s
AC-228	3875.25	968.97	592.	-22.	-0.006	156.70	1.601
EU-154	3984.71	996.33	769.	-48.	-0.013	83.75	1.622
PA-234M	4003.39	1001.00	771.	-7.	-0.002	315.90	1.626s
EU-154	4018.51	1004.77	641.	42.	0.012	85.83	1.629s
Co-56	4150.81	1037.84	300.	-21.	-0.006	182.64	1.655
Cs-136	4191.74	1048.07	306.	40.	0.011	64.34	1.663s
RH-106	4200.91	1050.36	345.	7.	0.002	385.15	1.665s
BI-207	4254.12	1063.66	241.	13.	0.004	268.14	1.675s
FE-59	4396.54	1099.25	310.	15.	0.004	259.34	1.702s
EU-152	4447.85	1112.07	547.	-13.	-0.004	249.65	1.712
ZN-65	4461.74	1115.55	401.	38.	0.011	75.91	1.714
BI-214	4480.72	1120.29	530.	-3.	-0.001	433.32	1.718s
Sc-46	4481.77	1120.55	546.	-12.	-0.003	284.67	1.718
Ta-182	4484.77	1121.30	458.	38.	0.011	81.69	1.719s
CO-60	4692.91	1173.31	96.	4650.	1.292	1.56	1.786
Ta-182	4755.88	1189.05	85.	25.	0.007	83.51	1.769s
Ta-182	4885.38	1221.41	53.	13.	0.004	134.03	1.792s
Co-56	4952.89	1238.28	85.	-25.	-0.007	287.50	1.805s
NA-22	5097.96	1274.53	48.	-5.	-0.001	201.00	1.831
EU-154	5098.01	1274.54	53.	0.	0.000	1000.00	1.831
FE-59	5166.25	1291.60	17.	10.	0.003	98.00	1.843s
TL-210	5251.92	1313.00	48.	-7.	-0.002	228.12	1.858s
CO-60	5330.69	1332.68	26.	4042.	1.123	1.60	1.693
AG-110M	5537.26	1384.30	21.	-5.	-0.001	201.56	1.907s
EU-152	5632.13	1408.00	27.	1.	0.000	884.59	1.923
K-40	5843.58	1460.83	30.	3.	0.001	376.18	1.958
La-140	6385.44	1596.21	11.	3.	0.001	302.33	2.044s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6764.81	1690.98	6.	7.	0.002	84.82	2.102s
BI-214	7059.07	1764.49	72.	-26.	-0.007	18.60	2.145s
Co-56	7086.53	1771.35	85.	-7.	-0.002	193.06	2.149s
y-88	7345.59	1836.06	18.	-7.	-0.002	151.19	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	5.8007E+00					5.31E+01	
			477.60	5.801E+00	&(	1.805E+01	9.38E+01 1.05E+01	G
NA-22	C	-1.5477E-01					9.50E+02	
			1274.53	-1.548E-01	?(	1.083E+00	2.01E+02 9.99E+01	G
K-40	N	1.0410E+00					4.66E+11	
			1460.83	1.041E+00	?(P	9.208E+00	3.76E+02 1.07E+01	G
Sc-46	F	-1.1089E+00					8.38E+01	
			889.28	-1.109E+00	&(	3.384E+00	9.21E+01 1.00E+02	G
			1120.55	-3.225E-01	+	3.084E+00	2.85E+02 1.00E+02	G
CR-51	F	-4.4088E+00					2.77E+01	
			320.08	-4.409E+00	?(P	1.467E+01	3.77E+01 9.94E+00	G
MN-54	C	-9.5849E-01					3.12E+02	
			834.85	-9.585E-01	&(	1.941E+00	9.07E+01 1.00E+02	G
FE-59	F	7.2149E-01					4.45E+01	
			1099.25	7.217E-01	(	4.078E+00	2.59E+02 5.65E+01	G
			1291.60	7.212E-01	?(P	1.595E+00	9.80E+01 4.32E+01	G
Co-56	C	-2.5177E-02					7.73E+01	
			846.77	-2.518E-02	&(P	1.810E+00	2.11E+03 9.99E+01	G
			1238.28	-1.152E+00	+ P	2.090E+00	2.87E+02 6.61E+01	G
			1037.84	-3.844E+00	+	1.527E+01	1.83E+02 1.41E+01	G
			1771.35	-1.845E+00	+	1.223E+01	1.93E+02 1.55E+01	A
CO-57	C	1.5186E-01					2.72E+02	
			122.06	-1.222E-01	(	9.769E-01	2.40E+02 8.56E+01	G
			136.47	2.348E+00	?(	9.876E+00	1.27E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-5.8563E-01					7.09E+01	
			810.78	-5.856E-01	?(	2.458E+00	1.26E+02	9.95E+01 G
CO-60	F	1.3198E+02					1.93E+03	
			1332.50	1.301E+02	(P	8.554E-01	1.60E+00	1.00E+02 G
			1173.24	1.339E+02	(P	1.396E+00	1.56E+00	9.99E+01 G
ZN-65	F	2.0775E+00					2.44E+02	
			1115.55	2.078E+00	?(	5.225E+00	7.59E+01	5.06E+01 G
NB-94	I	3.8307E-01					7.41E+06	
			702.63	3.831E-01	?(P	1.351E+00	1.50E+02	9.79E+01 G
			871.10	-1.890E-01	- P	2.053E+00	1.35E+02	9.99E+01 G
ZR-95	I	-5.5572E-01					6.40E+01	
			756.73	-5.557E-01	&(	2.844E+00	2.18E+02	5.45E+01 G
			724.20	-1.613E+00	+ P	4.130E+00	8.13E+01	4.42E+01 G
NB-95	I	6.4527E-01					6.40E+01	
			765.79	6.453E-01	(	1.573E+00	7.36E+01	9.98E+01 G
RU-103	I	-2.2950E-01					3.93E+01	
			497.05	-2.295E-01	?(	1.510E+00	2.70E+02	9.09E+01 G
			610.30	1.018E+01	?	4.708E+01	1.39E+02	5.75E+00 GA
RH-106	I	1.5592E+00					3.74E+02	
			621.92	0.000E+00	&(	2.874E+01	1.00E+03	9.93E+00 G
			1050.36	1.148E+01	@(	1.496E+02	3.85E+02	1.56E+00 G
			511.86	-5.673E+00	+ P	1.062E+01	8.63E+01	2.00E+01 GA
AG-108M	C	5.5431E-01					1.53E+05	
			433.94	3.180E-01	&(P	1.527E+00	1.89E+02	9.05E+01 G
			722.94	6.885E-01	&(	1.857E+00	8.12E+01	9.08E+01 G
			614.28	6.567E-01	?(	3.073E+00	1.41E+02	8.98E+01 G
AG-110M	F	4.5809E-01					2.50E+02	
			884.68	-1.497E+00	(	4.101E+00	8.27E+01	7.27E+01 G
			657.76	5.981E-01	&	8.259E+00	4.17E+02	9.46E+01 G
			937.49	2.852E+00	&(	5.897E+00	6.27E+01	3.44E+01 G
			1384.30	-7.305E-01	+	3.319E+00	2.02E+02	2.43E+01 G
			763.94	3.144E+00	?(	7.349E+00	7.07E+01	2.23E+01 G
SN-113	F	-2.0908E-01					1.15E+02	
			391.69	-2.091E-01	?(	3.042E+00	4.35E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	1.7506E-01					6.02E+01	
			602.73	-3.900E-01	?(	2.865E+00	2.20E+02	9.83E+01 G
			1690.98	6.083E-01	?(	1.148E+00	8.48E+01	4.78E+01 G
			722.79	3.396E+00	&(	1.661E+01	1.46E+02	1.08E+01 G
SB-125	I	1.3898E+00					1.01E+03	
			427.88	1.395E-02	&(P	4.737E+00	1.33E+04	2.96E+01 G
			600.50	-3.389E+00	+ P	1.593E+01	8.59E+01	1.79E+01 G
			635.89	4.991E+00	&(	1.174E+01	7.11E+01	1.13E+01 G
			463.37	-6.689E-01	&	2.110E+01	9.43E+02	1.05E+01 G
I-131	I	4.0281E-01					8.02E+00	
			364.48	4.028E-01	?(P	1.390E+00	1.36E+02	8.17E+01 G
			284.30	-5.209E+00	& P	1.800E+01	1.46E+02	6.14E+00 G
			636.97	-8.684E+00	+	2.135E+01	7.42E+01	7.17E+00 G
Gd-153	F	7.0026E-01					2.42E+02	
			97.50	7.003E-01	(	1.712E+00	8.22E+01	3.00E+01 G
			103.20	-3.907E-01	&	4.576E+00	3.51E+02	2.18E+01 G
Ga-68	C	2.1926E+00					4.71E-02	
			1077.40	2.193E+00	%(	8.455E+01	1.76E+03	3.30E+00 G
Tc-99m	I	2.0070E-01					2.51E-01	
			140.51	2.007E-01	*(	1.266E+00	1.90E+02	8.93E+01 G
BA-133	F	7.4126E-01					3.85E+03	
			356.00	7.413E-01	(	2.509E+00	1.02E+02	6.20E+01 G
			302.85	2.242E-01	%	1.244E+01	1.67E+03	1.83E+01 G
			383.84	5.372E+00	?	2.021E+01	1.13E+02	8.94E+00 GA
			80.99	-8.781E-01	+	2.641E+00	1.08E+02	3.41E+01 GA
CS-134	I	6.1534E-01					7.54E+02	
			604.71	0.000E+00	(	2.866E+00	1.00E+03	9.76E+01 G
			795.87	8.725E-01	&(	2.379E+00	8.22E+01	8.55E+01 G
			569.32	2.663E+00	?(	8.225E+00	9.27E+01	1.54E+01 G
			801.95	-9.791E+00	+	2.803E+01	8.63E+01	8.69E+00 G
			563.24	1.403E+00	?(P	1.438E+01	4.17E+02	8.35E+00 G
CS-137	I	1.7910E+02					1.10E+04	
			661.66	1.791E+02	(	1.666E+00	1.18E+00	8.52E+01 G
CE-139	F	3.2163E-01					1.38E+02	
			165.85	3.216E-01	(	1.207E+00	1.13E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	1.6645E+00					1.28E+01	
			537.26	1.216E-01	%(	5.295E+00	1.77E+03	2.44E+01 G
			162.66	4.055E+00	&(	1.560E+01	1.16E+02	6.22E+00 G
			304.85	6.970E+00	?(	5.370E+01	2.32E+02	4.29E+00 G
La-140	I	3.6837E-01					1.28E+01	
			1596.21	1.055E-01	(	7.281E-01	3.02E+02	9.54E+01 G
			487.02	9.195E-01	*(P	2.994E+00	1.34E+02	4.55E+01 G
			328.76	-2.260E+00	& P	6.063E+00	3.69E+01	2.03E+01 G
			815.77	0.000E+00	-	1.080E+01	1.00E+03	2.33E+01 G
CE-141	I	-5.4410E-01					3.25E+01	
			145.44	-5.441E-01	?(	1.597E+00	1.11E+02	4.82E+01 G
PM-144	C	1.4922E-01					3.63E+02	
			696.54	-8.056E-02	?(	1.388E+00	7.29E+02	9.90E+01 G
			618.06	3.788E-01	?(	2.840E+00	2.25E+02	9.91E+01 G
EU-152	F	1.8425E+00					4.94E+03	
			344.29	-8.330E-01	&(P	6.974E+00	9.96E+01	2.65E+01 G
			1112.07	-2.684E+00	+	2.249E+01	2.50E+02	1.36E+01 G
			121.78	1.650E+00	(	2.092E+00	4.84E+01	2.86E+01 G
			778.92	3.074E+00	(	1.136E+01	1.57E+02	1.29E+01 G
			964.11	5.982E+00	?(	1.404E+01	1.05E+02	1.46E+01 G
			244.69	-2.883E+00	&	2.015E+01	2.10E+02	7.58E+00 G
			1408.00	2.144E-01	-	4.305E+00	8.85E+02	2.10E+01 GA
EU-154	I	1.4293E+00					3.14E+03	
			873.23	-1.393E+00	&(	1.764E+01	3.75E+02	1.23E+01 G
			123.10	5.971E-01	&(	2.145E+00	1.08E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.221E+00	1.00E+03	3.52E+01 G
			723.36	8.207E-01	?(	8.726E+00	3.15E+02	2.02E+01 G
			1004.77	5.920E+00	?(	1.685E+01	8.58E+01	1.80E+01 G
			996.33	-1.120E+01	+	3.107E+01	8.37E+01	1.06E+01 G
EU-155	I	4.9379E-01					1.81E+03	
			105.31	0.000E+00	&(	4.741E+00	1.00E+03	2.12E+01 G
			86.54	8.348E-01	?(	4.623E+00	1.67E+02	3.07E+01 G
HF-181	F	1.0861E+00					4.24E+01	
			482.00	7.476E-01	?(	2.354E+00	9.49E+01	8.05E+01 G
			133.02	0.000E+00	&	2.561E+00	1.00E+03	4.33E+01 G
			345.83	2.895E+00	&(P	1.287E+01	1.34E+02	1.51E+01 G
			136.30	0.000E+00	-	1.915E+01	1.00E+03	5.85E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ta-182	F	2.7540E+00					1.14E+02	
			1121.30	2.996E+00	?(	8.119E+00	8.17E+01	3.49E+01 G
			1221.41	1.398E+00	?(	4.056E+00	1.34E+02	2.70E+01 G
			1189.05	4.492E+00	&(	8.207E+00	8.35E+01	1.62E+01 G
Hg-203	F	4.7574E-01					4.66E+01	
			279.20	4.757E-01	?(	1.500E+00	9.50E+01	8.15E+01 G
TL-208	N	2.9168E+00					6.98E+02	
			583.02	1.300E+00	*(P	1.436E+00	4.61E+01	8.45E+01 G
			277.28	-4.060E+00	- P	1.948E+01	1.79E+02	6.31E+00 G
			860.56	1.392E+01	&(P	1.348E+01	4.40E+01	1.24E+01 G
pm-146	C	4.3203E+00					2.02E+03	
			747.16	4.320E+00	*(P	3.035E+00	3.25E+01	3.40E+01 G
			735.72	4.283E-01	-	6.166E+00	6.09E+02	2.25E+01 G
			453.88	-2.488E-01	- P	2.455E+00	1.41E+02	6.50E+01 G
y-88	F	-7.3868E-01					1.07E+02	
			898.04	-7.387E-01	?(P	2.222E+00	3.81E+01	9.37E+01 G
			1836.06	-3.020E-01	+	9.700E-01	1.51E+02	9.92E+01 G
Cd-113m		3.0936E+03					5.33E+03	
			263.70	3.094E+03	&(	2.149E+04	2.08E+02	6.00E-03 K
Cd-109	F	6.7698E+00					4.53E+02	
							Derived Ave Activity	
			88.04	6.770E+00	}(	3.367E+01	1.50E+02	3.79E+00 G
Cf-251	T	9.5317E-01					3.28E+05	
			176.60	9.532E-01	?(	4.582E+00	1.81E+02	1.70E+01 G
			227.00	5.332E+00	&	1.431E+01	1.01E+02	6.30E+00 GA
Cf-249	T	7.3652E-01					1.28E+05	
			387.95	7.365E-01	?(	2.811E+00	1.15E+02	6.60E+01 G
			333.44	-3.057E+00	+	7.733E+00	1.00E+02	1.55E+01 G
Sn-126		2.4140E+00					3.65E+07	
			87.57	2.414E+00	}	3.755E+00	2.94E+01	3.75E+01 GA
			64.28	2.414E+00	&(	1.103E+01	1.38E+02	9.70E+00 G
			86.94	2.835E+00	?	1.573E+01	1.67E+02	9.04E+00 GA
PB-210	N	4.9142E+03					8.14E+03	
			46.54	4.914E+03	(P	6.730E+01	6.85E-01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.4790E+00					6.98E+02	
			238.63	1.479E+00	&(P	3.102E+00	6.37E+01	4.33E+01 G
			300.03	0.000E+00	} P	6.852E+01	2.68E+03	3.28E+00 GA
PB-214	N	2.5174E-01					5.84E+05	
			351.93	2.517E-01	(P	4.334E+00	5.15E+02	3.76E+01 G
			295.09	-2.606E+00	+ P	1.165E+01	9.64E+01	1.93E+01 G
			242.00	1.276E+00	*	1.909E+01	4.48E+02	7.43E+00 GA
BI-207	C	1.2988E-01					1.18E+04	
			569.70	-1.168E-01	&(	1.327E+00	3.36E+02	9.77E+01 G
			1063.66	4.535E-01	?(P	2.663E+00	2.68E+02	7.45E+01 G
BI-212	N	4.7820E+00					6.98E+02	
			727.17	4.782E+00	&(P	2.377E+01	1.48E+02	7.55E+00 G
			785.42	-7.107E+01	+ P	1.407E+02	5.48E+01	1.28E+00 GA
U-235	N	1.7431E+00					2.57E+11	
			143.79	-1.536E-01	%(P	9.920E+00	2.58E+03	1.10E+01 G
			205.33	6.542E+00	*(P	1.587E+01	9.16E+01	5.01E+00 G
			163.38	1.103E+00	?(P	1.618E+01	4.38E+02	5.08E+00 G
			185.72	2.474E-01	* P	1.953E+00	2.37E+02	5.40E+01 GA
BI-214	N	3.5668E+00					5.84E+05	
			609.31	3.567E+00	(P	2.537E+00	3.22E+01	4.61E+01 G
			1120.29	-5.932E-01	- P	2.014E+01	4.33E+02	1.51E+01 G
			1764.49	-6.972E+00	- P	1.130E+01	1.86E+01	1.54E+01 G
AC-228	N	2.0461E+00					2.10E+03	
			911.07	2.046E+00	?(	6.978E+00	1.52E+02	2.90E+01 G
			968.97	-3.095E+00	+	1.621E+01	1.57E+02	1.75E+01 G
			338.32	-3.965E+00	+	1.556E+01	1.18E+02	1.20E+01 G
			93.35	4.638E+00	&	2.323E+01	1.51E+02	5.56E+00 XA
TH-227	N	1.7477E+02					7.95E+03	
			50.14	1.748E+02	(P	8.025E+01	1.41E+01	8.00E+00 G
			256.24	4.250E+00	-	1.396E+01	1.24E+02	7.00E+00 G
TH-229	N	5.3021E+00					2.68E+06	
			193.51	7.100E+00	(P	1.988E+01	1.06E+02	4.40E+00 G
			210.85	2.656E+00	(P	3.103E+01	4.38E+02	2.99E+00 G
TH-234	N	-1.2866E+01					1.63E+12	
			63.29	-1.287E+01	(P	2.626E+01	3.55E+02	3.81E+00 G
			92.59	8.116E-01	+ P	2.314E+01	8.58E+02	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-231	N	1.4850E+01					1.20E+07	
			302.65	1.485E+01	?(	7.980E+01	1.62E+02	2.88E+00 G
			300.07	1.604E+00	} P	9.059E+01	6.28E+02	2.46E+00 G
PA-233	C	-6.5486E-01					7.82E+08	
			312.01	-6.549E-01	?(	3.152E+00	1.90E+02	3.60E+01 G
			300.18	1.141E-06	%	3.649E+01	9.60E+08	6.20E+00 G
PA-234	N	1.6932E+00					1.63E+12	
			131.29	-8.047E-01	&(	6.085E+00	2.27E+02	1.80E+01 G
			946.02	5.049E+00	&(	1.673E+01	1.48E+02	1.34E+01 G
			569.47	0.000E+00	-	1.611E+01	1.00E+03	8.20E+00 G
			883.24	-1.089E+01	+	3.104E+01	8.60E+01	9.60E+00 G
			880.53	-1.735E+01	+	5.087E+01	8.84E+01	6.00E+00 GA
PA-234M	N	-2.0182E+01					1.63E+12	
			1001.00	-2.018E+01	&(P	3.956E+02	3.16E+02	8.37E-01 G
			766.41	-2.492E+02	+ P	6.442E+02	6.65E+01	2.94E-01 G
AM-241	T	5.9227E+02					1.58E+05	
			59.54	5.923E+02	*(	5.120E+00	6.19E-01	3.59E+01 G
Np-237	F	2.0059E+00					2.14E+06	
			86.49	2.006E+00	?(	1.123E+01	1.69E+02	1.31E+01 G
Ir-192	F	2.1938E-01					7.40E+01	
			316.49	-4.035E-01	?(	1.484E+00	1.11E+02	8.70E+01 G
			468.06	1.267E+00	&(	3.930E+00	9.36E+01	5.18E+01 G
			308.44	2.276E-07	&	7.281E+00	9.60E+08	3.18E+01 G
Cs-136	F	1.0004E+00					1.30E+01	
			818.50	7.666E-01	&(	2.298E+00	9.02E+01	1.00E+02 G
			1048.07	1.293E+00	?(	2.744E+00	6.43E+01	8.00E+01 G
			340.57	-1.035E+00	-	3.709E+00	1.08E+02	4.69E+01 G
Np-239	T	1.0684E+00					2.36E+00	
			103.70	0.000E+00	&	4.205E+00	1.00E+03	2.40E+01 X
			106.13	1.068E+00	?(	4.037E+00	1.14E+02	2.27E+01 G
			99.50	1.629E+00		5.839E+00	1.08E+02	1.50E+01 X
Nd-147		5.8776E-01					1.11E+01	
			531.00	-1.130E-01	&(	1.035E+01	3.74E+03	1.30E+01 G
			91.10	9.096E-01	?(	4.545E+00	1.51E+02	2.83E+01 G
TL-210	N	3.7145E-01					5.84E+05	
			799.60	3.714E-01	&(	2.148E+00	1.73E+02	9.90E+01 G
			296.00	-5.285E-01	&	2.826E+00	1.61E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	-1.059E+00 +	5.292E+00	2.28E+02	2.10E+01	GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	63.29	1632.	-94.	-0.026	355.16	-1.287E+01	P
BA-133	80.99	1500.	-61.	-0.017	107.81	-8.781E-01	
Np-237	86.49	4109.	54.	0.015	168.95	2.006E+00	
EU-155	86.54	3821.	53.	0.015	167.08	8.348E-01	
Nd-147	91.10	3141.	53.	0.015	150.70	9.096E-01	
TH-234	92.59	3169.	9.	0.003	857.56	8.116E-01	P
Np-239	99.50	1412.	50.	0.014	108.07	1.629E+00	
Np-239	106.13	1522.	49.	0.014	113.89	1.068E+00	
CO-57	122.06	1196.	-20.	-0.006	239.65	-1.222E-01	
EU-154	123.10	1305.	48.	0.013	108.28	5.971E-01	
PA-234	131.29	1964.	-28.	-0.008	227.31	-8.047E-01	
CO-57	136.47	1761.	47.	0.013	126.73	2.348E+00	
Tc-99m	140.51	1749.	31.	0.009	189.58	2.007E-01	
CE-141	145.44	873.	-48.	-0.013	110.86	-5.441E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	163.38	872.	10.	0.003	437.80	1.103E+00	P
Cf-251	176.60	707.	26.	0.007	180.69	9.532E-01	
U-235	185.72	1212.	21.	0.006	236.88	2.474E-01	P
TH-229	193.51	777.	47.	0.013	105.74	7.100E+00	P
U-235	205.33	583.	47.	0.013	91.57	6.542E+00	P
TH-229	210.85	767.	11.	0.003	438.04	2.656E+00	P
Cf-251	227.00	643.	45.	0.013	101.26	5.332E+00	
PB-214	242.00	1466.	12.	0.003	448.12	1.276E+00	
Cd-113m	263.70	1054.	22.	0.006	208.20	3.094E+03	
Hg-203	279.20	862.	44.	0.012	95.01	4.757E-01	
I-131	284.30	682.	-36.	-0.010	146.36	-5.209E+00	P
PB-214	295.09	2725.	-55.	-0.015	96.36	-2.606E+00	P
TL-210	296.00	2670.	-46.	-0.013	161.15	-5.285E-01	
PA-233	312.01	620.	-25.	-0.007	189.87	-6.549E-01	
Ir-192	316.49	789.	-36.	-0.010	110.61	-4.035E-01	
CR-51	320.08	993.	-45.	-0.012	37.71	-4.409E+00	P
La-140	328.76	672.	-46.	-0.013	36.90	-2.260E+00	P
Cf-249	333.44	623.	-47.	-0.013	100.30	-3.057E+00	
Cs-136	340.57	1285.	-47.	-0.013	107.99	-1.035E+00	
HF-181	345.83	1563.	42.	0.012	133.83	2.895E+00	P
PB-214	351.93	1067.	9.	0.002	515.01	2.517E-01	P
BA-133	356.00	955.	43.	0.012	101.97	7.413E-01	
I-131	364.48	482.	30.	0.008	136.10	4.028E-01	P
BA-133	383.84	1143.	43.	0.012	113.29	5.372E+00	
Cf-249	387.95	1186.	43.	0.012	114.94	7.365E-01	
SN-113	391.69	1287.	-12.	-0.003	435.43	-2.091E-01	
AG-108M	433.94	540.	23.	0.006	189.20	3.180E-01	P
SB-125	463.37	1261.	-5.	-0.001	942.73	-6.689E-01	
Ir-192	468.06	1048.	50.	0.014	93.55	1.267E+00	
BE-7	477.60	882.	45.	0.013	93.80	5.801E+00	
HF-181	482.00	864.	44.	0.012	94.89	7.476E-01	
La-140	487.02	432.	31.	0.008	134.32	9.195E-01	P
RU-103	497.05	424.	-15.	-0.004	270.01	-2.295E-01	
RH-106	511.86	986.	-80.	-0.022	86.30	-5.673E+00	P
CS-134	563.24	260.	8.	0.002	417.17	1.403E+00	P
CS-134	569.32	285.	26.	0.007	92.68	2.663E+00	
BI-207	569.70	299.	-7.	-0.002	335.69	-1.168E-01	
SB-125	600.50	1367.	-37.	-0.010	85.94	-3.389E+00	P
SB-124	602.73	1329.	-23.	-0.007	220.42	-3.900E-01	
RU-103	610.30	1202.	36.	0.010	139.10	1.018E+01	
AG-108M	614.28	1238.	36.	0.010	140.72	6.567E-01	
PM-144	618.06	1273.	23.	0.006	224.88	3.788E-01	
SB-125	635.89	260.	33.	0.009	71.05	4.991E+00	
I-131	636.97	348.	-36.	-0.010	74.24	-8.684E+00	
AG-110M	657.76	9033.	32.	0.009	416.93	5.981E-01	
PM-144	696.54	238.	-4.	-0.001	728.80	-8.056E-02	
SB-124	722.79	389.	19.	0.005	145.99	3.396E+00	
AG-108M	722.94	341.	33.	0.009	81.23	6.885E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	723.36	374.	9.	0.002	315.08	8.207E-01	
ZR-95	724.20	400.	-37.	-0.010	81.27	-1.613E+00	P
BI-212	727.17	384.	19.	0.005	148.34	4.782E+00	P
ZR-95	756.73	264.	-15.	-0.004	217.94	-5.557E-01	
AG-110M	763.94	292.	35.	0.010	70.65	3.144E+00	
NB-95	765.79	266.	32.	0.009	73.58	6.453E-01	
PA-234M	766.41	392.	-37.	-0.010	66.52	-2.492E+02	P
BI-212	785.42	338.	-45.	-0.012	54.76	-7.107E+01	P
CS-134	795.87	425.	36.	0.010	82.18	8.725E-01	
TL-210	799.60	461.	18.	0.005	172.52	3.714E-01	
CS-134	801.95	606.	-41.	-0.011	86.29	-9.791E+00	
CO-58	810.77	600.	-28.	-0.008	125.88	-5.856E-01	
Cs-136	818.50	520.	36.	0.010	90.25	7.666E-01	
MN-54	834.85	355.	-45.	-0.012	90.68	-9.585E-01	
EU-154	873.23	410.	-8.	-0.002	375.40	-1.393E+00	
PA-234	880.53	817.	-46.	-0.013	88.44	-1.735E+01	
PA-234	883.24	774.	-46.	-0.013	86.03	-1.089E+01	
AG-110M	884.68	772.	-48.	-0.013	82.70	-1.497E+00	
Sc-46	889.28	991.	-49.	-0.014	92.06	-1.109E+00	
y-88	898.04	360.	-30.	-0.008	38.14	-7.387E-01	P
AG-110M	937.49	316.	41.	0.011	62.72	2.852E+00	
PA-234	946.02	383.	28.	0.008	147.66	5.049E+00	
EU-154	996.33	769.	-48.	-0.013	83.75	-1.120E+01	
PA-234M	1001.00	771.	-7.	-0.002	315.90	-2.018E+01	P
EU-154	1004.77	641.	42.	0.012	85.83	5.920E+00	
Co-56	1037.84	300.	-21.	-0.006	182.64	-3.844E+00	
Cs-136	1048.07	306.	40.	0.011	64.34	1.293E+00	
RH-106	1050.36	345.	7.	0.002	385.15	1.148E+01	
BI-207	1063.66	241.	13.	0.004	268.14	4.535E-01	P
FE-59	1099.25	310.	15.	0.004	259.34	7.217E-01	
ZN-65	1115.55	401.	38.	0.011	75.91	2.078E+00	
Sc-46	1120.55	546.	-12.	-0.003	284.67	-3.225E-01	
Ta-182	1121.30	458.	38.	0.011	81.69	2.996E+00	
Ta-182	1189.05	85.	25.	0.007	83.51	4.492E+00	
Ta-182	1221.41	53.	13.	0.004	134.03	1.398E+00	
Co-56	1238.28	85.	-25.	-0.007	287.50	-1.152E+00	P
NA-22	1274.53	48.	-5.	-0.001	201.00	-1.548E-01	
FE-59	1291.60	17.	10.	0.003	98.00	7.212E-01	P
TL-210	1313.00	48.	-7.	-0.002	228.12	-1.059E+00	
AG-110M	1384.30	21.	-5.	-0.001	201.56	-7.305E-01	
La-140	1596.21	11.	3.	0.001	302.33	1.055E-01	
SB-124	1690.98	6.	7.	0.002	84.82	6.083E-01	
Co-56	1771.35	85.	-7.	-0.002	193.06	-1.845E+00	
y-88	1836.06	18.	-7.	-0.002	151.19	-3.020E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	5.8006E+00	5.8007E+00	9.380E+01%	1.80E+01
NA-22	#A	-1.5477E-01	-1.5477E-01	2.010E+02%	1.08E+00
K-40	#A	1.0410E+00	1.0410E+00	3.762E+02%	9.21E+00
Sc-46	#A	-1.1089E+00	-1.1089E+00	9.206E+01%	3.38E+00
CR-51	#A	-4.4087E+00	-4.4088E+00	3.771E+01%	1.47E+01
MN-54	#A	-9.5849E-01	-9.5849E-01	9.068E+01%	1.94E+00
FE-59	#A	7.2148E-01	7.2149E-01	9.800E+01%	4.08E+00
Co-56	#A	-2.5177E-02	-2.5177E-02	2.114E+03%	1.81E+00
CO-57	#A	1.5186E-01	1.5186E-01	1.267E+02%	9.77E-01
CO-58	#A	-5.8563E-01	-5.8563E-01	1.259E+02%	2.46E+00
CO-60		1.3198E+02	1.3198E+02	1.119E+00%	8.55E-01
ZN-65	#A	2.0775E+00	2.0775E+00	7.591E+01%	5.22E+00
NB-94	#A	3.8307E-01	3.8307E-01	1.503E+02%	1.35E+00
ZR-95	#A	-5.5572E-01	-5.5572E-01	2.179E+02%	2.84E+00
NB-95	#A	6.4526E-01	6.4527E-01	7.358E+01%	1.57E+00
RU-103	#A	-2.2950E-01	-2.2950E-01	2.700E+02%	1.51E+00
RH-106	#A	1.5592E+00	1.5592E+00	3.852E+02%	2.87E+01
AG-108M	#A	5.5431E-01	5.5431E-01	8.123E+01%	1.53E+00
AG-110M	#A	4.5809E-01	4.5809E-01	4.185E+01%	4.10E+00
SN-113	#A	-2.0908E-01	-2.0908E-01	4.354E+02%	3.04E+00
SB-124	#A	1.7506E-01	1.7506E-01	8.482E+01%	2.87E+00
SB-125	#A	1.3898E+00	1.3898E+00	7.105E+01%	4.74E+00
I-131	#A	4.0278E-01	4.0281E-01	1.361E+02%	1.39E+00
Gd-153	A	7.0026E-01	7.0026E-01	8.224E+01%	1.71E+00
Ga-68	#A	2.1685E+00	2.1926E+00	1.757E+03%	8.46E+01
Tc-99m	#A	2.0028E-01	2.0070E-01	1.896E+02%	1.27E+00
BA-133	#A	7.4126E-01	7.4126E-01	1.020E+02%	2.51E+00
CS-134	#A	6.1534E-01	6.1534E-01	8.218E+01%	2.87E+00
CS-137		1.7910E+02	1.7910E+02	1.177E+00%	1.67E+00
CE-139	A	3.2163E-01	3.2163E-01	1.131E+02%	1.21E+00
Ba-140	#A	1.6645E+00	1.6645E+00	1.158E+02%	5.30E+00
La-140	#A	3.6836E-01	3.6837E-01	1.343E+02%	7.28E-01
CE-141	#A	-5.4409E-01	-5.4410E-01	1.109E+02%	1.60E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.00E+01
PM-144	#A	1.4922E-01	1.4922E-01	2.249E+02%	1.39E+00
EU-152	A	1.8425E+00	1.8425E+00	4.843E+01%	6.97E+00
EU-154	#A	1.4293E+00	1.4293E+00	8.583E+01%	1.76E+01
EU-155	#A	4.9379E-01	4.9379E-01	1.671E+02%	4.74E+00
HF-181	#A	1.0861E+00	1.0861E+00	8.203E+01%	2.35E+00
Ta-182	#A	2.7540E+00	2.7540E+00	5.927E+01%	8.12E+00
Hg-203	#A	4.7574E-01	4.7574E-01	9.501E+01%	1.50E+00
TL-208	#	2.9168E+00	2.9168E+00	3.187E+01%	1.44E+00
pm-146	#	4.3203E+00	4.3203E+00	3.245E+01%	3.04E+00

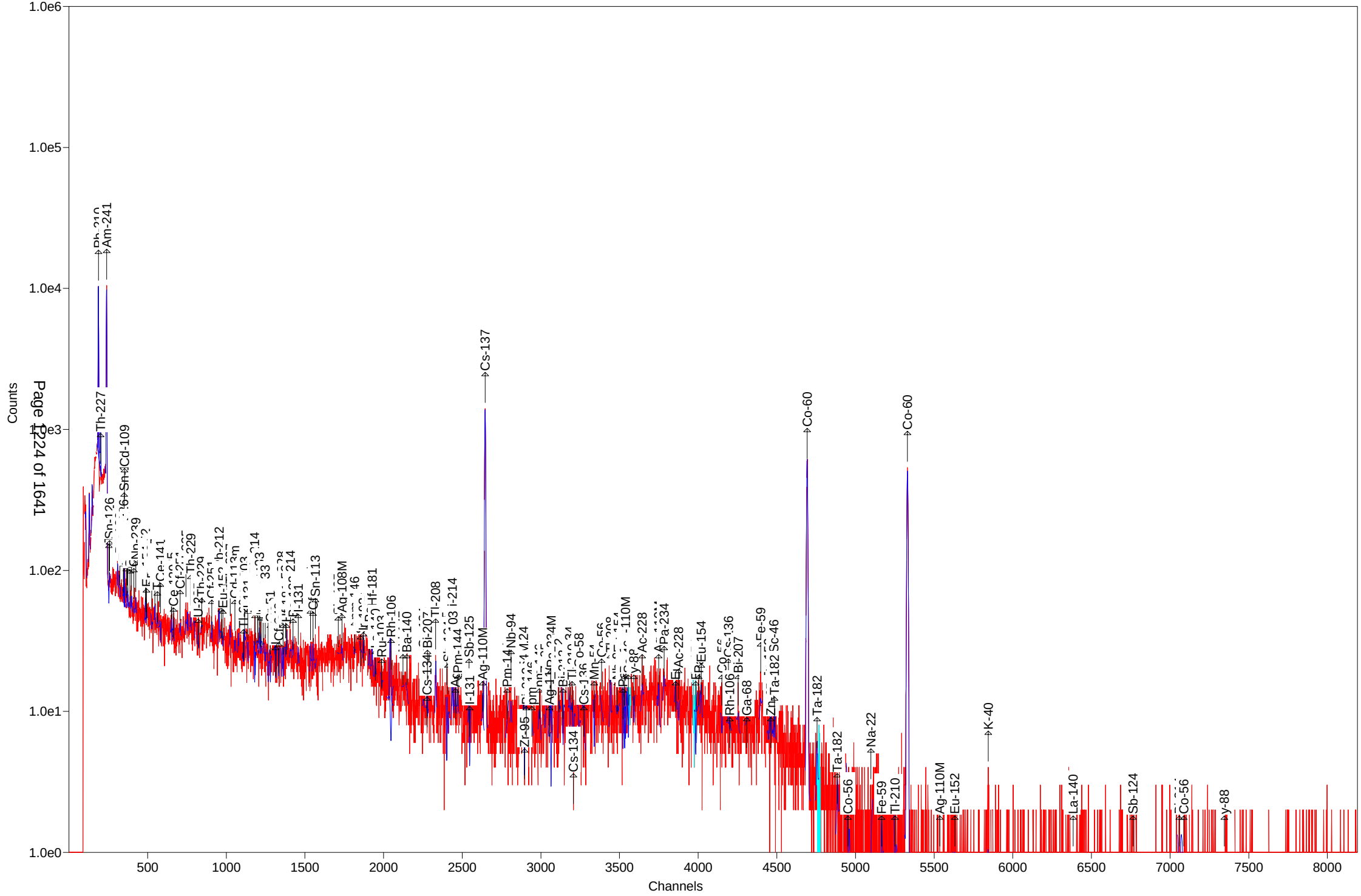
y-88	#A	-7.3868E-01	-7.3868E-01	3.814E+01%	2.22E+00
Cd-113m	#A	3.0936E+03	3.0936E+03	2.082E+02%	2.15E+04
Cd-109	A	6.7698E+00	6.7698E+00	1.500E+02%	3.37E+01
Cf-251	#A	9.5317E-01	9.5317E-01	1.807E+02%	4.58E+00
Cf-249	#A	7.3652E-01	7.3652E-01	1.149E+02%	2.81E+00
Sn-126	A	2.4140E+00	2.4140E+00	1.377E+02%	1.10E+01
PB-210	#	4.9142E+03	4.9142E+03	6.847E-01%	6.73E+01
PB-212	#A	1.4790E+00	1.4790E+00	6.367E+01%	3.10E+00
PB-214	#A	2.5174E-01	2.5174E-01	5.150E+02%	4.33E+00
BI-207	#A	1.2988E-01	1.2988E-01	2.148E+02%	1.33E+00
BI-212	#A	4.7820E+00	4.7820E+00	1.483E+02%	2.38E+01
U-235	#A	1.7431E+00	1.7431E+00	9.157E+01%	9.92E+00
BI-214		3.5668E+00	3.5668E+00	3.218E+01%	2.54E+00
BI-210M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.62E+00
AC-228	#A	2.0461E+00	2.0461E+00	1.517E+02%	6.98E+00
TH-227	#	1.7477E+02	1.7477E+02	1.405E+01%	8.02E+01
TH-229	#A	5.3021E+00	5.3021E+00	1.057E+02%	1.99E+01
TH-234	#A	-1.2866E+01	-1.2866E+01	3.552E+02%	2.63E+01
PA-231	#A	1.4850E+01	1.4850E+01	1.620E+02%	7.98E+01
PA-233	#A	-6.5486E-01	-6.5486E-01	1.899E+02%	3.15E+00
PA-234	#A	1.6932E+00	1.6932E+00	1.355E+02%	6.09E+00
PA-234M	#A	-2.0182E+01	-2.0182E+01	3.159E+02%	3.96E+02
AM-241	#	5.9227E+02	5.9227E+02	6.187E-01%	5.12E+00
Np-237	#A	2.0059E+00	2.0059E+00	1.689E+02%	1.12E+01
Ir-192	#A	2.1937E-01	2.1938E-01	7.243E+01%	1.48E+00
Cs-136	#A	1.0003E+00	1.0004E+00	5.542E+01%	2.30E+00
Np-239	#A	1.0682E+00	1.0684E+00	1.139E+02%	4.04E+00
Nd-147	#A	5.8773E-01	5.8776E-01	1.507E+02%	1.03E+01
TL-210	#A	3.7145E-01	3.7145E-01	1.725E+02%	2.15E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 5.825E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 5.8253936E+03 Bq/Sample

376766_Gamma_LCS 160-376766~2-A. 14_Gamma_20183009.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181361

Sample Description: 376766_Gamma_160-29527-A-1-B DU
Detector: Detector #12
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29527-A-1-B DU

Decay to Time: 8/9/2018 20:40 Live Time: 3600 sec
Acquisition Time: 8/9/2018 20:40:21 Real Time: 3607 sec
Analysis Time: 8/9/2018 21:40 Dead Time: 0.18 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_100mL.Clb
Efficiency Cal Desc: 12_100mlSolid_108513
Efficiency Cal Date: 4/20/2018 13:00
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-07-14_1810.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.443E+00	89.5	3.978E+00	3.985E+00	9.633E+00
NA-22	-6.295E-01	69.8	4.395E-01	4.406E-01	1.456E+00
K-40	4.993E+00	125.2	6.251E+00	6.257E+00	1.260E+01
Sc-46	-7.509E-01	85.0	6.385E-01	6.396E-01	2.119E+00
CR-51	-4.657E+00	91.9	4.282E+00	4.288E+00	1.419E+01
MN-54	-4.380E-01	134.2	5.879E-01	5.884E-01	1.328E+00
FE-59	6.767E-01	122.4	8.284E-01	8.291E-01	2.283E+00
Co-56	3.234E-02	200.2	6.473E-02	6.475E-02	1.464E+00
CO-57	-4.967E-02	673.5	3.345E-01	3.345E-01	1.117E+00
CO-58	-7.293E-01	119.9	8.747E-01	8.755E-01	2.908E+00
CO-60	2.208E-01	108.3	2.390E-01	2.393E-01	1.474E+00
ZN-65	0.000E+00	1.#INF	6.366E-01	6.366E-01	8.752E+00
NB-94	1.075E+00	49.6	5.325E-01	5.353E-01	1.178E+00
ZR-95	2.062E-01	305.9	6.308E-01	6.309E-01	1.936E+00
NB-95	-6.308E-02	1184.8	7.474E-01	7.474E-01	2.509E+00
RU-103	9.985E-02	452.6	4.519E-01	4.519E-01	1.110E+00
RH-106	5.080E+00	69.5	3.529E+00	3.538E+00	1.346E+01
AG-108M	-3.341E-01	153.4	5.124E-01	5.126E-01	1.244E+00
AG-110M	5.945E-01	139.1	8.268E-01	8.273E-01	2.795E+00
SN-113	7.190E-01	112.8	8.108E-01	8.116E-01	2.692E+00
SB-124	3.749E-03	104.8	3.927E-03	3.932E-03	6.005E+00
SB-125	-6.601E-01	254.5	1.680E+00	1.681E+00	4.086E+00
I-131	4.058E-01	122.6	4.974E-01	4.978E-01	1.196E+00
Gd-153	-1.008E+00	143.1	1.442E+00	1.443E+00	4.777E+00
Ga-68	-2.792E+01	101.3	2.830E+01	2.834E+01	5.962E+01
Tc-99m	-4.028E-01	158.9	6.399E-01	6.403E-01	2.119E+00
BA-133	-3.721E-01	573.6	2.134E+00	2.134E+00	7.071E+00
CS-134	-5.423E-01	336.2	1.823E+00	1.824E+00	6.043E+00
CS-137	0.000E+00	1.#INF	6.589E-02	6.589E-02	2.194E+00
CE-139	-1.561E-01	293.8	4.586E-01	4.587E-01	1.526E+00
Ba-140	6.189E-01	95.0	5.877E-01	5.885E-01	4.402E+00
La-140	8.288E-01	86.7	7.183E-01	7.196E-01	1.749E+00
CE-141	-7.243E-01	163.8	1.186E+00	1.187E+00	3.928E+00

CE-144	-2.084E+00	237.3	4.945E+00	4.946E+00	1.639E+01
PM-144	3.519E-01	133.0	4.680E-01	4.684E-01	1.060E+00
EU-152	2.383E+01	10.9	2.604E+00	2.871E+00	6.259E+00
EU-154	4.174E+00	51.5	2.149E+00	2.159E+00	1.169E+01
EU-155	8.276E-01	230.8	1.910E+00	1.911E+00	6.342E+00
HF-181	5.869E-01	108.1	6.342E-01	6.349E-01	2.108E+00
Ta-182	-2.378E+00	185.3	4.406E+00	4.408E+00	1.464E+01
Hg-203	-5.560E-01	87.0	4.836E-01	4.844E-01	1.601E+00
TL-208	2.702E+00	18.2	4.913E-01	5.101E-01	9.995E-01
pm-146	1.352E+00	32.0	4.319E-01	4.374E-01	3.072E+00
y-88	1.729E-01	110.6	1.911E-01	1.913E-01	1.494E+00
Cd-113m	-1.166E+03	437.9	5.105E+03	5.106E+03	1.712E+04
Cd-109	9.309E+00	266.2	2.478E+01	2.478E+01	8.192E+01
Cf-251	-2.329E+00	105.6	2.458E+00	2.461E+00	6.175E+00
Cf-249	2.070E+00	34.8	7.201E-01	7.277E-01	2.150E+00
Sn-126	2.351E+00	201.3	4.731E+00	4.733E+00	1.569E+01
PB-210	1.178E+02	7.5	8.842E+00	1.150E+01	2.011E+01
PB-212	5.530E+00	11.2	6.179E-01	6.819E-01	1.810E+00
PB-214	2.046E+02	1.0	2.128E+00	1.059E+01	3.037E+00
BI-207	0.000E+00	1.#INF	2.651E-01	2.651E-01	1.333E+00
BI-212	-6.651E+00	95.5	6.352E+00	6.362E+00	2.116E+01
U-235	2.288E+00	108.0	2.471E+00	2.474E+00	1.659E+01
BI-214	1.929E+02	1.4	2.637E+00	1.017E+01	2.524E+00
BI-210M	3.129E-01	217.3	6.797E-01	6.799E-01	2.270E+00
AC-228	6.822E+00	21.7	1.481E+00	1.521E+00	4.114E+00
TH-227	3.832E+00	163.1	6.250E+00	6.254E+00	2.072E+01
TH-229	-9.316E+00	103.8	9.671E+00	9.683E+00	2.430E+01
TH-234	3.598E+00	322.0	1.159E+01	1.159E+01	3.845E+01
PA-231	0.000E+00	1.#INF	6.184E+00	6.184E+00	1.240E+02
PA-233	2.245E-01	1365.5	3.065E+00	3.065E+00	1.016E+01
PA-234	-1.480E+00	151.6	2.244E+00	2.246E+00	7.442E+00
PA-234M	0.000E+00	1.#INF	9.892E+00	9.893E+00	2.198E+02
AM-241	1.020E+00	64.1	6.538E-01	6.565E-01	2.156E+00
Np-237	0.000E+00	1.#INF	7.387E+00	7.387E+00	2.442E+01
Ir-192	5.078E-01	152.6	7.750E-01	7.756E-01	2.398E+00
Cs-136	-7.490E-01	118.8	8.901E-01	8.911E-01	2.958E+00
Np-239	-1.158E+00	159.7	1.848E+00	1.850E+00	6.129E+00
Nd-147	-5.956E-01	591.9	3.525E+00	3.526E+00	8.313E+00
TL-210	-7.207E-01	125.0	9.008E-01	9.017E-01	2.994E+00
Total	6.071E+02				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29527-A-1-B DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181361.An1

Acquisition information

Start time:	8/9/2018 8:40:21 PM
Live time:	3600
Real time:	3607
Dead time:	0.18 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_100mL.Clb

12_100mlSolid_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 1:00:56 PM
Type:	Polynomial
Uncertainty:	1.293 %
Coefficients:	-0.344181 -4.490960 0.514003
	-0.058777 0.002879 -0.000052

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:40:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-07-14_1810.PBC 7/14/2018 6:10:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 37 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1497

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
27.83	3.	554.78	0.00	3.300E-02				
32.14	237.	21.29	0.78	3.549E-02				
46.46	789.	7.51	0.97	4.375E-02	46.54	4.250	1.178E+02	PB210
50.14	53.	163.08	0.85	4.829E-02	50.14	8.000	PBC<MDA	TH227
53.24	320.	16.51	1.03	5.026E-02				
59.69	68.	64.08	0.86	5.183E-02	59.54	35.900	PBC<MDA	AM241
63.45	26.	322.01	0.87	5.222E-02	63.29	3.810	PBC<MDA	TH234
64.44	43.	201.26	0.87	5.231E-02	64.28	9.700	PBC<MDA	Sn126
74.80	2550.	2.88	0.88	5.320E-02				
77.15	4292.	1.93	0.88	5.341E-02				
79.39	315.	15.68	0.88	5.361E-02				
83.90	214.	19.02	0.89	5.398E-02				
87.22	1456.	3.87	0.89	5.423E-02	86.49	13.100	5.698E+01	Np237
					86.54	30.700	2.431E+01	EU155
					86.94	9.040	8.252E+01	Sn126
					87.57	37.500	1.988E+01	Sn126
					88.04	3.790	1.966E+02	Cd109
89.98	558.	7.92	0.90	5.440E-02				
92.71	26.	152.59	0.90	5.455E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.357E+00	AC228
105.31	35.	230.80	0.91	5.478E-02	105.31	21.200	PBC<MDA	EU155
117.08	78.	51.81	1.38	5.436E-02				
123.10	16.	340.57	0.93	5.394E-02	123.10	40.790	PBC<MDA	EU154
128.44	40.	60.93	0.30	5.346E-02				
143.75	12.	868.45	0.95	5.172E-02	143.79	10.960	PBC<MDA	U235
162.66	63.	94.96	0.97	4.910E-02	162.66	6.220	PBC<MDA	Ba140
163.38	54.	108.03	0.97	4.900E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
186.20	1319.	6.48	1.08	4.563E-02	185.72	54.000	1.448E+01	U235
227.00	35.	154.35	1.03	4.000E-02	227.00	6.300	PBC<MDA	Cf251
238.53	332.	11.19	1.05	3.858E-02	238.63	43.300	5.523E+00	PB212
241.91	2225.	2.52	1.05	3.818E-02	242.00	7.430	2.180E+02	PB214
244.69	35.	261.29	1.05	3.784E-02	244.69	7.580	PBC<MDA	EU152
258.85	183.	20.51	1.23	3.626E-02				
265.83	20.	217.26	1.07	3.551E-02	265.83	50.000	PBC<MDA	BI210M
284.30	38.	122.56	1.09	3.368E-02	284.30	6.140	PBC<MDA	I131
295.07	4629.	1.88	1.12	3.270E-02	295.09	19.300	2.038E+02	PB214
					296.00	79.000	4.991E+01	TL210
308.44	22.	571.58	1.11	3.155E-02	308.44	31.750	PBC<MDA	Ir192
316.49	46.	152.63	1.12	3.090E-02	316.49	87.040	PBC<MDA	Ir192
328.76	45.	86.67	1.13	2.996E-02	328.76	20.300	PBC<MDA	La140
333.44	46.	97.83	1.14	2.962E-02	333.44	15.510	PBC<MDA	Cf249
351.77	7917.	1.33	1.14	2.835E-02	351.93	37.600	2.064E+02	PB214
364.48	4.	989.95	1.17	2.754E-02	364.48	81.700	PBC<MDA	I131
383.84	38.	114.43	1.19	2.640E-02	383.84	8.940	PBC<MDA	BA133
387.95	118.	34.78	1.19	2.617E-02	387.95	66.000	PBC<MDA	Cf249
391.69	43.	112.77	1.20	2.597E-02	391.69	64.000	PBC<MDA	SN113
415.96	57.	42.00	0.53	2.473E-02				
453.88	109.	31.95	1.26	2.304E-02	453.88	65.000	2.022E+00	pm146
477.60	37.	89.54	1.28	2.212E-02	477.60	10.520	PBC<MDA	BE7
482.00	37.	108.07	1.28	2.196E-02	482.00	80.500	PBC<MDA	HF181
487.02	33.	109.44	1.29	2.178E-02	487.02	45.500	PBC<MDA	La140
497.05	7.	452.58	1.30	2.142E-02	497.05	90.900	PBC<MDA	RU103
511.86	198.	26.88	2.56	2.093E-02	511.86	20.000	1.316E+01	RH106
572.35	35.	58.55	0.35	1.917E-02				
583.17	158.	18.18	0.83	1.889E-02	583.02	84.500	2.749E+00	TL208
609.25	5945.	1.43	1.46	1.826E-02	609.31	46.090	1.962E+02	BI214
					610.30	5.750	1.575E+03	RU103
656.44	18.	49.27	0.69	1.724E-02	657.76	94.640	3.069E-01	AG110M
665.31	284.	10.11	1.00	1.707E-02				
696.54	21.	133.01	1.49	1.648E-02	696.54	99.000	PBC<MDA	PM144
702.63	62.	49.56	1.49	1.637E-02	702.63	97.900	PBC<MDA	NB94
722.48	8.	337.54	1.51	1.602E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.463E-01	AG108M
724.20	5.	458.63	1.51	1.600E-02	724.20	44.150	PBC<MDA	ZR95
735.72	16.	172.45	1.52	1.581E-02	735.72	22.500	PBC<MDA	pm146
756.73	6.	404.82	1.54	1.548E-02	756.73	54.460	PBC<MDA	ZR95
768.21	648.	5.67	1.46	1.530E-02				
785.42	137.	20.22	1.57	1.505E-02	785.42	1.280	1.975E+02	BI212
806.01	204.	14.45	1.30	1.476E-02				
815.77	30.	116.98	1.60	1.463E-02	815.77	23.280	PBC<MDA	La140
860.56	15.	203.67	1.64	1.405E-02	860.56	12.420	PBC<MDA	TL208
873.23	32.	67.95	1.65	1.390E-02	873.23	12.270	PBC<MDA	EU154
880.53	34.	85.75	1.66	1.382E-02	880.53	6.000	PBC<MDA	PA234
910.82	76.	36.65	0.99	1.347E-02	911.07	29.000	5.405E+00	AC228
968.90	74.	23.29	2.50	1.286E-02	968.97	17.460	9.174E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
996.33	3.	768.89	1.76	1.260E-02	996.33	10.600	PBC<MDA	EU154
1004.77	28.	77.38	1.77	1.252E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	10.	208.02	1.80	1.222E-02	1037.84	14.130	PBC<MDA	Co56
1050.36	28.	69.46	1.81	1.211E-02	1050.36	1.560	PBC<MDA	RH106
1099.25	13.	190.79	1.85	1.170E-02	1099.25	56.500	PBC<MDA	FE59
1112.07	465.	10.93	1.86	1.160E-02	1112.07	13.644	8.157E+01	EU152
1120.27	1257.	3.61	1.87	1.153E-02	1120.29	15.100	2.004E+02	BI214
					1120.55	99.987	3.027E+01	Sc46
					1121.30	34.900	8.678E+01	Ta182
1155.28	169.	11.52	1.67	1.127E-02				
1173.24	21.	108.27	1.92	1.114E-02	1173.24	99.900	PBC<MDA	CO60
1238.13	522.	6.78	2.01	1.069E-02	1238.28	66.070	2.056E+01	Co56
1291.60	13.	153.43	2.02	1.034E-02	1291.60	43.200	PBC<MDA	FE59
1313.00	5.	495.41	2.04	1.021E-02	1313.00	21.000	PBC<MDA	TL210
1384.30	20.	139.06	2.10	9.797E-03	1384.30	24.290	PBC<MDA	AG110M
1407.86	166.	13.94	1.70	9.667E-03	1408.00	21.005	2.276E+01	EU152
1460.83	18.	125.22	2.16	9.386E-03	1460.83	10.670	PBC<MDA	K40
1596.21	4.	646.63	2.27	8.733E-03	1596.21	95.400	PBC<MDA	La140
1690.98	17.	104.77	2.35	8.321E-03	1690.98	47.790	PBC<MDA	SB124
1764.32	1046.	3.42	2.33	8.025E-03	1764.49	15.400	2.352E+02	BI214
1836.06	15.	110.55	2.46	7.751E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
111.00	27.83	137.	3.	9.090E+01	554.78	0.000	-	c
128.24	32.14	660.	237.	6.678E+03	21.29	0.779	-	s
212.59	53.24	780.	320.	6.367E+03	16.51	1.029	-	
298.75	74.79	1428.	2550.	4.794E+04	2.88	0.880	-	D
308.15	77.14	1283.	4292.	8.035E+04	1.93	0.883	-	D
317.09	79.38	1065.	315.	5.880E+03	15.69	0.885	-	sD
334.82	83.87	717.	220.	4.080E+03	18.47	0.889	-	sD
359.11	89.94	754.	574.	1.056E+04	7.94	0.896	-	sD
467.79	117.08	554.	78.	1.441E+03	51.81	1.380	-	sM
513.17	128.44	277.	40.	7.482E+02	60.93	0.301	-	sM
1034.55	258.85	366.	183.	5.038E+03	20.51	1.232	-	
1662.81	415.96	172.	57.	2.305E+03	42.00	0.534	-	s
2288.27	572.35	110.	35.	1.826E+03	58.55	0.348	-	s
2624.64	656.44	28.	18.	1.044E+03	49.27	0.685	-	s
2660.10	665.31	88.	284.	1.665E+04	10.11	1.001	-	s
3071.78	768.21	114.	648.	4.236E+04	5.67	1.464	-	s
3222.99	806.01	108.	204.	1.385E+04	14.45	1.302	-	
4620.71	1155.28	51.	169.	1.503E+04	11.52	1.675	-	M
4952.34	1238.13	98.	522.	4.890E+04	6.78	2.010	-	M
5631.82	1407.86	59.	166.	1.721E+04	13.94	1.703	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.46	46.46	803.	789.	0.219	7.51	0.965s
TH-227	200.18	50.14	3750.	53.	0.015	163.08	0.855s
AM-241	237.74	59.54	925.	68.	0.019	64.08	0.865D
TH-234	252.74	63.29	3425.	26.	0.007	322.01	0.868s
Sn-126	256.71	64.28	3713.	43.	0.012	201.26	0.869s
BA-133	323.50	80.99	17881.	-68.	-0.019	276.77	0.887s
Np-237	345.49	86.49	17777.	0.	0.000	274.31	0.892A
EU-155	345.70	86.54	17708.	-69.	-0.019	273.70	0.892D
Sn-126	347.29	86.94	1806.	41.	0.012	201.29	0.892A
Sn-126	349.81	87.57	16733.	172.	0.048	39.28	0.893D
Cd-109	351.68	88.04	16802.	69.	0.019	266.17	0.894A
Nd-147	363.92	91.10	17080.	-70.	-0.020	262.69	0.897s
TH-234	369.87	92.59	16979.	-26.	-0.007	714.87	0.898
AC-228	372.91	93.35	16932.	21.	0.006	889.35	0.899s
Gd-153	389.50	97.50	3600.	-60.	-0.017	143.07	0.903s
Np-239	397.50	99.50	3660.	-60.	-0.017	143.96	0.905
Gd-153	412.29	103.20	3719.	-60.	-0.017	144.51	0.909s
Np-239	414.29	103.70	3779.	-60.	-0.017	145.58	0.909s
EU-155	420.73	105.31	3172.	35.	0.010	230.80	0.911s
Np-239	424.00	106.13	3354.	-52.	-0.014	159.65	0.912s
EU-152	486.55	121.78	1735.	-60.	-0.017	98.92	0.928s
CO-57	487.69	122.06	1546.	-8.	-0.002	673.47	0.928s
EU-154	491.84	123.10	1477.	16.	0.004	340.57	0.929s
PA-234	524.60	131.29	2965.	-51.	-0.014	151.64	0.938s
HF-181	531.51	133.02	5411.	-63.	-0.017	165.72	0.939
CE-144	533.57	133.54	5440.	-44.	-0.012	237.30	0.940s
HF-181	544.61	136.30	5484.	0.	0.000	1000.00	0.943
CO-57	545.30	136.47	5484.	0.	0.000	1000.00	0.943s
Tc-99m	561.44	140.51	5090.	-64.	-0.018	158.88	0.947s
U-235	574.53	143.79	5191.	12.	0.003	868.45	0.950s
CE-141	581.15	145.44	5587.	-65.	-0.018	163.79	0.952s
Ba-140	649.99	162.66	1743.	63.	0.017	94.96	0.969s
U-235	652.87	163.38	1649.	54.	0.015	108.03	0.970s
CE-139	662.76	165.85	2047.	-22.	-0.006	293.83	0.973s
Cf-251	705.72	176.60	1412.	-67.	-0.019	105.55	0.983s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	744.11	186.20	976.	1261.	0.350	5.58	1.080
TH-229	773.32	193.51	1313.	-66.	-0.018	103.81	1.000s
U-235	820.59	205.33	1096.	-29.	-0.008	211.98	1.012s
TH-229	842.65	210.85	983.	-13.	-0.004	463.85	1.018s
Cf-251	907.22	227.00	840.	35.	0.010	154.35	1.034s
PB-212	953.73	238.63	519.	332.	0.092	11.17	1.045D
PB-214	967.18	242.00	455.	2225.	0.618	2.52	1.049D
EU-152	977.96	244.69	4272.	35.	0.010	261.29	1.051s
TH-227	1024.13	256.24	1200.	-50.	-0.014	98.53	1.063s
Cd-113m	1053.96	263.70	772.	-9.	-0.002	437.87	1.070s
BI-210M	1062.48	265.83	934.	20.	0.006	217.26	1.072s
TL-208	1108.27	277.28	1189.	-56.	-0.016	87.73	1.084s
Hg-203	1115.93	279.20	1146.	-56.	-0.015	86.98	1.086s
I-131	1136.32	284.30	620.	38.	0.011	122.56	1.091s
PB-214	1179.47	295.09	390.	4567.	1.269	1.60	1.102D
TL-210	1183.11	296.00	7870.	-47.	-0.013	265.15	1.102s
PB-212	1199.22	300.03	7823.	-48.	-0.013	263.41	1.106
PA-231	1199.38	300.07	7775.	-48.	-0.013	262.61	1.106s
PA-233	1199.82	300.18	7728.	-15.	-0.004	854.44	1.107
PA-231	1209.70	302.65	7713.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	7713.	0.	0.000	1000.00	1.109s
BI-210M	1218.68	304.90	7713.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	7691.	22.	0.006	571.58	1.115
Ir-192	1265.04	316.49	2424.	46.	0.013	152.63	1.123
CR-51	1279.41	320.08	1075.	-51.	-0.014	91.94	1.126
La-140	1314.10	328.76	725.	45.	0.012	86.67	1.135s
Cf-249	1332.81	333.44	983.	46.	0.013	97.83	1.139s
AC-228	1352.33	338.32	612.	-34.	-0.009	143.49	1.144s
Cs-136	1361.32	340.57	1501.	-50.	-0.014	109.62	1.146
HF-181	1382.35	345.83	618.	-10.	-0.003	469.23	1.151
PB-214	1406.12	351.77	596.	7917.	2.199	1.33	1.141
BA-133	1423.02	356.00	8944.	-23.	-0.006	573.58	1.162s
I-131	1456.95	364.48	408.	4.	0.001	989.95	1.170s
BA-133	1534.35	383.84	924.	38.	0.011	114.43	1.189s
Cf-249	1550.79	387.95	790.	118.	0.033	34.78	1.193
SN-113	1565.74	391.69	1155.	43.	0.012	112.77	1.196s
SB-125	1710.45	427.88	484.	-17.	-0.005	254.53	1.232s
AG-108M	1734.69	433.94	408.	-26.	-0.007	153.36	1.238s
pm-146	1814.45	453.88	288.	109.	0.030	31.95	1.257
Ir-192	1871.16	468.06	362.	-32.	-0.009	118.38	1.271s
BE-7	1909.29	477.60	280.	37.	0.010	89.54	1.280s
HF-181	1926.90	482.00	796.	37.	0.010	108.07	1.284
La-140	1946.98	487.02	633.	33.	0.009	109.44	1.289s
RU-103	1987.11	497.05	260.	7.	0.002	452.58	1.298s
RH-106	2046.35	511.86	407.	198.	0.055	26.88	2.563s
Nd-147	2122.88	531.00	269.	-6.	-0.002	591.93	1.331s
Ba-140	2147.92	537.26	260.	-12.	-0.003	275.80	1.337s
CS-134	2251.82	563.24	273.	-14.	-0.004	242.38	1.362s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2276.15	569.32	368.	-15.	-0.004	182.70	1.367s
PA-234	2276.75	569.47	353.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	353.	0.	0.000	1000.00	1.368s
TL-208	2331.54	583.17	138.	158.	0.044	18.18	0.832s
SB-125	2400.87	600.50	6919.	-27.	-0.008	429.92	1.397
SB-124	2409.79	602.73	6947.	-38.	-0.011	310.66	1.399s
CS-134	2417.71	604.71	6909.	-35.	-0.010	336.23	1.401s
BI-214	2436.11	609.31	251.	5817.	1.616	1.37	1.405D
RU-103	2440.06	610.30	6874.	0.	0.000	1000.00	1.406s
PM-144	2471.12	618.06	318.	-18.	-0.005	141.30	1.414s
RH-106	2486.54	621.92	323.	-4.	-0.001	637.38	1.417s
SB-125	2542.43	635.89	260.	-39.	-0.011	61.35	1.430s
I-131	2546.77	636.97	333.	-24.	-0.007	109.55	1.432s
AG-110M	2629.92	657.76	592.	-8.	-0.002	460.05	1.451s
CS-137	2645.51	661.66	584.	0.	0.000	1000.00	1.455s
PM-144	2785.05	696.54	163.	21.	0.006	133.01	1.487s
NB-94	2809.41	702.63	196.	62.	0.017	49.56	1.493s
SB-124	2890.04	722.79	330.	-8.	-0.002	310.38	1.512s
AG-108M	2890.65	722.94	331.	8.	0.002	337.54	1.512s
ZR-95	2895.69	724.20	278.	5.	0.001	458.63	1.513
BI-212	2907.58	727.17	365.	-29.	-0.008	95.52	1.516s
pm-146	2941.78	735.72	173.	16.	0.005	172.45	1.524
ZR-95	3025.83	756.73	145.	6.	0.002	404.82	1.543s
AG-110M	3054.69	763.94	876.	-29.	-0.008	145.36	1.550s
PA-234M	3064.57	766.41	869.	-27.	-0.007	156.54	1.552s
EU-152	3114.61	778.92	173.	-25.	-0.007	114.79	1.564
BI-212	3140.62	785.42	140.	137.	0.038	20.22	1.570s
CS-134	3182.42	795.87	1188.	-38.	-0.011	129.14	1.579s
TL-210	3197.35	799.60	1116.	-38.	-0.011	124.98	1.583s
CS-134	3206.76	801.95	1078.	-38.	-0.011	122.69	1.585s
CO-58	3242.06	810.78	1040.	-38.	-0.011	119.94	1.593
La-140	3262.05	815.77	597.	30.	0.008	116.98	1.598s
Cs-136	3272.97	818.50	1073.	-39.	-0.011	118.84	1.600s
MN-54	3338.38	834.85	201.	-23.	-0.006	134.23	1.615s
Co-56	3386.08	846.77	240.	-10.	-0.003	342.05	1.626
TL-208	3441.27	860.56	190.	15.	0.004	203.67	1.638
NB-94	3483.41	871.10	280.	-18.	-0.005	132.40	1.648
EU-154	3491.95	873.23	220.	32.	0.009	67.95	1.650
PA-234	3521.16	880.53	408.	34.	0.009	85.75	1.657s
PA-234	3532.00	883.24	442.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	442.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	478.	-37.	-0.010	85.04	1.664s
y-88	3591.22	898.04	200.	-10.	-0.003	312.52	1.672s
AC-228	3642.36	910.82	140.	76.	0.021	36.65	0.991s
AG-110M	3749.09	937.49	770.	-74.	-0.020	83.57	1.708s
PA-234	3783.21	946.02	175.	-27.	-0.007	109.42	1.716
EU-152	3855.60	964.11	352.	-37.	-0.010	74.24	1.732s
AC-228	3874.78	968.90	54.	74.	0.021	23.29	2.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3984.54	996.33	295.	3.	0.001	768.89	1.761
PA-234M	4003.22	1001.00	298.	0.	0.000	1000.00	1.765s
EU-154	4018.33	1004.77	224.	28.	0.008	77.38	1.768s
Co-56	4150.66	1037.84	85.	10.	0.003	208.02	1.798s
Cs-136	4191.60	1048.07	219.	-40.	-0.011	54.31	1.807
RH-106	4200.76	1050.36	177.	28.	0.008	69.46	1.809s
BI-207	4253.99	1063.66	165.	-35.	-0.010	84.60	1.820s
Ga-68	4308.98	1077.40	165.	-29.	-0.008	101.33	1.833s
FE-59	4396.44	1099.25	123.	13.	0.004	190.79	1.852
EU-152	4447.76	1112.07	1056.	465.	0.129	10.93	1.863s
ZN-65	4461.66	1115.55	1521.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	87.	1227.	0.341	3.05	1.870D
Ta-182	4484.69	1121.30	2018.	-34.	-0.010	185.26	1.871s
CO-60	4692.57	1173.24	96.	21.	0.006	108.27	1.916s
Ta-182	4885.39	1221.41	136.	-21.	-0.006	132.05	1.957
Co-56	4952.92	1238.28	665.	-26.	-0.007	141.63	1.972
NA-22	5098.03	1274.53	125.	-24.	-0.007	69.81	2.003s
EU-154	5098.09	1274.54	148.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	74.	13.	0.004	153.43	2.017
TL-210	5252.04	1313.00	96.	5.	0.001	495.41	2.036
CO-60	5330.11	1332.50	119.	-3.	-0.001	854.73	2.052s
AG-110M	5537.48	1384.30	142.	20.	0.006	139.06	2.096s
EU-152	5632.39	1408.00	264.	-22.	-0.006	107.37	2.115
K-40	5843.92	1460.83	84.	18.	0.005	125.22	2.159s
La-140	6386.02	1596.21	114.	4.	0.001	646.63	2.269s
SB-124	6765.58	1690.98	51.	17.	0.005	104.77	2.345s
BI-214	7059.31	1764.32	29.	1046.	0.291	3.42	2.331
Co-56	7087.48	1771.35	1156.	-25.	-0.007	192.19	2.408s
y-88	7346.69	1836.06	40.	15.	0.004	110.55	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.4429E+00				5.31E+01	
			477.60	4.443E+00	&(	9.633E+00 8.95E+01 1.05E+01	G
NA-22	C	-6.2948E-01				9.50E+02	
			1274.53	-6.295E-01	?(	1.456E+00 6.98E+01 9.99E+01	G
K-40	N	4.9925E+00				4.66E+11	
			1460.83	4.993E+00	?(	1.260E+01 1.25E+02 1.07E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F -7.5088E-01					8.38E+01	
		889.28	-7.509E-01	?(	2.119E+00	8.50E+01	1.00E+02 G
		1120.55	-1.150E-01	% P	4.451E+00	1.67E+03	1.00E+02 G
CR-51	F -4.6573E+00					2.77E+01	
		320.08	-4.657E+00	?(	1.419E+01	9.19E+01	9.94E+00 G
MN-54	C -4.3802E-01					3.12E+02	
		834.85	-4.380E-01	?(	1.328E+00	1.34E+02	1.00E+02 G
FE-59	F 6.7670E-01					4.45E+01	
		1099.25	5.603E-01	?(	2.283E+00	1.91E+02	5.65E+01 G
		1291.60	8.289E-01	?(	2.655E+00	1.53E+02	4.32E+01 G
Co-56	C 3.2339E-02					7.73E+01	
		846.77	-1.954E-01	?(	1.464E+00	3.42E+02	9.99E+01 G
		1238.28	-1.023E+00	+	4.835E+00	1.42E+02	6.61E+01 G
		1037.84	1.643E+00	?(	7.363E+00	2.08E+02	1.41E+01 G
		1771.35	-5.644E+00	+	3.616E+01	1.92E+02	1.55E+01 A
CO-57	C -4.9673E-02					2.72E+02	
		122.06	-4.967E-02	*(	1.117E+00	6.73E+02	8.56E+01 G
		136.47	0.000E+00	+	1.719E+01	1.00E+03	1.07E+01 G
CO-58	C -7.2935E-01					7.09E+01	
		810.78	-7.293E-01	?(	2.908E+00	1.20E+02	9.95E+01 G
CO-60	F 2.2078E-01					1.93E+03	
		1332.50	-8.257E-02	&(	1.474E+00	8.55E+02	1.00E+02 G
		1173.24	5.244E-01	?(	1.208E+00	1.08E+02	9.99E+01 G
NB-94	I 1.0745E+00					7.41E+06	
		702.63	1.075E+00	@(	1.178E+00	4.96E+01	9.79E+01 G
		871.10	-3.627E-01	&	1.612E+00	1.32E+02	9.99E+01 G
ZR-95	I 2.0622E-01					6.40E+01	
		756.73	2.087E-01	&(	1.936E+00	4.05E+02	5.45E+01 G
		724.20	2.032E-01	&(	3.163E+00	4.59E+02	4.42E+01 G
NB-95	I -6.3081E-02					6.40E+01	
		765.79	-6.308E-02	&(	2.509E+00	1.18E+03	9.98E+01 G
RU-103	I 9.9847E-02					3.93E+01	
		497.05	9.985E-02	(	1.110E+00	4.53E+02	9.09E+01 G
		610.30	0.000E+00	-	1.031E+02	1.00E+03	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	5.0798E+00					3.74E+02	
			621.92	-6.226E-01	?(	1.346E+01	6.37E+02	9.93E+00 G
			1050.36	4.138E+01	?(	9.514E+01	6.95E+01	1.56E+00 G
			511.86	1.316E+01	?	6.416E+00	2.69E+01	2.00E+01 GA
AG-108M	C	-3.3408E-01					1.53E+05	
			433.94	-3.341E-01	&(	1.244E+00	1.53E+02	9.05E+01 G
			722.94	1.463E-01	+	1.670E+00	3.38E+02	9.08E+01 G
			614.28	1.721E-01	%	6.624E+00	1.16E+03	8.98E+01 G
AG-110M	F	5.9455E-01					2.50E+02	
			884.68	0.000E+00	?(	2.795E+00	1.00E+03	7.27E+01 G
			657.76	-1.279E-01	&	1.978E+00	4.60E+02	9.46E+01 G
			937.49	-4.520E+00	+	8.096E+00	8.36E+01	3.44E+01 G
			1384.30	2.374E+00	?(	6.791E+00	1.39E+02	2.43E+01 G
			763.94	-2.355E+00	+	1.141E+01	1.45E+02	2.23E+01 G
SN-113	F	7.1900E-01					1.15E+02	
			391.69	7.190E-01	?(	2.692E+00	1.13E+02	6.40E+01 G
SB-124	F	3.7486E-03					6.02E+01	
			602.73	-5.833E-01	&(	6.005E+00	3.11E+02	9.83E+01 G
			1690.98	1.211E+00	?(	2.506E+00	1.05E+02	4.78E+01 G
			722.79	-1.336E+00	+	1.402E+01	3.10E+02	1.08E+01 G
SB-125	I	-6.6015E-01					1.01E+03	
			427.88	-6.601E-01	?(	4.086E+00	2.55E+02	2.96E+01 G
			600.50	-2.307E+00	&	3.288E+01	4.30E+02	1.79E+01 G
			635.89	-5.355E+00	+	1.082E+01	6.14E+01	1.13E+01 G
			463.37	-2.537E-01	&	1.227E+01	1.43E+03	1.05E+01 G
I-131	I	4.0582E-01					8.02E+00	
			364.48	4.938E-02	*(	1.196E+00	9.90E+02	8.17E+01 G
			284.30	5.149E+00	?(	1.594E+01	1.23E+02	6.14E+00 G
			636.97	-5.265E+00	&	1.927E+01	1.10E+02	7.17E+00 G
Gd-153	F	-1.0077E+00					2.42E+02	
			97.50	-1.008E+00	&(	4.777E+00	1.43E+02	3.00E+01 G
			103.20	-1.394E+00	+	6.672E+00	1.45E+02	2.18E+01 G
Ga-68	C	-2.7925E+01					4.71E-02	
			1077.40	-2.792E+01	&(	5.962E+01	1.01E+02	3.30E+00 G
Tc-99m	I	-4.0275E-01					2.51E-01	
			140.51	-4.028E-01	(	2.119E+00	1.59E+02	8.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F	-3.7206E-01					3.85E+03	
			356.00	-3.721E-01	&(	7.071E+00	5.74E+02	6.20E+01 G
			302.85	0.000E+00	&	1.950E+01	1.00E+03	1.83E+01 G
			383.84	4.466E+00	&	1.699E+01	1.14E+02	8.94E+00 GA
			80.99	-1.038E+00	+	9.497E+00	2.77E+02	3.41E+01 GA
CS-134	I	-5.4233E-01					7.54E+02	
			604.71	-5.423E-01	&(	6.043E+00	3.36E+02	9.76E+01 G
			795.87	-8.292E-01	+	3.560E+00	1.29E+02	8.55E+01 G
			569.32	-1.407E+00	+	8.642E+00	1.83E+02	1.54E+01 G
			801.95	-8.238E+00	+	3.360E+01	1.23E+02	8.69E+00 G
			563.24	-2.399E+00	+	1.366E+01	2.42E+02	8.35E+00 G
CE-139	F	-1.5607E-01					1.38E+02	
			165.85	-1.561E-01	?(	1.526E+00	2.94E+02	7.99E+01 G
Ba-140	I	6.1889E-01					1.28E+01	
			537.26	-6.785E-01	?(	4.402E+00	2.76E+02	2.44E+01 G
			162.66	5.706E+00	&(	1.794E+01	9.50E+01	6.22E+00 G
			304.85	1.692E+00	%	8.370E+01	1.49E+03	4.29E+00 G
La-140	I	8.2881E-01					1.28E+01	
			1596.21	1.334E-01	&(	1.749E+00	6.47E+02	9.54E+01 G
			487.02	9.230E-01	(	3.362E+00	1.09E+02	4.55E+01 G
			328.76	2.038E+00	*(	5.856E+00	8.67E+01	2.03E+01 G
			815.77	2.440E+00	?(	9.512E+00	1.17E+02	2.33E+01 G
CE-141	I	-7.2426E-01					3.25E+01	
			145.44	-7.243E-01	?(	3.928E+00	1.64E+02	4.82E+01 G
CE-144	I	-2.0839E+00					2.85E+02	
			133.54	-2.084E+00	*(	1.639E+01	2.37E+02	1.11E+01 G
PM-144	C	3.5187E-01					3.63E+02	
			696.54	3.519E-01	?(	1.060E+00	1.33E+02	9.90E+01 G
			618.06	-2.810E-01	&	1.332E+00	1.41E+02	9.91E+01 G
EU-152	F	2.3834E+01					4.94E+03	
			344.29	-5.841E-02	%(	6.259E+00	3.20E+03	2.65E+01 G
			1112.07	8.157E+01	?(	2.706E+01	1.09E+01	1.36E+01 G
			121.78	-1.080E+00	+	3.540E+00	9.89E+01	2.86E+01 G
			778.92	-3.496E+00	+	9.063E+00	1.15E+02	1.29E+01 G
			964.11	-5.398E+00	+	1.327E+01	7.42E+01	1.46E+01 G
			244.69	3.433E+00	?(	2.975E+01	2.61E+02	7.58E+00 G
			1408.00	-2.987E+00	+	1.073E+01	1.07E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.1736E+00					3.14E+03	
			873.23	5.203E+00	&(	1.169E+01	6.80E+01	1.23E+01 G
			123.10	2.020E-01	&	2.295E+00	3.41E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.492E+00	1.00E+03	3.52E+01 G
			723.36	5.113E-09	&	7.421E+00	4.27E+10	2.02E+01 G
			1004.77	3.473E+00	?(	8.921E+00	7.74E+01	1.80E+01 G
			996.33	6.588E-01	-	1.721E+01	7.69E+02	1.06E+01 G
EU-155	I	8.2762E-01					1.81E+03	
			105.31	8.276E-01	(	6.342E+00	2.31E+02	2.12E+01 G
			86.54	-1.149E+00	+	1.040E+01	2.74E+02	3.07E+01 G
HF-181	F	5.8688E-01					4.24E+01	
			482.00	5.869E-01	(	2.108E+00	1.08E+02	8.05E+01 G
			133.02	-7.621E-01	+	4.182E+00	1.66E+02	4.33E+01 G
			345.83	-6.663E-01	+	7.599E+00	4.69E+02	1.51E+01 G
			136.30	0.000E+00	-	3.138E+01	1.00E+03	5.85E+00 G
Ta-182	F	-2.3783E+00					1.14E+02	
			1121.30	-2.378E+00	?(	1.464E+01	1.85E+02	3.49E+01 G
			1221.41	-2.001E+00	+	5.436E+00	1.32E+02	2.70E+01 G
			1189.05	2.593E-01	%	7.719E+00	1.38E+03	1.62E+01 G
Hg-203	F	-5.5596E-01					4.66E+01	
			279.20	-5.560E-01	&(	1.601E+00	8.70E+01	8.15E+01 G
TL-208	N	2.7025E+00					6.98E+02	
			583.02	2.749E+00	(	9.995E-01	1.82E+01	8.45E+01 G
			277.28	-7.206E+00	&	2.094E+01	8.77E+01	6.31E+00 G
			860.56	2.387E+00	(	1.065E+01	2.04E+02	1.24E+01 G
pm-146	C	1.3519E+00					2.02E+03	
			747.16	1.220E-01	%(	3.072E+00	1.10E+03	3.40E+01 G
			735.72	1.275E+00	&(	4.993E+00	1.72E+02	2.25E+01 G
			453.88	2.022E+00	&(	1.517E+00	3.20E+01	6.50E+01 G
y-88	F	1.7290E-01					1.07E+02	
			898.04	-2.178E-01	&(	1.494E+00	3.13E+02	9.37E+01 G
			1836.06	5.419E-01	?(	1.163E+00	1.11E+02	9.92E+01 G
Cd-113m		-1.1659E+03					5.33E+03	
			263.70	-1.166E+03	?(	1.712E+04	4.38E+02	6.00E-03 K
Cd-109	F	9.3086E+00					4.53E+02	
							Derived Ave Activity	
			88.04	9.309E+00	}(	8.192E+01	2.66E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	-2.3286E+00					3.28E+05	
			176.60	-2.329E+00	&(	6.175E+00	1.06E+02	1.70E+01 G
			227.00	3.895E+00	&	1.518E+01	1.54E+02	6.30E+00 GA
Cf-249	T	2.0702E+00					1.28E+05	
			387.95	1.905E+00	&(	2.150E+00	3.48E+01	6.60E+01 G
			333.44	2.772E+00	?(	8.997E+00	9.78E+01	1.55E+01 G
Sn-126		2.3509E+00					3.65E+07	
			87.57	2.351E+00	}	8.268E+00	3.93E+01	3.75E+01 GA
			64.28	2.351E+00	&(	1.569E+01	2.01E+02	9.70E+00 G
			86.94	2.351E+00	}	1.138E+01	2.01E+02	9.04E+00 GA
PB-210	N	1.1780E+02					8.14E+03	
			46.54	1.178E+02	*(P	2.011E+01	7.51E+00	4.25E+00 G
PB-212	N	5.5305E+00					6.98E+02	
			238.63	5.530E+00	(P	1.810E+00	1.12E+01	4.33E+01 G
			300.03	-1.248E+01	-	1.089E+02	2.63E+02	3.28E+00 GA
PB-214	N	2.0457E+02					5.84E+05	
			351.93	2.064E+02	(P	3.037E+00	1.33E+00	3.76E+01 G
			295.09	2.011E+02	(P	4.168E+00	1.60E+00	1.93E+01 G
			242.00	2.180E+02	+	1.000E+01	2.52E+00	7.43E+00 GA
BI-212	N	-6.6506E+00					6.98E+02	
			727.17	-6.651E+00	&(	2.116E+01	9.55E+01	7.55E+00 G
			785.42	1.975E+02		8.341E+01	2.02E+01	1.28E+00 GA
U-235	N	2.2876E+00					2.57E+11	
			143.79	5.754E-01	?(P	1.659E+01	8.68E+02	1.10E+01 G
			205.33	-3.792E+00	+	2.030E+01	2.12E+02	5.01E+00 G
			163.38	5.982E+00	?(	2.142E+01	1.08E+02	5.08E+00 G
			185.72	1.420E+01	P	1.669E+00	5.58E+00	5.40E+01 GA
BI-214	N	1.9291E+02					5.84E+05	
			609.31	1.920E+02	(P	2.524E+00	1.37E+00	4.61E+01 G
			1120.29	1.956E+02	(P	7.373E+00	3.05E+00	1.51E+01 G
			1764.49	2.352E+02	+	6.218E+00	3.42E+00	1.54E+01 G
BI-210M	T	3.1286E-01					1.10E+09	
			265.83	3.129E-01	?(	2.270E+00	2.17E+02	5.00E+01 G
			304.90	0.000E+00	-	1.283E+01	1.00E+03	2.80E+01 G
AC-228	N	6.8215E+00					2.10E+03	
			911.07	5.405E+00	(	4.114E+00	3.67E+01	2.90E+01 G
			968.97	9.174E+00	(	4.564E+00	2.33E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	-2.687E+00	-	9.324E+00	1.43E+02	1.20E+01 G
			93.35	1.894E+00	&	5.575E+01	8.89E+02	5.56E+00 XA
TH-227	N	3.8324E+00					7.95E+03	
			50.14	3.832E+00	?(	2.072E+01	1.63E+02	8.00E+00 G
			256.24	-5.456E+00	+	1.783E+01	9.85E+01	7.00E+00 G
TH-229	N	-9.3157E+00					2.68E+06	
			193.51	-9.316E+00	?(	2.430E+01	1.04E+02	4.40E+00 G
			210.85	-2.793E+00	+	3.281E+01	4.64E+02	2.99E+00 G
TH-234	N	3.5981E+00					1.63E+12	
			63.29	3.598E+00	?(P	3.845E+01	3.22E+02	3.81E+00 G
			92.59	-2.351E+00	+ P	5.563E+01	7.15E+02	5.58E+00 G
PA-233	C	2.2446E-01					7.82E+08	
			312.01	2.245E-01	&(	1.016E+01	1.37E+03	3.60E+01 G
			300.18	-2.022E+00	+	5.729E+01	8.54E+02	6.20E+00 G
PA-234	N	-1.4800E+00					1.63E+12	
			131.29	-1.480E+00	?(	7.442E+00	1.52E+02	1.80E+01 G
			946.02	-4.274E+00	+	1.019E+01	1.09E+02	1.34E+01 G
			569.47	0.000E+00	+	1.589E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	&	2.113E+01	1.00E+03	9.60E+00 G
			880.53	1.139E+01	&	3.245E+01	8.57E+01	6.00E+00 GA
AM-241	T	1.0203E+00					1.58E+05	
			59.54	1.020E+00	(	2.156E+00	6.41E+01	3.59E+01 G
Ir-192	F	5.0778E-01					7.40E+01	
			316.49	4.734E-01	?(	2.398E+00	1.53E+02	8.70E+01 G
			468.06	-7.602E-01	+	2.182E+00	1.18E+02	5.18E+01 G
			308.44	6.021E-01	&(	1.141E+01	5.72E+02	3.18E+01 G
Cs-136	F	-7.4899E-01					1.30E+01	
			818.50	-7.490E-01	?(	2.958E+00	1.19E+02	1.00E+02 G
			1048.07	-1.152E+00	+	2.051E+00	5.43E+01	8.00E+01 G
			340.57	-1.025E+00	+	3.728E+00	1.10E+02	4.69E+01 G
Np-239	T	-1.1578E+00					2.36E+00	
			103.70	-1.274E+00	+	6.147E+00	1.46E+02	2.40E+01 X
			106.13	-1.158E+00	&(	6.129E+00	1.60E+02	2.27E+01 G
			99.50	-2.030E+00	&	9.684E+00	1.44E+02	1.50E+01 X
Nd-147		-5.9557E-01					1.11E+01	
			531.00	-5.956E-01	?(	8.313E+00	5.92E+02	1.30E+01 G
			91.10	-1.269E+00	+	1.102E+01	2.63E+02	2.83E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210 N	-7.2073E-01					5.84E+05	
		799.60	-7.207E-01	?(	2.994E+00	1.25E+02	9.90E+01 G
		296.00	-5.109E-01	+	4.486E+00	2.65E+02	7.90E+01 G
		1313.00	6.045E-01		6.276E+00	4.95E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	3750.	53.	0.015	163.08	3.832E+00
BA-133	80.99	17881.	-68.	-0.019	276.77	-1.038E+00
EU-155	86.54	17708.	-69.	-0.019	273.70	-1.149E+00
Nd-147	91.10	17080.	-70.	-0.020	262.69	-1.269E+00
Gd-153	97.50	3600.	-60.	-0.017	143.07	-1.008E+00
Np-239	99.50	3660.	-60.	-0.017	143.96	-2.030E+00
Gd-153	103.20	3719.	-60.	-0.017	144.51	-1.394E+00
Np-239	103.70	3779.	-60.	-0.017	145.58	-1.274E+00
EU-155	105.31	3172.	35.	0.010	230.80	8.276E-01
Np-239	106.13	3354.	-52.	-0.014	159.65	-1.158E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	122.06	1546.	-8.	-0.002	673.47	-4.967E-02	
EU-154	123.10	1477.	16.	0.004	340.57	2.020E-01	
PA-234	131.29	2965.	-51.	-0.014	151.64	-1.480E+00	
CE-144	133.54	5440.	-44.	-0.012	237.30	-2.084E+00	
Tc-99m	140.51	5090.	-64.	-0.018	158.88	-4.028E-01	
CE-141	145.44	5587.	-65.	-0.018	163.79	-7.243E-01	
CE-139	165.85	2047.	-22.	-0.006	293.83	-1.561E-01	
Cf-251	176.60	1412.	-67.	-0.019	105.55	-2.329E+00	
TH-229	193.51	1313.	-66.	-0.018	103.81	-9.316E+00	
TH-229	210.85	983.	-13.	-0.004	463.85	-2.793E+00	
Cf-251	227.00	840.	35.	0.010	154.35	3.895E+00	
TH-227	256.24	1200.	-50.	-0.014	98.53	-5.456E+00	
Cd-113m	263.70	772.	-9.	-0.002	437.87	-1.166E+03	
BI-210M	265.83	934.	20.	0.006	217.26	3.129E-01	
Hg-203	279.20	1146.	-56.	-0.015	86.98	-5.560E-01	
I-131	284.30	620.	38.	0.011	122.56	5.149E+00	
PA-231	300.07	7775.	-48.	-0.013	262.61	-1.665E+01	
PA-233	300.18	7728.	-15.	-0.004	854.44	-2.022E+00	
CR-51	320.08	1075.	-51.	-0.014	91.94	-4.657E+00	
La-140	328.76	725.	45.	0.012	86.67	2.038E+00	
Cf-249	333.44	983.	46.	0.013	97.83	2.772E+00	
Cs-136	340.57	1501.	-50.	-0.014	109.62	-1.025E+00	
BA-133	356.00	8944.	-23.	-0.006	573.58	-3.721E-01	
I-131	364.48	408.	4.	0.001	989.95	4.938E-02	
BA-133	383.84	924.	38.	0.011	114.43	4.466E+00	
Cf-249	387.95	790.	118.	0.033	34.78	1.905E+00	
SN-113	391.69	1155.	43.	0.012	112.77	7.190E-01	
SB-125	427.88	484.	-17.	-0.005	254.53	-6.601E-01	
pm-146	453.88	288.	109.	0.030	31.95	2.022E+00	
BE-7	477.60	280.	37.	0.010	89.54	4.443E+00	
La-140	487.02	633.	33.	0.009	109.44	9.230E-01	
RU-103	497.05	260.	7.	0.002	452.58	9.985E-02	
RH-106	511.86	407.	198.	0.055	26.88	1.316E+01	
Nd-147	531.00	269.	-6.	-0.002	591.93	-5.956E-01	
CS-134	563.24	273.	-14.	-0.004	242.38	-2.399E+00	
CS-134	569.32	368.	-15.	-0.004	182.70	-1.407E+00	
SB-125	600.50	6919.	-27.	-0.008	429.92	-2.307E+00	
SB-124	602.73	6947.	-38.	-0.011	310.66	-5.833E-01	
CS-134	604.71	6909.	-35.	-0.010	336.23	-5.423E-01	
PM-144	618.06	318.	-18.	-0.005	141.30	-2.810E-01	
RH-106	621.92	323.	-4.	-0.001	637.38	-6.226E-01	
SB-125	635.89	260.	-39.	-0.011	61.35	-5.355E+00	
I-131	636.97	333.	-24.	-0.007	109.55	-5.265E+00	
AG-110M	657.76	592.	-8.	-0.002	460.05	-1.279E-01	
PM-144	696.54	163.	21.	0.006	133.01	3.519E-01	
NB-94	702.63	196.	62.	0.017	49.56	1.075E+00	
SB-124	722.79	330.	-8.	-0.002	310.38	-1.336E+00	
ZR-95	724.20	278.	5.	0.001	458.63	2.032E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	727.17	365.	-29.	-0.008	95.52	-6.651E+00	
pm-146	735.72	173.	16.	0.005	172.45	1.275E+00	
ZR-95	756.73	145.	6.	0.002	404.82	2.087E-01	
AG-110M	763.94	876.	-29.	-0.008	145.36	-2.355E+00	
PA-234M	766.41	869.	-27.	-0.007	156.54	-1.654E+02	
BI-212	785.42	140.	137.	0.038	20.22	1.975E+02	
CS-134	795.87	1188.	-38.	-0.011	129.14	-8.292E-01	
CS-134	801.95	1078.	-38.	-0.011	122.69	-8.238E+00	
CO-58	810.78	1040.	-38.	-0.011	119.94	-7.293E-01	
La-140	815.77	597.	30.	0.008	116.98	2.440E+00	
Cs-136	818.50	1073.	-39.	-0.011	118.84	-7.490E-01	
MN-54	834.85	201.	-23.	-0.006	134.23	-4.380E-01	
Co-56	846.77	240.	-10.	-0.003	342.05	-1.954E-01	
NB-94	871.10	280.	-18.	-0.005	132.40	-3.627E-01	
EU-154	873.23	220.	32.	0.009	67.95	5.203E+00	
PA-234	880.53	408.	34.	0.009	85.75	1.139E+01	
Sc-46	889.28	478.	-37.	-0.010	85.04	-7.509E-01	
y-88	898.04	200.	-10.	-0.003	312.52	-2.178E-01	
AG-110M	937.49	770.	-74.	-0.020	83.57	-4.520E+00	
PA-234	946.02	175.	-27.	-0.007	109.42	-4.274E+00	
EU-154	996.33	295.	3.	0.001	768.89	6.588E-01	
EU-154	1004.77	224.	28.	0.008	77.38	3.473E+00	
Co-56	1037.84	85.	10.	0.003	208.02	1.643E+00	
Cs-136	1048.07	219.	-40.	-0.011	54.31	-1.152E+00	
RH-106	1050.36	177.	28.	0.008	69.46	4.138E+01	
BI-207	1063.66	165.	-35.	-0.010	84.60	-1.096E+00	
Ga-68	1077.40	165.	-29.	-0.008	101.33	-2.792E+01	
FE-59	1099.25	123.	13.	0.004	190.79	5.603E-01	
Ta-182	1121.30	2018.	-34.	-0.010	185.26	-2.378E+00	
CO-60	1173.24	96.	21.	0.006	108.27	5.244E-01	
Ta-182	1221.41	136.	-21.	-0.006	132.05	-2.001E+00	
Co-56	1238.28	665.	-26.	-0.007	141.63	-1.023E+00	
NA-22	1274.53	125.	-24.	-0.007	69.81	-6.295E-01	
FE-59	1291.60	74.	13.	0.004	153.43	8.289E-01	
CO-60	1332.50	119.	-3.	-0.001	854.73	-8.257E-02	
AG-110M	1384.30	142.	20.	0.006	139.06	2.374E+00	
K-40	1460.83	84.	18.	0.005	125.22	4.993E+00	
La-140	1596.21	114.	4.	0.001	646.63	1.334E-01	
SB-124	1690.98	51.	17.	0.005	104.77	1.211E+00	
Co-56	1771.35	1156.	-25.	-0.007	192.19	-5.644E+00	
y-88	1836.06	40.	15.	0.004	110.55	5.419E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	4.4429E+00	4.4429E+00	8.954E+01%	9.63E+00
NA-22	#A	-6.2948E-01	-6.2948E-01	6.981E+01%	1.46E+00
K-40	#A	4.9925E+00	4.9925E+00	1.252E+02%	1.26E+01
Sc-46	#A	-7.5088E-01	-7.5088E-01	8.504E+01%	2.12E+00
CR-51	#A	-4.6572E+00	-4.6573E+00	9.194E+01%	1.42E+01
MN-54	#A	-4.3802E-01	-4.3802E-01	1.342E+02%	1.33E+00
FE-59	#A	6.7669E-01	6.7670E-01	1.224E+02%	2.28E+00
Co-56	#A	3.2339E-02	3.2339E-02	2.002E+02%	1.46E+00
CO-57	#A	-4.9673E-02	-4.9673E-02	6.735E+02%	1.12E+00
CO-58	#A	-7.2935E-01	-7.2935E-01	1.199E+02%	2.91E+00
CO-60	#A	2.2078E-01	2.2078E-01	1.083E+02%	1.47E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.75E+00
NB-94	#A	1.0745E+00	1.0745E+00	4.956E+01%	1.18E+00
ZR-95	#A	2.0622E-01	2.0622E-01	3.059E+02%	1.94E+00
NB-95	#A	-6.3081E-02	-6.3081E-02	1.185E+03%	2.51E+00
RU-103	#A	9.9847E-02	9.9847E-02	4.526E+02%	1.11E+00
RH-106	#A	5.0798E+00	5.0798E+00	6.946E+01%	1.35E+01
AG-108M	#A	-3.3408E-01	-3.3408E-01	1.534E+02%	1.24E+00
AG-110M	#A	5.9455E-01	5.9455E-01	1.391E+02%	2.80E+00
SN-113	#A	7.1900E-01	7.1900E-01	1.128E+02%	2.69E+00
SB-124	#A	3.7486E-03	3.7486E-03	1.048E+02%	6.00E+00
SB-125	#A	-6.6015E-01	-6.6015E-01	2.545E+02%	4.09E+00
I-131	#A	4.0581E-01	4.0582E-01	1.226E+02%	1.20E+00
Gd-153	#A	-1.0077E+00	-1.0077E+00	1.431E+02%	4.78E+00
Ga-68	#A	-2.7825E+01	-2.7925E+01	1.013E+02%	5.96E+01
Tc-99m	#A	-4.0248E-01	-4.0275E-01	1.589E+02%	2.12E+00
BA-133	#A	-3.7206E-01	-3.7206E-01	5.736E+02%	7.07E+00
CS-134	#A	-5.4233E-01	-5.4233E-01	3.362E+02%	6.04E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.19E+00
CE-139	#A	-1.5607E-01	-1.5607E-01	2.938E+02%	1.53E+00
Ba-140	A	6.1888E-01	6.1889E-01	9.496E+01%	4.40E+00
La-140	#A	8.2879E-01	8.2881E-01	8.667E+01%	1.75E+00
CE-141	#A	-7.2425E-01	-7.2426E-01	1.638E+02%	3.93E+00
CE-144	#A	-2.0839E+00	-2.0839E+00	2.373E+02%	1.64E+01
PM-144	#A	3.5187E-01	3.5187E-01	1.330E+02%	1.06E+00
EU-152	#C	2.3834E+01	2.3834E+01	1.093E+01%	6.26E+00
EU-154	#A	4.1736E+00	4.1736E+00	5.149E+01%	1.17E+01
EU-155	#A	8.2762E-01	8.2762E-01	2.308E+02%	6.34E+00
HF-181	A	5.8687E-01	5.8688E-01	1.081E+02%	2.11E+00
Ta-182	#A	-2.3783E+00	-2.3783E+00	1.853E+02%	1.46E+01
Hg-203	#A	-5.5596E-01	-5.5596E-01	8.698E+01%	1.60E+00
TL-208		2.7025E+00	2.7025E+00	1.818E+01%	1.00E+00
pm-146	#A	1.3519E+00	1.3519E+00	3.195E+01%	3.07E+00

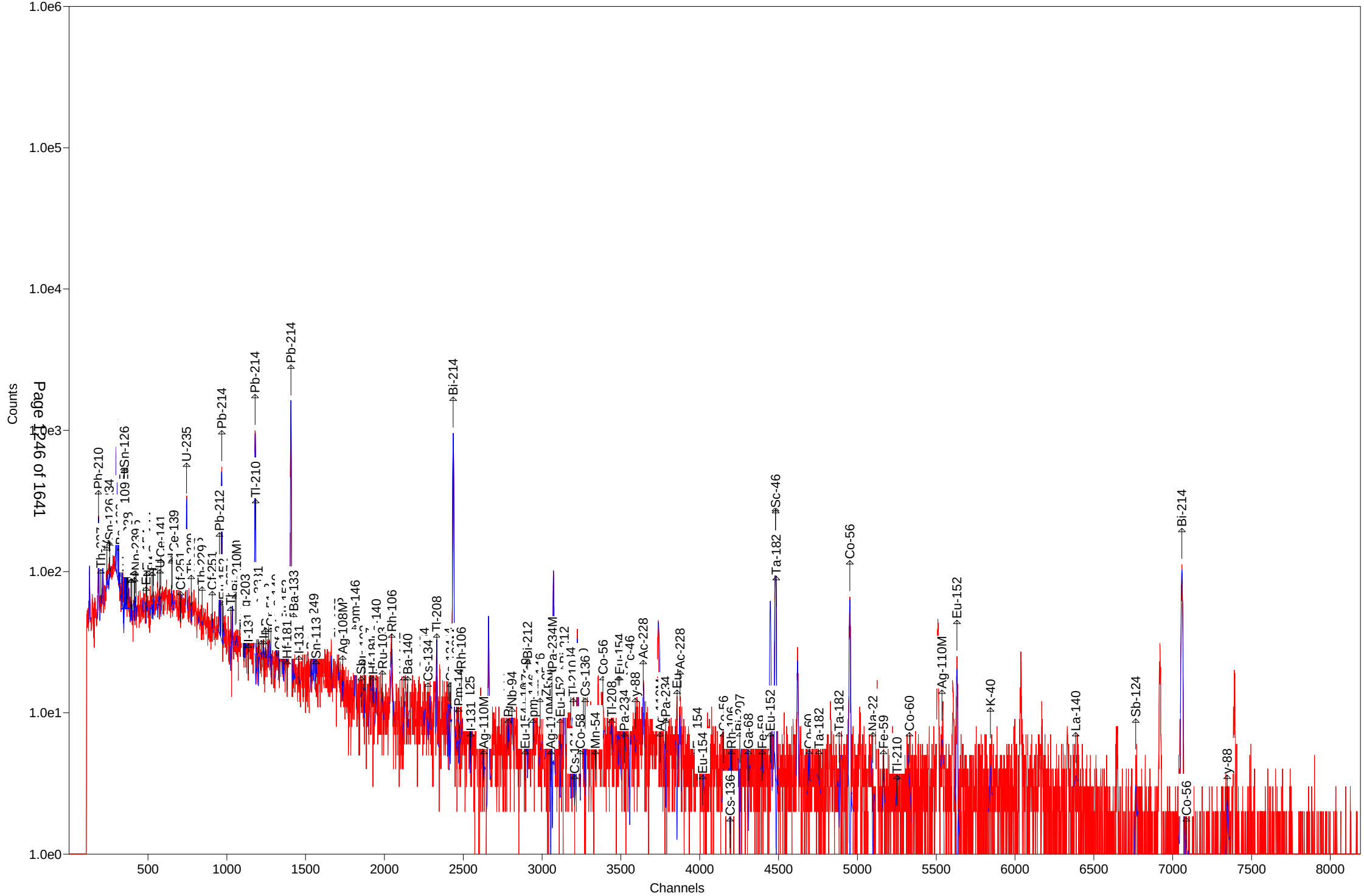
y-88 #A	1.7290E-01	1.7290E-01	1.106E+02%		1.49E+00
Cd-113m#A	-1.1659E+03	-1.1659E+03	4.379E+02%		1.71E+04
Cd-109 #A	9.3086E+00	9.3086E+00	2.662E+02%		8.19E+01
Cf-251 #A	-2.3286E+00	-2.3286E+00	1.056E+02%		6.18E+00
Cf-249 #A	2.0702E+00	2.0702E+00	3.478E+01%		2.15E+00
Sn-126 A	2.3509E+00	2.3509E+00	2.013E+02%		1.57E+01
PB-210 #	1.1780E+02	1.1780E+02	7.505E+00%		2.01E+01
PB-212	5.5305E+00	5.5305E+00	1.117E+01%		1.81E+00
PB-214	2.0457E+02	2.0457E+02	1.040E+00%		3.04E+00
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.33E+00
BI-212 #A	-6.6506E+00	-6.6506E+00	9.552E+01%		2.12E+01
U-235 A	2.2876E+00	2.2876E+00	1.080E+02%		1.66E+01
BI-214	1.9291E+02	1.9291E+02	1.367E+00%		2.52E+00
BI-210M#A	3.1286E-01	3.1286E-01	2.173E+02%		2.27E+00
AC-228	6.8215E+00	6.8215E+00	2.171E+01%		4.11E+00
TH-227 #A	3.8324E+00	3.8324E+00	1.631E+02%		2.07E+01
TH-229 #A	-9.3157E+00	-9.3157E+00	1.038E+02%		2.43E+01
TH-234 #A	3.5981E+00	3.5981E+00	3.220E+02%		3.85E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.24E+02
PA-233 #A	2.2446E-01	2.2446E-01	1.365E+03%		1.02E+01
PA-234 #A	-1.4800E+00	-1.4800E+00	1.516E+02%		7.44E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		2.20E+02
AM-241 #A	1.0203E+00	1.0203E+00	6.408E+01%		2.16E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.44E+01
Ir-192 #A	5.0778E-01	5.0778E-01	1.526E+02%		2.40E+00
Cs-136 #A	-7.4898E-01	-7.4899E-01	1.188E+02%		2.96E+00
Np-239 #A	-1.1577E+00	-1.1578E+00	1.597E+02%		6.13E+00
Nd-147 #A	-5.9556E-01	-5.9557E-01	5.919E+02%		8.31E+00
TL-210 A	-7.2073E-01	-7.2073E-01	1.250E+02%		2.99E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 5.303E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 5.3033466E+02 Bq/Sample

376766_Gamma_160-29527-A-1-B DU. 12_Gamma_20181361.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20183015

Sample Description: 376766_Gamma_160-29521-A-16-C
Detector: Detector #14
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-A-16-C

Decay to Time: 8/10/2018 01:27 Live Time: 3600 sec
Acquisition Time: 8/10/2018 01:27:31 Real Time: 3605 sec
Analysis Time: 8/10/2018 02:28 Dead Time: 0.13 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_100ml.Clb
Efficiency Cal Desc: 14_100mLSoild_90099_022012
Efficiency Cal Date: 4/12/2012 10:42
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-07-14_1759.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.322E+00	125.8	1.663E+00	1.665E+00	5.657E+00
NA-22	-3.405E-01	82.8	2.820E-01	2.825E-01	9.494E-01
K-40	6.372E+01	7.4	4.744E+00	5.756E+00	4.961E+00
Sc-46	-7.549E-03	2954.7	2.230E-01	2.230E-01	7.951E-01
CR-51	-1.440E+00	77.9	1.122E+00	1.125E+00	6.258E+00
MN-54	1.860E-01	123.0	2.288E-01	2.290E-01	5.412E-01
FE-59	2.782E-01	97.8	2.722E-01	2.725E-01	8.394E-01
Co-56	-2.737E-03	360.7	9.875E-03	9.876E-03	6.817E-01
CO-57	-2.552E-02	571.5	1.459E-01	1.459E-01	4.951E-01
CO-58	-1.788E-01	139.9	2.503E-01	2.505E-01	8.566E-01
CO-60	-1.742E-01	110.6	1.928E-01	1.930E-01	6.947E-01
ZN-65	-5.000E-01	164.2	8.209E-01	8.213E-01	2.797E+00
NB-94	1.542E-02	159.4	2.457E-02	2.459E-02	6.613E-01
ZR-95	3.745E-01	97.1	3.635E-01	3.641E-01	8.844E-01
NB-95	1.165E-01	189.5	2.208E-01	2.209E-01	7.642E-01
RU-103	-1.224E-01	166.1	2.034E-01	2.035E-01	5.144E-01
RH-106	2.424E+00	199.5	4.835E+00	4.837E+00	1.625E+01
AG-108M	2.148E-01	77.1	1.657E-01	1.661E-01	4.841E-01
AG-110M	1.121E-01	83.4	9.347E-02	9.365E-02	1.075E+00
SN-113	-2.726E-01	122.6	3.341E-01	3.344E-01	1.125E+00
SB-124	7.719E-02	427.6	3.300E-01	3.300E-01	1.623E+00
SB-125	7.744E-01	30.3	2.343E-01	2.377E-01	1.745E+00
I-131	-2.239E-02	228.1	5.106E-02	5.107E-02	4.832E-01
Gd-153	-2.850E-01	131.6	3.751E-01	3.755E-01	1.260E+00
Ga-68	0.000E+00	1.#INF	5.336E+00	5.336E+00	2.565E+01
Tc-99m	1.289E-01	130.8	1.685E-01	1.687E-01	5.645E-01
BA-133	-2.820E-01	188.2	5.307E-01	5.309E-01	1.780E+00
CS-134	-1.194E-01	125.9	1.503E-01	1.504E-01	1.743E+00
CS-137	-2.898E-01	90.5	2.624E-01	2.628E-01	8.821E-01
CE-139	2.031E-03	8020.8	1.629E-01	1.629E-01	5.565E-01
Ba-140	8.344E-01	82.1	6.855E-01	6.868E-01	1.767E+00
La-140	1.718E-01	81.8	1.406E-01	1.409E-01	8.676E-01
CE-141	1.702E-01	177.9	3.028E-01	3.029E-01	1.018E+00

CE-144	0.000E+00	1.#INF	4.356E-01	4.356E-01	4.724E+00
PM-144	-7.436E-02	322.6	2.399E-01	2.399E-01	5.914E-01
EU-152	-1.613E-01	88.2	1.422E-01	1.424E-01	3.094E+00
EU-154	7.229E-01	62.7	4.534E-01	4.550E-01	5.477E+00
EU-155	0.000E+00	1.#INF	2.977E-01	2.977E-01	2.095E+00
HF-181	2.185E-01	101.6	2.220E-01	2.223E-01	7.493E-01
Ta-182	-1.498E+00	96.9	1.452E+00	1.454E+00	4.862E+00
Hg-203	1.804E-01	101.3	1.827E-01	1.830E-01	6.133E-01
TL-208	1.937E+00	12.7	2.469E-01	2.666E-01	4.195E-01
pm-146	4.629E-01	123.6	5.723E-01	5.728E-01	1.409E+00
y-88	2.280E-01	104.6	2.384E-01	2.387E-01	5.694E-01
Cd-113m	2.305E+03	98.5	2.270E+03	2.275E+03	7.620E+03
Cd-109	2.116E+00	255.1	5.398E+00	5.399E+00	1.805E+01
Cf-251	6.661E-01	108.5	7.225E-01	7.249E-01	1.946E+00
Cf-249	2.168E-01	122.0	2.645E-01	2.647E-01	8.947E-01
Sn-126	-5.534E-01	277.9	1.538E+00	1.538E+00	5.182E+00
PB-210	8.452E+00	35.8	3.023E+00	3.064E+00	8.393E+00
PB-212	4.816E+00	8.0	3.852E-01	4.954E-01	8.606E-01
PB-214	8.756E+00	6.3	5.544E-01	7.172E-01	9.305E-01
BI-207	2.008E-01	72.9	1.464E-01	1.468E-01	4.800E-01
BI-212	-3.598E-01	805.2	2.897E+00	2.897E+00	1.036E+01
U-235	1.195E+00	106.2	1.270E+00	1.271E+00	4.532E+00
BI-214	8.619E+00	8.3	7.116E-01	8.408E-01	1.144E+00
BI-210M	1.711E-01	157.6	2.696E-01	2.698E-01	9.161E-01
AC-228	6.031E+00	10.9	6.579E-01	7.263E-01	9.434E-01
TH-227	-1.672E+00	91.5	1.530E+00	1.533E+00	5.268E+00
TH-229	-3.333E+00	107.5	3.583E+00	3.593E+00	9.343E+00
TH-234	6.170E+00	26.0	1.607E+00	1.639E+00	8.558E+00
PA-231	0.000E+00	1.#INF	2.049E+00	2.049E+00	3.426E+01
PA-233	-4.203E-01	200.7	8.435E-01	8.438E-01	2.830E+00
PA-234	-4.266E-01	198.3	8.460E-01	8.463E-01	2.842E+00
PA-234M	3.763E+01	76.9	2.895E+01	2.902E+01	8.865E+01
AM-241	3.567E-01	112.1	3.998E-01	4.002E-01	1.129E+00
Np-237	9.313E-01	162.8	1.516E+00	1.517E+00	5.058E+00
Ir-192	-1.892E-01	101.8	1.926E-01	1.929E-01	6.464E-01
Cs-136	3.926E-01	35.2	1.382E-01	1.401E-01	7.535E-01
Np-239	4.176E-01	118.7	4.958E-01	4.964E-01	1.662E+00
Nd-147	3.514E-01	153.7	5.403E-01	5.406E-01	3.464E+00
TL-210	0.000E+00	1.#INF	7.820E-02	7.820E-02	8.734E-01
Total	2.466E+03				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-A-16-C

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183015.An1

Acquisition information

Start time:	8/10/2018 1:27:31 AM
Live time:	3600
Real time:	3605
Dead time:	0.13 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration

Filename:	14_Soil_100ml.Clb

14_100mLSoild_90099_022012

Energy Calibration

Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration

Created:	4/12/2012 10:42:57 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.39 %
Log(Eff):	-1.272938E-02 + (-4.365475E-01*Log(E)) + (-3.087719E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.54 %
Log(Eff):	-1.386068E+01 + (4.872649E+00*Log(E)) + (-5.398101E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.14keV)
Stop channel:	8000 (1999.51keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/10/2018 1:27:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-07-14_1759.PBC 7/14/2018 5:59:49 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1704

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.51	58.	35.77	1.15	4.463E-02	46.54	4.250	8.452E+00	PB210
59.54	24.	112.07	0.76	5.166E-02	59.54	35.900	PBC<MDA	AM241
63.22	38.	71.80	0.63	5.300E-02	63.29	3.810	PBC<MDA	TH234
74.91	180.	12.07	0.78	5.581E-02				
77.22	279.	8.98	0.78	5.614E-02				
87.18	144.	16.74	1.11	5.693E-02	86.49	13.100	5.378E+00	Np237
					86.54	30.700	2.295E+00	EU155
					86.94	9.040	7.791E+00	Sn126
					87.57	37.500	1.878E+00	Sn126
88.04	16.	255.09	0.79	5.695E-02	88.04	3.790	PBC<MDA	Cd109
91.10	27.	153.73	0.79	5.699E-02	91.10	28.300	PBC<MDA	Nd147
92.93	169.	16.75	0.87	5.698E-02	92.59	5.584	1.092E+01	TH234
					93.35	5.561	1.479E+01	AC228
99.50	7.	317.83	0.80	5.676E-02	99.50	15.000	PBC<MDA	Np239
106.13	19.	118.72	0.81	5.629E-02	106.13	22.700	PBC<MDA	Np239
123.10	21.	110.25	0.83	5.430E-02	123.10	40.790	PBC<MDA	EU154
140.51	20.	130.77	0.85	5.153E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	17.	158.67	0.85	5.097E-02	143.79	10.960	PBC<MDA	U235
145.44	15.	177.88	0.85	5.068E-02	145.44	48.200	PBC<MDA	CE141
162.66	18.	117.16	0.87	4.758E-02	162.66	6.220	PBC<MDA	Ba140
163.38	17.	130.66	0.87	4.745E-02	163.38	5.080	PBC<MDA	U235
176.60	18.	108.47	0.88	4.514E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.72	76.	31.44	0.89	4.345E-02	185.72	54.000	8.977E-01	U235
205.33	8.	243.62	0.91	4.025E-02	205.33	5.010	PBC<MDA	U235
238.23	291.	7.19	0.94	3.591E-02	238.63	43.300	4.919E+00	PB212
241.55	116.	14.59	0.95	3.552E-02	242.00	7.430	1.226E+01	PB214
244.29	17.	204.49	0.95	3.516E-02	244.69	7.580	PBC<MDA	EU152
263.70	17.	98.47	0.97	3.317E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	10.	157.58	0.97	3.297E-02	265.83	50.000	PBC<MDA	BI210M
279.20	17.	101.29	0.99	3.172E-02	279.20	81.460	PBC<MDA	Hg203
294.88	180.	9.98	1.17	3.039E-02	295.09	19.300	8.104E+00	PB214
300.05	25.	45.29	1.93	2.998E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.420E+00	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	11.	142.80	1.03	2.788E-02	328.76	20.300	PBC<MDA	La140
338.14	67.	24.78	1.17	2.726E-02	338.32	12.010	5.714E+00	AC228
351.61	340.	6.23	1.24	2.643E-02	351.93	37.600	9.091E+00	PB214
383.84	13.	115.74	1.09	2.464E-02	383.84	8.940	PBC<MDA	BA133
387.95	13.	122.02	1.09	2.443E-02	387.95	66.000	PBC<MDA	Cf249
433.94	10.	128.29	1.13	2.231E-02	433.94	90.480	PBC<MDA	AG108M
463.37	31.	30.26	1.16	2.115E-02	463.37	10.470	3.933E+00	SB125
482.00	13.	101.58	1.18	2.048E-02	482.00	80.500	PBC<MDA	HF181
487.02	11.	103.48	1.18	2.031E-02	487.02	45.500	PBC<MDA	La140
511.86	77.	34.27	2.46	1.950E-02	511.86	20.000	5.476E+00	RH106
537.26	10.	115.18	1.23	1.874E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	141.85	1.25	1.802E-02	563.24	8.350	PBC<MDA	CS134
569.70	12.	72.92	1.26	1.785E-02	569.32	15.380	1.254E+00	CS134
					569.47	8.200	2.352E+00	PA234
					569.70	97.740	1.974E-01	BI207
583.35	102.	12.75	1.52	1.751E-02	583.02	84.500	1.920E+00	TL208
600.50	12.	236.69	1.29	1.709E-02	600.50	17.860	PBC<MDA	SB125
602.73	4.	789.61	1.29	1.703E-02	602.73	98.260	PBC<MDA	SB124
609.30	241.	8.26	1.36	1.688E-02	609.31	46.090	8.619E+00	BI214
					610.30	5.750	6.918E+01	RU103
621.92	14.	199.49	1.31	1.659E-02	621.92	9.930	PBC<MDA	RH106
636.97	3.	314.47	1.32	1.627E-02	636.97	7.170	PBC<MDA	I131
657.76	10.	83.39	1.34	1.584E-02	657.76	94.640	PBC<MDA	AG110M
722.94	14.	85.64	1.40	1.463E-02	722.79	10.810	2.401E+00	SB124
					722.94	90.840	2.857E-01	AG108M
					723.36	20.220	1.284E+00	EU154
747.16	8.	123.63	1.42	1.423E-02	747.16	34.000	PBC<MDA	pm146
756.73	10.	97.07	1.43	1.407E-02	756.73	54.460	PBC<MDA	ZR95
763.94	2.	737.86	1.43	1.396E-02	763.94	22.280	PBC<MDA	AG110M
765.79	6.	189.48	1.43	1.393E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
766.41	13.	80.88	1.43	1.392E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	11.	90.66	1.45	1.364E-02	785.42	1.280	PBC<MDA	BI212
815.77	10.	122.98	1.48	1.320E-02	815.77	23.280	PBC<MDA	La140
818.50	11.	97.33	1.48	1.317E-02	818.50	100.000	PBC<MDA	Cs136

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
834.85	9.	123.02	1.49	1.295E-02	834.85	99.980	PBC<MDA	MN54
860.58	12.	93.33	1.51	1.262E-02	860.56	12.420	PBC<MDA	TL208
871.10	5.	159.37	1.52	1.249E-02	871.10	99.890	PBC<MDA	NB94
880.53	6.	147.84	1.53	1.237E-02	880.53	6.000	PBC<MDA	PA234
898.04	9.	104.59	1.54	1.216E-02	898.04	93.700	PBC<MDA	y88
911.19	78.	12.58	1.74	1.202E-02	911.07	29.000	6.231E+00	AC228
968.79	42.	17.28	1.60	1.140E-02	968.97	17.460	5.915E+00	AC228
996.33	12.	62.72	1.62	1.113E-02	996.33	10.600	PBC<MDA	EU154
1001.00	7.	130.91	1.63	1.108E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	107.77	1.63	1.105E-02	1004.77	18.010	PBC<MDA	EU154
1048.07	18.	35.21	1.66	1.065E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	6.	177.27	1.67	1.051E-02	1063.66	74.500	PBC<MDA	BI207
1099.25	5.	146.06	1.70	1.022E-02	1099.25	56.500	PBC<MDA	FE59
1119.78	68.	14.70	2.21	1.005E-02	1120.29	15.100	1.240E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1173.24	3.	385.80	1.76	9.654E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	2.	840.28	1.80	9.209E-03	1238.28	66.070	PBC<MDA	Co56
1274.54	6.	142.69	1.83	8.979E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	5.568E-01	EU154
1291.60	5.	130.19	1.84	8.875E-03	1291.60	43.200	PBC<MDA	FE59
1407.47	6.	156.94	1.92	8.225E-03	1408.00	21.005	PBC<MDA	EU152
1461.05	195.	7.44	1.46	7.961E-03	1460.83	10.670	6.372E+01	K40
1690.98	1.	427.57	2.10	6.988E-03	1690.98	47.790	PBC<MDA	SB124
1764.64	47.	16.12	2.14	6.726E-03	1764.49	15.400	1.263E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.03	74.89	145.	180.	3.232E+03	12.07	0.777	- sD
308.27	77.20	173.	279.	4.976E+03	8.98	0.780	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.44	46.51	137.	58.	0.016	35.77	1.149s
TH-227	199.98	50.14	216.	-23.	-0.006	91.53	0.751
AM-241	237.55	59.54	243.	24.	0.007	112.07	0.761s
TH-234	252.55	63.29	163.	50.	0.014	39.32	0.765D
Sn-126	256.52	64.28	405.	-10.	-0.003	277.92	0.766s
BA-133	323.33	80.99	270.	-26.	-0.007	108.84	0.784
Np-237	345.33	86.49	815.	25.	0.007	162.77	0.789A
EU-155	345.54	86.54	592.	-30.	-0.008	115.43	0.790s
Sn-126	347.13	86.94	502.	-30.	-0.008	106.51	0.790
Sn-126	349.65	87.57	557.	-23.	-0.006	146.95	0.791s
Cd-109	351.53	88.04	872.	16.	0.005	255.09	0.791A
Nd-147	363.77	91.10	833.	27.	0.007	153.73	0.794s
TH-234	369.72	92.59	210.	65.	0.018	34.15	0.796D
AC-228	372.76	93.35	814.	27.	0.007	151.56	0.797s
Gd-153	389.36	97.50	256.	-18.	-0.005	131.61	0.801s
Np-239	397.36	99.50	256.	7.	0.002	317.83	0.803s
Gd-153	412.15	103.20	334.	-17.	-0.005	151.11	0.807s
Np-239	414.15	103.70	352.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	352.	0.	0.000	1000.00	0.809
Np-239	423.87	106.13	247.	19.	0.005	118.72	0.810
EU-152	486.43	121.78	275.	-22.	-0.006	108.53	0.826s
CO-57	487.58	122.06	297.	-4.	-0.001	571.54	0.826s
EU-154	491.73	123.10	256.	21.	0.006	110.25	0.828s
PA-234	524.50	131.29	416.	-15.	-0.004	198.31	0.836s
HF-181	531.42	133.02	430.	0.	0.000	1000.00	0.838s
CE-144	533.47	133.54	430.	0.	0.000	1000.00	0.838s
HF-181	544.52	136.30	430.	0.	0.000	1000.00	0.841s
CO-57	545.21	136.47	401.	-3.	-0.001	946.14	0.841s
Tc-99m	561.35	140.51	337.	20.	0.006	130.77	0.845s
U-235	574.45	143.79	360.	17.	0.005	158.67	0.849s
CE-141	581.07	145.44	347.	15.	0.004	177.88	0.850s
Ba-140	649.93	162.66	222.	18.	0.005	117.16	0.868
U-235	652.81	163.38	242.	17.	0.005	130.66	0.869
Cf-251	705.68	176.60	120.	18.	0.005	108.47	0.882s
U-235	742.15	185.72	163.	76.	0.021	31.44	0.892s
TH-229	773.30	193.51	164.	-22.	-0.006	107.50	0.899
U-235	820.58	205.33	130.	8.	0.002	243.62	0.912
TH-229	842.65	210.85	180.	-23.	-0.007	87.16	0.917s
PB-212	953.75	238.63	95.	269.	0.075	8.00	0.945D
PB-214	967.21	242.00	463.	131.	0.036	24.78	0.948s
EU-152	977.99	244.69	631.	17.	0.005	204.49	0.951s
TH-227	1024.17	256.24	107.	-11.	-0.003	175.00	0.962s
Cd-113m	1054.01	263.70	124.	17.	0.005	98.47	0.970s
BI-210M	1062.53	265.83	123.	10.	0.003	157.58	0.972s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.33	277.28	117.	-18.	-0.005	28.26	0.983s
Hg-203	1115.99	279.20	136.	17.	0.005	101.29	0.985s
I-131	1136.39	284.30	88.	-13.	-0.004	41.13	0.990s
PB-214	1178.69	294.88	55.	171.	0.048	10.77	1.172
TL-210	1183.18	296.00	525.	-16.	-0.004	204.53	1.002s
PB-212	1199.36	300.05	31.	25.	0.007	45.29	1.933s
PA-231	1199.46	300.07	509.	-16.	-0.004	200.66	1.006s
PA-233	1199.90	300.18	493.	-4.	-0.001	852.61	1.006s
PA-231	1209.78	302.65	489.	0.	0.000	1000.00	1.008s
BA-133	1210.59	302.85	489.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	489.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	489.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	489.	0.	0.000	1000.00	1.014s
PA-233	1247.22	312.01	497.	-16.	-0.004	200.67	1.018s
Ir-192	1265.13	316.49	142.	-17.	-0.005	101.79	1.022s
CR-51	1279.51	320.08	172.	-15.	-0.004	77.89	1.026
La-140	1314.21	328.76	74.	11.	0.003	142.80	1.034s
Cf-249	1332.92	333.44	95.	-18.	-0.005	101.94	1.039s
AC-228	1351.72	338.14	51.	67.	0.019	24.78	1.169s
Cs-136	1361.44	340.57	288.	-18.	-0.005	134.20	1.045s
EU-152	1376.30	344.29	270.	-19.	-0.005	88.16	1.049s
HF-181	1382.47	345.83	252.	-19.	-0.005	87.73	1.050s
PB-214	1405.61	351.61	43.	325.	0.090	6.66	1.245s
BA-133	1423.15	356.00	473.	-16.	-0.005	188.21	1.060
I-131	1457.08	364.48	53.	-7.	-0.002	330.37	1.069s
BA-133	1534.50	383.84	99.	13.	0.003	115.74	1.087s
Cf-249	1550.94	387.95	112.	13.	0.003	122.02	1.091s
SN-113	1565.90	391.69	166.	-15.	-0.004	122.57	1.095s
SB-125	1710.63	427.88	71.	-13.	-0.004	167.79	1.129
AG-108M	1734.87	433.94	49.	10.	0.003	128.29	1.135s
pm-146	1814.64	453.88	53.	-10.	-0.003	141.46	1.154
SB-125	1852.59	463.37	29.	31.	0.009	30.26	1.163s
Ir-192	1871.36	468.06	73.	-3.	-0.001	365.25	1.167s
BE-7	1909.50	477.60	79.	-10.	-0.003	125.81	1.176s
HF-181	1927.10	482.00	80.	13.	0.004	101.58	1.180s
La-140	1947.19	487.02	32.	11.	0.003	103.48	1.185s
RU-103	1987.33	497.05	44.	-8.	-0.002	166.15	1.194s
RH-106	2046.57	511.86	95.	77.	0.021	34.27	2.458
Ba-140	2148.15	537.26	32.	10.	0.003	115.18	1.231s
CS-134	2252.06	563.24	28.	8.	0.002	141.85	1.255s
CS-134	2276.40	569.32	54.	0.	0.000	1000.00	1.260s
PA-234	2276.99	569.47	54.	0.	0.000	1000.00	1.261s
BI-207	2277.92	569.70	35.	12.	0.003	72.92	1.261s
TL-208	2332.52	583.35	18.	102.	0.028	12.75	1.520s
SB-125	2401.12	600.50	404.	12.	0.003	236.69	1.289s
SB-124	2410.04	602.73	416.	4.	0.001	789.61	1.291s
CS-134	2417.96	604.71	473.	-15.	-0.004	208.05	1.292s
BI-214	2436.31	609.30	40.	241.	0.067	8.26	1.361

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2440.31	610.30	458.	-15.	-0.004	204.03	1.297s
AG-108M	2456.25	614.28	443.	-15.	-0.004	200.18	1.301s
PM-144	2471.37	618.06	428.	-9.	-0.003	316.22	1.304s
RH-106	2486.79	621.92	404.	14.	0.004	199.49	1.308s
SB-125	2542.69	635.89	42.	-3.	-0.001	310.91	1.320s
I-131	2547.03	636.97	43.	3.	0.001	314.47	1.321s
AG-110M	2630.18	657.76	32.	10.	0.003	83.39	1.339s
CS-137	2645.77	661.66	73.	-14.	-0.004	90.53	1.343s
PM-144	2785.32	696.54	39.	-4.	-0.001	322.59	1.374s
NB-94	2809.67	702.63	48.	-4.	-0.001	529.20	1.379s
SB-124	2890.31	722.79	72.	-6.	-0.002	215.41	1.396s
AG-108M	2890.91	722.94	62.	14.	0.004	85.64	1.397
BI-212	2907.84	727.17	67.	-1.	0.000	805.22	1.400s
pm-146	2942.05	735.72	26.	0.	0.000	1000.00	1.408s
pm-146	2987.81	747.16	22.	8.	0.002	123.63	1.417s
ZR-95	3026.09	756.73	22.	10.	0.003	97.07	1.426s
AG-110M	3054.96	763.94	60.	2.	0.000	737.86	1.432s
NB-95	3062.34	765.79	58.	6.	0.002	189.48	1.433s
PA-234M	3064.83	766.41	49.	13.	0.004	80.88	1.434s
BI-212	3140.88	785.42	22.	11.	0.003	90.66	1.450s
CS-134	3182.67	795.87	67.	-4.	-0.001	319.22	1.459s
TL-210	3197.61	799.60	70.	0.	0.000	1000.00	1.462s
CS-134	3207.01	801.95	72.	-1.	0.000	902.08	1.464s
CO-58	3242.31	810.77	66.	-8.	-0.002	139.95	1.471s
La-140	3262.30	815.77	64.	10.	0.003	122.98	1.475s
Cs-136	3273.22	818.50	50.	11.	0.003	97.33	1.478s
MN-54	3338.63	834.85	23.	9.	0.002	123.02	1.492s
Co-56	3386.32	846.77	38.	-3.	-0.001	360.74	1.501s
TL-208	3441.51	860.56	23.	12.	0.003	93.33	1.513s
NB-94	3483.65	871.10	23.	5.	0.001	159.37	1.522s
PA-234	3521.39	880.53	41.	6.	0.002	147.84	1.529s
PA-234	3532.24	883.24	47.	0.	0.000	1000.00	1.531s
AG-110M	3538.01	884.68	47.	0.	0.000	1000.00	1.533s
y-88	3591.45	898.04	20.	9.	0.003	104.59	1.543s
AC-228	3644.05	911.19	4.	78.	0.022	12.58	1.743
AG-110M	3749.30	937.49	51.	-18.	-0.005	86.87	1.576s
PA-234	3783.42	946.02	42.	-17.	-0.005	86.84	1.582s
EU-152	3855.80	964.11	84.	-8.	-0.002	159.00	1.597s
AC-228	3875.25	968.97	6.	42.	0.012	17.28	1.601D
EU-154	3984.71	996.33	20.	12.	0.003	62.72	1.622s
PA-234M	4003.39	1001.00	33.	7.	0.002	130.91	1.626s
EU-154	4018.51	1004.77	51.	10.	0.003	107.77	1.629s
Co-56	4150.81	1037.84	25.	-8.	-0.002	141.88	1.655s
Cs-136	4191.74	1048.07	12.	18.	0.005	35.21	1.663s
RH-106	4200.91	1050.36	44.	-9.	-0.003	106.07	1.665s
BI-207	4254.12	1063.66	21.	6.	0.002	177.27	1.675s
Ga-68	4309.10	1077.40	20.	0.	0.000	1000.00	1.685s
FE-59	4396.54	1099.25	10.	5.	0.001	146.06	1.702s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4447.85	1112.07	122.	-13.	-0.004	120.74	1.712
ZN-65	4461.74	1115.55	109.	-9.	-0.003	164.18	1.714s
BI-214	4478.69	1119.78	6.	68.	0.019	14.70	2.214s
Sc-46	4481.77	1120.55	100.	0.	0.000	1000.00	1.718s
Ta-182	4484.77	1121.30	158.	-19.	-0.005	96.91	1.719
CO-60	4692.60	1173.24	20.	3.	0.001	385.80	1.757
Ta-182	4755.88	1189.05	40.	-17.	-0.005	85.31	1.769
Ta-182	4885.38	1221.41	32.	-11.	-0.003	120.72	1.792
Co-56	4952.89	1238.28	48.	2.	0.001	840.28	1.805s
NA-22	5097.96	1274.53	36.	-11.	-0.003	82.82	1.831s
EU-154	5098.01	1274.54	38.	6.	0.002	142.69	1.831s
FE-59	5166.25	1291.60	6.	5.	0.001	130.19	1.843s
TL-210	5251.92	1313.00	32.	-14.	-0.004	95.65	1.858s
CO-60	5329.96	1332.50	16.	-5.	-0.002	110.63	1.871s
AG-110M	5537.26	1384.30	21.	-7.	-0.002	147.85	1.907s
EU-152	5632.13	1408.00	16.	6.	0.002	156.94	1.923s
K-40	5844.46	1461.05	7.	195.	0.054	7.44	1.462s
La-140	6385.44	1596.21	17.	-4.	-0.001	246.86	2.044s
SB-124	6764.81	1690.98	6.	1.	0.000	427.57	2.102s
BI-214	7059.07	1764.49	5.	47.	0.013	16.12	2.145
Co-56	7086.53	1771.35	52.	0.	0.000	1000.00	2.149s
y-88	7345.59	1836.06	30.	-17.	-0.005	81.51	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.3222E+00				5.31E+01	
			477.60	-1.322E+00	?(	5.657E+00 1.26E+02 1.05E+01	G
NA-22	C	-3.4050E-01				9.50E+02	
			1274.53	-3.405E-01	?(	9.494E-01 8.28E+01 9.99E+01	G
K-40	N	6.3720E+01				4.66E+11	
			1460.83	6.372E+01	(P	4.961E+00 7.44E+00 1.07E+01	G
Sc-46	F	-7.5490E-03				8.38E+01	
			889.28	-7.549E-03	%(	7.951E-01 2.95E+03 1.00E+02	G
			1120.55	0.000E+00	+	1.363E+00 1.00E+03 1.00E+02	G
CR-51	F	-1.4404E+00				2.77E+01	
			320.08	-1.440E+00	?(P	6.258E+00 7.79E+01 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 1.8598E-01					3.12E+02	
		834.85	1.860E-01	?(	5.412E-01	1.23E+02	1.00E+02 G
FE-59	F 2.7819E-01					4.45E+01	
		1099.25	2.406E-01	?(	8.394E-01	1.46E+02	5.65E+01 G
		1291.60	3.274E-01	?(P	1.056E+00	1.30E+02	4.32E+01 G
Co-56	C -2.7374E-03					7.73E+01	
		846.77	-6.139E-02	?(P	6.817E-01	3.61E+02	9.99E+01 G
		1238.28	8.598E-02	?(P	1.599E+00	8.40E+02	6.61E+01 G
		1037.84	-1.464E+00	+	4.761E+00	1.42E+02	1.41E+01 G
		1771.35	0.000E+00	+	9.722E+00	1.00E+03	1.55E+01 A
CO-57	C -2.5525E-02					2.72E+02	
		122.06	-2.552E-02	&(	4.951E-01	5.72E+02	8.56E+01 G
		136.47	-1.494E-01	+	4.785E+00	9.46E+02	1.07E+01 G
CO-58	C -1.7884E-01					7.09E+01	
		810.78	-1.788E-01	?(	8.566E-01	1.40E+02	9.95E+01 G
CO-60	F -1.7424E-01					1.93E+03	
		1332.50	-1.742E-01	?(P	6.947E-01	1.11E+02	1.00E+02 G
		1173.24	7.479E-02	+ P	6.843E-01	3.86E+02	9.99E+01 G
ZN-65	F -5.0002E-01					2.44E+02	
		1115.55	-5.000E-01	?(	2.797E+00	1.64E+02	5.06E+01 G
NB-94	I 1.5420E-02					7.41E+06	
		702.63	-7.145E-02	?(P	6.613E-01	5.29E+02	9.79E+01 G
		871.10	1.006E-01	?(P	5.633E-01	1.59E+02	9.99E+01 G
ZR-95	I 3.7451E-01					6.40E+01	
		756.73	3.745E-01	?(	8.844E-01	9.71E+01	5.45E+01 G
		724.20	-1.838E-02	% P	1.728E+00	2.66E+03	4.42E+01 G
NB-95	I 1.1655E-01					6.40E+01	
		765.79	1.165E-01	?(	7.642E-01	1.89E+02	9.98E+01 G
RU-103	I -1.2240E-01					3.93E+01	
		497.05	-1.224E-01	(	5.144E-01	1.66E+02	9.09E+01 G
		610.30	-4.287E+00	+	2.936E+01	2.04E+02	5.75E+00 GA
RH-106	I 2.4238E+00					3.74E+02	
		621.92	2.424E+00	?(	1.625E+01	1.99E+02	9.93E+00 G
		1050.36	-1.564E+01	+	5.652E+01	1.06E+02	1.56E+00 G
		511.86	5.476E+00	? P	3.431E+00	3.43E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	2.1484E-01					1.53E+05	
			433.94	1.437E-01	?(P	4.841E-01	1.28E+02	9.05E+01 G
			722.94	2.857E-01	&(	8.217E-01	8.56E+01	9.08E+01 G
			614.28	-2.766E-01	+	1.859E+00	2.00E+02	8.98E+01 G
AG-110M	F	1.1209E-01					2.50E+02	
			884.68	0.000E+00	?(	1.075E+00	1.00E+03	7.27E+01 G
			657.76	1.930E-01	?(	5.426E-01	8.34E+01	9.46E+01 G
			937.49	-1.253E+00	+	2.489E+00	8.69E+01	3.44E+01 G
			1384.30	-1.004E+00	+	3.319E+00	1.48E+02	2.43E+01 G
			763.94	1.340E-01	?(	3.479E+00	7.38E+02	2.23E+01 G
SN-113	F	-2.7258E-01					1.15E+02	
			391.69	-2.726E-01	?(	1.125E+00	1.23E+02	6.40E+01 G
SB-124	F	7.7187E-02					6.02E+01	
			602.73	6.079E-02	?(	1.623E+00	7.90E+02	9.83E+01 G
			1690.98	1.109E-01	?(	1.148E+00	4.28E+02	4.78E+01 G
			722.79	-9.953E-01	+	7.405E+00	2.15E+02	1.08E+01 G
SB-125	I	7.7443E-01					1.01E+03	
			427.88	-5.405E-01	&(P	1.745E+00	1.68E+02	2.96E+01 G
			600.50	1.102E+00	?(P	8.775E+00	2.37E+02	1.79E+01 G
			635.89	-4.523E-01	+	4.962E+00	3.11E+02	1.13E+01 G
			463.37	3.933E+00	?(	3.505E+00	3.03E+01	1.05E+01 G
I-131	I	-2.2388E-02					8.02E+00	
			364.48	-8.706E-02	?(P	4.832E-01	3.30E+02	8.17E+01 G
			284.30	-1.882E+00	+ P	6.716E+00	4.11E+01	6.14E+00 G
			636.97	7.145E-01	?(	7.924E+00	3.14E+02	7.17E+00 G
Gd-153	F	-2.8499E-01					2.42E+02	
			97.50	-2.850E-01	?(	1.260E+00	1.32E+02	3.00E+01 G
			103.20	-3.907E-01	+	1.982E+00	1.51E+02	2.18E+01 G
Tc-99m	I	1.2885E-01					2.51E-01	
			140.51	1.289E-01	&(	5.645E-01	1.31E+02	8.93E+01 G
BA-133	F	-2.8198E-01					3.85E+03	
			356.00	-2.820E-01	(	1.780E+00	1.88E+02	6.20E+01 G
			302.85	0.000E+00	&	5.386E+00	1.00E+03	1.83E+01 G
			383.84	1.581E+00	&	6.189E+00	1.16E+02	8.94E+00 GA
			80.99	-3.726E-01	+	1.143E+00	1.09E+02	3.41E+01 GA
CS-134	I	-1.1937E-01					7.54E+02	
			604.71	-2.496E-01	?(	1.743E+00	2.08E+02	9.76E+01 G
			795.87	-8.831E-02	+	9.817E-01	3.19E+02	8.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			569.32	0.000E+00	+	3.737E+00	1.00E+03	1.54E+01 G
			801.95	-3.181E-01	+	1.006E+01	9.02E+02	8.69E+00 G
			563.24	1.403E+00	?(P	5.085E+00	1.42E+02	8.35E+00 G
CS-137	I	-2.8982E-01					1.10E+04	
			661.66	-2.898E-01	?(	8.821E-01	9.05E+01	8.52E+01 G
CE-139	F	2.0307E-03					1.38E+02	
			165.85	2.031E-03	%(	5.565E-01	8.02E+03	7.99E+01 G
Ba-140	I	8.3445E-01					1.28E+01	
			537.26	6.079E-01	?(	1.767E+00	1.15E+02	2.44E+01 G
			162.66	1.723E+00	?(	6.772E+00	1.17E+02	6.22E+00 G
			304.85	0.000E+00	-	2.313E+01	1.00E+03	4.29E+00 G
La-140	I	1.7181E-01					1.28E+01	
			1596.21	-1.583E-01	?(	8.676E-01	2.47E+02	9.54E+01 G
			487.02	3.377E-01	(P	8.790E-01	1.03E+02	4.55E+01 G
			328.76	5.638E-01	?(P	2.094E+00	1.43E+02	2.03E+01 G
			815.77	8.585E-01	?(	3.600E+00	1.23E+02	2.33E+01 G
CE-141	I	1.7024E-01					3.25E+01	
			145.44	1.702E-01	?(	1.018E+00	1.78E+02	4.82E+01 G
PM-144	C	-7.4365E-02					3.63E+02	
			696.54	-7.436E-02	?(	5.914E-01	3.23E+02	9.90E+01 G
			618.06	-1.564E-01	&	1.666E+00	3.16E+02	9.91E+01 G
EU-152	F	-1.6127E-01					4.94E+03	
			344.29	-7.288E-01	?(P	3.094E+00	8.82E+01	2.65E+01 G
			1112.07	-2.679E+00	+	1.093E+01	1.21E+02	1.36E+01 G
			121.78	-3.934E-01	+	1.428E+00	1.09E+02	2.86E+01 G
			778.92	5.210E-02	%	4.712E+00	3.61E+03	1.29E+01 G
			964.11	-1.391E+00	&	7.563E+00	1.59E+02	1.46E+01 G
			244.69	1.823E+00	?(	1.248E+01	2.04E+02	7.58E+00 G
			1408.00	9.647E-01	?	3.433E+00	1.57E+02	2.10E+01 GA
EU-154	I	7.2293E-01					3.14E+03	
			873.23	6.056E-02	%(	5.477E+00	2.50E+03	1.23E+01 G
			123.10	2.626E-01	(	9.691E-01	1.10E+02	4.08E+01 G
			1274.54	5.568E-01	?(	2.753E+00	1.43E+02	3.52E+01 G
			723.36	4.481E-08	%	3.758E+00	2.37E+09	2.02E+01 G
			1004.77	1.370E+00	?(	5.026E+00	1.08E+02	1.80E+01 G
			996.33	2.713E+00	?(	5.588E+00	6.27E+01	1.06E+01 G
HF-181	F	2.1855E-01					4.24E+01	
			482.00	2.185E-01	&(	7.493E-01	1.02E+02	8.05E+01 G
			133.02	0.000E+00	-	1.208E+00	1.00E+03	4.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			345.83	-1.298E+00	& P	5.281E+00	8.77E+01	1.51E+01 G
			136.30	0.000E+00	-	9.033E+00	1.00E+03	5.85E+00 G
Ta-182	F	-1.4980E+00					1.14E+02	
			1121.30	-1.498E+00	(	4.862E+00	9.69E+01	3.49E+01 G
			1221.41	-1.214E+00	+	3.209E+00	1.21E+02	2.70E+01 G
			1189.05	-3.055E+00	+	5.783E+00	8.53E+01	1.62E+01 G
Hg-203	F	1.8035E-01					4.66E+01	
			279.20	1.804E-01	?(	6.133E-01	1.01E+02	8.15E+01 G
TL-208	N	1.9372E+00					6.98E+02	
			583.02	1.920E+00	@(P	4.195E-01	1.27E+01	8.45E+01 G
			277.28	-2.542E+00	- P	7.344E+00	2.83E+01	6.31E+00 G
			860.56	2.057E+00	?(P	4.485E+00	9.33E+01	1.24E+01 G
pm-146	C	4.6290E-01					2.02E+03	
			747.16	4.629E-01	?(P	1.409E+00	1.24E+02	3.40E+01 G
			735.72	0.000E+00	-	2.268E+00	1.00E+03	2.25E+01 G
			453.88	-1.892E-01	- P	7.247E-01	1.41E+02	6.50E+01 G
y-88	F	2.2799E-01					1.07E+02	
			898.04	2.280E-01	?(P	5.694E-01	1.05E+02	9.37E+01 G
			1836.06	-7.335E-01	+	1.218E+00	8.15E+01	9.92E+01 G
Cd-113m		2.3050E+03					5.33E+03	
			263.70	2.305E+03	&(	7.620E+03	9.85E+01	6.00E-03 K
Cd-109	F	2.1161E+00					4.53E+02	
							Derived Ave Activity	
			88.04	2.116E+00	}(	1.805E+01	2.55E+02	3.79E+00 G
Cf-251	T	6.6608E-01					3.28E+05	
			176.60	6.661E-01	(	1.946E+00	1.08E+02	1.70E+01 G
			227.00	1.183E-01	&	6.103E+00	1.87E+03	6.30E+00 GA
Cf-249	T	2.1676E-01					1.28E+05	
			387.95	2.168E-01	?(	8.947E-01	1.22E+02	6.60E+01 G
			333.44	-1.196E+00	+	3.131E+00	1.02E+02	1.55E+01 G
Sn-126		-5.5342E-01					3.65E+07	
			87.57	-2.984E-01	}	1.466E+00	1.47E+02	3.75E+01 GA
			64.28	-5.534E-01	?(	5.182E+00	2.78E+02	9.70E+00 G
			86.94	-1.630E+00	}	5.784E+00	1.07E+02	9.04E+00 GA
PB-210	N	8.4522E+00					8.14E+03	
			46.54	8.452E+00	(P	8.393E+00	3.58E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	4.8157E+00					6.98E+02	
			238.63	4.816E+00	(P	8.606E-01	8.00E+00	4.33E+01 G
			300.03	7.064E+00	+ P	8.095E+00	4.53E+01	3.28E+00 GA
PB-214	N	8.7561E+00					5.84E+05	
			351.93	9.091E+00	@(P	9.305E-01	6.66E+00	3.76E+01 G
			295.09	8.104E+00	(P	1.766E+00	1.08E+01	1.93E+01 G
			242.00	1.383E+01	&	1.085E+01	2.48E+01	7.43E+00 GA
BI-207	C	2.0078E-01					1.18E+04	
			569.70	1.974E-01	&(	4.800E-01	7.29E+01	9.77E+01 G
			1063.66	2.052E-01	?(P	8.572E-01	1.77E+02	7.45E+01 G
BI-212	N	-3.5983E-01					6.98E+02	
			727.17	-3.598E-01	@(P	1.036E+01	8.05E+02	7.55E+00 G
			785.42	1.774E+01	P	3.893E+01	9.07E+01	1.28E+00 GA
U-235	N	1.1950E+00					2.57E+11	
			143.79	8.520E-01	?(P	4.532E+00	1.59E+02	1.10E+01 G
			205.33	1.154E+00	(P	7.681E+00	2.44E+02	5.01E+00 G
			163.38	1.976E+00	&(P	8.660E+00	1.31E+02	5.08E+00 G
			185.72	8.977E-01	* P	7.368E-01	3.14E+01	5.40E+01 GA
BI-214	N	8.6190E+00					5.84E+05	
			609.31	8.619E+00	(P	1.144E+00	8.26E+00	4.61E+01 G
			1120.29	1.240E+01	+ P	2.625E+00	1.47E+01	1.51E+01 G
			1764.49	1.263E+01	+ P	3.491E+00	1.61E+01	1.54E+01 G
BI-210M	T	1.7107E-01					1.10E+09	
			265.83	1.711E-01	?(	9.161E-01	1.58E+02	5.00E+01 G
			304.90	0.000E+00	-	3.545E+00	1.00E+03	2.80E+01 G
AC-228	N	6.0305E+00					2.10E+03	
			911.07	6.231E+00	(	9.434E-01	1.26E+01	2.90E+01 G
			968.97	5.915E+00	(	1.922E+00	1.73E+01	1.75E+01 G
			338.32	5.714E+00	*(	3.045E+00	2.48E+01	1.20E+01 G
			93.35	2.353E+00	-	1.190E+01	1.52E+02	5.56E+00 XA
TH-227	N	-1.6719E+00					7.95E+03	
			50.14	-1.672E+00	?(P	5.268E+00	9.15E+01	8.00E+00 G
			256.24	-1.248E+00	+	5.947E+00	1.75E+02	7.00E+00 G
TH-229	N	-3.3331E+00					2.68E+06	
			193.51	-3.333E+00	?(P	9.343E+00	1.08E+02	4.40E+00 G
			210.85	-5.531E+00	+ P	1.537E+01	8.72E+01	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   6.1699E+00                                      1.63E+12
                          63.29 6.879E+00  (P 8.558E+00 3.93E+01 3.81E+00 G
                          92.59 5.686E+00  (P 6.128E+00 3.42E+01 5.58E+00 G

PA-233   C  -4.2035E-01                                      7.82E+08
                         312.01-4.203E-01 ?(  2.830E+00 2.01E+02 3.60E+01 G
                         300.18-5.515E-01 +   1.587E+01 8.53E+02 6.20E+00 G

PA-234   N  -4.2660E-01                                      1.63E+12
                         131.29-4.266E-01 ?(  2.842E+00 1.98E+02 1.80E+01 G
                         946.02-2.941E+00 +   5.864E+00 8.68E+01 1.34E+01 G
                         569.47 0.000E+00 &   7.011E+00 1.00E+03 8.20E+00 G
                         883.24 0.000E+00 +   8.127E+00 1.00E+03 9.60E+00 G
                         880.53 2.370E+00 ?   1.213E+01 1.48E+02 6.00E+00 GA

PA-234M  N   3.7630E+01                                      1.63E+12
                        1001.00 1.962E+01 ?(P 8.865E+01 1.31E+02 8.37E-01 G
                         766.41 8.891E+01 ?(P 2.407E+02 8.09E+01 2.94E-01 G

AM-241   T   3.5671E-01                                      1.58E+05
                          59.54 3.567E-01 ?(  1.129E+00 1.12E+02 3.59E+01 G

Np-237   F   9.3134E-01                                      2.14E+06
                                                           Derived Ave Activity
                          86.49 9.313E-01 }(  5.058E+00 1.63E+02 1.31E+01 G

Ir-192   F  -1.8919E-01                                      7.40E+01
                         316.49-1.892E-01 ?(  6.464E-01 1.02E+02 8.70E+01 G
                         468.06-8.581E-02 +   1.090E+00 3.65E+02 5.18E+01 G
                         308.44 0.000E+00 +   3.155E+00 1.00E+03 3.18E+01 G

Cs-136   F   3.9265E-01                                      1.30E+01
                         818.50 2.285E-01  (  7.535E-01 9.73E+01 1.00E+02 G
                        1048.07 5.978E-01 ?(  6.073E-01 3.52E+01 8.00E+01 G
                         340.57-3.969E-01 -   1.787E+00 1.34E+02 4.69E+01 G

Np-239   T   4.1762E-01                                      2.36E+00
                         103.70 0.000E+00 -   1.858E+00 1.00E+03 2.40E+01 X
                         106.13 4.176E-01 ?(  1.662E+00 1.19E+02 2.27E+01 G
                          99.50 2.353E-01     2.536E+00 3.18E+02 1.50E+01 X

Nd-147       3.5143E-01                                      1.11E+01
                         531.00 1.130E-01 %(  3.464E+00 1.18E+03 1.30E+01 G
                          91.10 4.610E-01 ?(  2.363E+00 1.54E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.
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  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	216.	-23.	-0.006	91.53	-1.672E+00	P
AM-241	59.54	243.	24.	0.007	112.07	3.567E-01	
Sn-126	64.28	405.	-10.	-0.003	277.92	-5.534E-01	
BA-133	80.99	270.	-26.	-0.007	108.84	-3.726E-01	
EU-155	86.54	592.	-30.	-0.008	115.43	-4.800E-01	
Sn-126	86.94	502.	-30.	-0.008	106.51	-1.630E+00	
Sn-126	87.57	557.	-23.	-0.006	146.95	-2.984E-01	
Nd-147	91.10	833.	27.	0.007	153.73	4.610E-01	
Gd-153	97.50	256.	-18.	-0.005	131.61	-2.850E-01	
Np-239	99.50	256.	7.	0.002	317.83	2.353E-01	
Gd-153	103.20	334.	-17.	-0.005	151.11	-3.907E-01	
Np-239	106.13	247.	19.	0.005	118.72	4.176E-01	
CO-57	122.06	297.	-4.	-0.001	571.54	-2.552E-02	
EU-154	123.10	256.	21.	0.006	110.25	2.626E-01	
PA-234	131.29	416.	-15.	-0.004	198.31	-4.266E-01	
CO-57	136.47	401.	-3.	-0.001	946.14	-1.494E-01	
Tc-99m	140.51	337.	20.	0.006	130.77	1.289E-01	
U-235	143.79	360.	17.	0.005	158.67	8.520E-01	P
CE-141	145.44	347.	15.	0.004	177.88	1.702E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	162.66	222.	18.	0.005	117.16	1.723E+00	
U-235	163.38	242.	17.	0.005	130.66	1.976E+00	P
Cf-251	176.60	120.	18.	0.005	108.47	6.661E-01	
U-235	185.72	163.	76.	0.021	31.44	8.977E-01	P
TH-229	193.51	164.	-22.	-0.006	107.50	-3.333E+00	P
U-235	205.33	130.	8.	0.002	243.62	1.154E+00	P
TH-229	210.85	180.	-23.	-0.007	87.16	-5.531E+00	P
TH-227	256.24	107.	-11.	-0.003	175.00	-1.248E+00	
Cd-113m	263.70	124.	17.	0.005	98.47	2.305E+03	
BI-210M	265.83	123.	10.	0.003	157.58	1.711E-01	
Hg-203	279.20	136.	17.	0.005	101.29	1.804E-01	
I-131	284.30	88.	-13.	-0.004	41.13	-1.882E+00	P
TL-210	296.00	525.	-16.	-0.004	204.53	-1.852E-01	
PA-231	300.07	509.	-16.	-0.004	200.66	-6.035E+00	
PA-233	300.18	493.	-4.	-0.001	852.61	-5.515E-01	
PA-233	312.01	497.	-16.	-0.004	200.67	-4.203E-01	
Ir-192	316.49	142.	-17.	-0.005	101.79	-1.892E-01	
CR-51	320.08	172.	-15.	-0.004	77.89	-1.440E+00	P
La-140	328.76	74.	11.	0.003	142.80	5.638E-01	P
Cf-249	333.44	95.	-18.	-0.005	101.94	-1.196E+00	
Cs-136	340.57	288.	-18.	-0.005	134.20	-3.969E-01	
HF-181	345.83	252.	-19.	-0.005	87.73	-1.298E+00	P
BA-133	356.00	473.	-16.	-0.005	188.21	-2.820E-01	
I-131	364.48	53.	-7.	-0.002	330.37	-8.706E-02	P
BA-133	383.84	99.	13.	0.003	115.74	1.581E+00	
Cf-249	387.95	112.	13.	0.003	122.02	2.168E-01	
SN-113	391.69	166.	-15.	-0.004	122.57	-2.726E-01	
SB-125	427.88	71.	-13.	-0.004	167.79	-5.405E-01	P
AG-108M	433.94	49.	10.	0.003	128.29	1.437E-01	P
pm-146	453.88	53.	-10.	-0.003	141.46	-1.892E-01	P
SB-125	463.37	29.	31.	0.009	30.26	3.933E+00	
Ir-192	468.06	73.	-3.	-0.001	365.25	-8.581E-02	
BE-7	477.60	79.	-10.	-0.003	125.81	-1.322E+00	
HF-181	482.00	80.	13.	0.004	101.58	2.185E-01	
La-140	487.02	32.	11.	0.003	103.48	3.377E-01	P
RU-103	497.05	44.	-8.	-0.002	166.15	-1.224E-01	
RH-106	511.86	95.	77.	0.021	34.27	5.476E+00	P
Ba-140	537.26	32.	10.	0.003	115.18	6.079E-01	
CS-134	563.24	28.	8.	0.002	141.85	1.403E+00	P
BI-207	569.70	35.	12.	0.003	72.92	1.974E-01	
SB-125	600.50	404.	12.	0.003	236.69	1.102E+00	P
SB-124	602.73	416.	4.	0.001	789.61	6.079E-02	
CS-134	604.71	473.	-15.	-0.004	208.05	-2.496E-01	
RU-103	610.30	458.	-15.	-0.004	204.03	-4.287E+00	
AG-108M	614.28	443.	-15.	-0.004	200.18	-2.766E-01	
PM-144	618.06	428.	-9.	-0.003	316.22	-1.564E-01	
RH-106	621.92	404.	14.	0.004	199.49	2.424E+00	
SB-125	635.89	42.	-3.	-0.001	310.91	-4.523E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	636.97	43.	3.	0.001	314.47	7.145E-01	
AG-110M	657.76	32.	10.	0.003	83.39	1.930E-01	
CS-137	661.66	73.	-14.	-0.004	90.53	-2.898E-01	
PM-144	696.54	39.	-4.	-0.001	322.59	-7.436E-02	
NB-94	702.63	48.	-4.	-0.001	529.20	-7.145E-02	P
SB-124	722.79	72.	-6.	-0.002	215.41	-9.953E-01	
AG-108M	722.94	62.	14.	0.004	85.64	2.857E-01	
BI-212	727.17	67.	-1.	0.000	805.22	-3.598E-01	P
pm-146	747.16	22.	8.	0.002	123.63	4.629E-01	P
ZR-95	756.73	22.	10.	0.003	97.07	3.745E-01	
AG-110M	763.94	60.	2.	0.000	737.86	1.340E-01	
NB-95	765.79	58.	6.	0.002	189.48	1.165E-01	
PA-234M	766.41	49.	13.	0.004	80.88	8.891E+01	P
BI-212	785.42	22.	11.	0.003	90.66	1.774E+01	P
CS-134	795.87	67.	-4.	-0.001	319.22	-8.831E-02	
CS-134	801.95	72.	-1.	0.000	902.08	-3.181E-01	
CO-58	810.77	66.	-8.	-0.002	139.95	-1.788E-01	
La-140	815.77	64.	10.	0.003	122.98	8.585E-01	
Cs-136	818.50	50.	11.	0.003	97.33	2.285E-01	
MN-54	834.85	23.	9.	0.002	123.02	1.860E-01	
Co-56	846.77	38.	-3.	-0.001	360.74	-6.139E-02	P
NB-94	871.10	23.	5.	0.001	159.37	1.006E-01	P
PA-234	880.53	41.	6.	0.002	147.84	2.370E+00	
y-88	898.04	20.	9.	0.003	104.59	2.280E-01	P
AG-110M	937.49	51.	-18.	-0.005	86.87	-1.253E+00	
PA-234	946.02	42.	-17.	-0.005	86.84	-2.941E+00	
EU-154	996.33	20.	12.	0.003	62.72	2.713E+00	
PA-234M	1001.00	33.	7.	0.002	130.91	1.962E+01	P
EU-154	1004.77	51.	10.	0.003	107.77	1.370E+00	
Co-56	1037.84	25.	-8.	-0.002	141.88	-1.464E+00	
Cs-136	1048.07	12.	18.	0.005	35.21	5.978E-01	
RH-106	1050.36	44.	-9.	-0.003	106.07	-1.564E+01	
BI-207	1063.66	21.	6.	0.002	177.27	2.052E-01	P
FE-59	1099.25	10.	5.	0.001	146.06	2.406E-01	
ZN-65	1115.55	109.	-9.	-0.003	164.18	-5.000E-01	
Ta-182	1121.30	158.	-19.	-0.005	96.91	-1.498E+00	
CO-60	1173.24	20.	3.	0.001	385.80	7.479E-02	P
Ta-182	1189.05	40.	-17.	-0.005	85.31	-3.055E+00	
Ta-182	1221.41	32.	-11.	-0.003	120.72	-1.214E+00	
Co-56	1238.28	48.	2.	0.001	840.28	8.598E-02	P
NA-22	1274.53	36.	-11.	-0.003	82.82	-3.405E-01	
EU-154	1274.54	38.	6.	0.002	142.69	5.568E-01	
FE-59	1291.60	6.	5.	0.001	130.19	3.274E-01	P
TL-210	1313.00	32.	-14.	-0.004	95.65	-2.117E+00	
CO-60	1332.50	16.	-5.	-0.002	110.63	-1.742E-01	P
AG-110M	1384.30	21.	-7.	-0.002	147.85	-1.004E+00	
La-140	1596.21	17.	-4.	-0.001	246.86	-1.583E-01	
SB-124	1690.98	6.	1.	0.000	427.57	1.109E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	1836.06	30.	-17.	-0.005	81.51	-7.335E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.3221E+00	-1.3222E+00	1.258E+02%	5.66E+00
NA-22	#A	-3.4050E-01	-3.4050E-01	8.282E+01%	9.49E-01
K-40		6.3720E+01	6.3720E+01	7.444E+00%	4.96E+00
Sc-46	#A	-7.5490E-03	-7.5490E-03	2.955E+03%	7.95E-01
CR-51	#A	-1.4404E+00	-1.4404E+00	7.789E+01%	6.26E+00
MN-54	#A	1.8598E-01	1.8598E-01	1.230E+02%	5.41E-01
FE-59	#A	2.7819E-01	2.7819E-01	9.783E+01%	8.39E-01
Co-56	#A	-2.7374E-03	-2.7374E-03	3.607E+02%	6.82E-01
CO-57	#A	-2.5525E-02	-2.5525E-02	5.715E+02%	4.95E-01
CO-58	#A	-1.7884E-01	-1.7884E-01	1.399E+02%	8.57E-01
CO-60	#A	-1.7424E-01	-1.7424E-01	1.106E+02%	6.95E-01
ZN-65	#A	-5.0002E-01	-5.0002E-01	1.642E+02%	2.80E+00
NB-94	#A	1.5420E-02	1.5420E-02	1.594E+02%	6.61E-01
ZR-95	#A	3.7451E-01	3.7451E-01	9.707E+01%	8.84E-01
NB-95	#A	1.1655E-01	1.1655E-01	1.895E+02%	7.64E-01
RU-103	#A	-1.2240E-01	-1.2240E-01	1.661E+02%	5.14E-01
RH-106	#A	2.4238E+00	2.4238E+00	1.995E+02%	1.62E+01
AG-108M	#A	2.1484E-01	2.1484E-01	7.712E+01%	4.84E-01
AG-110M	#A	1.1209E-01	1.1209E-01	8.339E+01%	1.07E+00
SN-113	#A	-2.7258E-01	-2.7258E-01	1.226E+02%	1.13E+00
SB-124	#A	7.7186E-02	7.7187E-02	4.276E+02%	1.62E+00
SB-125	#A	7.7443E-01	7.7443E-01	3.026E+01%	1.75E+00
I-131	#A	-2.2388E-02	-2.2388E-02	2.281E+02%	4.83E-01
Gd-153	#A	-2.8499E-01	-2.8499E-01	1.316E+02%	1.26E+00
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.57E+01
Tc-99m	#A	1.2873E-01	1.2885E-01	1.308E+02%	5.64E-01
BA-133	#A	-2.8198E-01	-2.8198E-01	1.882E+02%	1.78E+00
CS-134	#A	-1.1937E-01	-1.1937E-01	1.259E+02%	1.74E+00
CS-137	#A	-2.8982E-01	-2.8982E-01	9.053E+01%	8.82E-01
CE-139	#A	2.0307E-03	2.0307E-03	8.021E+03%	5.56E-01
Ba-140	#A	8.3443E-01	8.3445E-01	8.215E+01%	1.77E+00
La-140	#A	1.7181E-01	1.7181E-01	8.184E+01%	8.68E-01
CE-141	#A	1.7024E-01	1.7024E-01	1.779E+02%	1.02E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.72E+00
PM-144	#A	-7.4365E-02	-7.4365E-02	3.226E+02%	5.91E-01
EU-152	#A	-1.6127E-01	-1.6127E-01	8.816E+01%	3.09E+00
EU-154	#A	7.2293E-01	7.2293E-01	6.272E+01%	5.48E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.09E+00
HF-181	#A	2.1855E-01	2.1855E-01	1.016E+02%	7.49E-01

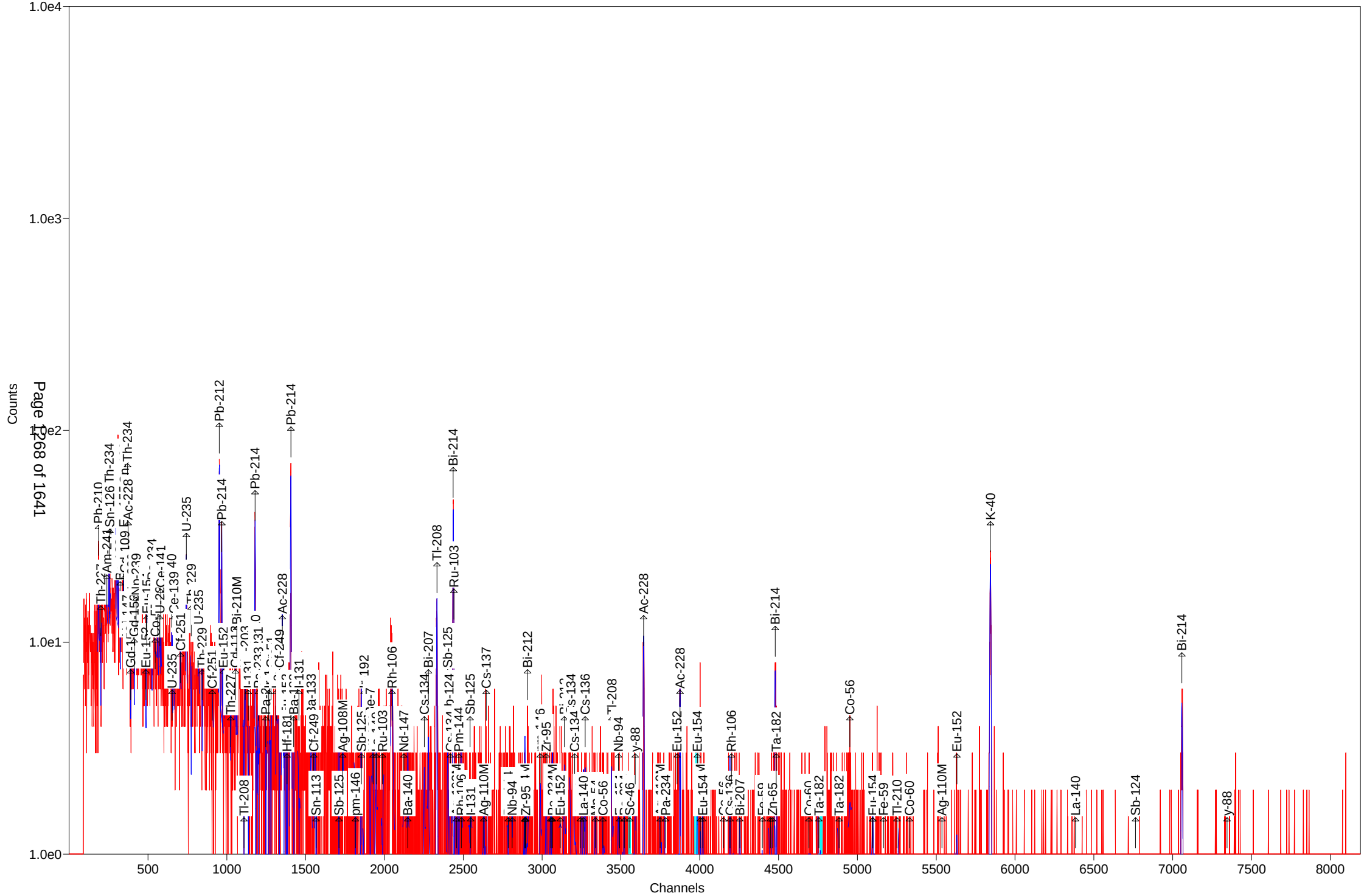
Ta-182 #A	-1.4980E+00	-1.4980E+00	9.691E+01%	4.86E+00
Hg-203 #A	1.8035E-01	1.8035E-01	1.013E+02%	6.13E-01
TL-208 #	1.9372E+00	1.9372E+00	1.275E+01%	4.19E-01
pm-146 #A	4.6290E-01	4.6290E-01	1.236E+02%	1.41E+00
y-88 #A	2.2798E-01	2.2799E-01	1.046E+02%	5.69E-01
Cd-113m#A	2.3050E+03	2.3050E+03	9.847E+01%	7.62E+03
Cd-109 #A	2.1161E+00	2.1161E+00	2.551E+02%	1.81E+01
Cf-251 #A	6.6608E-01	6.6608E-01	1.085E+02%	1.95E+00
Cf-249 #A	2.1676E-01	2.1676E-01	1.220E+02%	8.95E-01
Sn-126 #A	-5.5342E-01	-5.5342E-01	2.779E+02%	5.18E+00
PB-210	8.4522E+00	8.4522E+00	3.577E+01%	8.39E+00
PB-212	4.8157E+00	4.8157E+00	7.999E+00%	8.61E-01
PB-214	8.7561E+00	8.7561E+00	6.332E+00%	9.31E-01
BI-207 #A	2.0078E-01	2.0078E-01	7.292E+01%	4.80E-01
BI-212 #A	-3.5983E-01	-3.5983E-01	8.052E+02%	1.04E+01
U-235 #A	1.1950E+00	1.1950E+00	1.062E+02%	4.53E+00
BI-214	8.6190E+00	8.6190E+00	8.256E+00%	1.14E+00
BI-210M#A	1.7107E-01	1.7107E-01	1.576E+02%	9.16E-01
AC-228	6.0305E+00	6.0305E+00	1.091E+01%	9.43E-01
TH-227 #A	-1.6719E+00	-1.6719E+00	9.153E+01%	5.27E+00
TH-229 #A	-3.3331E+00	-3.3331E+00	1.075E+02%	9.34E+00
TH-234 A	6.1699E+00	6.1699E+00	2.604E+01%	8.56E+00
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.43E+01
PA-233 #A	-4.2035E-01	-4.2035E-01	2.007E+02%	2.83E+00
PA-234 #A	-4.2660E-01	-4.2660E-01	1.983E+02%	2.84E+00
PA-234M#A	3.7630E+01	3.7630E+01	7.694E+01%	8.87E+01
AM-241 #A	3.5671E-01	3.5671E-01	1.121E+02%	1.13E+00
Np-237 #A	9.3134E-01	9.3134E-01	1.628E+02%	5.06E+00
Ir-192 #A	-1.8918E-01	-1.8919E-01	1.018E+02%	6.46E-01
Cs-136 #A	3.9264E-01	3.9265E-01	3.521E+01%	7.53E-01
Np-239 #A	4.1757E-01	4.1762E-01	1.187E+02%	1.66E+00
Nd-147 #A	3.5142E-01	3.5143E-01	1.537E+02%	3.46E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%	8.73E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.085E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.0850091E+02 Bq/Sample

376766_Gamma_160-29521-A-16-C. 14_Gamma_20183015.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20182811

Sample Description: 376766_Gamma_160-29521-B-17-C
Detector: Detector # 8
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-B-17-C

Decay to Time: 8/9/2018 19:21 Live Time: 1800 sec
Acquisition Time: 8/9/2018 19:21:35 Real Time: 1848 sec
Analysis Time: 8/9/2018 19:52 Dead Time: 2.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-07-14_1855.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.039E+00	107.1	3.255E+00	3.259E+00	1.110E+01
NA-22	8.011E-01	31.6	2.533E-01	2.565E-01	5.904E-01
K-40	1.348E+02	8.1	1.091E+01	1.290E+01	9.546E+00
Sc-46	1.962E-02	2467.8	4.843E-01	4.843E-01	1.751E+00
CR-51	4.068E+00	180.0	7.321E+00	7.325E+00	2.458E+01
MN-54	-1.116E-01	403.1	4.500E-01	4.501E-01	1.125E+00
FE-59	1.231E+00	32.1	3.946E-01	3.994E-01	2.177E+00
Co-56	7.035E-01	42.7	3.005E-01	3.027E-01	1.658E+00
CO-57	0.000E+00	1.#INF	2.065E-01	2.065E-01	1.146E+00
CO-58	3.011E-01	146.0	4.397E-01	4.400E-01	1.534E+00
CO-60	-8.668E-02	545.5	4.729E-01	4.729E-01	1.325E+00
ZN-65	8.523E-01	177.3	1.511E+00	1.512E+00	5.230E+00
NB-94	-3.289E-02	1380.2	4.540E-01	4.540E-01	1.127E+00
ZR-95	6.587E-01	101.4	6.676E-01	6.685E-01	1.634E+00
NB-95	-1.134E-01	486.7	5.517E-01	5.517E-01	1.941E+00
RU-103	1.573E-01	269.4	4.238E-01	4.239E-01	1.059E+00
RH-106	-5.340E-01	65.5	3.499E-01	3.510E-01	1.633E+01
AG-108M	4.116E-01	72.6	2.988E-01	2.995E-01	8.790E-01
AG-110M	8.868E-01	31.6	2.804E-01	2.841E-01	2.410E+00
SN-113	4.963E-01	91.5	4.543E-01	4.550E-01	1.535E+00
SB-124	4.390E-02	84.5	3.708E-02	3.715E-02	3.432E+00
SB-125	8.911E-01	105.9	9.438E-01	9.449E-01	2.818E+00
I-131	2.811E-01	89.2	2.507E-01	2.511E-01	1.119E+00
Gd-153	4.496E-01	141.5	6.363E-01	6.368E-01	5.718E+00
Ga-68	2.077E+01	89.3	1.855E+01	1.859E+01	4.296E+01
Tc-99m	0.000E+00	1.#INF	2.205E-01	2.205E-01	1.965E+00
BA-133	-7.244E-01	158.5	1.148E+00	1.149E+00	3.858E+00
CS-134	1.477E-01	86.7	1.281E-01	1.283E-01	3.388E+00
CS-137	-2.067E-02	2727.3	5.638E-01	5.638E-01	1.999E+00
CE-139	-1.118E-01	323.2	3.613E-01	3.614E-01	1.232E+00
Ba-140	-7.799E-01	72.4	5.649E-01	5.663E-01	5.535E+00
La-140	3.646E-01	123.3	4.496E-01	4.500E-01	7.522E-01
CE-141	-8.925E-02	1170.5	1.045E+00	1.045E+00	3.519E+00

CE-144	-3.020E+00	144.4	4.362E+00	4.365E+00	1.457E+01
PM-144	3.048E-01	105.3	3.210E-01	3.214E-01	9.759E-01
EU-152	1.755E+00	128.3	2.252E+00	2.253E+00	6.820E+00
EU-154	-6.923E+00	71.0	4.917E+00	4.929E+00	1.635E+01
EU-155	-1.408E+00	90.9	1.280E+00	1.282E+00	5.492E+00
HF-181	6.431E-01	111.1	7.142E-01	7.150E-01	1.597E+00
Ta-182	2.487E+00	84.8	2.109E+00	2.112E+00	7.093E+00
Hg-203	-4.589E-01	96.6	4.434E-01	4.441E-01	1.488E+00
TL-208	3.721E+00	13.2	4.911E-01	5.277E-01	7.379E-01
pm-146	-1.246E+00	127.7	1.592E+00	1.593E+00	3.772E+00
y-88	6.618E-01	35.4	2.340E-01	2.364E-01	1.073E+00
Cd-113m	-1.094E+03	435.9	4.770E+03	4.770E+03	1.657E+04
Cd-109	0.000E+00	1.#INF	1.384E+01	1.384E+01	4.615E+01
Cf-251	-3.148E-02	5790.1	1.823E+00	1.823E+00	4.795E+00
Cf-249	2.167E-01	167.9	3.637E-01	3.638E-01	1.503E+00
Sn-126	3.950E+00	99.9	3.945E+00	3.950E+00	1.319E+01
PB-210	-1.691E+01	67.7	1.145E+01	1.150E+01	5.757E+01
PB-212	9.390E+00	8.8	8.252E-01	1.025E+00	1.730E+00
PB-214	1.573E+01	8.4	1.314E+00	1.548E+00	1.791E+00
BI-207	3.462E-02	963.7	3.337E-01	3.337E-01	1.205E+00
BI-212	4.097E+00	148.9	6.102E+00	6.105E+00	2.113E+01
U-235	2.226E+00	189.1	4.210E+00	4.211E+00	1.608E+01
BI-214	1.551E+01	8.6	1.336E+00	1.560E+00	1.654E+00
BI-210M	-7.914E-01	98.5	7.793E-01	7.807E-01	2.168E+00
AC-228	7.636E+00	16.0	1.219E+00	1.280E+00	4.174E+00
TH-227	5.821E+00	107.3	6.247E+00	6.255E+00	2.094E+01
TH-229	7.315E+00	94.8	6.937E+00	6.962E+00	1.782E+01
TH-234	1.005E+01	49.6	4.984E+00	5.012E+00	2.960E+01
PA-231	-1.376E+01	186.7	2.569E+01	2.570E+01	8.620E+01
PA-233	0.000E+00	1.#INF	1.388E-01	1.388E-01	6.839E+00
PA-234	-1.836E-01	109.8	2.016E-01	2.018E-01	8.922E+00
PA-234M	3.007E+01	89.9	2.702E+01	2.706E+01	3.202E+02
AM-241	1.140E-01	1273.7	1.452E+00	1.452E+00	4.920E+00
Np-237	-2.984E+00	180.6	5.391E+00	5.393E+00	1.796E+01
Ir-192	2.296E-01	104.8	2.406E-01	2.410E-01	2.861E+00
Cs-136	-1.384E-01	107.2	1.484E-01	1.486E-01	1.861E+00
Np-239	1.236E+00	116.5	1.440E+00	1.442E+00	4.820E+00
Nd-147	-4.619E+00	93.4	4.316E+00	4.324E+00	1.029E+01
TL-210	0.000E+00	1.#INF	1.884E-01	1.884E-01	1.829E+00
Total	2.946E+02				

Analyst: Morgan Reichert

TestAmerica Inc Spectrum name: 8_Gamma_20182811.An1

Sample description
376766_Gamma_160-29521-B-17-C

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182811.An1

Acquisition information
Start time: 8/9/2018 7:21:35 PM
Live time: 1800
Real time: 1848
Dead time: 2.58 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 7:21:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-07-14_1855.PBC 7/14/2018 6:55:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1393

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	19.	107.32	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
63.32	22.	85.05	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
64.31	22.	99.88	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
74.83	125.	16.18	1.03	3.617E-02				
77.11	193.	10.58	1.04	3.698E-02				
86.99	43.	38.39	1.04	3.969E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.987E+00	EU155
					86.94	9.040	6.733E+00	Sn126
87.62	24.	77.04	1.04	3.982E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	8.689E+00	Cd109
93.05	168.	13.66	1.51	4.078E-02	92.59	5.584	2.870E+01	TH234
					93.35	5.561	4.099E+01	AC228
99.50	21.	116.73	1.05	4.151E-02	99.50	15.000	PBC<MDA	Np239
103.20	18.	141.52	1.06	4.176E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	9.921E-01	Np239
103.70	13.	200.84	1.06	4.178E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	7.019E-01	Np239
106.13	21.	116.53	1.06	4.187E-02	106.13	22.700	PBC<MDA	Np239
123.10	18.	110.29	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
143.72	19.	199.75	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
162.66	19.	98.08	1.10	3.593E-02	162.66	6.220	PBC<MDA	Ba140
163.38	6.	321.20	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.90	87.	25.51	1.03	3.327E-02	185.72	54.000	2.683E+00	U235
193.51	19.	94.84	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
227.00	13.	116.07	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.60	208.	9.34	1.07	2.745E-02	238.63	43.300	9.705E+00	PB212
241.98	74.	18.14	1.16	2.714E-02	242.00	7.430	2.047E+01	PB214
256.24	2.	786.34	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
275.48	15.	80.80	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
295.22	158.	9.75	1.01	2.323E-02	295.09	19.300	1.957E+01	PB214
					296.00	79.000	4.793E+00	TL210
300.26	26.	32.41	1.20	2.294E-02	300.03	3.280	1.932E+01	PB212
					300.07	2.460	2.576E+01	PA231
					300.18	6.200	1.022E+01	PA233
320.08	16.	179.97	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
328.76	10.	176.19	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	10.	178.04	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
338.17	62.	15.97	1.49	2.085E-02	338.32	12.010	1.375E+01	AC228
340.57	11.	182.58	1.23	2.074E-02	340.57	46.900	PBC<MDA	Cs136
344.29	10.	193.95	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
345.83	11.	190.27	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
351.89	195.	8.96	1.29	2.021E-02	351.93	37.600	1.424E+01	PB214
391.69	11.	91.54	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
433.94	9.	108.28	1.30	1.708E-02	433.94	90.480	PBC<MDA	AG108M
453.88	9.	115.42	1.32	1.647E-02	453.88	65.000	PBC<MDA	pm146
463.37	11.	105.92	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
468.06	9.	104.77	1.33	1.606E-02	468.06	51.750	PBC<MDA	Ir192
477.60	9.	107.11	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	9.	114.58	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
487.02	9.	123.31	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	4.	269.38	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	55.	31.18	2.61	1.494E-02	511.86	20.000	1.023E+01	RH106
563.24	7.	111.73	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.70	1.	963.74	1.40	1.368E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.125E-01	PA234
					569.70	97.740	3.462E-02	BI207
583.11	76.	13.20	1.39	1.342E-02	583.02	84.500	3.721E+00	TL208
609.22	167.	8.61	1.81	1.294E-02	609.31	46.090	1.551E+01	BI214
618.06	5.	271.56	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
636.97	10.	89.19	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
696.54	8.	105.33	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
722.79	9.	84.47	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.910E-01	AG108M
					723.36	20.220	2.207E+00	EU154
722.94	9.	96.70	1.50	1.123E-02	722.79	10.810	4.126E+00	SB124
					722.94	90.840	4.911E-01	AG108M
					723.36	20.220	2.207E+00	EU154
723.36	5.	174.13	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.976E-01	AG108M
					723.36	20.220	1.337E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.17	6.	148.95	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
756.73	7.	101.35	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
766.07	11.	92.17	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.874E+02	PA234M
795.87	9.	102.77	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
810.78	6.	146.02	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
880.53	8.	90.49	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
883.24	5.	165.20	1.60	9.493E-03	883.24	9.600	PBC<MDA	PA234
898.04	7.	104.64	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.25	32.	30.46	1.62	9.247E-03	911.07	29.000	6.630E+00	AC228
946.02	2.	431.57	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
969.32	14.	84.77	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1004.77	10.	112.40	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	6.	93.16	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	8.	78.61	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	8.	89.32	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	6.	122.85	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	167.95	1.74	7.803E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	177.35	1.74	7.782E-03	1115.55	50.600	PBC<MDA	ZN65
1120.27	4.	168.06	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.54	12.	84.78	1.74	7.748E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	-2.	590.24	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	20.	42.72	1.81	7.114E-03	1238.28	66.070	2.403E+00	Co56
1274.53	10.	31.62	1.83	6.939E-03	1274.53	99.940	8.011E-01	NA22
					1274.54	35.190	2.275E+00	EU154
1291.60	10.	32.07	1.84	6.860E-03	1291.60	43.200	1.861E+00	FE59
1313.00	5.	44.72	1.85	6.763E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	-1.	545.55	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	10.	31.62	1.88	6.460E-03	1384.30	24.290	3.540E+00	AG110M
1460.67	160.	8.09	1.81	6.165E-03	1460.83	10.670	1.348E+02	K40
1690.98	1.	427.57	2.03	5.425E-03	1690.98	47.790	PBC<MDA	SB124
1763.38	31.	19.00	2.07	5.226E-03	1764.49	15.400	2.150E+01	BI214
1836.06	8.	35.36	2.10	5.046E-03	1836.06	99.200	8.880E-01	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.14	74.79	141.	125.	3.451E+03	16.18	1.034	- sD
308.24	77.07	113.	193.	5.230E+03	10.58	1.036	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	338.	-26.	-0.014	67.72	1.012
TH-227	200.37	50.14	198.	19.	0.011	107.32	1.015s
TH-234	252.96	63.29	166.	22.	0.012	85.05	1.025D
Sn-126	256.93	64.28	224.	22.	0.012	99.88	1.026s
BA-133	323.77	80.99	822.	-29.	-0.016	142.66	1.039s
Np-237	345.77	86.49	1253.	-28.	-0.015	180.65	1.043
EU-155	345.98	86.54	723.	-27.	-0.015	142.70	1.043s
Sn-126	347.57	86.94	118.	43.	0.024	38.39	1.044D
Sn-126	350.09	87.57	642.	24.	0.013	77.04	1.044D
Cd-109	351.97	88.04	696.	0.	0.000	139.92	1.044A
Nd-147	364.21	91.10	655.	0.	0.000	1000.00	1.047s
TH-234	370.17	92.59	187.	40.	0.022	51.13	1.048D
AC-228	373.21	93.35	605.	27.	0.015	130.11	1.049s
Np-239	397.81	99.50	291.	21.	0.012	116.73	1.053
Gd-153	412.62	103.20	312.	18.	0.010	141.52	1.056s
Np-239	414.62	103.70	317.	13.	0.007	200.84	1.057s
EU-155	421.07	105.31	333.	-22.	-0.012	90.91	1.058s
Np-239	424.34	106.13	293.	21.	0.012	116.53	1.058s
EU-152	486.92	121.78	209.	-20.	-0.011	104.64	1.071s
CO-57	488.06	122.06	229.	0.	0.000	1000.00	1.071s
EU-154	492.22	123.10	178.	18.	0.010	110.29	1.072s
PA-234	525.00	131.29	606.	-24.	-0.013	144.72	1.078s
HF-181	531.92	133.02	581.	-24.	-0.014	141.67	1.079s
CE-144	533.98	133.54	605.	-24.	-0.014	144.44	1.080
HF-181	545.02	136.30	629.	-14.	-0.008	262.84	1.082s
CO-57	545.72	136.47	643.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	643.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	673.	19.	0.010	199.75	1.087s
Ba-140	650.47	162.66	160.	19.	0.010	98.08	1.102s
U-235	653.35	163.38	183.	6.	0.003	321.20	1.102
CE-139	663.24	165.85	175.	-6.	-0.003	323.22	1.104s
U-235	743.44	185.90	100.	89.	0.050	24.63	1.027s
TH-229	773.87	193.51	84.	19.	0.010	94.84	1.125s
U-235	821.17	205.33	117.	-19.	-0.011	94.41	1.134
TH-229	843.24	210.85	120.	-14.	-0.008	155.51	1.138
Cf-251	907.84	227.00	56.	13.	0.007	116.07	1.151s
PB-212	954.37	238.63	54.	201.	0.112	8.79	1.159D
PB-214	967.84	242.00	54.	74.	0.041	18.14	1.162D
EU-152	978.62	244.69	497.	-21.	-0.011	154.38	1.164
TH-227	1024.81	256.24	64.	2.	0.001	786.34	1.172s
Cd-113m	1054.65	263.70	84.	-3.	-0.002	435.89	1.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1063.18	265.83	100.	-18.	-0.010	98.47	1.179
TL-208	1108.99	277.28	64.	15.	0.008	80.80	1.188s
Hg-203	1116.66	279.20	116.	-16.	-0.009	96.61	1.189s
I-131	1137.05	284.30	61.	-2.	-0.001	684.21	1.193s
PB-214	1180.22	295.09	20.	157.	0.087	8.93	1.201D
TL-210	1183.86	296.00	501.	-16.	-0.009	197.14	1.202s
PB-212	1199.98	300.03	23.	26.	0.015	32.41	1.205D
PA-231	1200.14	300.07	485.	-16.	-0.009	193.51	1.205s
PA-233	1200.58	300.18	468.	-16.	-0.009	190.27	1.205s
PA-231	1210.46	302.65	452.	-16.	-0.009	186.74	1.207s
BA-133	1211.27	302.85	436.	-13.	-0.007	231.54	1.207s
Ba-140	1219.26	304.85	423.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	423.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	423.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	423.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	423.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	400.	16.	0.009	179.97	1.219s
La-140	1314.91	328.76	158.	10.	0.006	176.19	1.226
Cf-249	1333.63	333.44	168.	10.	0.006	178.04	1.229s
AC-228	1352.56	338.17	9.	62.	0.034	15.97	1.487s
Cs-136	1362.15	340.57	179.	11.	0.006	182.58	1.234s
EU-152	1377.01	344.29	190.	10.	0.006	193.95	1.237s
HF-181	1383.19	345.83	196.	11.	0.006	190.27	1.238s
PB-214	1407.79	351.98	22.	215.	0.120	8.35	1.297
BA-133	1423.87	356.00	322.	-16.	-0.009	158.50	1.245s
I-131	1457.81	364.48	40.	-6.	-0.004	281.86	1.252s
Cf-249	1551.68	387.95	43.	-3.	-0.002	284.61	1.269s
SN-113	1566.64	391.69	42.	11.	0.006	91.54	1.271s
AG-108M	1735.64	433.94	22.	9.	0.005	108.28	1.301s
pm-146	1815.41	453.88	22.	9.	0.005	115.42	1.315
SB-125	1853.36	463.37	65.	11.	0.006	105.92	1.322s
Ir-192	1872.14	468.06	42.	9.	0.005	104.77	1.325s
BE-7	1910.28	477.60	43.	9.	0.005	107.11	1.332s
HF-181	1927.89	482.00	52.	9.	0.005	114.58	1.335s
La-140	1947.98	487.02	61.	9.	0.005	123.31	1.339s
RU-103	1988.12	497.05	26.	4.	0.002	269.38	1.346s
RH-106	2047.36	511.86	35.	55.	0.031	31.18	2.606s
Nd-147	2123.91	531.00	48.	-16.	-0.009	93.44	1.369s
Ba-140	2148.95	537.26	48.	-14.	-0.008	106.61	1.373s
CS-134	2252.86	563.24	13.	7.	0.004	111.73	1.391s
PA-234	2277.80	569.47	31.	0.	0.000	1000.00	1.395s
BI-207	2278.73	569.70	32.	1.	0.000	963.74	1.396
TL-208	2332.37	583.11	7.	76.	0.042	13.20	1.393
SB-125	2401.92	600.50	282.	-12.	-0.007	81.12	1.416s
SB-124	2410.85	602.73	270.	-12.	-0.007	194.56	1.418s
CS-134	2418.76	604.71	258.	-11.	-0.006	211.26	1.419s
BI-214	2436.81	609.22	10.	167.	0.093	8.61	1.809s
PM-144	2472.18	618.06	92.	5.	0.003	271.56	1.428s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2487.60	621.92	55.	-14.	-0.008	104.87	1.431s
SB-125	2543.49	635.89	32.	-6.	-0.004	128.26	1.440s
I-131	2547.83	636.97	32.	10.	0.005	89.19	1.441
AG-110M	2630.98	657.76	38.	-6.	-0.004	140.58	1.455s
PM-144	2786.11	696.54	14.	8.	0.004	105.33	1.480s
SB-124	2891.09	722.79	24.	9.	0.005	84.47	1.497s
AG-108M	2891.70	722.94	34.	9.	0.005	96.70	1.498s
EU-154	2893.37	723.36	43.	5.	0.003	174.13	1.498s
ZR-95	2896.74	724.20	56.	-8.	-0.004	137.88	1.498s
BI-212	2908.63	727.17	40.	6.	0.003	148.95	1.500
pm-146	2942.83	735.72	14.	0.	0.000	1000.00	1.506
pm-146	2988.59	747.16	23.	-8.	-0.005	127.75	1.513s
ZR-95	3026.87	756.73	10.	7.	0.004	101.35	1.519s
AG-110M	3055.73	763.94	56.	-15.	-0.008	75.09	1.524s
NB-95	3063.11	765.79	55.	-2.	-0.001	486.66	1.525s
PA-234M	3065.60	766.41	42.	11.	0.006	92.17	1.526s
EU-152	3115.64	778.92	19.	-1.	-0.001	737.90	1.534s
BI-212	3141.64	785.42	33.	-12.	-0.007	59.21	1.538s
CS-134	3183.43	795.87	35.	9.	0.005	102.77	1.544s
TL-210	3198.36	799.60	44.	0.	0.000	1000.00	1.547s
CO-58	3243.06	810.78	30.	6.	0.003	146.02	1.554s
La-140	3263.04	815.77	35.	0.	0.000	1000.00	1.557s
Cs-136	3273.97	818.50	45.	-9.	-0.005	112.36	1.559s
MN-54	3339.36	834.85	14.	-2.	-0.001	403.11	1.569s
Co-56	3387.05	846.77	33.	-13.	-0.007	99.76	1.577s
NB-94	3484.36	871.10	19.	-4.	-0.002	244.85	1.592s
EU-154	3492.89	873.23	47.	-15.	-0.008	71.02	1.593s
PA-234	3522.10	880.53	21.	8.	0.004	90.49	1.598s
PA-234	3532.94	883.24	29.	5.	0.003	165.20	1.599s
AG-110M	3538.71	884.68	34.	0.	0.000	1000.00	1.600s
y-88	3592.14	898.04	9.	7.	0.004	104.64	1.608s
AC-228	3644.26	911.07	14.	32.	0.018	30.46	1.616
AG-110M	3749.96	937.49	20.	-6.	-0.003	168.87	1.633s
PA-234	3784.07	946.02	15.	2.	0.001	431.57	1.638s
EU-152	3856.43	964.11	102.	-14.	-0.008	105.18	1.649s
AC-228	3875.88	968.97	64.	14.	0.008	84.77	1.652
EU-154	3985.31	996.33	72.	-13.	-0.007	96.32	1.668s
PA-234M	4003.99	1001.00	68.	-3.	-0.002	154.29	1.671s
EU-154	4019.10	1004.77	56.	10.	0.005	112.40	1.673s
Co-56	4151.36	1037.84	5.	6.	0.003	93.16	1.693s
Cs-136	4192.29	1048.07	20.	-2.	-0.001	324.04	1.698s
RH-106	4201.45	1050.36	15.	8.	0.004	78.61	1.700s
BI-207	4254.65	1063.66	16.	-4.	-0.002	170.36	1.708s
Ga-68	4309.61	1077.40	10.	8.	0.005	89.32	1.716s
FE-59	4397.02	1099.25	10.	6.	0.003	122.85	1.728s
EU-152	4448.32	1112.07	48.	6.	0.003	167.95	1.736s
ZN-65	4462.20	1115.55	54.	6.	0.003	177.35	1.738s
BI-214	4481.17	1120.29	25.	4.	0.002	168.06	1.740

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sc-46	4482.22	1120.55	135.	-20.	-0.011	85.00	1.740s
Ta-182	4485.22	1121.30	47.	12.	0.007	84.78	1.741s
CO-60	4692.97	1173.24	18.	-2.	-0.001	590.24	1.770s
Ta-182	4756.23	1189.05	20.	-1.	-0.001	988.26	1.779
Co-56	4953.16	1238.28	11.	20.	0.011	42.72	1.806s
NA-22	5098.16	1274.53	0.	10.	0.006	31.62	1.826s
EU-154	5098.22	1274.54	10.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	0.	10.	0.006	32.07	1.835s
TL-210	5252.05	1313.00	0.	5.	0.003	44.72	1.847s
CO-60	5330.06	1332.50	8.	-1.	-0.001	545.55	1.857s
AG-110M	5537.25	1384.30	0.	10.	0.006	31.62	1.884s
EU-152	5632.07	1408.00	11.	-2.	-0.001	330.27	1.896s
K-40	5842.74	1460.67	3.	160.	0.089	8.09	1.812
SB-124	6764.03	1690.98	6.	1.	0.001	427.57	2.034s
BI-214	7058.07	1764.49	2.	31.	0.017	19.00	2.067s
Co-56	7085.51	1771.35	43.	-7.	-0.004	134.62	2.070s
y-88	7344.36	1836.06	0.	8.	0.004	35.36	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.0394E+00				5.31E+01	
			477.60	3.039E+00	?(P	1.110E+01 1.07E+02 1.05E+01	G
NA-22	C	8.0106E-01				9.50E+02	
			1274.53	8.011E-01	?(	5.904E-01 3.16E+01 9.99E+01	G
K-40	N	1.3479E+02				4.66E+11	
			1460.83	1.348E+02	(P	9.546E+00 8.09E+00 1.07E+01	G
Sc-46	F	1.9624E-02				8.38E+01	
			889.28	1.962E-02	&(	1.751E+00 2.47E+03 1.00E+02	G
			1120.55	-1.438E+00	+	4.081E+00 8.50E+01 1.00E+02	G
CR-51	F	4.0682E+00				2.77E+01	
			320.08	4.068E+00	?(	2.458E+01 1.80E+02 9.94E+00	G
MN-54	C	-1.1164E-01				3.12E+02	
			834.85	-1.116E-01	?(	1.125E+00 4.03E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	1.2305E+00					4.45E+01	
			1099.25	7.486E-01	&(	2.177E+00	1.23E+02	5.65E+01 G
			1291.60	1.861E+00	?(P	1.382E+00	3.21E+01	4.32E+01 G
Co-56	C	7.0353E-01					7.73E+01	
			846.77	-7.159E-01	?(	1.658E+00	9.98E+01	9.99E+01 G
			1238.28	2.403E+00	(	2.119E+00	4.27E+01	6.61E+01 G
			1037.84	2.795E+00	?(	6.236E+00	9.32E+01	1.41E+01 G
			1771.35	-4.960E+00	+	2.301E+01	1.35E+02	1.55E+01 A
CO-58	C	3.0111E-01					7.09E+01	
			810.78	3.011E-01	?(	1.534E+00	1.46E+02	9.95E+01 G
CO-60	F	-8.6681E-02					1.93E+03	
			1332.50	-8.668E-02	?(P	1.325E+00	5.46E+02	1.00E+02 G
			1173.24	-1.119E-01	+ P	1.698E+00	5.90E+02	9.99E+01 G
ZN-65	F	8.5226E-01					2.44E+02	
			1115.55	8.523E-01	?(	5.230E+00	1.77E+02	5.06E+01 G
NB-94	I	-3.2894E-02					7.41E+06	
			702.63	-3.289E-02	%(	1.127E+00	1.38E+03	9.79E+01 G
			871.10	-2.183E-01	+ P	1.326E+00	2.45E+02	9.99E+01 G
ZR-95	I	6.5874E-01					6.40E+01	
			756.73	6.587E-01	?(P	1.634E+00	1.01E+02	5.45E+01 G
			724.20	-8.522E-01	+ P	4.203E+00	1.38E+02	4.42E+01 G
NB-95	I	-1.1336E-01					6.40E+01	
			765.79	-1.134E-01	?(	1.941E+00	4.87E+02	9.98E+01 G
RU-103	I	1.5733E-01					3.93E+01	
			497.05	1.573E-01	?(P	1.059E+00	2.69E+02	9.09E+01 G
			610.30	1.140E-05	%	5.677E+01	1.46E+08	5.75E+00 GA
RH-106	I	-5.3398E-01					3.74E+02	
			621.92	-6.034E+00	?(P	1.633E+01	1.05E+02	9.93E+00 G
			1050.36	3.447E+01	?(P	9.133E+01	7.86E+01	1.56E+00 G
			511.86	1.023E+01	&	5.631E+00	3.12E+01	2.00E+01 GA
AG-108M	C	4.1160E-01					1.53E+05	
			433.94	3.318E-01	(P	8.790E-01	1.08E+02	9.05E+01 G
			722.94	4.911E-01	?(	1.617E+00	9.67E+01	9.08E+01 G
			614.28	-7.338E-07	%	3.652E+00	1.46E+08	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	8.8681E-01					2.50E+02	
			884.68	0.000E+00	?(	2.410E+00	1.00E+03	7.27E+01 G
			657.76	-3.141E-01	+	1.528E+00	1.41E+02	9.46E+01 G
			937.49	-1.075E+00	+	4.219E+00	1.69E+02	3.44E+01 G
			1384.30	3.540E+00	?(	2.609E+00	3.16E+01	2.43E+01 G
			763.94	-3.485E+00	+	8.726E+00	7.51E+01	2.23E+01 G
SN-113	F	4.9632E-01					1.15E+02	
			391.69	4.963E-01	?(P	1.535E+00	9.15E+01	6.40E+01 G
SB-124	F	4.3902E-02					6.02E+01	
			602.73	-5.228E-01	(	3.432E+00	1.95E+02	9.83E+01 G
			1690.98	2.857E-01	?(	2.958E+00	4.28E+02	4.78E+01 G
			722.79	4.126E+00	(	1.179E+01	8.45E+01	1.08E+01 G
SB-125	I	8.9106E-01					1.01E+03	
			427.88	-9.279E-02	%(P	2.818E+00	1.15E+03	2.96E+01 G
			600.50	-2.951E+00	+ P	1.924E+01	8.11E+01	1.79E+01 G
			635.89	-2.555E+00	+	1.135E+01	1.28E+02	1.13E+01 G
			463.37	3.673E+00	?(P	1.318E+01	1.06E+02	1.05E+01 G
I-131	I	2.8109E-01					8.02E+00	
			364.48	-2.211E-01	&(P	1.119E+00	2.82E+02	8.17E+01 G
			284.30	-6.660E-01	+ P	1.476E+01	6.84E+02	6.14E+00 G
			636.97	6.003E+00	?(	1.814E+01	8.92E+01	7.17E+00 G
Gd-153	F	4.4960E-01					2.42E+02	
			97.50	-1.775E-02	%(	5.718E+00	9.57E+03	3.00E+01 G
			103.20	1.093E+00	?(	5.189E+00	1.42E+02	2.18E+01 G
Ga-68	C	2.0771E+01					4.71E-02	
			1077.40	2.077E+01	?(	4.296E+01	8.93E+01	3.30E+00 G
BA-133	F	-7.2444E-01					3.85E+03	
			356.00	-7.244E-01	?(	3.858E+00	1.59E+02	6.20E+01 G
			302.85	-1.710E+00	+	1.331E+01	2.32E+02	1.83E+01 G
			383.84	2.197E-01	%	1.440E+01	1.87E+03	8.94E+00 GA
			80.99	-1.224E+00	+	5.820E+00	1.43E+02	3.41E+01 GA
CS-134	I	1.4774E-01					7.54E+02	
			604.71	-4.746E-01	?(	3.388E+00	2.11E+02	9.76E+01 G
			795.87	5.432E-01	?(	1.906E+00	1.03E+02	8.55E+01 G
			569.32	-8.796E-02	%	7.488E+00	2.34E+03	1.54E+01 G
			801.95	-2.368E-06	%	2.087E+01	2.46E+08	8.69E+00 G
			563.24	3.372E+00	?(	9.400E+00	1.12E+02	8.35E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

CS-137   I  -2.0672E-02                                     1.10E+04
                          661.66-2.067E-02 %(P 1.999E+00 2.73E+03 8.52E+01 G

CE-139   F  -1.1177E-01                                     1.38E+02
                          165.85-1.118E-01 ?(  1.232E+00 3.23E+02 7.99E+01 G

Ba-140   I  -7.7992E-01                                     1.28E+01
                          537.26-2.169E+00 ?(  5.535E+00 1.07E+02 2.44E+01 G
                          162.66 4.665E+00 &(  1.533E+01 9.81E+01 6.22E+00 G
                          304.85 0.000E+00 +   5.635E+01 1.00E+03 4.29E+00 G

La-140   I   3.6458E-01                                     1.28E+01
                         1596.21-1.249E-02 %(P 7.522E-01 1.06E+04 9.54E+01 G
                          487.02 7.307E-01 &(  3.075E+00 1.23E+02 4.55E+01 G
                          328.76 1.316E+00 &(P 7.866E+00 1.76E+02 2.03E+01 G
                          815.77 0.000E+00 -   7.119E+00 1.00E+03 2.33E+01 G

CE-141   I  -8.9252E-02                                     3.25E+01
                          145.44-8.925E-02 %(  3.519E+00 1.17E+03 4.82E+01 G

CE-144   I  -3.0200E+00                                     2.85E+02
                          133.54-3.020E+00 &(  1.457E+01 1.44E+02 1.11E+01 G

PM-144   C   3.0476E-01                                     3.63E+02
                          696.54 3.875E-01 ?(  9.759E-01 1.05E+02 9.90E+01 G
                          618.06 2.221E-01 ?(  2.079E+00 2.72E+02 9.91E+01 G

EU-152   F   1.7552E+00                                     4.94E+03
                          344.29 1.038E+00 *(P 6.820E+00 1.94E+02 2.65E+01 G
                         1112.07 3.149E+00 ?(  1.832E+01 1.68E+02 1.36E+01 G
                          121.78-9.373E-01 &   3.284E+00 1.05E+02 2.86E+01 G
                          778.92-3.931E-01 - P 9.360E+00 7.38E+02 1.29E+01 G
                          964.11-6.059E+00 +   2.148E+01 1.05E+02 1.46E+01 G
                          244.69-5.619E+00 &   2.903E+01 1.54E+02 7.58E+00 G
                         1408.00-7.173E-01 + P 7.467E+00 3.30E+02 2.10E+01 GA

EU-154   I  -6.9225E+00                                     3.14E+03
                          873.23-6.923E+00 ?(  1.635E+01 7.10E+01 1.23E+01 G
                          123.10 5.760E-01 &   2.133E+00 1.10E+02 4.08E+01 G
                         1274.54 0.000E+00 +   3.969E+00 1.00E+03 3.52E+01 G
                          723.36 1.337E+00 +   8.102E+00 1.74E+02 2.02E+01 G
                         1004.77 3.565E+00 +   1.364E+01 1.12E+02 1.80E+01 G
                          996.33-7.929E+00 &   2.575E+01 9.63E+01 1.06E+01 G

EU-155   I  -1.4081E+00                                     1.81E+03
                          105.31-1.408E+00 &(P 5.492E+00 9.09E+01 2.12E+01 G
                           86.54-1.229E+00 +   5.850E+00 1.43E+02 3.07E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	6.4312E-01					4.24E+01	
			482.00	4.084E-01	(	1.597E+00	1.15E+02	8.05E+01 G
			133.02	-7.721E-01	+	3.653E+00	1.42E+02	4.33E+01 G
			345.83	1.897E+00	?(	1.222E+01	1.90E+02	1.51E+01 G
			136.30	-3.221E+00	+	2.839E+01	2.63E+02	5.85E+00 G
Ta-182	F	2.4869E+00					1.14E+02	
			1121.30	2.487E+00	?(	7.093E+00	8.48E+01	3.49E+01 G
			1221.41	9.527E-02	%	5.125E+00	2.23E+03	2.70E+01 G
			1189.05	-4.655E-01	-	1.096E+01	9.88E+02	1.62E+01 G
Hg-203	F	-4.5892E-01					4.66E+01	
			279.20	-4.589E-01	?(	1.488E+00	9.66E+01	8.15E+01 G
TL-208	N	3.7210E+00					6.98E+02	
			583.02	3.721E+00	(P	7.379E-01	1.32E+01	8.45E+01 G
			277.28	5.346E+00	& P	1.445E+01	8.08E+01	6.31E+00 G
			860.56	-4.406E-02	% P	1.064E+01	9.64E+03	1.24E+01 G
pm-146	C	-1.2462E+00					2.02E+03	
			747.16	-1.246E+00	?(	3.772E+00	1.28E+02	3.40E+01 G
			735.72	0.000E+00	+	4.494E+00	1.00E+03	2.25E+01 G
			453.88	4.505E-01	+ P	1.283E+00	1.15E+02	6.50E+01 G
y-88	F	6.6177E-01					1.07E+02	
			898.04	4.223E-01	?(	1.073E+00	1.05E+02	9.37E+01 G
			1836.06	8.880E-01	?(	8.180E-01	3.54E+01	9.92E+01 G
Cd-113m		-1.0943E+03					5.33E+03	
			263.70	-1.094E+03	?(	1.657E+04	4.36E+02	6.00E-03 K
Cf-251	T	-3.1484E-02					3.28E+05	
			176.60	-3.148E-02	%(	4.795E+00	5.79E+03	1.70E+01 G
			227.00	4.019E+00	?	1.162E+01	1.16E+02	6.30E+00 GA
Cf-249	T	2.1666E-01					1.28E+05	
			387.95	-1.501E-01	?(	1.503E+00	2.85E+02	6.60E+01 G
			333.44	1.777E+00	?(	1.073E+01	1.78E+02	1.55E+01 G
Sn-126		3.9498E+00					3.65E+07	
			87.57	8.803E-01	}	4.495E+00	7.70E+01	3.75E+01 GA
			64.28	3.950E+00	?(	1.319E+01	9.99E+01	9.70E+00 G
			86.94	6.733E+00		8.244E+00	3.84E+01	9.04E+00 GA
PB-210	N	-1.6911E+01					8.14E+03	
			46.54	-1.691E+01	?(P	5.757E+01	6.77E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	9.3900E+00					6.98E+02	
			238.63	9.390E+00	(P	1.730E+00	8.79E+00	4.33E+01 G
			300.03	1.932E+01	+	1.845E+01	3.24E+01	3.28E+00 GA
PB-214	N	1.5730E+01					5.84E+05	
			351.93	1.573E+01	(P	1.791E+00	8.35E+00	3.76E+01 G
			295.09	1.946E+01	+	2.911E+00	8.93E+00	1.93E+01 G
			242.00	2.047E+01	+	1.015E+01	1.81E+01	7.43E+00 GA
BI-207	C	3.4622E-02					1.18E+04	
			569.70	3.462E-02	?(	1.205E+00	9.64E+02	9.77E+01 G
			1063.66	-3.440E-01	+ P	1.950E+00	1.70E+02	7.45E+01 G
BI-212	N	4.0966E+00					6.98E+02	
			727.17	4.097E+00	(P	2.113E+01	1.49E+02	7.55E+00 G
			785.42	-5.047E+01	+ P	1.224E+02	5.92E+01	1.28E+00 GA
U-235	N	2.2259E+00					2.57E+11	
			143.79	2.406E+00	?(P	1.608E+01	2.00E+02	1.10E+01 G
			205.33	-6.850E+00	+ P	1.911E+01	9.44E+01	5.01E+00 G
			163.38	1.837E+00	(P	2.008E+01	3.21E+02	5.08E+00 G
			185.72	2.764E+00	@ P	1.520E+00	2.46E+01	5.40E+01 GA
BI-214	N	1.5511E+01					5.84E+05	
			609.31	1.551E+01	(P	1.654E+00	8.61E+00	4.61E+01 G
			1120.29	2.088E+00	- P	1.235E+01	1.68E+02	1.51E+01 G
			1764.49	2.150E+01	& P	6.256E+00	1.90E+01	1.54E+01 G
BI-210M	T	-7.9143E-01					1.10E+09	
			265.83	-7.914E-01	?(P	2.168E+00	9.85E+01	5.00E+01 G
			304.90	0.000E+00	+	8.634E+00	1.00E+03	2.80E+01 G
AC-228	N	7.6358E+00					2.10E+03	
			911.07	6.630E+00	?(	4.174E+00	3.05E+01	2.90E+01 G
			968.97	5.099E+00	?(	1.450E+01	8.48E+01	1.75E+01 G
			338.32	1.375E+01	(	3.702E+00	1.60E+01	1.20E+01 G
			93.35	6.616E+00	?	2.871E+01	1.30E+02	5.56E+00 XA
TH-227	N	5.8211E+00					7.95E+03	
			50.14	5.821E+00	?(	2.094E+01	1.07E+02	8.00E+00 G
			256.24	6.114E-01	-	1.223E+01	7.86E+02	7.00E+00 G
TH-229	N	7.3149E+00					2.68E+06	
			193.51	7.315E+00	&(P	1.782E+01	9.48E+01	4.40E+00 G
			210.85	-8.613E+00	&	3.307E+01	1.56E+02	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   1.0045E+01                                      1.63E+12
                          63.29 1.046E+01  (P 2.960E+01 8.51E+01 3.81E+00 G
                          92.59 9.761E+00  (P 1.622E+01 5.11E+01 5.58E+00 G

PA-231   N  -1.3758E+01                                      1.20E+07
                         302.65-1.376E+01 ?(  8.620E+01 1.87E+02 2.88E+00 G
                         300.07-1.597E+01 +   1.037E+02 1.94E+02 2.46E+00 G

PA-234   N  -1.8356E-01                                      1.63E+12
                         131.29-1.846E+00  (  8.922E+00 1.45E+02 1.80E+01 G
                         946.02 9.258E-01 +   9.609E+00 4.32E+02 1.34E+01 G
                         569.47 0.000E+00 +   1.412E+01 1.00E+03 8.20E+00 G
                         883.24 2.933E+00 ?(  1.700E+01 1.65E+02 9.60E+00 G
                         880.53 7.642E+00 ?   2.358E+01 9.05E+01 6.00E+00 GA

PA-234M  N   3.0066E+01                                      1.63E+12
                        1001.00-2.521E+01 ?(P 3.202E+02 1.54E+02 8.37E-01 G
                         766.41 1.874E+02 ?(  5.846E+02 9.22E+01 2.94E-01 G

AM-241   T   1.1402E-01                                      1.58E+05
                          59.54 1.140E-01 %(P 4.920E+00 1.27E+03 3.59E+01 G

Np-237   F  -2.9842E+00                                      2.14E+06
                          86.49-2.984E+00  (  1.796E+01 1.81E+02 1.31E+01 G

Ir-192   F   2.2962E-01                                      7.40E+01
                         316.49 0.000E+00 &(  2.861E+00 1.00E+03 8.70E+01 G
                         468.06 6.158E-01 ?(  2.199E+00 1.05E+02 5.18E+01 G
                         308.44 0.000E+00 &   7.684E+00 1.00E+03 3.18E+01 G

Cs-136   F  -1.3842E-01                                      1.30E+01
                         818.50-4.849E-01 &(  1.861E+00 1.12E+02 1.00E+02 G
                        1048.07-1.692E-01 +   1.992E+00 3.24E+02 8.00E+01 G
                         340.57 6.002E-01 ?(  3.714E+00 1.83E+02 4.69E+01 G

Np-239   T   1.2357E+00                                      2.36E+00
                         103.70 7.019E-01 &   4.750E+00 2.01E+02 2.40E+01 X
                         106.13 1.236E+00 ?(  4.820E+00 1.17E+02 2.27E+01 G
                          99.50 1.877E+00     7.335E+00 1.17E+02 1.50E+01 X

Nd-147      -4.6194E+00                                      1.11E+01
                         531.00-4.619E+00 ?(  1.029E+01 9.34E+01 1.30E+01 G
                          91.10 0.000E+00 +   5.915E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
```

! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	338.	-26.	-0.014	67.72	-1.691E+01	P
TH-227	50.14	198.	19.	0.011	107.32	5.821E+00	
BA-133	80.99	822.	-29.	-0.016	142.66	-1.224E+00	
Np-237	86.49	1253.	-28.	-0.015	180.65	-2.984E+00	
EU-155	86.54	723.	-27.	-0.015	142.70	-1.229E+00	
Gd-153	103.20	312.	18.	0.010	141.52	1.093E+00	
EU-155	105.31	333.	-22.	-0.012	90.91	-1.408E+00	P
EU-152	121.78	209.	-20.	-0.011	104.64	-9.373E-01	
EU-154	123.10	178.	18.	0.010	110.29	5.760E-01	
PA-234	131.29	606.	-24.	-0.013	144.72	-1.846E+00	
HF-181	133.02	581.	-24.	-0.014	141.67	-7.721E-01	
CE-144	133.54	605.	-24.	-0.014	144.44	-3.020E+00	
HF-181	136.30	629.	-14.	-0.008	262.84	-3.221E+00	
Ba-140	162.66	160.	19.	0.010	98.08	4.665E+00	
CE-139	165.85	175.	-6.	-0.003	323.22	-1.118E-01	
TH-229	193.51	84.	19.	0.010	94.84	7.315E+00	P
TH-229	210.85	120.	-14.	-0.008	155.51	-8.613E+00	
Cf-251	227.00	56.	13.	0.007	116.07	4.019E+00	
EU-152	244.69	497.	-21.	-0.011	154.38	-5.619E+00	
TH-227	256.24	64.	2.	0.001	786.34	6.114E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	263.70	84.	-3.	-0.002	435.89	-1.094E+03	
BI-210M	265.83	100.	-18.	-0.010	98.47	-7.914E-01	P
Hg-203	279.20	116.	-16.	-0.009	96.61	-4.589E-01	
I-131	284.30	61.	-2.	-0.001	684.21	-6.660E-01	P
TL-210	296.00	501.	-16.	-0.009	197.14	-4.909E-01	
PA-231	300.07	485.	-16.	-0.009	193.51	-1.597E+01	
PA-233	300.18	468.	-16.	-0.009	190.27	-6.341E+00	
PA-231	302.65	452.	-16.	-0.009	186.74	-1.376E+01	
BA-133	302.85	436.	-13.	-0.007	231.54	-1.710E+00	
CR-51	320.08	400.	16.	0.009	179.97	4.068E+00	
La-140	328.76	158.	10.	0.006	176.19	1.316E+00	P
Cf-249	333.44	168.	10.	0.006	178.04	1.777E+00	
Cs-136	340.57	179.	11.	0.006	182.58	6.002E-01	
EU-152	344.29	190.	10.	0.006	193.95	1.038E+00	P
HF-181	345.83	196.	11.	0.006	190.27	1.897E+00	
BA-133	356.00	322.	-16.	-0.009	158.50	-7.244E-01	
I-131	364.48	40.	-6.	-0.004	281.86	-2.211E-01	P
Cf-249	387.95	43.	-3.	-0.002	284.61	-1.501E-01	
SN-113	391.69	42.	11.	0.006	91.54	4.963E-01	P
AG-108M	433.94	22.	9.	0.005	108.28	3.318E-01	P
pm-146	453.88	22.	9.	0.005	115.42	4.505E-01	P
SB-125	463.37	65.	11.	0.006	105.92	3.673E+00	P
Ir-192	468.06	42.	9.	0.005	104.77	6.158E-01	
BE-7	477.60	43.	9.	0.005	107.11	3.039E+00	P
HF-181	482.00	52.	9.	0.005	114.58	4.084E-01	
La-140	487.02	61.	9.	0.005	123.31	7.307E-01	
RU-103	497.05	26.	4.	0.002	269.38	1.573E-01	P
RH-106	511.86	35.	55.	0.031	31.18	1.023E+01	
Nd-147	531.00	48.	-16.	-0.009	93.44	-4.619E+00	
Ba-140	537.26	48.	-14.	-0.008	106.61	-2.169E+00	
CS-134	563.24	13.	7.	0.004	111.73	3.372E+00	
BI-207	569.70	32.	1.	0.000	963.74	3.462E-02	
SB-125	600.50	282.	-12.	-0.007	81.12	-2.951E+00	P
SB-124	602.73	270.	-12.	-0.007	194.56	-5.228E-01	
CS-134	604.71	258.	-11.	-0.006	211.26	-4.746E-01	
PM-144	618.06	92.	5.	0.003	271.56	2.221E-01	
RH-106	621.92	55.	-14.	-0.008	104.87	-6.034E+00	P
SB-125	635.89	32.	-6.	-0.004	128.26	-2.555E+00	
I-131	636.97	32.	10.	0.005	89.19	6.003E+00	
AG-110M	657.76	38.	-6.	-0.004	140.58	-3.141E-01	
PM-144	696.54	14.	8.	0.004	105.33	3.875E-01	
SB-124	722.79	24.	9.	0.005	84.47	4.126E+00	
AG-108M	722.94	34.	9.	0.005	96.70	4.911E-01	
EU-154	723.36	43.	5.	0.003	174.13	1.337E+00	
ZR-95	724.20	56.	-8.	-0.004	137.88	-8.522E-01	P
BI-212	727.17	40.	6.	0.003	148.95	4.097E+00	P
pm-146	747.16	23.	-8.	-0.005	127.75	-1.246E+00	
ZR-95	756.73	10.	7.	0.004	101.35	6.587E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-110M	763.94	56.	-15.	-0.008	75.09	-3.485E+00		
NB-95	765.79	55.	-2.	-0.001	486.66	-1.134E-01		
EU-152	778.92	19.	-1.	-0.001	737.90	-3.931E-01		P
BI-212	785.42	33.	-12.	-0.007	59.21	-5.047E+01		P
CS-134	795.87	35.	9.	0.005	102.77	5.432E-01		
CO-58	810.78	30.	6.	0.003	146.02	3.011E-01		
Cs-136	818.50	45.	-9.	-0.005	112.36	-4.849E-01		
MN-54	834.85	14.	-2.	-0.001	403.11	-1.116E-01		
Co-56	846.77	33.	-13.	-0.007	99.76	-7.159E-01		
NB-94	871.10	19.	-4.	-0.002	244.85	-2.183E-01		P
EU-154	873.23	47.	-15.	-0.008	71.02	-6.923E+00		
PA-234	880.53	21.	8.	0.004	90.49	7.642E+00		
PA-234	883.24	29.	5.	0.003	165.20	2.933E+00		
y-88	898.04	9.	7.	0.004	104.64	4.223E-01		
AG-110M	937.49	20.	-6.	-0.003	168.87	-1.075E+00		
PA-234	946.02	15.	2.	0.001	431.57	9.258E-01		
EU-152	964.11	102.	-14.	-0.008	105.18	-6.059E+00		
EU-154	996.33	72.	-13.	-0.007	96.32	-7.929E+00		
EU-154	1004.77	56.	10.	0.005	112.40	3.565E+00		
Co-56	1037.84	5.	6.	0.003	93.16	2.795E+00		
Cs-136	1048.07	20.	-2.	-0.001	324.04	-1.692E-01		
RH-106	1050.36	15.	8.	0.004	78.61	3.447E+01		P
BI-207	1063.66	16.	-4.	-0.002	170.36	-3.440E-01		P
Ga-68	1077.40	10.	8.	0.005	89.32	2.077E+01		
FE-59	1099.25	10.	6.	0.003	122.85	7.486E-01		
EU-152	1112.07	48.	6.	0.003	167.95	3.149E+00		
ZN-65	1115.55	54.	6.	0.003	177.35	8.523E-01		
Sc-46	1120.55	135.	-20.	-0.011	85.00	-1.438E+00		
Ta-182	1121.30	47.	12.	0.007	84.78	2.487E+00		
CO-60	1173.24	18.	-2.	-0.001	590.24	-1.119E-01		P
Ta-182	1189.05	20.	-1.	-0.001	988.26	-4.655E-01		
Co-56	1238.28	11.	20.	0.011	42.72	2.403E+00		
FE-59	1291.60	0.	10.	0.006	32.07	1.861E+00		P
TL-210	1313.00	0.	5.	0.003	44.72	1.956E+00		
CO-60	1332.50	8.	-1.	-0.001	545.55	-8.668E-02		P
AG-110M	1384.30	0.	10.	0.006	31.62	3.540E+00		
EU-152	1408.00	11.	-2.	-0.001	330.27	-7.173E-01		P
SB-124	1690.98	6.	1.	0.001	427.57	2.857E-01		
Co-56	1771.35	43.	-7.	-0.004	134.62	-4.960E+00		
y-88	1836.06	0.	8.	0.004	35.36	8.880E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.0394E+00	3.0394E+00	1.071E+02%	1.11E+01
NA-22	#	8.0106E-01	8.0106E-01	3.162E+01%	5.90E-01
K-40		1.3479E+02	1.3479E+02	8.091E+00%	9.55E+00
Sc-46	#A	1.9624E-02	1.9624E-02	2.468E+03%	1.75E+00
CR-51	#A	4.0682E+00	4.0682E+00	1.800E+02%	2.46E+01
MN-54	#A	-1.1164E-01	-1.1164E-01	4.031E+02%	1.12E+00
FE-59	#A	1.2305E+00	1.2305E+00	3.207E+01%	2.18E+00
Co-56	#A	7.0353E-01	7.0353E-01	4.272E+01%	1.66E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.15E+00
CO-58	#A	3.0111E-01	3.0111E-01	1.460E+02%	1.53E+00
CO-60	#A	-8.6681E-02	-8.6681E-02	5.455E+02%	1.33E+00
ZN-65	#A	8.5226E-01	8.5226E-01	1.773E+02%	5.23E+00
NB-94	#A	-3.2894E-02	-3.2894E-02	1.380E+03%	1.13E+00
ZR-95	#A	6.5874E-01	6.5874E-01	1.014E+02%	1.63E+00
NB-95	#A	-1.1336E-01	-1.1336E-01	4.867E+02%	1.94E+00
RU-103	#A	1.5733E-01	1.5733E-01	2.694E+02%	1.06E+00
RH-106	#A	-5.3398E-01	-5.3398E-01	6.553E+01%	1.63E+01
AG-108M	#A	4.1160E-01	4.1160E-01	7.259E+01%	8.79E-01
AG-110M	#A	8.8681E-01	8.8681E-01	3.162E+01%	2.41E+00
SN-113	#A	4.9632E-01	4.9632E-01	9.154E+01%	1.54E+00
SB-124	#A	4.3902E-02	4.3902E-02	8.447E+01%	3.43E+00
SB-125	#A	8.9106E-01	8.9106E-01	1.059E+02%	2.82E+00
I-131	#A	2.8108E-01	2.8109E-01	8.919E+01%	1.12E+00
Gd-153	#A	4.4960E-01	4.4960E-01	1.415E+02%	5.72E+00
Ga-68	#A	2.0647E+01	2.0771E+01	8.932E+01%	4.30E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.97E+00
BA-133	#A	-7.2444E-01	-7.2444E-01	1.585E+02%	3.86E+00
CS-134	#A	1.4774E-01	1.4774E-01	8.672E+01%	3.39E+00
CS-137	#A	-2.0672E-02	-2.0672E-02	2.727E+03%	2.00E+00
CE-139	#A	-1.1177E-01	-1.1177E-01	3.232E+02%	1.23E+00
Ba-140	#A	-7.7991E-01	-7.7992E-01	7.243E+01%	5.54E+00
La-140	#A	3.6458E-01	3.6458E-01	1.233E+02%	7.52E-01
CE-141	#A	-8.9251E-02	-8.9252E-02	1.170E+03%	3.52E+00
CE-144	#A	-3.0200E+00	-3.0200E+00	1.444E+02%	1.46E+01
PM-144	#A	3.0476E-01	3.0476E-01	1.053E+02%	9.76E-01
EU-152	#A	1.7552E+00	1.7552E+00	1.283E+02%	6.82E+00
EU-154	#A	-6.9225E+00	-6.9225E+00	7.102E+01%	1.63E+01
EU-155	#A	-1.4081E+00	-1.4081E+00	9.091E+01%	5.49E+00
HF-181	#A	6.4312E-01	6.4312E-01	1.111E+02%	1.60E+00
Ta-182	#A	2.4869E+00	2.4869E+00	8.478E+01%	7.09E+00
Hg-203	#A	-4.5891E-01	-4.5892E-01	9.661E+01%	1.49E+00
TL-208		3.7210E+00	3.7210E+00	1.320E+01%	7.38E-01
pm-146	#A	-1.2462E+00	-1.2462E+00	1.277E+02%	3.77E+00

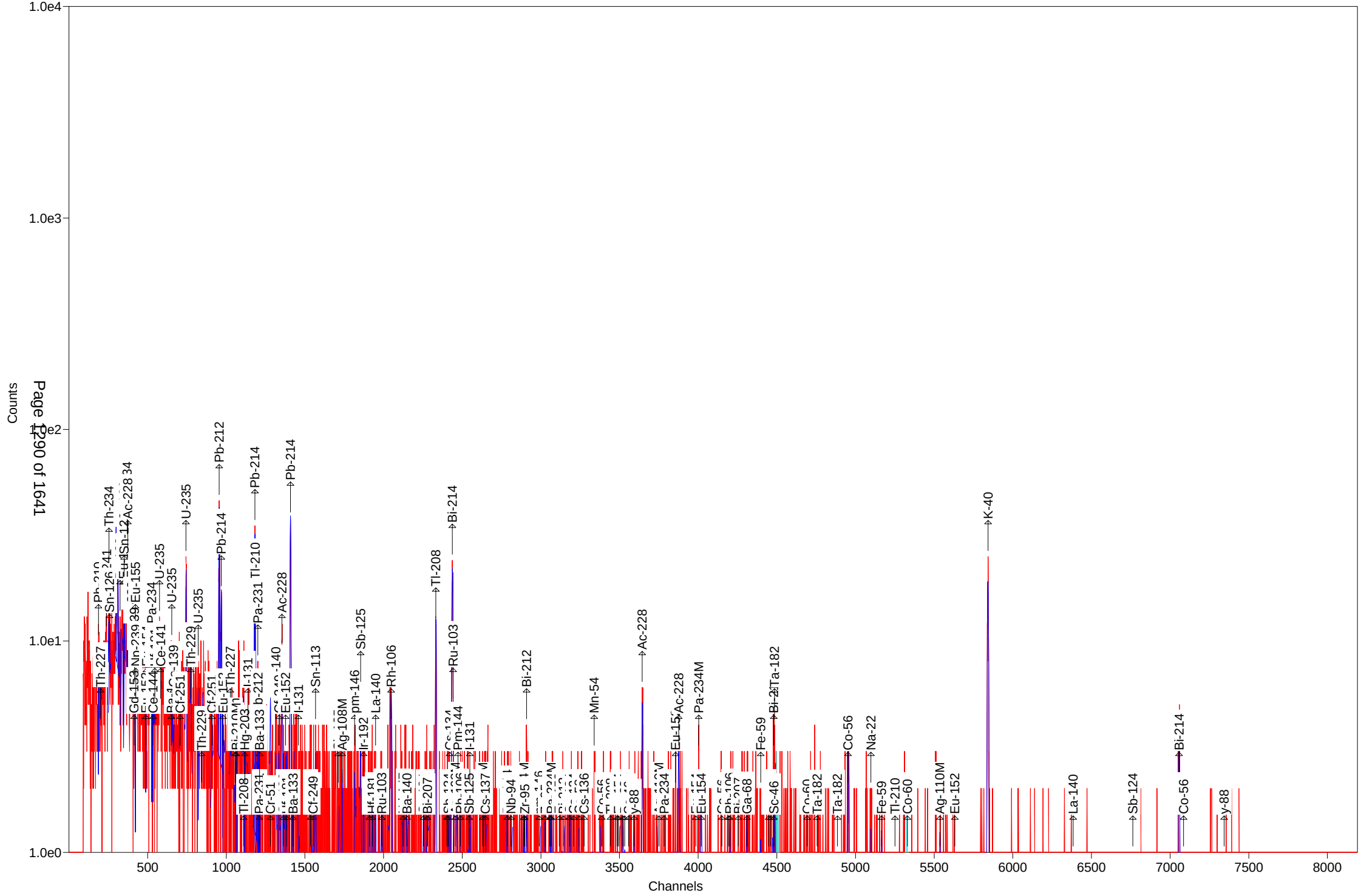
y-88	#A	6.6177E-01	6.6177E-01	3.536E+01%	1.07E+00
Cd-113m	#A	-1.0943E+03	-1.0943E+03	4.359E+02%	1.66E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.62E+01
Cf-251	#A	-3.1484E-02	-3.1484E-02	5.790E+03%	4.79E+00
Cf-249	#A	2.1666E-01	2.1666E-01	1.679E+02%	1.50E+00
Sn-126	A	3.9498E+00	3.9498E+00	9.988E+01%	1.32E+01
PB-210	#A	-1.6911E+01	-1.6911E+01	6.772E+01%	5.76E+01
PB-212		9.3900E+00	9.3900E+00	8.789E+00%	1.73E+00
PB-214		1.5730E+01	1.5730E+01	8.354E+00%	1.79E+00
BI-207	#A	3.4622E-02	3.4622E-02	9.637E+02%	1.20E+00
BI-212	#A	4.0966E+00	4.0966E+00	1.489E+02%	2.11E+01
U-235	A	2.2259E+00	2.2259E+00	1.891E+02%	1.61E+01
BI-214		1.5511E+01	1.5511E+01	8.613E+00%	1.65E+00
BI-210M	#A	-7.9143E-01	-7.9143E-01	9.847E+01%	2.17E+00
AC-228		7.6358E+00	7.6358E+00	1.597E+01%	4.17E+00
TH-227	#A	5.8211E+00	5.8211E+00	1.073E+02%	2.09E+01
TH-229	#A	7.3149E+00	7.3149E+00	9.484E+01%	1.78E+01
TH-234	#A	1.0045E+01	1.0045E+01	4.962E+01%	2.96E+01
PA-231	#A	-1.3758E+01	-1.3758E+01	1.867E+02%	8.62E+01
PA-233	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.84E+00
PA-234	#A	-1.8356E-01	-1.8356E-01	1.098E+02%	8.92E+00
PA-234M	#A	3.0066E+01	3.0066E+01	8.986E+01%	3.20E+02
AM-241	#A	1.1402E-01	1.1402E-01	1.274E+03%	4.92E+00
Np-237	#A	-2.9842E+00	-2.9842E+00	1.806E+02%	1.80E+01
Ir-192	#A	2.2962E-01	2.2962E-01	1.048E+02%	2.86E+00
Cs-136	#A	-1.3842E-01	-1.3842E-01	1.072E+02%	1.86E+00
Np-239	A	1.2356E+00	1.2357E+00	1.165E+02%	4.82E+00
Nd-147	#A	-4.6192E+00	-4.6194E+00	9.344E+01%	1.03E+01
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.83E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.868E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.8677568E+02 Bq/Sample

376766_Gamma_160-29521-B-17-C. 8_Gamma_20182811.spc.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1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Th-227
Th-234
Ac-228
Eu-155
U-235
Pb-212
Pb-214
Pa-231
Tl-210
Ac-228
Sn-113
Sb-125
Rh-106
Ru-103
Bi-214
Tl-208
Bi-212
Mn-54
Ac-228
Pa-234M
Ta-182
Co-56
Na-22
K-40
Bi-214
La-140
Sb-124
Co-56
y-88
Eu-152
Co-60
Ag-110M
Fe-59
Tl-210
Ta-182
Sc-46
Ga-68
Eu-154
Cs-136
Nb-94
Cs-137
Ba-133
Cf-249
Ru-103
Ba-140
Bi-207
Pa-234
Pa-231
Cr-51
Tl-208
Hg-203
Ba-133
Ag-108M
pm-146
Ir-192
La-140
Th-229
Cf-251
Eu-152
I-131
Pm-144
Eu-154
Pb-210
Pb-214
Pb-212
Pb-214
Pb-214
Pb-214

Test America St. Louis Spectrum ID: 8_Gamma_20182812

Sample Description: 376766_Gamma_160-29521-A-18-B
Detector: Detector # 8
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-A-18-B

Decay to Time: 8/9/2018 20:01 Live Time: 1800 sec
Acquisition Time: 8/9/2018 20:02:05 Real Time: 1848 sec
Analysis Time: 8/9/2018 20:33 Dead Time: 2.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-07-14_1855.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.897E-01	728.2	2.837E+00	2.838E+00	1.357E+01
NA-22	2.670E-02	1396.4	3.729E-01	3.729E-01	1.436E+00
K-40	1.415E+02	7.9	1.116E+01	1.331E+01	9.546E+00
Sc-46	4.707E-01	75.1	3.533E-01	3.542E-01	1.263E+00
CR-51	1.710E-01	3739.0	6.393E+00	6.393E+00	2.175E+01
MN-54	1.489E-01	250.6	3.731E-01	3.731E-01	9.460E-01
FE-59	2.295E-01	92.5	2.124E-01	2.127E-01	2.938E+00
Co-56	1.441E+00	20.4	2.942E-01	3.034E-01	1.291E+00
CO-57	0.000E+00	1.#INF	1.435E-01	1.435E-01	9.087E-01
CO-58	3.011E-01	146.0	4.397E-01	4.400E-01	1.534E+00
CO-60	3.119E-01	162.5	5.067E-01	5.070E-01	1.325E+00
ZN-65	0.000E+00	1.#INF	1.411E-01	1.411E-01	5.258E+00
NB-94	-3.618E-01	144.5	5.230E-01	5.233E-01	1.244E+00
ZR-95	-1.053E+00	83.5	8.794E-01	8.811E-01	2.788E+00
NB-95	1.423E-01	312.9	4.452E-01	4.453E-01	1.580E+00
RU-103	-5.574E-02	610.3	3.402E-01	3.402E-01	8.848E-01
RH-106	2.879E+00	170.1	4.898E+00	4.900E+00	2.962E+01
AG-108M	-5.309E-01	55.0	2.918E-01	2.931E-01	1.255E+00
AG-110M	5.106E-01	73.0	3.730E-01	3.739E-01	2.171E+00
SN-113	4.183E-01	134.5	5.627E-01	5.631E-01	1.921E+00
SB-124	3.188E-01	60.5	1.928E-01	1.935E-01	2.943E+00
SB-125	2.132E+00	31.7	6.748E-01	6.836E-01	2.373E+00
I-131	-2.903E-01	55.6	1.615E-01	1.622E-01	1.168E+00
Gd-153	-1.147E+00	169.4	1.943E+00	1.944E+00	6.480E+00
Ga-68	3.217E+01	27.7	8.923E+00	9.104E+00	1.824E+01
Tc-99m	0.000E+00	1.#INF	1.509E-01	1.509E-01	1.469E+00
BA-133	-2.236E-01	422.8	9.453E-01	9.454E-01	3.219E+00
CS-134	2.223E-01	86.3	1.918E-01	1.921E-01	2.940E+00
CS-137	-1.181E+00	56.9	6.727E-01	6.755E-01	2.464E+00
CE-139	5.429E-02	659.5	3.580E-01	3.581E-01	1.227E+00
Ba-140	-2.116E-01	643.2	1.361E+00	1.361E+00	3.509E+00
La-140	-1.407E+00	96.0	1.351E+00	1.353E+00	2.547E+00
CE-141	0.000E+00	1.#INF	2.186E-01	2.186E-01	2.671E+00

CE-144	0.000E+00	1.#INF	8.779E-01	8.779E-01	1.121E+01
PM-144	4.844E-02	1126.9	5.459E-01	5.459E-01	1.326E+00
EU-152	8.338E-01	233.3	1.945E+00	1.946E+00	6.679E+00
EU-154	7.750E-01	116.8	9.053E-01	9.062E-01	1.113E+01
EU-155	1.572E+00	171.9	2.702E+00	2.703E+00	9.011E+00
HF-181	-8.535E-02	113.7	9.703E-02	9.713E-02	1.818E+00
Ta-182	-1.872E+00	128.6	2.408E+00	2.410E+00	8.223E+00
Hg-203	5.151E-02	713.6	3.676E-01	3.676E-01	9.463E-01
TL-208	2.676E+00	14.4	3.860E-01	4.102E-01	5.513E-01
pm-146	1.478E-01	94.9	1.403E-01	1.405E-01	3.416E+00
y-88	4.856E-01	91.9	4.464E-01	4.471E-01	1.073E+00
Cd-113m	4.724E+03	89.0	4.206E+03	4.217E+03	1.415E+04
Cd-109	0.000E+00	1.#INF	1.545E+01	1.545E+01	5.153E+01
Cf-251	-1.133E+00	149.1	1.690E+00	1.693E+00	4.385E+00
Cf-249	0.000E+00	1.#INF	2.112E-01	2.112E-01	1.995E+00
Sn-126	-4.307E+00	114.7	4.941E+00	4.946E+00	1.651E+01
PB-210	1.045E+01	100.8	1.053E+01	1.055E+01	3.537E+01
PB-212	5.393E+00	12.0	6.496E-01	7.374E-01	1.463E+00
PB-214	1.216E+01	8.1	9.909E-01	1.175E+00	2.012E+00
BI-207	5.822E-01	50.3	2.928E-01	2.943E-01	1.697E+00
BI-212	-1.170E+00	520.6	6.094E+00	6.094E+00	2.208E+01
U-235	-7.790E-01	722.8	5.631E+00	5.631E+00	1.183E+01
BI-214	8.340E+00	13.2	1.104E+00	1.186E+00	1.843E+00
BI-210M	7.980E-02	667.7	5.329E-01	5.329E-01	1.863E+00
AC-228	6.094E+00	14.8	9.034E-01	9.554E-01	3.511E+00
TH-227	2.821E+00	132.9	3.748E+00	3.752E+00	2.028E+01
TH-229	3.591E+00	102.3	3.674E+00	3.685E+00	1.669E+01
TH-234	8.460E+00	44.1	3.729E+00	3.755E+00	2.205E+01
PA-231	0.000E+00	1.#INF	3.972E+00	3.972E+00	7.200E+01
PA-233	0.000E+00	1.#INF	3.539E-01	3.539E-01	5.900E+00
PA-234	1.788E+00	88.3	1.579E+00	1.581E+00	6.542E+00
PA-234M	4.386E+01	114.7	5.029E+01	5.034E+01	1.519E+02
AM-241	-2.347E-01	556.5	1.306E+00	1.306E+00	4.462E+00
Np-237	0.000E+00	1.#INF	4.401E+00	4.401E+00	1.470E+01
Ir-192	0.000E+00	1.#INF	2.286E-01	2.286E-01	2.468E+00
Cs-136	-6.652E-01	90.9	6.049E-01	6.061E-01	2.040E+00
Np-239	-1.536E+00	169.8	2.609E+00	2.611E+00	8.699E+00
Nd-147	4.521E+00	46.8	2.115E+00	2.131E+00	4.844E+00
TL-210	3.122E-01	130.7	4.079E-01	4.083E-01	1.421E+00
Total	5.022E+03				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-A-18-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182812.An1

Acquisition information
Start time: 8/9/2018 8:02:05 PM
Live time: 1800
Real time: 1848
Dead time: 2.58 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) +
(-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) +
(-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:01:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-07-14_1855.PBC 7/14/2018 6:55:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0864

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	16.	100.84	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
50.14	9.	207.39	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.54	-4.	556.53	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.11	21.	67.75	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
77.11	123.	15.36	0.77	3.699E-02				
92.76	48.	38.14	0.97	4.074E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.165E+01	AC228
105.31	25.	171.89	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
131.29	18.	139.76	1.08	4.061E-02	131.29	18.000	PBC<MDA	PA234
133.02	15.	179.59	1.08	4.041E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.818E+00	CE144
143.79	-6.	722.84	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
165.85	3.	659.50	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
185.72	28.	71.03	1.12	3.329E-02	185.72	54.000	PBC<MDA	U235
210.85	15.	102.30	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
238.74	102.	15.56	1.02	2.743E-02	238.63	43.300	4.788E+00	PB212
242.06	41.	27.31	1.16	2.714E-02	242.00	7.430	1.136E+01	PB214
256.24	9.	166.17	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
263.70	13.	89.04	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	2.	667.73	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
279.20	2.	713.56	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203
295.14	114.	12.20	0.89	2.324E-02	295.09	19.300	1.412E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					296.00	79.000	3.458E+00	TL210
338.33	59.	14.82	1.15	2.085E-02	338.32	12.010	1.309E+01	AC228
344.29	4.	443.79	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.86	153.	10.80	1.25	2.021E-02	351.93	37.600	1.116E+01	PB214
391.69	9.	134.51	1.27	1.855E-02	391.69	64.000	PBC<MDA	SN113
427.88	2.	376.71	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
463.37	27.	31.65	1.32	1.620E-02	463.37	10.470	8.751E+00	SB125
487.02	10.	112.23	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
511.86	22.	79.24	2.61	1.494E-02	511.86	20.000	PBC<MDA	RH106
531.00	15.	46.78	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
569.70	4.	293.68	1.40	1.368E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.980E+00	PA234
					569.70	97.740	1.662E-01	BI207
582.70	55.	14.42	1.19	1.342E-02	583.02	84.500	2.676E+00	TL208
600.50	9.	197.20	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
609.15	90.	13.24	1.40	1.294E-02	609.31	46.090	8.340E+00	BI214
635.89	2.	316.23	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
657.76	9.	103.97	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
722.79	11.	60.47	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.787E-01	AG108M
					723.36	20.220	2.601E+00	EU154
722.94	7.	104.57	1.50	1.123E-02	722.79	10.810	3.369E+00	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
723.36	7.	116.82	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.010E-01	AG108M
					723.36	20.220	1.802E+00	EU154
724.20	2.	413.13	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
735.72	7.	94.93	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
763.94	11.	73.05	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
765.79	3.	312.88	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.833E+01	PA234M
766.41	6.	148.00	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.001E+02	PA234M
778.92	3.	308.71	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
785.42	7.	100.58	1.54	1.048E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	86.28	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
799.60	6.	130.68	1.55	1.032E-02	799.60	98.960	PBC<MDA	TL210
810.78	6.	146.02	1.55	1.020E-02	810.78	99.460	PBC<MDA	CO58
834.85	3.	250.62	1.57	9.955E-03	834.85	99.980	PBC<MDA	MN54
860.15	2.	515.16	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	1.	445.43	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
880.53	6.	122.69	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
889.28	6.	110.47	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
898.04	8.	91.92	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88
911.08	23.	35.48	1.62	9.247E-03	911.07	29.000	4.696E+00	AC228
946.02	5.	108.01	1.64	8.957E-03	946.02	13.400	PBC<MDA	PA234
969.05	10.	80.82	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
996.33	2.	535.41	1.67	8.571E-03	996.33	10.600	PBC<MDA	EU154
1001.00	3.	175.15	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	4.	180.15	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	13.	27.74	1.69	8.278E-03	1037.84	14.130	6.175E+00	Co56
1050.36	5.	170.15	1.70	8.193E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	12.	50.29	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	13.	27.74	1.72	8.017E-03	1077.40	3.300	3.217E+01	Ga68
1112.07	2.	444.70	1.74	7.803E-03	1112.07	13.644	PBC<MDA	EU152
1120.43	7.	112.51	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.55	9.	101.66	1.74	7.752E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.133E-01	Sc46
					1121.30	34.900	1.758E+00	Ta182
1189.05	1.	702.38	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	3.	229.35	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	24.	20.41	1.81	7.114E-03	1238.28	66.070	2.837E+00	Co56
1291.60	6.	92.55	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	4.	162.48	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	9.	33.76	1.90	6.366E-03	1408.00	21.005	3.714E+00	EU152
1460.70	168.	7.89	1.28	6.166E-03	1460.83	10.670	1.415E+02	K40
1765.39	7.	47.33	2.07	5.226E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	19.	31.60	2.07	5.208E-03	1771.35	15.480	1.323E+01	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.25	77.11	78.	123.	3.325E+03	15.36	0.769	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	122.	16.	0.009	100.84	1.012s
TH-227	200.37	50.14	186.	9.	0.005	207.39	1.015s
AM-241	237.95	59.54	297.	-4.	-0.002	556.53	1.022s
TH-234	252.96	63.29	89.	21.	0.012	67.75	1.025D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	256.93	64.28	357.	-24.	-0.013	114.72	1.026s
BA-133	323.77	80.99	447.	-27.	-0.015	114.30	1.039s
Np-237	345.77	86.49	833.	0.	0.000	181.41	1.043A
EU-155	345.98	86.54	954.	-25.	-0.014	173.21	1.043s
Sn-126	347.57	86.94	898.	-25.	-0.014	167.98	1.044s
Sn-126	350.09	87.57	834.	-25.	-0.014	161.94	1.044s
Cd-109	351.97	88.04	872.	0.	0.000	165.50	1.044A
Nd-147	364.21	91.10	857.	-25.	-0.014	163.76	1.047s
TH-234	370.17	92.59	132.	31.	0.017	56.41	1.048D
AC-228	373.21	93.35	902.	-26.	-0.014	167.62	1.049s
Gd-153	389.81	97.50	928.	-26.	-0.014	169.41	1.052s
Np-239	397.81	99.50	953.	-26.	-0.014	171.45	1.053s
Gd-153	412.62	103.20	979.	-12.	-0.007	363.28	1.056s
Np-239	414.62	103.70	991.	0.	0.000	1000.00	1.057s
EU-155	421.07	105.31	918.	25.	0.014	171.89	1.058s
Np-239	424.34	106.13	983.	-26.	-0.015	169.83	1.058s
EU-152	486.92	121.78	132.	-9.	-0.005	183.59	1.071s
CO-57	488.06	122.06	141.	0.	0.000	1000.00	1.071
EU-154	492.22	123.10	140.	-20.	-0.011	86.20	1.072
PA-234	525.00	131.29	320.	18.	0.010	139.76	1.078s
HF-181	531.92	133.02	338.	15.	0.008	179.59	1.079s
CE-144	533.98	133.54	353.	0.	0.000	1000.00	1.080
HF-181	545.02	136.30	353.	0.	0.000	1000.00	1.082
CO-57	545.72	136.47	353.	0.	0.000	1000.00	1.082
Tc-99m	561.86	140.51	353.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	359.	-6.	-0.003	722.84	1.087s
CE-141	581.59	145.44	349.	0.	0.000	1000.00	1.089s
Ba-140	650.47	162.66	148.	-20.	-0.011	89.44	1.102s
U-235	653.35	163.38	173.	-6.	-0.003	746.71	1.102s
CE-139	663.24	165.85	173.	3.	0.002	659.50	1.104
Cf-251	706.23	176.60	88.	-12.	-0.007	149.07	1.112s
U-235	742.71	185.72	114.	28.	0.015	71.03	1.119
U-235	821.17	205.33	69.	-5.	-0.003	371.73	1.134s
TH-229	843.24	210.85	56.	15.	0.008	102.30	1.138s
Cf-251	907.84	227.00	92.	-19.	-0.011	100.52	1.151s
PB-212	954.37	238.63	38.	115.	0.064	12.04	1.159D
PB-214	967.84	242.00	43.	41.	0.023	27.31	1.162D
EU-152	978.62	244.69	289.	-14.	-0.008	177.73	1.164s
TH-227	1024.81	256.24	56.	9.	0.005	166.17	1.172s
Cd-113m	1054.65	263.70	60.	13.	0.007	89.04	1.178s
BI-210M	1063.18	265.83	72.	2.	0.001	667.73	1.179s
Hg-203	1116.66	279.20	44.	2.	0.001	713.56	1.189s
I-131	1137.05	284.30	65.	-17.	-0.010	24.36	1.193s
PB-214	1180.41	295.14	14.	114.	0.063	12.20	0.888s
TL-210	1183.86	296.00	332.	-13.	-0.007	197.06	1.202s
PB-212	1199.98	300.03	319.	-7.	-0.004	356.75	1.205
PA-231	1200.14	300.07	312.	0.	0.000	1000.00	1.205s
PA-233	1200.58	300.18	312.	0.	0.000	1000.00	1.205

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1210.46	302.65	312.	0.	0.000	1000.00	1.207
BA-133	1211.27	302.85	312.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	312.	0.	0.000	1000.00	1.208
BI-210M	1219.45	304.90	312.	0.	0.000	1000.00	1.208
Ir-192	1233.62	308.44	312.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	312.	0.	0.000	1000.00	1.214
Ir-192	1265.82	316.49	312.	0.	0.000	1000.00	1.217s
La-140	1314.91	328.76	292.	-17.	-0.009	25.81	1.226s
Cf-249	1333.63	333.44	275.	-17.	-0.009	143.81	1.229s
AC-228	1353.19	338.33	5.	59.	0.033	14.82	1.154
Cs-136	1362.15	340.57	258.	-17.	-0.009	138.98	1.234s
EU-152	1377.01	344.29	182.	4.	0.002	443.79	1.237s
HF-181	1383.19	345.83	290.	-18.	-0.010	133.93	1.238s
PB-214	1407.32	351.86	28.	153.	0.085	10.80	1.250
BA-133	1423.87	356.00	221.	-5.	-0.003	422.85	1.245s
I-131	1457.81	364.48	44.	-8.	-0.005	55.64	1.252s
BA-133	1535.24	383.84	77.	-2.	-0.001	537.00	1.266s
Cf-249	1551.68	387.95	80.	0.	0.000	1000.00	1.269s
SN-113	1566.64	391.69	68.	9.	0.005	134.51	1.271s
SB-125	1711.39	427.88	17.	2.	0.001	376.71	1.297s
AG-108M	1735.64	433.94	48.	-15.	-0.008	54.96	1.301s
pm-146	1815.41	453.88	31.	-5.	-0.003	164.83	1.315s
SB-125	1853.36	463.37	22.	27.	0.015	31.65	1.322s
Ir-192	1872.14	468.06	58.	-6.	-0.004	169.58	1.325s
BE-7	1910.28	477.60	66.	-1.	-0.001	728.18	1.332s
HF-181	1927.89	482.00	69.	-9.	-0.005	139.42	1.335s
La-140	1947.98	487.02	63.	10.	0.006	112.23	1.339s
RU-103	1988.12	497.05	17.	-1.	-0.001	610.28	1.346s
RH-106	2047.36	511.86	42.	22.	0.012	79.24	2.606s
Nd-147	2123.91	531.00	9.	15.	0.009	46.78	1.369s
Ba-140	2148.95	537.26	17.	-1.	-0.001	643.23	1.373s
CS-134	2252.86	563.24	26.	-9.	-0.005	120.36	1.391s
CS-134	2277.20	569.32	48.	-16.	-0.009	65.61	1.395s
PA-234	2277.80	569.47	61.	-9.	-0.005	128.48	1.395s
BI-207	2278.73	569.70	67.	4.	0.002	293.68	1.396s
TL-208	2330.72	582.70	3.	55.	0.030	14.42	1.187
SB-125	2401.92	600.50	170.	9.	0.005	197.20	1.416
SB-124	2410.85	602.73	196.	-4.	-0.002	476.13	1.418s
CS-134	2418.76	604.71	192.	0.	0.000	1000.00	1.419s
BI-214	2436.52	609.15	13.	90.	0.050	13.24	1.398
RU-103	2441.12	610.30	192.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	192.	0.	0.000	1000.00	1.426s
PM-144	2472.18	618.06	192.	0.	0.000	1000.00	1.428s
SB-125	2543.49	635.89	19.	2.	0.001	316.23	1.440s
I-131	2547.83	636.97	28.	-6.	-0.003	134.44	1.441s
AG-110M	2630.98	657.76	41.	9.	0.005	103.97	1.455s
CS-137	2646.58	661.66	85.	-22.	-0.012	56.94	1.457s
NB-94	2810.46	702.63	23.	-7.	-0.004	144.53	1.484s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2891.09	722.79	15.	11.	0.006	60.47	1.497s
AG-108M	2891.70	722.94	26.	7.	0.004	104.57	1.498s
EU-154	2893.37	723.36	33.	7.	0.004	116.82	1.498s
ZR-95	2896.74	724.20	41.	2.	0.001	413.13	1.498s
BI-212	2908.63	727.17	44.	-2.	-0.001	520.62	1.500s
pm-146	2942.83	735.72	9.	7.	0.004	94.93	1.506s
pm-146	2988.59	747.16	19.	-6.	-0.003	167.10	1.513s
ZR-95	3026.87	756.73	33.	-11.	-0.006	83.53	1.519s
AG-110M	3055.73	763.94	25.	11.	0.006	73.05	1.524s
NB-95	3063.11	765.79	35.	3.	0.002	312.88	1.525
PA-234M	3065.60	766.41	32.	6.	0.003	148.00	1.526s
EU-152	3115.64	778.92	19.	3.	0.002	308.71	1.534s
BI-212	3141.64	785.42	10.	7.	0.004	100.58	1.538s
CS-134	3183.43	795.87	18.	8.	0.004	86.28	1.544s
TL-210	3198.36	799.60	25.	6.	0.003	130.68	1.547s
CS-134	3207.77	801.95	49.	-11.	-0.006	96.57	1.548s
CO-58	3243.06	810.78	30.	6.	0.003	146.02	1.554
La-140	3263.04	815.77	35.	0.	0.000	1000.00	1.557
Cs-136	3273.97	818.50	55.	-12.	-0.007	90.94	1.559s
MN-54	3339.36	834.85	9.	3.	0.001	250.62	1.569s
Co-56	3387.05	846.77	19.	-3.	-0.001	349.11	1.577
TL-208	3442.23	860.56	14.	2.	0.001	515.16	1.585s
NB-94	3484.36	871.10	19.	1.	0.001	445.43	1.592s
EU-154	3492.89	873.23	20.	0.	0.000	1000.00	1.593s
PA-234	3522.10	880.53	21.	6.	0.003	122.69	1.598
PA-234	3532.94	883.24	27.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	27.	0.	0.000	1000.00	1.600s
Sc-46	3557.10	889.28	16.	6.	0.003	110.47	1.603s
y-88	3592.14	898.04	9.	8.	0.004	91.92	1.608s
AC-228	3644.26	911.07	9.	23.	0.013	35.48	1.616s
AG-110M	3749.96	937.49	25.	-7.	-0.004	161.52	1.633s
PA-234	3784.07	946.02	5.	5.	0.003	108.01	1.638s
EU-152	3856.43	964.11	38.	-2.	-0.001	380.92	1.649s
AC-228	3875.88	968.97	27.	10.	0.006	80.82	1.652s
EU-154	3985.31	996.33	32.	2.	0.001	535.41	1.668s
PA-234M	4003.99	1001.00	13.	3.	0.002	175.15	1.671s
EU-154	4019.10	1004.77	29.	4.	0.002	180.15	1.673s
Co-56	4151.36	1037.84	0.	13.	0.007	27.74	1.693s
Cs-136	4192.29	1048.07	32.	-11.	-0.006	80.65	1.698s
RH-106	4201.45	1050.36	37.	5.	0.003	170.15	1.700s
BI-207	4254.65	1063.66	6.	12.	0.007	50.29	1.708s
Ga-68	4309.61	1077.40	0.	13.	0.007	27.74	1.716s
FE-59	4397.02	1099.25	20.	-4.	-0.002	250.83	1.728s
EU-152	4448.32	1112.07	53.	2.	0.001	444.70	1.736
ZN-65	4462.20	1115.55	55.	0.	0.000	1000.00	1.738s
BI-214	4481.17	1120.29	27.	7.	0.004	112.51	1.740s
Sc-46	4482.22	1120.55	34.	9.	0.005	101.66	1.740s
Ta-182	4485.22	1121.30	64.	-9.	-0.005	128.59	1.741s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.97	1173.24	34.	-14.	-0.008	56.93	1.770s
Ta-182	4756.23	1189.05	10.	1.	0.001	702.38	1.779s
Ta-182	4885.67	1221.41	11.	3.	0.002	229.35	1.797s
Co-56	4953.16	1238.28	0.	24.	0.013	20.41	1.806s
EU-154	5098.22	1274.54	11.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	5.	6.	0.004	92.55	1.835s
TL-210	5252.05	1313.00	16.	-7.	-0.004	135.27	1.847s
CO-60	5330.06	1332.50	8.	4.	0.002	162.48	1.857s
AG-110M	5537.25	1384.30	11.	-3.	-0.001	285.04	1.884s
EU-152	5632.07	1408.00	0.	9.	0.005	33.76	1.896s
K-40	5842.87	1460.70	3.	168.	0.093	7.89	1.282s
La-140	6384.93	1596.21	23.	-14.	-0.008	95.96	1.990s
BI-214	7058.07	1764.49	2.	7.	0.004	47.33	2.067s
Co-56	7085.51	1771.35	9.	19.	0.011	31.60	2.070s
y-88	7344.36	1836.06	0.	0.	0.000	1000.00	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.8967E-01				5.31E+01	
			477.60	-3.897E-01	?(P	1.357E+01 7.28E+02 1.05E+01	G
NA-22	C	2.6702E-02				9.50E+02	
			1274.53	2.670E-02	%(	1.436E+00 1.40E+03 9.99E+01	G
K-40	N	1.4154E+02				4.66E+11	
			1460.83	1.415E+02	(P	9.546E+00 7.89E+00 1.07E+01	G
Sc-46	F	4.7070E-01				8.38E+01	
			889.28	3.281E-01	&(	1.263E+00 1.10E+02 1.00E+02	G
			1120.55	6.133E-01	?(	2.129E+00 1.02E+02 1.00E+02	G
CR-51	F	1.7099E-01				2.77E+01	
			320.08	1.710E-01	&(	2.175E+01 3.74E+03 9.94E+00	G
MN-54	C	1.4885E-01				3.12E+02	
			834.85	1.489E-01	?(	9.460E-01 2.51E+02 1.00E+02	G
FE-59	F	2.2946E-01				4.45E+01	
			1099.25	-4.991E-01	?(	2.938E+00 2.51E+02 5.65E+01	G
			1291.60	1.182E+00	?(P	2.539E+00 9.25E+01 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	1.4412E+00					7.73E+01	
			846.77	-1.507E-01	?(	1.291E+00	3.49E+02	9.99E+01 G
			1238.28	2.837E+00	&(	8.711E-01	2.04E+01	6.61E+01 G
			1037.84	6.175E+00	?(	3.501E+00	2.77E+01	1.41E+01 G
			1771.35	1.323E+01	?	1.139E+01	3.16E+01	1.55E+01 A
CO-58	C	3.0111E-01					7.09E+01	
			810.78	3.011E-01	&(	1.534E+00	1.46E+02	9.95E+01 G
CO-60	F	3.1188E-01					1.93E+03	
			1332.50	3.119E-01	?(P	1.325E+00	1.62E+02	1.00E+02 G
			1173.24	-1.082E+00	+ P	2.215E+00	5.69E+01	9.99E+01 G
NB-94	I	-3.6183E-01					7.41E+06	
			702.63	-3.618E-01	?(	1.244E+00	1.45E+02	9.79E+01 G
			871.10	8.086E-02	+ P	1.321E+00	4.45E+02	9.99E+01 G
ZR-95	I	-1.0528E+00					6.40E+01	
			756.73	-1.053E+00	?(P	2.788E+00	8.35E+01	5.45E+01 G
			724.20	2.487E-01	+ P	3.643E+00	4.13E+02	4.42E+01 G
NB-95	I	1.4230E-01					6.40E+01	
			765.79	1.423E-01	(	1.580E+00	3.13E+02	9.98E+01 G
RU-103	I	-5.5745E-02					3.93E+01	
			497.05	-5.574E-02	?(P	8.848E-01	6.10E+02	9.09E+01 G
			610.30	0.000E+00	+	5.029E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.8786E+00					3.74E+02	
			621.92	-2.478E-01	%(P	2.962E+01	2.11E+03	9.93E+00 G
			1050.36	2.278E+01	?(P	1.351E+02	1.70E+02	1.56E+00 G
			511.86	4.127E+00	?	6.121E+00	7.92E+01	2.00E+01 GA
AG-108M	C	-5.3095E-01					1.53E+05	
			433.94	-5.309E-01	&(P	1.255E+00	5.50E+01	9.05E+01 G
			722.94	4.010E-01	+	1.440E+00	1.05E+02	9.08E+01 G
			614.28	0.000E+00	+	3.236E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.1061E-01					2.50E+02	
			884.68	0.000E+00	?(	2.171E+00	1.00E+03	7.27E+01 G
			657.76	4.429E-01	?(	1.570E+00	1.04E+02	9.46E+01 G
			937.49	-1.254E+00	+	4.660E+00	1.62E+02	3.44E+01 G
			1384.30	-9.441E-01	+	6.348E+00	2.85E+02	2.43E+01 G
			763.94	2.464E+00	?(	6.011E+00	7.30E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	4.1833E-01					1.15E+02	
			391.69	4.183E-01	?(P	1.921E+00	1.35E+02	6.40E+01 G
SB-124	F	3.1877E-01					6.02E+01	
			602.73	-1.811E-01	(	2.943E+00	4.76E+02	9.83E+01 G
			1690.98	7.143E-02	%	2.958E+00	1.68E+03	4.78E+01 G
			722.79	4.862E+00	?(	9.588E+00	6.05E+01	1.08E+01 G
SB-125	I	2.1321E+00					1.01E+03	
			427.88	2.331E-01	?(P	2.373E+00	3.77E+02	2.96E+01 G
			600.50	2.252E+00	?(P	1.507E+01	1.97E+02	1.79E+01 G
			635.89	7.862E-01	&(	9.051E+00	3.16E+02	1.13E+01 G
			463.37	8.751E+00	?(P	8.096E+00	3.17E+01	1.05E+01 G
I-131	I	-2.9030E-01					8.02E+00	
			364.48	-2.903E-01	&(P	1.168E+00	5.56E+01	8.17E+01 G
			284.30	-6.562E+00	& P	1.520E+01	2.44E+01	6.14E+00 G
			636.97	-3.623E+00	&	1.695E+01	1.34E+02	7.17E+00 G
Gd-153	F	-1.1470E+00					2.42E+02	
			97.50	-1.147E+00	?(	6.480E+00	1.69E+02	3.00E+01 G
			103.20	-7.456E-01	+	9.063E+00	3.63E+02	2.18E+01 G
Ga-68	C	3.2174E+01					4.71E-02	
			1077.40	3.217E+01	?(	1.824E+01	2.77E+01	3.30E+00 G
BA-133	F	-2.2356E-01					3.85E+03	
			356.00	-2.236E-01	?(	3.219E+00	4.23E+02	6.20E+01 G
			302.85	0.000E+00	+	1.132E+01	1.00E+03	1.83E+01 G
			383.84	-7.691E-01	+	1.440E+01	5.37E+02	8.94E+00 GA
			80.99	-1.133E+00	+	4.322E+00	1.14E+02	3.41E+01 GA
CS-134	I	2.2227E-01					7.54E+02	
			604.71	0.000E+00	?(	2.940E+00	1.00E+03	9.76E+01 G
			795.87	4.760E-01	?(	1.398E+00	8.63E+01	8.55E+01 G
			569.32	-4.245E+00	+	9.205E+00	6.56E+01	1.54E+01 G
			801.95	-6.684E+00	+	2.187E+01	9.66E+01	8.69E+00 G
			563.24	-4.336E+00	+	1.275E+01	1.20E+02	8.35E+00 G
CS-137	I	-1.1813E+00					1.10E+04	
			661.66	-1.181E+00	?(P	2.464E+00	5.69E+01	8.52E+01 G
CE-139	F	5.4286E-02					1.38E+02	
			165.85	5.429E-02	?(	1.227E+00	6.60E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	-2.1157E-01					1.28E+01	
			537.26	-2.116E-01	?(	3.509E+00	6.43E+02	2.44E+01 G
			162.66	-4.948E+00	+	1.479E+01	8.94E+01	6.22E+00 G
			304.85	0.000E+00	+	4.861E+01	1.00E+03	4.29E+00 G
La-140	I	-1.4073E+00					1.28E+01	
			1596.21	-1.407E+00	?(P	2.547E+00	9.60E+01	9.54E+01 G
			487.02	8.169E-01	&	3.116E+00	1.12E+02	4.55E+01 G
			328.76	-2.140E+00	& P	1.056E+01	2.58E+01	2.03E+01 G
			815.77	0.000E+00	+	7.119E+00	1.00E+03	2.33E+01 G
PM-144	C	4.8440E-02					3.63E+02	
			696.54	4.844E-02	%(	1.326E+00	1.13E+03	9.90E+01 G
			618.06	0.000E+00	-	2.948E+00	1.00E+03	9.91E+01 G
EU-152	F	8.3378E-01					4.94E+03	
			344.29	4.405E-01	(P	6.679E+00	4.44E+02	2.65E+01 G
			1112.07	1.218E+00	?(	1.906E+01	4.45E+02	1.36E+01 G
			121.78	-4.218E-01	+	2.636E+00	1.84E+02	2.86E+01 G
			778.92	1.234E+00	?(P	9.360E+00	3.09E+02	1.29E+01 G
			964.11	-1.007E+00	+	1.362E+01	3.81E+02	1.46E+01 G
			244.69	-3.725E+00	+	2.230E+01	1.78E+02	7.58E+00 G
			1408.00	3.714E+00	? P	3.062E+00	3.38E+01	2.10E+01 GA
EU-154	I	7.7496E-01					3.14E+03	
			873.23	0.000E+00	?(	1.113E+01	1.00E+03	1.23E+01 G
			123.10	-6.603E-01	+	1.901E+00	8.62E+01	4.08E+01 G
			1274.54	0.000E+00	?(	4.133E+00	1.00E+03	3.52E+01 G
			723.36	1.802E+00	?(	7.247E+00	1.17E+02	2.02E+01 G
			1004.77	1.580E+00	?(	1.002E+01	1.80E+02	1.80E+01 G
			996.33	9.173E-01	?(	1.765E+01	5.35E+02	1.06E+01 G
EU-155	I	1.5718E+00					1.81E+03	
			105.31	1.572E+00	?(P	9.011E+00	1.72E+02	2.12E+01 G
			86.54	-1.160E+00	+	6.701E+00	1.73E+02	3.07E+01 G
HF-181	F	-8.5353E-02					4.24E+01	
			482.00	-3.813E-01	?(	1.818E+00	1.39E+02	8.05E+01 G
			133.02	4.649E-01	?(	2.808E+00	1.80E+02	4.33E+01 G
			345.83	-3.285E+00	+	1.476E+01	1.34E+02	1.51E+01 G
			136.30	0.000E+00	&	2.142E+01	1.00E+03	5.85E+00 G
Ta-182	F	-1.8724E+00					1.14E+02	
			1121.30	-1.872E+00	?(	8.223E+00	1.29E+02	3.49E+01 G
			1221.41	9.527E-01	+	5.125E+00	2.29E+02	2.70E+01 G
			1189.05	4.655E-01	+	8.121E+00	7.02E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	5.1511E-02					4.66E+01	
			279.20	5.151E-02	&(	9.463E-01	7.14E+02	8.15E+01 G
TL-208	N	2.6761E+00					6.98E+02	
			583.02	2.676E+00	(P	5.513E-01	1.44E+01	8.45E+01 G
			277.28	-5.011E-03	% P	1.238E+01	6.91E+04	6.31E+00 G
			860.56	7.242E-01	- P	9.409E+00	5.15E+02	1.24E+01 G
pm-146	C	1.4782E-01					2.02E+03	
			747.16	-8.474E-01	?(	3.416E+00	1.67E+02	3.40E+01 G
			735.72	1.652E+00	&(	3.781E+00	9.49E+01	2.25E+01 G
			453.88	-2.587E-01	+ P	1.487E+00	1.65E+02	6.50E+01 G
y-88	F	4.8564E-01					1.07E+02	
			898.04	4.856E-01	&(	1.073E+00	9.19E+01	9.37E+01 G
			1836.06	0.000E+00	-	8.180E-01	1.00E+03	9.92E+01 G
Cd-113m		4.7237E+03					5.33E+03	
			263.70	4.724E+03	?(	1.415E+04	8.90E+01	6.00E-03 K
Cf-251	T	-1.1335E+00					3.28E+05	
			176.60	-1.133E+00	&(	4.385E+00	1.49E+02	1.70E+01 G
			227.00	-5.930E+00	&	1.465E+01	1.01E+02	6.30E+00 GA
Sn-126		-4.3072E+00					3.65E+07	
			87.57	-9.453E-01	}	5.107E+00	1.62E+02	3.75E+01 GA
			64.28	-4.307E+00	?(	1.651E+01	1.15E+02	9.70E+00 G
			86.94	-3.933E+00	}	2.204E+01	1.68E+02	9.04E+00 GA
PB-210	N	1.0447E+01					8.14E+03	
			46.54	1.045E+01	&(P	3.537E+01	1.01E+02	4.25E+00 G
PB-212	N	5.3935E+00					6.98E+02	
			238.63	5.393E+00	(P	1.463E+00	1.20E+01	4.33E+01 G
			300.03	-5.259E+00	-	6.348E+01	3.57E+02	3.28E+00 GA
PB-214	N	1.2164E+01					5.84E+05	
			351.93	1.116E+01	(P	2.012E+00	1.08E+01	3.76E+01 G
			295.09	1.412E+01	(	2.495E+00	1.22E+01	1.93E+01 G
			242.00	1.136E+01		9.141E+00	2.73E+01	7.43E+00 GA
BI-207	C	5.8218E-01					1.18E+04	
			569.70	1.662E-01	?(	1.697E+00	2.94E+02	9.77E+01 G
			1063.66	1.128E+00	?(P	1.276E+00	5.03E+01	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-1.1705E+00					6.98E+02	
			727.17	-1.170E+00	?(P	2.208E+01	5.21E+02	7.55E+00 G
			785.42	2.917E+01	? P	7.181E+01	1.01E+02	1.28E+00 GA
U-235	N	-7.7901E-01					2.57E+11	
			143.79	-7.790E-01	&(P	1.183E+01	7.23E+02	1.10E+01 G
			205.33	-1.934E+00	& P	1.494E+01	3.72E+02	5.01E+00 G
			163.38	-1.777E+00	& P	1.953E+01	7.47E+02	5.08E+00 G
			185.72	8.587E-01	P	1.623E+00	7.10E+01	5.40E+01 GA
BI-214	N	8.3402E+00					5.84E+05	
			609.31	8.340E+00	(P	1.843E+00	1.32E+01	4.61E+01 G
			1120.29	3.277E+00	- P	1.270E+01	1.13E+02	1.51E+01 G
			1764.49	4.793E+00	- P	6.256E+00	4.73E+01	1.54E+01 G
BI-210M	T	7.9804E-02					1.10E+09	
			265.83	7.980E-02	?(P	1.863E+00	6.68E+02	5.00E+01 G
			304.90	0.000E+00	-	7.449E+00	1.00E+03	2.80E+01 G
AC-228	N	6.0940E+00					2.10E+03	
			911.07	4.696E+00	?(	3.511E+00	3.55E+01	2.90E+01 G
			968.97	3.606E+00	?(	9.816E+00	8.08E+01	1.75E+01 G
			338.32	1.309E+01	(	2.912E+00	1.48E+01	1.20E+01 G
			93.35	-6.244E+00	-	3.491E+01	1.68E+02	5.56E+00 XA
TH-227	N	2.8210E+00					7.95E+03	
			50.14	2.882E+00	&(	2.028E+01	2.07E+02	8.00E+00 G
			256.24	2.751E+00	?(	1.149E+01	1.66E+02	7.00E+00 G
TH-229	N	3.5914E+00					2.68E+06	
			193.51	-1.587E-01	%(P	1.669E+01	4.87E+03	4.40E+00 G
			210.85	9.110E+00	?(	2.312E+01	1.02E+02	2.99E+00 G
TH-234	N	8.4598E+00					1.63E+12	
			63.29	9.872E+00	(P	2.205E+01	6.77E+01	3.81E+00 G
			92.59	7.496E+00	(P	1.377E+01	5.64E+01	5.58E+00 G
PA-234	N	1.7876E+00					1.63E+12	
			131.29	1.395E+00	*(	6.542E+00	1.40E+02	1.80E+01 G
			946.02	2.314E+00	?(	6.078E+00	1.08E+02	1.34E+01 G
			569.47	-4.412E+00	+	1.937E+01	1.28E+02	8.20E+00 G
			883.24	0.000E+00	-	1.641E+01	1.00E+03	9.60E+00 G
			880.53	5.513E+00	?	2.358E+01	1.23E+02	6.00E+00 GA
PA-234M	N	4.3863E+01					1.63E+12	
			1001.00	2.410E+01	?(P	1.519E+02	1.75E+02	8.37E-01 G
			766.41	1.001E+02	?(	5.160E+02	1.48E+02	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -2.3473E-01                                      1.58E+05
                           59.54-2.347E-01 ?(P 4.462E+00 5.57E+02 3.59E+01 G

Cs-136   F  -6.6517E-01                                      1.30E+01
                          818.50-6.652E-01 ?(  2.040E+00 9.09E+01 1.00E+02 G
                         1048.07-9.024E-01 +   2.448E+00 8.06E+01 8.00E+01 G
                          340.57-9.491E-01 +   4.433E+00 1.39E+02 4.69E+01 G

Np-239   T  -1.5363E+00                                      2.36E+00
                          103.70 0.000E+00 +   8.279E+00 1.00E+03 2.40E+01 X
                          106.13-1.536E+00 ?(  8.699E+00 1.70E+02 2.27E+01 G
                           99.50-2.288E+00 +   1.308E+01 1.71E+02 1.50E+01 X

Nd-147       4.5212E+00                                      1.11E+01
                          531.00 4.521E+00 ?(  4.844E+00 4.68E+01 1.30E+01 G
                           91.10-1.236E+00 -   6.749E+00 1.64E+02 2.83E+01 G

TL-210   N   3.1217E-01                                      5.84E+05
                          799.60 3.122E-01 ?(  1.421E+00 1.31E+02 9.90E+01 G
                          296.00-4.008E-01 +   2.659E+00 1.97E+02 7.90E+01 G
                         1313.00-2.738E+00 +   8.351E+00 1.35E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
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M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	122.	16.	0.009	100.84	1.045E+01	P
TH-227	50.14	186.	9.	0.005	207.39	2.882E+00	
AM-241	59.54	297.	-4.	-0.002	556.53	-2.347E-01	P
Sn-126	64.28	357.	-24.	-0.013	114.72	-4.307E+00	
BA-133	80.99	447.	-27.	-0.015	114.30	-1.133E+00	
EU-155	86.54	954.	-25.	-0.014	173.21	-1.160E+00	
Sn-126	86.94	898.	-25.	-0.014	167.98	-3.933E+00	
Sn-126	87.57	834.	-25.	-0.014	161.94	-9.453E-01	
Nd-147	91.10	857.	-25.	-0.014	163.76	-1.236E+00	
Gd-153	97.50	928.	-26.	-0.014	169.41	-1.147E+00	
Np-239	99.50	953.	-26.	-0.014	171.45	-2.288E+00	
Gd-153	103.20	979.	-12.	-0.007	363.28	-7.456E-01	
EU-155	105.31	918.	25.	0.014	171.89	1.572E+00	P
Np-239	106.13	983.	-26.	-0.015	169.83	-1.536E+00	
EU-152	121.78	132.	-9.	-0.005	183.59	-4.218E-01	
EU-154	123.10	140.	-20.	-0.011	86.20	-6.603E-01	
PA-234	131.29	320.	18.	0.010	139.76	1.395E+00	
HF-181	133.02	338.	15.	0.008	179.59	4.649E-01	
U-235	143.79	359.	-6.	-0.003	722.84	-7.790E-01	P
Ba-140	162.66	148.	-20.	-0.011	89.44	-4.948E+00	
U-235	163.38	173.	-6.	-0.003	746.71	-1.777E+00	P
CE-139	165.85	173.	3.	0.002	659.50	5.429E-02	
Cf-251	176.60	88.	-12.	-0.007	149.07	-1.133E+00	
U-235	185.72	114.	28.	0.015	71.03	8.587E-01	P
U-235	205.33	69.	-5.	-0.003	371.73	-1.934E+00	P
TH-229	210.85	56.	15.	0.008	102.30	9.110E+00	
Cf-251	227.00	92.	-19.	-0.011	100.52	-5.930E+00	
EU-152	244.69	289.	-14.	-0.008	177.73	-3.725E+00	
TH-227	256.24	56.	9.	0.005	166.17	2.751E+00	
Cd-113m	263.70	60.	13.	0.007	89.04	4.724E+03	
BI-210M	265.83	72.	2.	0.001	667.73	7.980E-02	P
Hg-203	279.20	44.	2.	0.001	713.56	5.151E-02	
I-131	284.30	65.	-17.	-0.010	24.36	-6.562E+00	P
TL-210	296.00	332.	-13.	-0.007	197.06	-4.008E-01	
La-140	328.76	292.	-17.	-0.009	25.81	-2.140E+00	P
Cf-249	333.44	275.	-17.	-0.009	143.81	-2.810E+00	
Cs-136	340.57	258.	-17.	-0.009	138.98	-9.491E-01	
EU-152	344.29	182.	4.	0.002	443.79	4.405E-01	P
HF-181	345.83	290.	-18.	-0.010	133.93	-3.285E+00	
BA-133	356.00	221.	-5.	-0.003	422.85	-2.236E-01	
I-131	364.48	44.	-8.	-0.005	55.64	-2.903E-01	P
BA-133	383.84	77.	-2.	-0.001	537.00	-7.691E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	68.	9.	0.005	134.51	4.183E-01	P
SB-125	427.88	17.	2.	0.001	376.71	2.331E-01	P
AG-108M	433.94	48.	-15.	-0.008	54.96	-5.309E-01	P
pm-146	453.88	31.	-5.	-0.003	164.83	-2.587E-01	P
SB-125	463.37	22.	27.	0.015	31.65	8.751E+00	P
Ir-192	468.06	58.	-6.	-0.004	169.58	-4.344E-01	
BE-7	477.60	66.	-1.	-0.001	728.18	-3.897E-01	P
HF-181	482.00	69.	-9.	-0.005	139.42	-3.813E-01	
La-140	487.02	63.	10.	0.006	112.23	8.169E-01	
RU-103	497.05	17.	-1.	-0.001	610.28	-5.574E-02	P
RH-106	511.86	42.	22.	0.012	79.24	4.127E+00	
Nd-147	531.00	9.	15.	0.009	46.78	4.521E+00	
Ba-140	537.26	17.	-1.	-0.001	643.23	-2.116E-01	
CS-134	563.24	26.	-9.	-0.005	120.36	-4.336E+00	
CS-134	569.32	48.	-16.	-0.009	65.61	-4.245E+00	
PA-234	569.47	61.	-9.	-0.005	128.48	-4.412E+00	
BI-207	569.70	67.	4.	0.002	293.68	1.662E-01	
SB-125	600.50	170.	9.	0.005	197.20	2.252E+00	P
SB-124	602.73	196.	-4.	-0.002	476.13	-1.811E-01	
SB-125	635.89	19.	2.	0.001	316.23	7.862E-01	
I-131	636.97	28.	-6.	-0.003	134.44	-3.623E+00	
AG-110M	657.76	41.	9.	0.005	103.97	4.429E-01	
CS-137	661.66	85.	-22.	-0.012	56.94	-1.181E+00	P
NB-94	702.63	23.	-7.	-0.004	144.53	-3.618E-01	
SB-124	722.79	15.	11.	0.006	60.47	4.862E+00	
AG-108M	722.94	26.	7.	0.004	104.57	4.010E-01	
EU-154	723.36	33.	7.	0.004	116.82	1.802E+00	
ZR-95	724.20	41.	2.	0.001	413.13	2.487E-01	P
BI-212	727.17	44.	-2.	-0.001	520.62	-1.170E+00	P
pm-146	735.72	9.	7.	0.004	94.93	1.652E+00	
pm-146	747.16	19.	-6.	-0.003	167.10	-8.474E-01	
ZR-95	756.73	33.	-11.	-0.006	83.53	-1.053E+00	P
AG-110M	763.94	25.	11.	0.006	73.05	2.464E+00	
PA-234M	766.41	32.	6.	0.003	148.00	1.001E+02	
EU-152	778.92	19.	3.	0.002	308.71	1.234E+00	P
BI-212	785.42	10.	7.	0.004	100.58	2.917E+01	P
CS-134	795.87	18.	8.	0.004	86.28	4.760E-01	
TL-210	799.60	25.	6.	0.003	130.68	3.122E-01	
CS-134	801.95	49.	-11.	-0.006	96.57	-6.684E+00	
CO-58	810.78	30.	6.	0.003	146.02	3.011E-01	
Cs-136	818.50	55.	-12.	-0.007	90.94	-6.652E-01	
MN-54	834.85	9.	3.	0.001	250.62	1.489E-01	
NB-94	871.10	19.	1.	0.001	445.43	8.086E-02	P
PA-234	880.53	21.	6.	0.003	122.69	5.513E+00	
Sc-46	889.28	16.	6.	0.003	110.47	3.281E-01	
y-88	898.04	9.	8.	0.004	91.92	4.856E-01	
AG-110M	937.49	25.	-7.	-0.004	161.52	-1.254E+00	
PA-234	946.02	5.	5.	0.003	108.01	2.314E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	964.11	38.	-2.	-0.001	380.92	-1.007E+00		
EU-154	996.33	32.	2.	0.001	535.41	9.173E-01		
PA-234M	1001.00	13.	3.	0.002	175.15	2.410E+01		P
EU-154	1004.77	29.	4.	0.002	180.15	1.580E+00		
Cs-136	1048.07	32.	-11.	-0.006	80.65	-9.024E-01		
RH-106	1050.36	37.	5.	0.003	170.15	2.278E+01		P
BI-207	1063.66	6.	12.	0.007	50.29	1.128E+00		P
FE-59	1099.25	20.	-4.	-0.002	250.83	-4.991E-01		
EU-152	1112.07	53.	2.	0.001	444.70	1.218E+00		
Sc-46	1120.55	34.	9.	0.005	101.66	6.133E-01		
Ta-182	1121.30	64.	-9.	-0.005	128.59	-1.872E+00		
CO-60	1173.24	34.	-14.	-0.008	56.93	-1.082E+00		P
Ta-182	1189.05	10.	1.	0.001	702.38	4.655E-01		
Ta-182	1221.41	11.	3.	0.002	229.35	9.527E-01		
FE-59	1291.60	5.	6.	0.004	92.55	1.182E+00		P
TL-210	1313.00	16.	-7.	-0.004	135.27	-2.738E+00		
CO-60	1332.50	8.	4.	0.002	162.48	3.119E-01		P
AG-110M	1384.30	11.	-3.	-0.001	285.04	-9.441E-01		
EU-152	1408.00	0.	9.	0.005	33.76	3.714E+00		P
La-140	1596.21	23.	-14.	-0.008	95.96	-1.407E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.8966E-01	-3.8967E-01	7.282E+02%	1.36E+01
NA-22	#A	2.6702E-02	2.6702E-02	1.396E+03%	1.44E+00
K-40		1.4154E+02	1.4154E+02	7.888E+00%	9.55E+00
Sc-46	#A	4.7070E-01	4.7070E-01	7.506E+01%	1.26E+00
CR-51	#A	1.7099E-01	1.7099E-01	3.739E+03%	2.18E+01
MN-54	#A	1.4885E-01	1.4885E-01	2.506E+02%	9.46E-01
FE-59	#A	2.2946E-01	2.2946E-01	9.255E+01%	2.94E+00
Co-56	#C	1.4411E+00	1.4412E+00	2.041E+01%	1.29E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	9.09E-01
CO-58	#A	3.0111E-01	3.0111E-01	1.460E+02%	1.53E+00
CO-60	#A	3.1188E-01	3.1188E-01	1.625E+02%	1.33E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.26E+00
NB-94	#A	-3.6183E-01	-3.6183E-01	1.445E+02%	1.24E+00
ZR-95	#A	-1.0528E+00	-1.0528E+00	8.353E+01%	2.79E+00
NB-95	A	1.4230E-01	1.4230E-01	3.129E+02%	1.58E+00
RU-103	#A	-5.5744E-02	-5.5745E-02	6.103E+02%	8.85E-01
RH-106	#A	2.8786E+00	2.8786E+00	1.701E+02%	2.96E+01
AG-108M	#A	-5.3095E-01	-5.3095E-01	5.496E+01%	1.26E+00
AG-110M	#A	5.1061E-01	5.1061E-01	7.305E+01%	2.17E+00
SN-113	#A	4.1833E-01	4.1833E-01	1.345E+02%	1.92E+00

SB-124	#A	3.1876E-01	3.1877E-01	6.047E+01%	2.94E+00
SB-125	#A	2.1321E+00	2.1321E+00	3.165E+01%	2.37E+00
I-131	#A	-2.9028E-01	-2.9030E-01	5.564E+01%	1.17E+00
Gd-153	#A	-1.1470E+00	-1.1470E+00	1.694E+02%	6.48E+00
Ga-68	#	3.1819E+01	3.2174E+01	2.774E+01%	1.82E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+00
BA-133	#A	-2.2356E-01	-2.2356E-01	4.228E+02%	3.22E+00
CS-134	#A	2.2227E-01	2.2227E-01	8.628E+01%	2.94E+00
CS-137	#A	-1.1813E+00	-1.1813E+00	5.694E+01%	2.46E+00
CE-139	#A	5.4286E-02	5.4286E-02	6.595E+02%	1.23E+00
Ba-140	#A	-2.1156E-01	-2.1157E-01	6.432E+02%	3.51E+00
La-140	#A	-1.4073E+00	-1.4073E+00	9.596E+01%	2.55E+00
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.67E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.12E+01
PM-144	#A	4.8440E-02	4.8440E-02	1.127E+03%	1.33E+00
EU-152	#A	8.3378E-01	8.3378E-01	2.333E+02%	6.68E+00
EU-154	#A	7.7496E-01	7.7496E-01	1.168E+02%	1.11E+01
EU-155	#A	1.5718E+00	1.5718E+00	1.719E+02%	9.01E+00
HF-181	#A	-8.5352E-02	-8.5353E-02	1.137E+02%	1.82E+00
Ta-182	#A	-1.8724E+00	-1.8724E+00	1.286E+02%	8.22E+00
Hg-203	#A	5.1511E-02	5.1511E-02	7.136E+02%	9.46E-01
TL-208		2.6761E+00	2.6761E+00	1.442E+01%	5.51E-01
pm-146	#A	1.4782E-01	1.4782E-01	9.493E+01%	3.42E+00
y-88	#A	4.8563E-01	4.8564E-01	9.192E+01%	1.07E+00
Cd-113m	#A	4.7237E+03	4.7237E+03	8.904E+01%	1.42E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.15E+01
Cf-251	#A	-1.1335E+00	-1.1335E+00	1.491E+02%	4.39E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.99E+00
Sn-126	#A	-4.3072E+00	-4.3072E+00	1.147E+02%	1.65E+01
PB-210	#A	1.0447E+01	1.0447E+01	1.008E+02%	3.54E+01
PB-212		5.3935E+00	5.3935E+00	1.204E+01%	1.46E+00
PB-214		1.2164E+01	1.2164E+01	8.146E+00%	2.01E+00
BI-207	#A	5.8218E-01	5.8218E-01	5.029E+01%	1.70E+00
BI-212	#A	-1.1705E+00	-1.1705E+00	5.206E+02%	2.21E+01
U-235	#A	-7.7901E-01	-7.7901E-01	7.228E+02%	1.18E+01
BI-214		8.3402E+00	8.3402E+00	1.324E+01%	1.84E+00
BI-210M	#A	7.9804E-02	7.9804E-02	6.677E+02%	1.86E+00
AC-228		6.0940E+00	6.0940E+00	1.482E+01%	3.51E+00
TH-227	#A	2.8210E+00	2.8210E+00	1.329E+02%	2.03E+01
TH-229	#A	3.5914E+00	3.5914E+00	1.023E+02%	1.67E+01
TH-234	A	8.4598E+00	8.4598E+00	4.408E+01%	2.20E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.20E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.90E+00
PA-234	#A	1.7876E+00	1.7876E+00	8.832E+01%	6.54E+00
PA-234M	#A	4.3863E+01	4.3863E+01	1.147E+02%	1.52E+02
AM-241	#A	-2.3473E-01	-2.3473E-01	5.565E+02%	4.46E+00
Np-237	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+01
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.47E+00
Cs-136	#A	-6.6515E-01	-6.6517E-01	9.094E+01%	2.04E+00

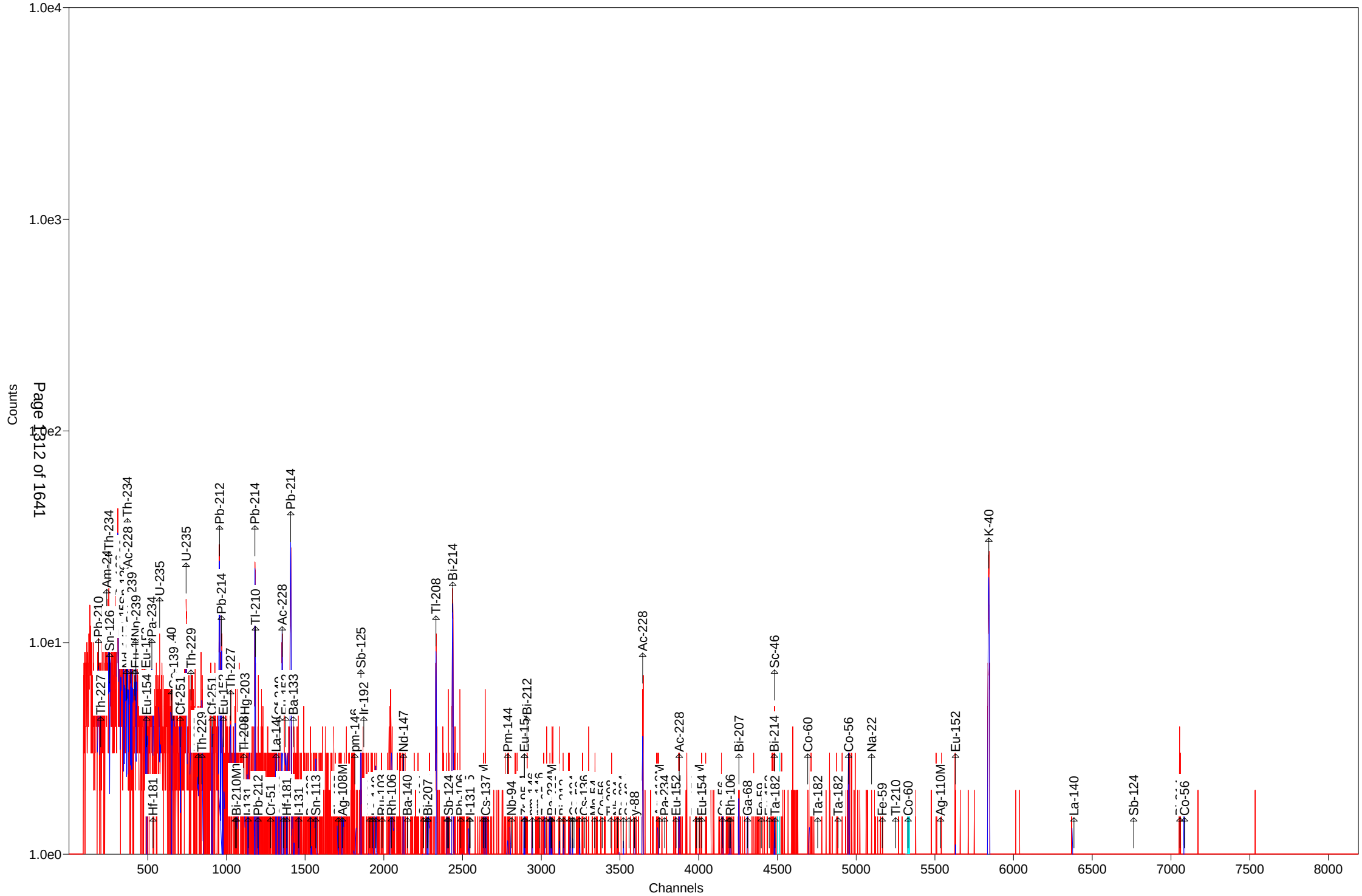
Np-239 #A	-1.5360E+00	-1.5363E+00	1.698E+02%	8.70E+00
Nd-147 #A	4.5210E+00	4.5212E+00	4.678E+01%	4.84E+00
TL-210 #A	3.1217E-01	3.1217E-01	1.307E+02%	1.42E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.762E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.7621313E+02 Bq/Sample

376766_Gamma_160-29521-A-18-B. 8_Gamma_20182812.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20182740

Sample Description: 376766_Gamma_160-29521-A-19-B
Detector: Detector # 5
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-A-19-B

Decay to Time: 8/9/2018 20:32 Live Time: 1800 sec
Acquisition Time: 8/9/2018 20:33:15 Real Time: 1823 sec
Analysis Time: 8/9/2018 21:04 Dead Time: 1.27 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-07-14_1831.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.393E+00	96.8	3.285E+00	3.290E+00	1.121E+01
NA-22	-1.942E-01	291.5	5.662E-01	5.663E-01	2.073E+00
K-40	1.318E+02	9.9	1.306E+01	1.470E+01	1.689E+01
Sc-46	6.475E-01	95.8	6.205E-01	6.214E-01	2.951E+00
CR-51	-2.287E+00	165.4	3.783E+00	3.785E+00	1.371E+01
MN-54	-7.273E-02	693.3	5.042E-01	5.042E-01	1.569E+00
FE-59	2.042E-01	530.9	1.084E+00	1.084E+00	3.148E+00
Co-56	6.889E-01	107.9	7.432E-01	7.441E-01	1.387E+00
CO-57	4.548E-02	222.3	1.011E-01	1.011E-01	1.061E+00
CO-58	-7.723E-01	89.9	6.942E-01	6.953E-01	2.343E+00
CO-60	8.248E-01	33.8	2.791E-01	2.822E-01	7.427E-01
ZN-65	4.993E-01	327.7	1.636E+00	1.636E+00	5.770E+00
NB-94	1.048E-01	121.4	1.272E-01	1.273E-01	1.467E+00
ZR-95	-7.369E-01	114.6	8.448E-01	8.457E-01	2.548E+00
NB-95	-1.109E+00	74.0	8.205E-01	8.225E-01	2.730E+00
RU-103	2.795E-01	105.6	2.950E-01	2.954E-01	7.802E-01
RH-106	3.661E+00	318.7	1.167E+01	1.167E+01	3.962E+01
AG-108M	-3.931E-01	85.0	3.343E-01	3.349E-01	1.335E+00
AG-110M	2.784E-01	102.0	2.840E-01	2.843E-01	4.248E+00
SN-113	4.939E-01	130.9	6.466E-01	6.471E-01	2.211E+00
SB-124	-7.997E-01	55.1	4.409E-01	4.428E-01	4.235E+00
SB-125	3.671E+00	27.4	1.005E+00	1.023E+00	2.089E+00
I-131	-2.403E-01	90.7	2.180E-01	2.183E-01	1.403E+00
Gd-153	-4.314E-01	220.9	9.531E-01	9.535E-01	3.242E+00
Ga-68	6.017E+00	431.6	2.597E+01	2.597E+01	6.245E+01
Tc-99m	-3.259E-01	121.7	3.966E-01	3.970E-01	1.332E+00
BA-133	-1.538E-01	117.3	1.805E-01	1.807E-01	4.396E+00
CS-134	1.323E-01	75.5	9.992E-02	1.002E-01	4.160E+00
CS-137	8.349E-02	576.2	4.811E-01	4.811E-01	1.731E+00
CE-139	-3.477E-01	115.4	4.013E-01	4.027E-01	1.350E+00
Ba-140	-2.981E-01	66.1	1.970E-01	1.976E-01	5.305E+00
La-140	2.442E-01	94.5	2.308E-01	2.311E-01	2.262E+00
CE-141	0.000E+00	1.#INF	3.508E-01	3.508E-01	2.544E+00

CE-144	-2.724E+00	134.2	3.655E+00	3.658E+00	1.226E+01
PM-144	2.414E-01	190.7	4.602E-01	4.604E-01	1.563E+00
EU-152	2.533E+00	60.7	1.538E+00	1.544E+00	5.818E+00
EU-154	4.039E-01	108.1	4.365E-01	4.370E-01	7.431E+00
EU-155	-9.816E-01	115.0	1.129E+00	1.130E+00	6.693E+00
HF-181	-3.437E-01	74.8	2.572E-01	2.578E-01	2.143E+00
Ta-182	2.016E+00	73.6	1.484E+00	1.487E+00	7.260E+00
Hg-203	-4.987E-01	110.0	5.488E-01	5.495E-01	1.636E+00
TL-208	3.785E+00	12.7	4.791E-01	5.178E-01	4.392E-01
pm-146	-1.725E-02	129.1	2.227E-02	2.229E-02	4.448E+00
y-88	-8.527E-01	37.9	3.229E-01	3.258E-01	1.779E+00
Cd-113m	4.537E+03	89.9	4.079E+03	4.089E+03	1.380E+04
Cd-109	0.000E+00	1.#INF	1.301E+01	1.301E+01	4.402E+01
Cf-251	-1.172E+00	166.9	1.955E+00	1.958E+00	5.331E+00
Cf-249	4.064E-01	155.0	6.301E-01	6.305E-01	2.165E+00
Sn-126	-3.893E-01	1012.2	3.940E+00	3.940E+00	1.351E+01
PB-210	-6.570E+00	181.9	1.195E+01	1.196E+01	3.622E+01
PB-212	1.091E+01	8.3	9.048E-01	1.147E+00	1.671E+00
PB-214	1.666E+01	7.0	1.160E+00	1.448E+00	2.032E+00
BI-207	6.971E-01	27.5	1.916E-01	1.950E-01	1.601E+00
BI-212	7.713E+00	104.1	8.031E+00	8.041E+00	2.734E+01
U-235	5.241E-01	185.2	9.709E-01	9.712E-01	1.108E+01
BI-214	1.609E+01	9.5	1.535E+00	1.748E+00	1.989E+00
BI-210M	7.844E-01	100.9	7.914E-01	7.927E-01	1.899E+00
AC-228	1.180E+01	14.9	1.759E+00	1.859E+00	3.238E+00
TH-227	-3.464E+00	163.0	5.646E+00	5.649E+00	1.742E+01
TH-229	-6.103E+00	117.5	7.173E+00	7.190E+00	1.951E+01
TH-234	1.340E+01	29.8	3.989E+00	4.050E+00	2.368E+01
PA-231	1.215E+01	155.9	1.895E+01	1.896E+01	6.411E+01
PA-233	-1.135E+00	148.0	1.680E+00	1.681E+00	5.667E+00
PA-234	4.004E-01	113.9	4.560E-01	4.565E-01	7.286E+00
PA-234M	0.000E+00	1.#INF	3.278E+01	3.278E+01	3.214E+02
AM-241	5.218E-01	208.1	1.086E+00	1.086E+00	3.144E+00
Np-237	0.000E+00	1.#INF	4.537E+00	4.537E+00	1.516E+01
Ir-192	-8.761E-03	90.9	7.968E-03	7.985E-03	1.296E+00
Cs-136	3.477E-01	118.0	4.104E-01	4.109E-01	1.437E+00
Np-239	1.142E+00	158.6	1.810E+00	1.812E+00	6.078E+00
Nd-147	2.206E+00	98.6	2.174E+00	2.178E+00	5.694E+00
TL-210	0.000E+00	1.#INF	6.629E-02	6.629E-02	1.954E+00
Total	4.794E+03				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-A-19-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182740.An1

Acquisition information
Start time: 8/9/2018 8:33:15 PM
Live time: 1800
Real time: 1823
Dead time: 1.27 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-07-14_1831.PBC 7/14/2018 6:31:50 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2756

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-9.	181.88	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
59.54	9.	208.06	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.36	34.	41.23	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
74.79	150.	11.83	0.81	3.148E-02				
77.27	159.	11.00	0.82	3.222E-02				
87.65	15.	100.34	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
89.78	55.	27.87	0.68	3.489E-02				
92.67	36.	42.96	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
106.13	17.	158.57	0.84	3.620E-02	106.13	22.700	PBC<MDA	Np239
123.10	16.	108.07	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
135.72	8.	305.36	0.88	3.457E-02	136.47	10.680	PBC<MDA	CO57
136.30	14.	173.34	0.88	3.458E-02				
163.38	9.	185.23	0.90	3.102E-02	163.38	5.080	PBC<MDA	U235
185.72	68.	25.81	0.93	2.854E-02	185.72	54.000	2.464E+00	U235
238.73	194.	8.91	1.14	2.318E-02	238.63	43.300	1.075E+01	PB212
242.15	54.	24.19	0.98	2.293E-02	242.00	7.430	1.750E+01	PB214
263.70	10.	89.91	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	10.	107.77	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
276.33	13.	95.22	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
295.31	110.	10.95	1.02	1.944E-02	295.09	19.300	1.625E+01	PB214
					296.00	79.000	3.988E+00	TL210
302.65	12.	155.90	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					302.85	18.330	1.911E+00	BA133
302.85	12.	160.84	1.04	1.903E-02	302.65	2.880	1.216E+01	PA231
					302.85	18.330	1.911E+00	BA133
304.85	12.	165.63	1.04	1.893E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.260E+00	BI210M
304.90	12.	170.58	1.04	1.893E-02	304.85	4.290	8.226E+00	Ba140
					304.90	28.000	1.260E+00	BI210M
308.44	12.	174.83	1.05	1.875E-02	308.44	31.750	PBC<MDA	Ir192
328.76	9.	153.26	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.77	41.	24.19	0.54	1.736E-02	338.32	12.010	1.086E+01	AC228
344.29	12.	118.04	1.08	1.711E-02	344.29	26.500	PBC<MDA	EU152
352.16	196.	8.29	0.98	1.679E-02	351.93	37.600	1.687E+01	PB214
383.84	10.	113.88	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
387.95	7.	155.04	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	130.91	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	28.	27.38	1.16	1.428E-02	427.88	29.600	3.679E+00	SB125
453.88	2.	494.99	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	9.	98.05	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	123.93	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	96.81	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
487.02	5.	209.04	1.21	1.282E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	105.55	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	60.	29.81	2.48	1.230E-02	511.86	20.000	1.355E+01	RH106
531.00	6.	98.56	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
563.24	9.	94.11	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.47	4.	256.33	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.208E+00	PA234
					569.70	97.740	1.853E-01	BI207
583.31	64.	12.66	1.21	1.103E-02	583.02	84.500	3.785E+00	TL208
609.75	142.	9.15	1.25	1.063E-02	609.31	46.090	1.563E+01	BI214
					610.30	5.750	1.289E+02	RU103
618.06	10.	190.66	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
621.92	7.	318.73	1.33	1.045E-02	621.92	9.930	PBC<MDA	RH106
636.97	4.	133.50	1.34	1.025E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	102.02	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
661.66	1.	576.22	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
722.79	8.	97.24	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.530E-01	AG108M
					723.36	20.220	2.486E+00	EU154
727.17	10.	104.12	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	6.	129.28	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
778.92	5.	100.41	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	8.	101.98	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
815.77	5.	128.77	1.49	8.328E-03	815.77	23.280	PBC<MDA	La140
818.50	5.	118.02	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
871.10	4.	121.38	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
873.23	0.	889.27	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
889.28	11.	112.34	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.61	48.	17.45	1.47	7.591E-03	911.07	29.000	1.218E+01	AC228
946.02	4.	184.30	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
964.11	6.	109.01	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
966.97	2.	624.50	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
1037.84	5.	149.46	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1063.66	14.	27.48	1.68	6.666E-03	1063.66	74.500	1.612E+00	BI207
1077.40	2.	431.57	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	1.	857.32	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	151.94	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	3.	327.74	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1120.23	4.	217.00	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	155.27	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.215E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1121.24	6.	139.71	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	13.	47.32	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1188.78	4.	132.68	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1221.21	7.	107.76	1.79	5.934E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	107.88	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	1.	626.58	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	4.	152.39	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	5.	48.39	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	4.	152.39	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1460.89	129.	9.91	1.95	5.103E-03	1460.83	10.670	1.318E+02	K40
1765.10	21.	23.75	2.11	4.351E-03	1764.49	15.400	1.747E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.78	74.71	83.	150.	4.771E+03	11.83	0.813	-	D
308.72	77.20	73.	159.	4.930E+03	11.00	0.815	-	D
359.11	89.78	67.	45.	1.301E+03	29.43	0.828	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	101.	-9.	-0.005	181.88	0.783s
TH-227	200.11	50.14	105.	-10.	-0.006	163.01	0.787s
AM-241	237.72	59.54	109.	9.	0.005	208.06	0.797s
TH-234	252.74	63.29	79.	34.	0.019	41.23	0.801D
BA-133	323.61	80.99	163.	-20.	-0.011	116.18	0.819s
Np-237	345.63	86.49	664.	0.	0.000	169.61	0.825A
EU-155	345.84	86.54	558.	-20.	-0.011	164.45	0.825s
Sn-126	347.43	86.94	493.	-20.	-0.011	154.71	0.825s
Sn-126	349.95	87.57	457.	15.	0.008	100.34	0.826D
Cd-109	351.83	88.04	472.	0.	0.000	1000.00	0.826A
TH-234	370.05	92.59	102.	36.	0.020	42.96	0.831D
AC-228	373.09	93.35	512.	-22.	-0.012	148.04	0.832s
Gd-153	389.70	97.50	165.	-8.	-0.005	220.94	0.836s
Np-239	397.71	99.50	167.	-6.	-0.004	291.29	0.838s
Gd-153	412.52	103.20	198.	-17.	-0.009	119.08	0.842s
Np-239	414.52	103.70	215.	-8.	-0.005	253.94	0.842s
EU-155	420.98	105.31	371.	-14.	-0.008	115.03	0.844s
Np-239	424.25	106.13	350.	17.	0.009	158.57	0.845s
EU-152	486.88	121.78	139.	-17.	-0.010	99.80	0.861
CO-57	488.03	122.06	144.	-5.	-0.003	323.16	0.861
EU-154	492.18	123.10	139.	16.	0.009	108.07	0.862s
PA-234	524.99	131.29	296.	-19.	-0.011	130.61	0.871s
HF-181	531.91	133.02	295.	-19.	-0.011	130.25	0.872s
CE-144	533.97	133.54	314.	-19.	-0.011	134.17	0.873
HF-181	545.02	136.30	280.	14.	0.008	173.34	0.876s
CO-57	545.72	136.47	282.	8.	0.004	305.36	0.876s
Tc-99m	561.88	140.51	213.	-17.	-0.010	121.67	0.880s
U-235	574.99	143.79	232.	-4.	-0.002	355.02	0.883s
CE-141	581.61	145.44	234.	0.	0.000	1000.00	0.885
Ba-140	650.54	162.66	168.	-10.	-0.006	186.01	0.902s
U-235	653.42	163.38	127.	9.	0.005	185.23	0.903
CE-139	663.32	165.85	156.	-16.	-0.009	115.42	0.905s
Cf-251	706.34	176.60	97.	-11.	-0.006	166.86	0.916s
U-235	742.85	185.72	77.	68.	0.038	25.81	0.925s
TH-229	774.03	193.51	73.	-13.	-0.007	117.53	0.933s
TH-229	843.44	210.85	80.	-4.	-0.002	401.04	0.950s
Cf-251	908.08	227.00	70.	-5.	-0.003	301.11	0.966s
PB-212	954.64	238.63	35.	197.	0.110	8.29	0.978D
PB-214	968.10	242.00	57.	54.	0.030	24.19	0.981D
EU-152	978.89	244.69	416.	-15.	-0.008	191.94	0.984s
TH-227	1025.11	256.24	70.	-12.	-0.006	137.01	0.995s
Cd-113m	1054.97	263.70	39.	10.	0.006	89.91	1.002s
BI-210M	1063.50	265.83	52.	10.	0.005	107.77	1.005s
TL-208	1109.33	277.28	67.	13.	0.007	95.22	1.016

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1117.00	279.20	98.	-15.	-0.008	110.03	1.017s
I-131	1137.41	284.30	44.	-8.	-0.004	159.10	1.022s
PB-214	1181.48	295.31	10.	110.	0.061	10.98	1.015
TL-210	1184.24	296.00	278.	-3.	-0.002	709.93	1.034s
PA-231	1210.86	302.65	169.	12.	0.007	155.90	1.040s
BA-133	1211.66	302.85	180.	12.	0.007	160.84	1.040s
Ba-140	1219.66	304.85	192.	12.	0.007	165.63	1.042
BI-210M	1219.85	304.90	204.	12.	0.007	170.58	1.042
Ir-192	1234.03	308.44	216.	12.	0.007	174.83	1.046
PA-233	1248.32	312.01	197.	-14.	-0.008	148.04	1.049s
Ir-192	1266.25	316.49	55.	-12.	-0.007	90.95	1.053s
CR-51	1280.63	320.08	81.	-7.	-0.004	165.41	1.057s
La-140	1315.35	328.76	56.	9.	0.005	153.26	1.065s
Cf-249	1334.08	333.44	51.	-6.	-0.004	215.34	1.070s
AC-228	1355.42	338.77	17.	41.	0.023	24.19	0.536s
EU-152	1377.49	344.29	92.	12.	0.007	118.04	1.080s
HF-181	1383.66	345.83	61.	-7.	-0.004	164.92	1.082s
PB-214	1408.98	352.16	19.	192.	0.107	8.57	0.983
BA-133	1424.36	356.00	287.	-14.	-0.008	170.92	1.091
I-131	1458.32	364.48	44.	-13.	-0.007	122.89	1.099s
BA-133	1535.78	383.84	54.	10.	0.005	113.88	1.117s
Cf-249	1552.22	387.95	64.	7.	0.004	155.04	1.121s
SN-113	1567.19	391.69	61.	9.	0.005	130.91	1.125s
SB-125	1711.99	427.88	8.	28.	0.016	27.38	1.158s
AG-108M	1736.25	433.94	36.	-9.	-0.005	85.03	1.164s
pm-146	1816.05	453.88	29.	2.	0.001	494.99	1.182s
SB-125	1854.01	463.37	36.	9.	0.005	98.05	1.191s
Ir-192	1872.79	468.06	24.	6.	0.003	123.93	1.195
BE-7	1910.94	477.59	29.	8.	0.005	96.81	1.204s
HF-181	1928.56	482.00	65.	-12.	-0.007	74.83	1.208s
La-140	1948.65	487.02	24.	5.	0.003	209.04	1.212s
RU-103	1988.80	497.05	8.	6.	0.003	105.55	1.221s
RH-106	2048.06	511.86	40.	60.	0.033	29.81	2.485
Nd-147	2124.62	531.00	8.	6.	0.003	98.56	1.252s
Ba-140	2149.67	537.26	28.	-9.	-0.005	66.10	1.258s
CS-134	2253.60	563.24	16.	9.	0.005	94.11	1.280s
CS-134	2277.94	569.32	36.	-9.	-0.005	100.00	1.286s
PA-234	2278.54	569.47	42.	4.	0.002	256.33	1.286s
BI-207	2279.47	569.70	39.	0.	0.000	1000.00	1.286s
TL-208	2333.92	583.31	0.	64.	0.035	12.66	1.213
SB-125	2402.69	600.50	288.	-13.	-0.007	188.02	1.313s
SB-124	2411.61	602.73	278.	-15.	-0.008	55.13	1.315s
CS-134	2419.53	604.71	262.	-13.	-0.007	179.09	1.317s
BI-214	2439.70	609.75	10.	138.	0.077	9.54	1.249
RU-103	2441.89	610.30	250.	-9.	-0.005	263.99	1.322s
AG-108M	2457.82	614.28	241.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	182.	10.	0.006	190.66	1.328s
RH-106	2488.37	621.92	234.	7.	0.004	318.73	1.332s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2544.26	635.89	13.	-5.	-0.003	370.04	1.344s
I-131	2548.61	636.97	16.	4.	0.002	133.50	1.345s
AG-110M	2631.76	657.76	22.	7.	0.004	102.02	1.362s
CS-137	2647.36	661.66	26.	1.	0.001	576.22	1.366s
NB-94	2811.25	702.63	22.	-2.	-0.001	575.33	1.400s
SB-124	2891.88	722.79	29.	8.	0.005	97.24	1.417s
AG-108M	2892.48	722.94	37.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	37.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	82.	-18.	-0.010	75.83	1.418s
BI-212	2909.41	727.17	45.	10.	0.005	104.12	1.421s
pm-146	2943.61	735.72	13.	6.	0.003	129.28	1.428s
pm-146	2989.37	747.16	22.	-8.	-0.004	129.09	1.437s
ZR-95	3027.65	756.73	17.	-6.	-0.004	114.64	1.445s
AG-110M	3056.50	763.94	32.	-7.	-0.004	120.37	1.451s
NB-95	3063.89	765.79	75.	-17.	-0.010	73.98	1.453s
PA-234M	3066.38	766.41	100.	-14.	-0.008	102.25	1.453s
EU-152	3116.41	778.92	5.	5.	0.003	100.41	1.463s
BI-212	3142.41	785.42	23.	-1.	-0.001	773.39	1.468s
CS-134	3184.19	795.87	26.	8.	0.004	101.98	1.477s
TL-210	3199.12	799.60	33.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	34.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	48.	-12.	-0.006	89.88	1.489s
La-140	3263.80	815.77	20.	5.	0.003	128.77	1.493s
Cs-136	3274.72	818.50	16.	5.	0.003	118.02	1.495s
MN-54	3340.10	834.85	19.	-1.	-0.001	693.28	1.508s
Co-56	3387.78	846.77	14.	0.	0.000	1000.00	1.518s
TL-208	3442.95	860.56	33.	-14.	-0.008	27.48	1.529s
NB-94	3485.08	871.10	12.	4.	0.002	121.38	1.537s
EU-154	3493.61	873.23	5.	0.	0.000	889.27	1.539s
PA-234	3522.80	880.53	52.	-12.	-0.007	89.47	1.544s
PA-234	3533.64	883.24	64.	-11.	-0.006	110.17	1.547s
AG-110M	3539.41	884.68	76.	-3.	-0.002	373.09	1.547s
Sc-46	3557.79	889.28	68.	11.	0.006	112.34	1.551s
y-88	3592.83	898.04	19.	-11.	-0.006	37.86	1.558s
AC-228	3647.11	911.61	5.	48.	0.027	17.45	1.474
AG-110M	3750.60	937.49	47.	-17.	-0.010	86.38	1.589s
PA-234	3784.70	946.02	9.	4.	0.002	184.30	1.595s
EU-152	3857.05	964.11	21.	6.	0.004	109.01	1.609s
AC-228	3876.48	968.97	53.	2.	0.001	624.50	1.612s
EU-154	3985.88	996.33	42.	-3.	-0.002	310.91	1.633s
PA-234M	4004.55	1001.00	45.	0.	0.000	1000.00	1.636s
Co-56	4151.87	1037.84	10.	5.	0.003	149.46	1.664s
Cs-136	4192.77	1048.07	38.	-6.	-0.003	150.92	1.671s
RH-106	4201.93	1050.36	52.	-6.	-0.004	160.99	1.673s
BI-207	4255.11	1063.66	1.	14.	0.008	27.48	1.682s
Ga-68	4310.04	1077.40	15.	2.	0.001	431.57	1.692s
FE-59	4397.41	1099.25	15.	1.	0.001	857.32	1.708s
EU-152	4448.68	1112.07	38.	6.	0.003	151.94	1.717s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4462.56	1115.55	44.	3.	0.002	327.74	1.720s
BI-214	4481.51	1120.29	36.	4.	0.002	217.00	1.723
Sc-46	4482.57	1120.55	40.	6.	0.003	155.27	1.723
Ta-182	4485.56	1121.30	32.	6.	0.003	139.71	1.724s
CO-60	4693.21	1173.24	5.	13.	0.007	47.32	1.760s
Ta-182	4756.42	1189.05	5.	4.	0.002	132.68	1.771s
Ta-182	4885.79	1221.41	11.	7.	0.004	107.76	1.793s
Co-56	4953.23	1238.28	16.	9.	0.005	107.88	1.804s
NA-22	5098.13	1274.53	16.	-2.	-0.001	291.55	1.828
EU-154	5098.19	1274.54	18.	0.	0.000	1000.00	1.828
FE-59	5166.35	1291.60	11.	1.	0.001	626.58	1.840s
TL-210	5251.91	1313.00	5.	4.	0.002	152.39	1.854s
CO-60	5329.85	1332.50	0.	5.	0.003	48.39	1.866s
AG-110M	5536.88	1384.30	5.	4.	0.002	152.39	1.899s
EU-152	5631.62	1408.00	11.	-1.	-0.001	238.18	1.914s
K-40	5842.75	1460.83	9.	129.	0.072	9.91	1.946s
La-140	6383.73	1596.21	11.	-3.	-0.002	243.10	2.024s
SB-124	6762.39	1690.98	0.	0.	0.000	1000.00	2.076s
BI-214	7056.06	1764.49	2.	21.	0.012	23.75	2.114s
Co-56	7083.46	1771.35	23.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	12.	-8.	-0.004	62.24	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.3935E+00				5.31E+01	
			477.60	3.393E+00	?(	1.121E+01 9.68E+01 1.05E+01	G
NA-22	C	-1.9420E-01				9.50E+02	
			1274.53	-1.942E-01	?(	2.073E+00 2.92E+02 9.99E+01	G
K-40	N	1.3179E+02				4.66E+11	
			1460.83	1.318E+02	?(P	1.689E+01 9.91E+00 1.07E+01	G
Sc-46	F	6.4750E-01				8.38E+01	
			889.28	7.735E-01	?(	2.951E+00 1.12E+02 1.00E+02	G
			1120.55	5.215E-01	?(	2.810E+00 1.55E+02 1.00E+02	G
CR-51	F	-2.2871E+00				2.77E+01	
			320.08	-2.287E+00	?(P	1.371E+01 1.65E+02 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C -7.2732E-02					3.12E+02	
		834.85	-7.273E-02	?(P	1.569E+00	6.93E+02	1.00E+02 G
FE-59	F 2.0417E-01					4.45E+01	
		1099.25	1.517E-01	?(	3.148E+00	8.57E+02	5.65E+01 G
		1291.60	2.728E-01	?(P	4.094E+00	6.27E+02	4.32E+01 G
Co-56	C 6.8890E-01					7.73E+01	
		846.77	0.000E+00	&(	1.387E+00	1.00E+03	9.99E+01 G
		1238.28	1.273E+00	?(P	3.070E+00	1.08E+02	6.61E+01 G
		1037.84	2.828E+00	?(P	1.013E+01	1.49E+02	1.41E+01 G
		1771.35	0.000E+00	-	2.073E+01	1.00E+03	1.55E+01 A
CO-57	C 4.5480E-02					2.72E+02	
		122.06	-9.593E-02	?(	1.061E+00	3.23E+02	8.56E+01 G
		136.47	1.179E+00	&(	1.219E+01	3.05E+02	1.07E+01 G
CO-58	C -7.7234E-01					7.09E+01	
		810.78	-7.723E-01	?(	2.343E+00	8.99E+01	9.95E+01 G
CO-60	F 8.2484E-01					1.93E+03	
		1332.50	4.800E-01	?(P	7.427E-01	4.84E+01	1.00E+02 G
		1173.24	1.170E+00	?(P	1.198E+00	4.73E+01	9.99E+01 G
ZN-65	F 4.9927E-01					2.44E+02	
		1115.55	4.993E-01	?(	5.770E+00	3.28E+02	5.06E+01 G
NB-94	I 1.0481E-01					7.41E+06	
		702.63	-1.002E-01	?(	1.467E+00	5.75E+02	9.79E+01 G
		871.10	3.057E-01	?(	1.314E+00	1.21E+02	9.99E+01 G
ZR-95	I -7.3693E-01					6.40E+01	
		756.73	-7.369E-01	?(P	2.548E+00	1.15E+02	5.45E+01 G
		724.20	-2.431E+00	+	6.141E+00	7.58E+01	4.42E+01 G
NB-95	I -1.1090E+00					6.40E+01	
		765.79	-1.109E+00	?(	2.730E+00	7.40E+01	9.98E+01 G
RU-103	I 2.7953E-01					3.93E+01	
		497.05	2.795E-01	?(P	7.802E-01	1.06E+02	9.09E+01 G
		610.30	-7.766E+00	+	6.945E+01	2.64E+02	5.75E+00 GA
RH-106	I 3.6608E+00					3.74E+02	
		621.92	3.661E+00	&(	3.962E+01	3.19E+02	9.93E+00 G
		1050.36	-3.436E+01	+	1.911E+02	1.61E+02	1.56E+00 G
		511.86	1.355E+01		7.269E+00	2.98E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -3.9313E-01					1.53E+05	
		433.94	-3.931E-01	?(P	1.335E+00	8.50E+01	9.05E+01 G
		722.94	0.000E+00	+	2.061E+00	1.00E+03	9.08E+01 G
		614.28	0.000E+00	+	4.394E+00	1.00E+03	8.98E+01 G
AG-110M	F 2.7837E-01					2.50E+02	
		884.68	-3.275E-01	?(	4.248E+00	3.73E+02	7.27E+01 G
		657.76	4.120E-01	&(	1.446E+00	1.02E+02	9.46E+01 G
		937.49	-3.809E+00	+	7.536E+00	8.64E+01	3.44E+01 G
		1384.30	1.570E+00	?(	5.770E+00	1.52E+02	2.43E+01 G
		763.94	-1.984E+00	+	8.238E+00	1.20E+02	2.23E+01 G
SN-113	F 4.9394E-01					1.15E+02	
		391.69	4.939E-01	?(	2.211E+00	1.31E+02	6.40E+01 G
SB-124	F -7.9968E-01					6.02E+01	
		602.73	-7.997E-01	?(P	4.235E+00	5.51E+01	9.83E+01 G
		1690.98	0.000E+00	+	1.899E+00	1.00E+03	4.78E+01 G
		722.79	4.647E+00	+	1.542E+01	9.72E+01	1.08E+01 G
SB-125	I 3.6711E+00					1.01E+03	
		427.88	3.679E+00	&(P	2.089E+00	2.74E+01	2.96E+01 G
		600.50	-3.732E+00	-	2.365E+01	1.88E+02	1.79E+01 G
		635.89	-2.506E+00	- P	9.414E+00	3.70E+02	1.13E+01 G
		463.37	3.648E+00	?(P	1.216E+01	9.80E+01	1.05E+01 G
I-131	I -2.4027E-01					8.02E+00	
		364.48	-5.582E-01	?(P	1.403E+00	1.23E+02	8.17E+01 G
		284.30	-3.609E+00	&	1.517E+01	1.59E+02	6.14E+00 G
		636.97	3.382E+00	?(P	1.594E+01	1.33E+02	7.17E+00 G
Gd-153	F -4.3139E-01					2.42E+02	
		97.50	-4.314E-01	?(	3.242E+00	2.21E+02	3.00E+01 G
		103.20	-1.205E+00	+	4.822E+00	1.19E+02	2.18E+01 G
Ga-68	C 6.0167E+00					4.71E-02	
		1077.40	6.017E+00	?(	6.245E+01	4.32E+02	3.30E+00 G
Tc-99m	I -3.2593E-01					2.51E-01	
		140.51	-3.259E-01	?(	1.332E+00	1.22E+02	8.93E+01 G
BA-133	F -1.5383E-01					3.85E+03	
		356.00	-7.639E-01	?(	4.396E+00	1.71E+02	6.20E+01 G
		302.85	1.911E+00	?(	1.040E+01	1.61E+02	1.83E+01 G
		383.84	3.784E+00	?	1.469E+01	1.14E+02	8.94E+00 GA
		80.99	-9.801E-01	+	3.059E+00	1.16E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	1.3231E-01					7.54E+02	
			604.71	-6.888E-01	?(	4.160E+00	1.79E+02	9.76E+01 G
			795.87	5.730E-01	&(	2.005E+00	1.02E+02	8.55E+01 G
			569.32	-2.889E+00	+	9.845E+00	1.00E+02	1.54E+01 G
			801.95	0.000E+00	+	2.261E+01	1.00E+03	8.69E+00 G
			563.24	5.218E+00	?(	1.251E+01	9.41E+01	8.35E+00 G
CS-137	I	8.3487E-02					1.10E+04	
			661.66	8.349E-02	(P	1.731E+00	5.76E+02	8.52E+01 G
CE-139	F	-3.4769E-01					1.38E+02	
			165.85	-3.477E-01	&(	1.350E+00	1.15E+02	7.99E+01 G
Ba-140	I	-2.9808E-01					1.28E+01	
			537.26	-1.797E+00	?(P	5.305E+00	6.61E+01	2.44E+01 G
			162.66	-2.869E+00	+	1.811E+01	1.86E+02	6.22E+00 G
			304.85	8.226E+00	?(	4.607E+01	1.66E+02	4.29E+00 G
La-140	I	2.4421E-01					1.28E+01	
			1596.21	-4.099E-01	?(	2.262E+00	2.43E+02	9.54E+01 G
			487.02	4.496E-01	?(P	2.445E+00	2.09E+02	4.55E+01 G
			328.76	1.432E+00	?(P	5.770E+00	1.53E+02	2.03E+01 G
			815.77	1.487E+00	?(	6.710E+00	1.29E+02	2.33E+01 G
CE-144	I	-2.7243E+00					2.85E+02	
			133.54	-2.724E+00	&(	1.226E+01	1.34E+02	1.11E+01 G
PM-144	C	2.4136E-01					3.63E+02	
			696.54	-5.903E-02	%(	1.563E+00	1.05E+03	9.90E+01 G
			618.06	5.414E-01	?(P	3.499E+00	1.91E+02	9.91E+01 G
EU-152	F	2.5328E+00					4.94E+03	
			344.29	1.455E+00	(	5.818E+00	1.18E+02	2.65E+01 G
			1112.07	3.784E+00	?(	1.996E+01	1.52E+02	1.36E+01 G
			121.78	-9.333E-01	-	3.125E+00	9.98E+01	2.86E+01 G
			778.92	2.523E+00	?(	6.336E+00	1.00E+02	1.29E+01 G
			964.11	3.328E+00	?(	1.256E+01	1.09E+02	1.46E+01 G
			244.69	-4.894E+00	&	3.155E+01	1.92E+02	7.58E+00 G
			1408.00	-5.232E-01	- P	9.141E+00	2.38E+02	2.10E+01 GA
EU-154	I	4.0392E-01					3.14E+03	
			873.23	-2.634E-01	&(P	7.431E+00	8.89E+02	1.23E+01 G
			123.10	6.046E-01	(	2.197E+00	1.08E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.200E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	9.264E+00	1.00E+03	2.02E+01 G
			1004.77	-2.941E-01	%	1.509E+01	1.44E+03	1.80E+01 G
			996.33	-2.233E+00	+	2.449E+01	3.11E+02	1.06E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

EU-155   I  -9.8156E-01                                     1.81E+03
                         105.31-9.816E-01  (P 6.693E+00 1.15E+02 2.12E+01 G
                          86.54-1.079E+00 +   5.938E+00 1.64E+02 3.07E+01 G

HF-181   F  -3.4373E-01                                     4.24E+01
                         482.00-6.447E-01 ?(P 2.143E+00 7.48E+01 8.05E+01 G
                         133.02-6.963E-01 +   3.041E+00 1.30E+02 4.33E+01 G
                         345.83-1.487E+00 +   8.449E+00 1.65E+02 1.51E+01 G
                         136.30 3.798E+00 &(  2.218E+01 1.73E+02 5.85E+00 G

Ta-182   F   2.0162E+00                                     1.14E+02
                        1121.30 1.495E+00 ?(  7.260E+00 1.40E+02 3.49E+01 G
                        1221.41 2.543E+00 ?(  6.217E+00 1.08E+02 2.70E+01 G
                        1189.05 2.260E+00 ?(  7.419E+00 1.33E+02 1.62E+01 G

Hg-203   F  -4.9874E-01                                     4.66E+01
                         279.20-4.987E-01  (P 1.636E+00 1.10E+02 8.15E+01 G

TL-208   N   3.7854E+00                                     6.98E+02
                         583.02 3.785E+00  (P 4.392E-01 1.27E+01 8.45E+01 G
                         277.28 5.476E+00 &   1.758E+01 9.52E+01 6.31E+00 G
                         860.56-8.038E+00 - P 1.663E+01 2.75E+01 1.24E+01 G

pm-146   C  -1.7255E-02                                     2.02E+03
                         747.16-1.397E+00 ?(  4.448E+00 1.29E+02 3.40E+01 G
                         735.72 1.631E+00 ?(  5.305E+00 1.29E+02 2.25E+01 G
                         453.88 1.340E-01 &(P 1.744E+00 4.95E+02 6.50E+01 G

y-88     F  -8.5273E-01                                     1.07E+02
                         898.04-8.527E-01 ?(P 1.779E+00 3.79E+01 9.37E+01 G
                        1836.06-1.075E+00 + P 2.516E+00 6.22E+01 9.92E+01 G

Cd-113m      4.5366E+03                                     5.33E+03
                         263.70 4.537E+03  (  1.380E+04 8.99E+01 6.00E-03   K

Cf-251   T  -1.1718E+00                                     3.28E+05
                         176.60-1.172E+00 ?(  5.331E+00 1.67E+02 1.70E+01 G
                         227.00-1.824E+00 &   1.521E+01 3.01E+02 6.30E+00 GA

Cf-249   T   4.0643E-01                                     1.28E+05
                         387.95 4.064E-01 ?(  2.165E+00 1.55E+02 6.60E+01 G
                         333.44-1.291E+00 &   7.358E+00 2.15E+02 1.55E+01 G

Sn-126      -3.8925E-01                                     3.65E+07
                          87.57 6.550E-01 }   4.388E+00 1.00E+02 3.75E+01 GA
                          64.28-3.893E-01 %(  1.351E+01 1.01E+03 9.70E+00 G
                          86.94-3.659E+00 }   1.895E+01 1.55E+02 9.04E+00 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	-6.5702E+00					8.14E+03	
			46.54	-6.570E+00	(P	3.622E+01	1.82E+02	4.25E+00 G
PB-212	N	1.0909E+01					6.98E+02	
			238.63	1.091E+01	(P	1.671E+00	8.29E+00	4.33E+01 G
			300.03	-7.565E-01	% P	7.073E+01	1.41E+03	3.28E+00 GA
PB-214	N	1.6661E+01					5.84E+05	
			351.93	1.687E+01	(P	2.032E+00	8.57E+00	3.76E+01 G
			295.09	1.625E+01	(P	2.602E+00	1.10E+01	1.93E+01 G
			242.00	1.750E+01		1.239E+01	2.42E+01	7.43E+00 GA
BI-207	C	6.9714E-01					1.18E+04	
			569.70	0.000E+00	?(	1.601E+00	1.00E+03	9.77E+01 G
			1063.66	1.612E+00	?(P	8.245E-01	2.75E+01	7.45E+01 G
BI-212	N	7.7133E+00					6.98E+02	
			727.17	7.713E+00	?(	2.734E+01	1.04E+02	7.55E+00 G
			785.42	-6.731E+00	-	1.273E+02	7.73E+02	1.28E+00 GA
U-235	N	5.2414E-01					2.57E+11	
			143.79	-6.647E-01	?(P	1.108E+01	3.55E+02	1.10E+01 G
			205.33	2.612E-01	% P	1.845E+01	2.53E+03	5.01E+00 G
			163.38	3.089E+00	?(P	1.949E+01	1.85E+02	5.08E+00 G
			185.72	2.464E+00	*	1.569E+00	2.58E+01	5.40E+01 GA
BI-214	N	1.6091E+01					5.84E+05	
			609.31	1.563E+01	(P	1.989E+00	9.54E+00	4.61E+01 G
			1120.29	2.328E+00	- P	1.773E+01	2.17E+02	1.51E+01 G
			1764.49	1.747E+01	?(P	7.607E+00	2.37E+01	1.54E+01 G
BI-210M	T	7.8442E-01					1.10E+09	
			265.83	5.178E-01	?(	1.899E+00	1.08E+02	5.00E+01 G
			304.90	1.260E+00	?(	7.267E+00	1.71E+02	2.80E+01 G
AC-228	N	1.1796E+01					2.10E+03	
			911.07	1.218E+01	(P	3.238E+00	1.75E+01	2.90E+01 G
			968.97	7.357E-01	&	1.622E+01	6.24E+02	1.75E+01 G
			338.32	1.086E+01	(P	5.879E+00	2.42E+01	1.20E+01 G
			93.35	-6.172E+00	-	3.056E+01	1.48E+02	5.56E+00 XA
TH-227	N	-3.4638E+00					7.95E+03	
			50.14	-3.464E+00	&(P	1.742E+01	1.63E+02	8.00E+00 G
			256.24	-4.235E+00	+	1.510E+01	1.37E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-6.1032E+00					2.68E+06	
			193.51	-6.103E+00	?(	1.951E+01	1.18E+02	4.40E+00 G
			210.85	-2.893E+00	+	3.210E+01	4.01E+02	2.99E+00 G
TH-234	N	1.3400E+01					1.63E+12	
			63.29	1.809E+01	(P	2.368E+01	4.12E+01	3.81E+00 G
			92.59	1.020E+01	(P	1.403E+01	4.30E+01	5.58E+00 G
PA-231	N	1.2154E+01					1.20E+07	
			302.65	1.215E+01	?(	6.411E+01	1.56E+02	2.88E+00 G
			300.07	-6.164E-01	% P	9.427E+01	2.33E+03	2.46E+00 G
PA-233	C	-1.1347E+00					7.82E+08	
			312.01	-1.135E+00	?(	5.667E+00	1.48E+02	3.60E+01 G
			300.18	-2.446E-01	% P	3.741E+01	2.34E+03	6.20E+00 G
PA-234	N	4.0041E-01					1.63E+12	
			131.29	-1.664E+00	?(	7.286E+00	1.31E+02	1.80E+01 G
			946.02	2.067E+00	?(	9.552E+00	1.84E+02	1.34E+01 G
			569.47	2.208E+00	?(	1.989E+01	2.56E+02	8.20E+00 G
			883.24	-7.920E+00	+	2.963E+01	1.10E+02	9.60E+00 G
			880.53	-1.423E+01	+	4.292E+01	8.95E+01	6.00E+00 GA
AM-241	T	5.2178E-01					1.58E+05	
			59.54	5.218E-01	(P	3.144E+00	2.08E+02	3.59E+01 G
Ir-192	F	-8.7611E-03					7.40E+01	
			316.49	-4.227E-01	?(	1.296E+00	9.09E+01	8.70E+01 G
			468.06	4.762E-01	+	2.053E+00	1.24E+02	5.18E+01 G
			308.44	1.126E+00	(	6.651E+00	1.75E+02	3.18E+01 G
Cs-136	F	3.4773E-01					1.30E+01	
			818.50	3.477E-01	?(	1.437E+00	1.18E+02	1.00E+02 G
			1048.07	-6.174E-01	&	3.235E+00	1.51E+02	8.00E+01 G
			340.57	4.574E-02	%	3.878E+00	2.45E+03	4.69E+01 G
Np-239	T	1.1417E+00					2.36E+00	
			103.70	-5.287E-01	+	4.556E+00	2.54E+02	2.40E+01 X
			106.13	1.142E+00	?(	6.078E+00	1.59E+02	2.27E+01 G
			99.50	-6.532E-01	&	6.490E+00	2.91E+02	1.50E+01 X
Nd-147		2.2061E+00					1.11E+01	
			531.00	2.206E+00	?(	5.694E+00	9.86E+01	1.30E+01 G
			91.10	-4.270E-07	%	5.818E+00	4.03E+08	2.83E+01 G

(- This peak used in the nuclide activity average.

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  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	101.	-9.	-0.005	181.88	-6.570E+00	P
TH-227	50.14	105.	-10.	-0.006	163.01	-3.464E+00	P
AM-241	59.54	109.	9.	0.005	208.06	5.218E-01	P
BA-133	80.99	163.	-20.	-0.011	116.18	-9.801E-01	
EU-155	86.54	558.	-20.	-0.011	164.45	-1.079E+00	
Gd-153	97.50	165.	-8.	-0.005	220.94	-4.314E-01	
Np-239	99.50	167.	-6.	-0.004	291.29	-6.532E-01	
Gd-153	103.20	198.	-17.	-0.009	119.08	-1.205E+00	
Np-239	103.70	215.	-8.	-0.005	253.94	-5.287E-01	
EU-155	105.31	371.	-14.	-0.008	115.03	-9.816E-01	P
Np-239	106.13	350.	17.	0.009	158.57	1.142E+00	
EU-152	121.78	139.	-17.	-0.010	99.80	-9.333E-01	
EU-154	123.10	139.	16.	0.009	108.07	6.046E-01	
PA-234	131.29	296.	-19.	-0.011	130.61	-1.664E+00	
HF-181	133.02	295.	-19.	-0.011	130.25	-6.963E-01	
CE-144	133.54	314.	-19.	-0.011	134.17	-2.724E+00	
HF-181	136.30	280.	14.	0.008	173.34	3.798E+00	
Tc-99m	140.51	213.	-17.	-0.010	121.67	-3.259E-01	
U-235	143.79	232.	-4.	-0.002	355.02	-6.647E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	162.66	168.	-10.	-0.006	186.01	-2.869E+00	
U-235	163.38	127.	9.	0.005	185.23	3.089E+00	P
CE-139	165.85	156.	-16.	-0.009	115.42	-3.477E-01	
Cf-251	176.60	97.	-11.	-0.006	166.86	-1.172E+00	
U-235	185.72	77.	68.	0.038	25.81	2.464E+00	
TH-229	193.51	73.	-13.	-0.007	117.53	-6.103E+00	
TH-229	210.85	80.	-4.	-0.002	401.04	-2.893E+00	
Cf-251	227.00	70.	-5.	-0.003	301.11	-1.824E+00	
EU-152	244.69	416.	-15.	-0.008	191.94	-4.894E+00	
TH-227	256.24	70.	-12.	-0.006	137.01	-4.235E+00	
Cd-113m	263.70	39.	10.	0.006	89.91	4.537E+03	
BI-210M	265.83	52.	10.	0.005	107.77	5.178E-01	
Hg-203	279.20	98.	-15.	-0.008	110.03	-4.987E-01	P
I-131	284.30	44.	-8.	-0.004	159.10	-3.609E+00	
TL-210	296.00	278.	-3.	-0.002	709.93	-1.208E-01	
PA-231	302.65	169.	12.	0.007	155.90	1.215E+01	
BA-133	302.85	180.	12.	0.007	160.84	1.911E+00	
Ba-140	304.85	192.	12.	0.007	165.63	8.226E+00	
BI-210M	304.90	204.	12.	0.007	170.58	1.260E+00	
Ir-192	308.44	216.	12.	0.007	174.83	1.126E+00	
PA-233	312.01	197.	-14.	-0.008	148.04	-1.135E+00	
Ir-192	316.49	55.	-12.	-0.007	90.95	-4.227E-01	
CR-51	320.08	81.	-7.	-0.004	165.41	-2.287E+00	P
La-140	328.76	56.	9.	0.005	153.26	1.432E+00	P
Cf-249	333.44	51.	-6.	-0.004	215.34	-1.291E+00	
EU-152	344.29	92.	12.	0.007	118.04	1.455E+00	
HF-181	345.83	61.	-7.	-0.004	164.92	-1.487E+00	
BA-133	356.00	287.	-14.	-0.008	170.92	-7.639E-01	
I-131	364.48	44.	-13.	-0.007	122.89	-5.582E-01	P
BA-133	383.84	54.	10.	0.005	113.88	3.784E+00	
Cf-249	387.95	64.	7.	0.004	155.04	4.064E-01	
SN-113	391.69	61.	9.	0.005	130.91	4.939E-01	
AG-108M	433.94	36.	-9.	-0.005	85.03	-3.931E-01	P
pm-146	453.88	29.	2.	0.001	494.99	1.340E-01	P
Ir-192	468.06	24.	6.	0.003	123.93	4.762E-01	
BE-7	477.59	29.	8.	0.005	96.81	3.393E+00	
HF-181	482.00	65.	-12.	-0.007	74.83	-6.447E-01	P
La-140	487.02	24.	5.	0.003	209.04	4.496E-01	P
RU-103	497.05	8.	6.	0.003	105.55	2.795E-01	P
RH-106	511.86	40.	60.	0.033	29.81	1.355E+01	
Nd-147	531.00	8.	6.	0.003	98.56	2.206E+00	
Ba-140	537.26	28.	-9.	-0.005	66.10	-1.797E+00	P
CS-134	563.24	16.	9.	0.005	94.11	5.218E+00	
CS-134	569.32	36.	-9.	-0.005	100.00	-2.889E+00	
PA-234	569.47	42.	4.	0.002	256.33	2.208E+00	
SB-124	602.73	278.	-15.	-0.008	55.13	-7.997E-01	P
CS-134	604.71	262.	-13.	-0.007	179.09	-6.888E-01	
RU-103	610.30	250.	-9.	-0.005	263.99	-7.766E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	618.06	182.	10.	0.006	190.66	5.414E-01	P
RH-106	621.92	234.	7.	0.004	318.73	3.661E+00	
I-131	636.97	16.	4.	0.002	133.50	3.382E+00	P
AG-110M	657.76	22.	7.	0.004	102.02	4.120E-01	
CS-137	661.66	26.	1.	0.001	576.22	8.349E-02	P
NB-94	702.63	22.	-2.	-0.001	575.33	-1.002E-01	
SB-124	722.79	29.	8.	0.005	97.24	4.647E+00	
ZR-95	724.20	82.	-18.	-0.010	75.83	-2.431E+00	
BI-212	727.17	45.	10.	0.005	104.12	7.713E+00	
pm-146	735.72	13.	6.	0.003	129.28	1.631E+00	
pm-146	747.16	22.	-8.	-0.004	129.09	-1.397E+00	
ZR-95	756.73	17.	-6.	-0.004	114.64	-7.369E-01	P
AG-110M	763.94	32.	-7.	-0.004	120.37	-1.984E+00	
NB-95	765.79	75.	-17.	-0.010	73.98	-1.109E+00	
PA-234M	766.41	100.	-14.	-0.008	102.25	-3.088E+02	
EU-152	778.92	5.	5.	0.003	100.41	2.523E+00	
BI-212	785.42	23.	-1.	-0.001	773.39	-6.731E+00	
CS-134	795.87	26.	8.	0.004	101.98	5.730E-01	
CO-58	810.78	48.	-12.	-0.006	89.88	-7.723E-01	
La-140	815.77	20.	5.	0.003	128.77	1.487E+00	
Cs-136	818.50	16.	5.	0.003	118.02	3.477E-01	
MN-54	834.85	19.	-1.	-0.001	693.28	-7.273E-02	P
NB-94	871.10	12.	4.	0.002	121.38	3.057E-01	
EU-154	873.23	5.	0.	0.000	889.27	-2.634E-01	P
PA-234	880.53	52.	-12.	-0.007	89.47	-1.423E+01	
PA-234	883.24	64.	-11.	-0.006	110.17	-7.920E+00	
AG-110M	884.68	76.	-3.	-0.002	373.09	-3.275E-01	
Sc-46	889.28	68.	11.	0.006	112.34	7.735E-01	
y-88	898.04	19.	-11.	-0.006	37.86	-8.527E-01	P
AG-110M	937.49	47.	-17.	-0.010	86.38	-3.809E+00	
PA-234	946.02	9.	4.	0.002	184.30	2.067E+00	
EU-152	964.11	21.	6.	0.004	109.01	3.328E+00	
EU-154	996.33	42.	-3.	-0.002	310.91	-2.233E+00	
Co-56	1037.84	10.	5.	0.003	149.46	2.828E+00	P
Cs-136	1048.07	38.	-6.	-0.003	150.92	-6.174E-01	
RH-106	1050.36	52.	-6.	-0.004	160.99	-3.436E+01	
BI-207	1063.66	1.	14.	0.008	27.48	1.612E+00	P
Ga-68	1077.40	15.	2.	0.001	431.57	6.017E+00	
FE-59	1099.25	15.	1.	0.001	857.32	1.517E-01	
EU-152	1112.07	38.	6.	0.003	151.94	3.784E+00	
ZN-65	1115.55	44.	3.	0.002	327.74	4.993E-01	
Sc-46	1120.55	40.	6.	0.003	155.27	5.215E-01	
Co-56	1238.28	16.	9.	0.005	107.88	1.273E+00	P
NA-22	1274.53	16.	-2.	-0.001	291.55	-1.942E-01	
FE-59	1291.60	11.	1.	0.001	626.58	2.728E-01	P
TL-210	1313.00	5.	4.	0.002	152.39	1.737E+00	
AG-110M	1384.30	5.	4.	0.002	152.39	1.570E+00	
EU-152	1408.00	11.	-1.	-0.001	238.18	-5.232E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1596.21	11.	-3.	-0.002	243.10	-4.099E-01	
y-88	1836.06	12.	-8.	-0.004	62.24	-1.075E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.3935E+00	3.3935E+00	9.681E+01%	1.12E+01
NA-22	#A	-1.9420E-01	-1.9420E-01	2.915E+02%	2.07E+00
K-40	#	1.3179E+02	1.3179E+02	9.913E+00%	1.69E+01
Sc-46	#A	6.4749E-01	6.4750E-01	9.583E+01%	2.95E+00
CR-51	#A	-2.2870E+00	-2.2871E+00	1.654E+02%	1.37E+01
MN-54	#A	-7.2732E-02	-7.2732E-02	6.933E+02%	1.57E+00
FE-59	#A	2.0416E-01	2.0417E-01	5.309E+02%	3.15E+00
Co-56	#A	6.8889E-01	6.8890E-01	1.079E+02%	1.39E+00
CO-57	#A	4.5480E-02	4.5480E-02	2.223E+02%	1.06E+00
CO-58	#A	-7.7233E-01	-7.7234E-01	8.988E+01%	2.34E+00
CO-60	#	8.2484E-01	8.2484E-01	3.384E+01%	7.43E-01
ZN-65	#A	4.9927E-01	4.9927E-01	3.277E+02%	5.77E+00
NB-94	#A	1.0481E-01	1.0481E-01	1.214E+02%	1.47E+00
ZR-95	#A	-7.3692E-01	-7.3693E-01	1.146E+02%	2.55E+00
NB-95	#A	-1.1090E+00	-1.1090E+00	7.398E+01%	2.73E+00
RU-103	#A	2.7953E-01	2.7953E-01	1.056E+02%	7.80E-01
RH-106	#A	3.6608E+00	3.6608E+00	3.187E+02%	3.96E+01
AG-108M	#A	-3.9313E-01	-3.9313E-01	8.503E+01%	1.33E+00
AG-110M	#A	2.7837E-01	2.7837E-01	1.020E+02%	4.25E+00
SN-113	#A	4.9394E-01	4.9394E-01	1.309E+02%	2.21E+00
SB-124	#A	-7.9967E-01	-7.9968E-01	5.513E+01%	4.23E+00
SB-125	#	3.6711E+00	3.6711E+00	2.738E+01%	2.09E+00
I-131	#A	-2.4025E-01	-2.4027E-01	9.072E+01%	1.40E+00
Gd-153	#A	-4.3139E-01	-4.3139E-01	2.209E+02%	3.24E+00
Ga-68	#A	5.9403E+00	6.0167E+00	4.316E+02%	6.24E+01
Tc-99m	#A	-3.2515E-01	-3.2593E-01	1.217E+02%	1.33E+00
BA-133	#A	-1.5383E-01	-1.5383E-01	1.173E+02%	4.40E+00
CS-134	#A	1.3231E-01	1.3231E-01	7.552E+01%	4.16E+00
CS-137	#A	8.3487E-02	8.3487E-02	5.762E+02%	1.73E+00
CE-139	#A	-3.4769E-01	-3.4769E-01	1.154E+02%	1.35E+00
Ba-140	#A	-2.9807E-01	-2.9808E-01	6.610E+01%	5.31E+00
La-140	#A	2.4420E-01	2.4421E-01	9.449E+01%	2.26E+00
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.54E+00
CE-144	#A	-2.7243E+00	-2.7243E+00	1.342E+02%	1.23E+01
PM-144	#A	2.4136E-01	2.4136E-01	1.907E+02%	1.56E+00
EU-152	#A	2.5328E+00	2.5328E+00	6.072E+01%	5.82E+00
EU-154	#A	4.0392E-01	4.0392E-01	1.081E+02%	7.43E+00
EU-155	#A	-9.8156E-01	-9.8156E-01	1.150E+02%	6.69E+00

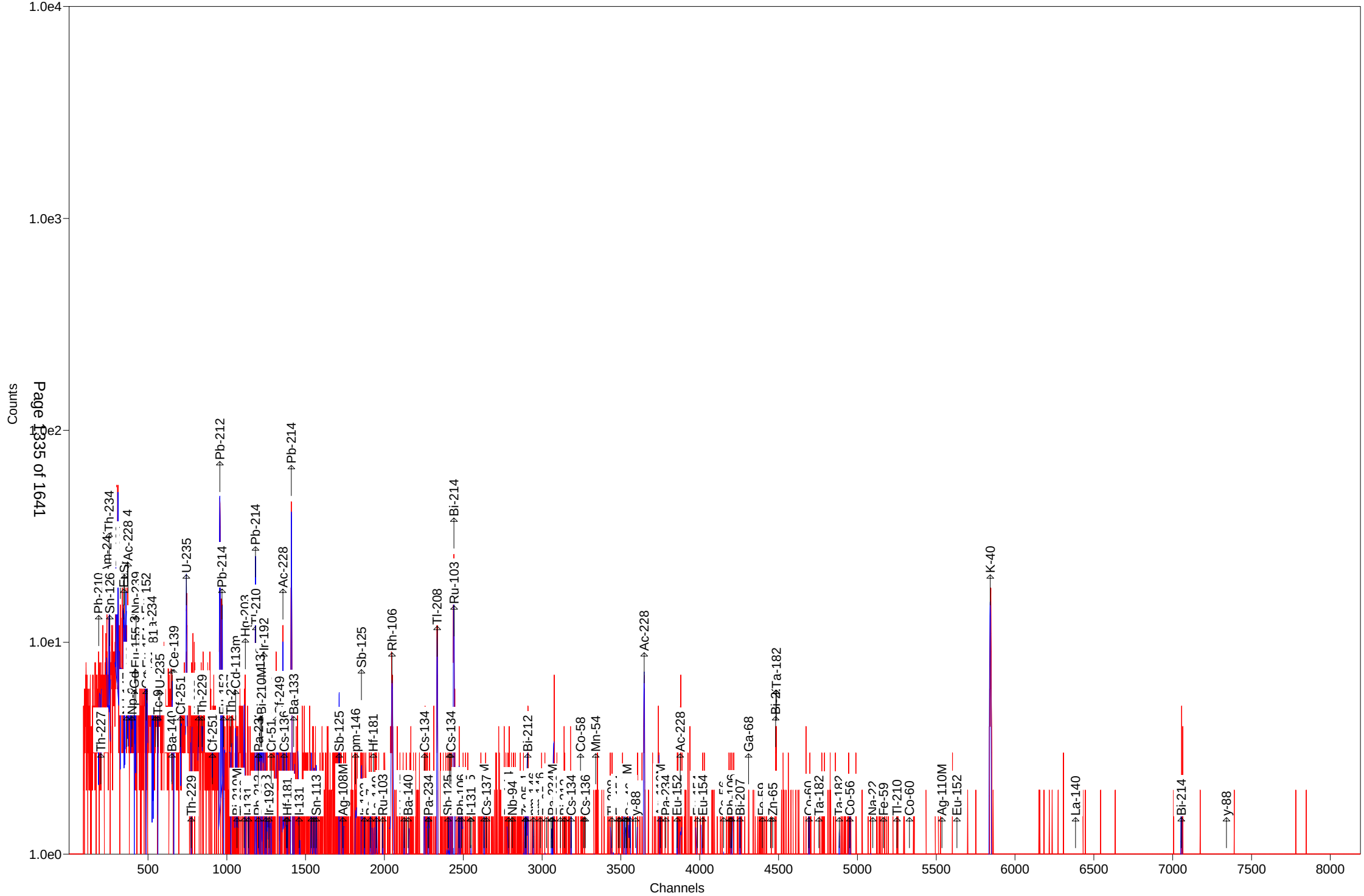
HF-181 #A	-3.4372E-01	-3.4373E-01	7.483E+01%		2.14E+00
Ta-182 #A	2.0162E+00	2.0162E+00	7.359E+01%		7.26E+00
Hg-203 #A	-4.9874E-01	-4.9874E-01	1.100E+02%		1.64E+00
TL-208	3.7854E+00	3.7854E+00	1.266E+01%		4.39E-01
pm-146 #A	-1.7255E-02	-1.7255E-02	1.291E+02%		4.45E+00
y-88 #A	-8.5272E-01	-8.5273E-01	3.786E+01%		1.78E+00
Cd-113m#A	4.5366E+03	4.5366E+03	8.991E+01%		1.38E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.40E+01
Cf-251 #A	-1.1718E+00	-1.1718E+00	1.669E+02%		5.33E+00
Cf-249 #A	4.0643E-01	4.0643E-01	1.550E+02%		2.16E+00
Sn-126 #A	-3.8925E-01	-3.8925E-01	1.012E+03%		1.35E+01
PB-210 #A	-6.5702E+00	-6.5702E+00	1.819E+02%		3.62E+01
PB-212	1.0909E+01	1.0909E+01	8.294E+00%		1.67E+00
PB-214	1.6661E+01	1.6661E+01	6.964E+00%		2.03E+00
BI-207 #A	6.9714E-01	6.9714E-01	2.748E+01%		1.60E+00
BI-212 #A	7.7133E+00	7.7133E+00	1.041E+02%		2.73E+01
U-235 #A	5.2414E-01	5.2414E-01	1.852E+02%		1.11E+01
BI-214	1.6091E+01	1.6091E+01	9.538E+00%		1.99E+00
BI-210M#A	7.8442E-01	7.8442E-01	1.009E+02%		1.90E+00
AC-228	1.1796E+01	1.1796E+01	1.491E+01%		3.24E+00
TH-227 #A	-3.4638E+00	-3.4638E+00	1.630E+02%		1.74E+01
TH-229 #A	-6.1032E+00	-6.1032E+00	1.175E+02%		1.95E+01
TH-234 #A	1.3400E+01	1.3400E+01	2.977E+01%		2.37E+01
PA-231 #A	1.2154E+01	1.2154E+01	1.559E+02%		6.41E+01
PA-233 #A	-1.1347E+00	-1.1347E+00	1.480E+02%		5.67E+00
PA-234 #A	4.0041E-01	4.0041E-01	1.139E+02%		7.29E+00
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%		3.21E+02
AM-241 #A	5.2178E-01	5.2178E-01	2.081E+02%		3.14E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.52E+01
Ir-192 #A	-8.7610E-03	-8.7611E-03	9.095E+01%		1.30E+00
Cs-136 #A	3.4772E-01	3.4773E-01	1.180E+02%		1.44E+00
Np-239 #A	1.1414E+00	1.1417E+00	1.586E+02%		6.08E+00
Nd-147 #A	2.2060E+00	2.2061E+00	9.856E+01%		5.69E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.95E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 2.044E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 2.0443748E+02 Bq/Sample

376766_Gamma_160-29521-A-19-B. 5_Gamma_20182740.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20182941

Sample Description: 376766_Gamma_160-29521-B-20-B
Detector: Detector # 7
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-B-20-B

Decay to Time: 8/9/2018 20:28 Live Time: 1800 sec
Acquisition Time: 8/9/2018 20:28:31 Real Time: 1829 sec
Analysis Time: 8/9/2018 20:59 Dead Time: 1.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev14.lib
Bkgd Correction File: 7_2018-07-14_1851.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.901E+00	108.0	3.132E+00	3.136E+00	1.063E+01
NA-22	4.581E-01	62.4	2.861E-01	2.870E-01	9.266E-01
K-40	1.520E+02	7.0	1.059E+01	1.314E+01	8.218E+00
Sc-46	4.834E-01	106.2	5.135E-01	5.141E-01	1.746E+00
CR-51	2.583E+00	257.0	6.640E+00	6.641E+00	2.229E+01
MN-54	-7.174E-01	95.9	6.879E-01	6.889E-01	1.582E+00
FE-59	6.203E-01	109.1	6.769E-01	6.776E-01	2.516E+00
Co-56	5.867E-01	83.3	4.889E-01	4.898E-01	1.064E+00
CO-57	0.000E+00	1.#INF	8.968E-02	8.968E-02	8.095E-01
CO-58	-6.068E-01	84.1	5.104E-01	5.113E-01	1.713E+00
CO-60	1.502E-01	270.3	4.060E-01	4.060E-01	9.772E-01
ZN-65	0.000E+00	1.#INF	6.645E-01	6.645E-01	5.654E+00
NB-94	-6.734E-01	51.0	3.438E-01	3.455E-01	1.391E+00
ZR-95	-5.134E-02	1822.8	9.358E-01	9.358E-01	2.260E+00
NB-95	-1.133E-01	499.4	5.656E-01	5.657E-01	1.965E+00
RU-103	-4.246E-02	1011.5	4.295E-01	4.295E-01	1.063E+00
RH-106	-1.494E+00	619.7	9.259E+00	9.260E+00	3.138E+01
AG-108M	-5.241E-01	58.2	3.051E-01	3.062E-01	1.175E+00
AG-110M	2.366E-01	97.2	2.301E-01	2.304E-01	2.773E+00
SN-113	1.126E-01	504.9	5.687E-01	5.687E-01	1.961E+00
SB-124	1.938E-01	44.7	8.669E-02	8.727E-02	3.439E+00
SB-125	4.029E+00	30.3	1.222E+00	1.239E+00	2.214E+00
I-131	-3.950E-02	80.1	3.163E-02	3.170E-02	1.174E+00
Gd-153	-8.468E-01	144.4	1.223E+00	1.224E+00	4.082E+00
Ga-68	-1.974E+01	125.6	2.480E+01	2.482E+01	5.467E+01
Tc-99m	2.383E-01	115.6	2.755E-01	2.758E-01	9.229E-01
BA-133	1.381E-01	256.8	3.547E-01	3.547E-01	3.455E+00
CS-134	1.614E-01	72.2	1.166E-01	1.169E-01	3.406E+00
CS-137	-6.252E-01	82.8	5.175E-01	5.185E-01	1.734E+00
CE-139	-9.497E-02	325.2	3.088E-01	3.090E-01	1.049E+00
Ba-140	1.983E+00	106.9	2.120E+00	2.123E+00	3.365E+00
La-140	5.836E-01	44.7	2.610E-01	2.628E-01	6.371E-01
CE-141	-4.786E-01	157.3	7.527E-01	7.531E-01	2.517E+00

CE-144	0.000E+00	1.#INF	7.568E-01	7.568E-01	8.261E+00
PM-144	3.355E-01	99.9	3.351E-01	3.356E-01	8.033E-01
EU-152	1.164E+00	73.3	8.533E-01	8.555E-01	5.877E+00
EU-154	2.790E+00	72.6	2.024E+00	2.029E+00	1.278E+01
EU-155	9.080E-01	104.7	9.504E-01	9.517E-01	4.915E+00
HF-181	3.834E-01	115.8	4.439E-01	4.444E-01	1.507E+00
Ta-182	1.098E+00	204.4	2.245E+00	2.245E+00	7.721E+00
Hg-203	-4.309E-01	90.2	3.889E-01	3.897E-01	1.300E+00
TL-208	3.888E+00	13.7	5.323E-01	5.692E-01	9.443E-01
pm-146	-1.545E+00	99.8	1.541E+00	1.543E+00	3.579E+00
y-88	6.532E-01	49.0	3.203E-01	3.221E-01	7.103E-01
Cd-113m	1.119E+03	335.4	3.753E+03	3.753E+03	1.299E+04
Cd-109	6.849E+00	155.3	1.063E+01	1.064E+01	3.549E+01
Cf-251	4.467E-01	317.4	1.418E+00	1.418E+00	3.695E+00
Cf-249	7.206E-01	76.9	5.542E-01	5.554E-01	1.783E+00
Sn-126	1.206E+00	304.6	3.675E+00	3.675E+00	1.241E+01
PB-210	-3.190E+00	382.1	1.219E+01	1.219E+01	4.175E+01
PB-212	7.333E+00	10.0	7.297E-01	8.703E-01	1.807E+00
PB-214	1.990E+01	6.0	1.191E+00	1.577E+00	1.898E+00
BI-207	1.273E-01	259.2	3.300E-01	3.301E-01	1.019E+00
BI-212	-3.485E+00	183.0	6.377E+00	6.380E+00	2.198E+01
U-235	2.642E+00	98.3	2.596E+00	2.600E+00	1.026E+01
BI-214	1.804E+01	7.2	1.305E+00	1.607E+00	1.253E+00
BI-210M	-9.234E-02	130.2	1.202E-01	1.203E-01	1.643E+00
AC-228	1.093E+01	12.7	1.388E+00	1.496E+00	1.258E+00
TH-227	-2.974E+00	197.7	5.880E+00	5.882E+00	1.983E+01
TH-229	1.175E+01	41.2	4.843E+00	4.933E+00	1.193E+01
TH-234	2.324E+00	432.0	1.004E+01	1.004E+01	3.387E+01
PA-231	8.979E+00	177.5	1.594E+01	1.594E+01	7.130E+01
PA-233	5.656E-01	251.3	1.421E+00	1.421E+00	6.093E+00
PA-234	-7.585E-01	194.4	1.474E+00	1.475E+00	4.962E+00
PA-234M	4.754E+01	84.1	3.998E+01	4.005E+01	2.113E+02
AM-241	-9.338E-01	123.5	1.154E+00	1.155E+00	3.089E+00
Np-237	1.996E+00	144.8	2.891E+00	2.894E+00	9.654E+00
Ir-192	-3.042E-01	251.4	7.648E-01	7.651E-01	2.566E+00
Cs-136	3.973E-01	132.6	5.268E-01	5.273E-01	1.801E+00
Np-239	-1.078E+00	140.7	1.517E+00	1.518E+00	5.064E+00
Nd-147	-3.788E+00	95.0	3.599E+00	3.606E+00	8.568E+00
TL-210	1.320E-01	245.9	3.246E-01	3.247E-01	1.687E+00
Total	1.439E+03				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-B-20-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20182941.An1

Acquisition information
Start time: 8/9/2018 8:28:31 PM
Live time: 1800
Real time: 1829
Dead time: 1.58 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:28:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-07-14_1851.PBC 7/14/2018 6:51:14 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1711

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-6.	382.14	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
63.29	6.	432.01	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	9.	304.64	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
77.22	205.	17.72	1.04	4.893E-02				
86.49	25.	144.84	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.516E-01	EU155
86.54	25.	147.59	0.88	5.281E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.516E-01	EU155
					86.94	9.040	2.885E+00	Sn126
86.94	25.	150.25	0.88	5.294E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	2.886E+00	Sn126
87.57	25.	152.76	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
88.04	25.	155.28	0.88	5.329E-02	88.04	3.790	PBC<MDA	Cd109
91.10	25.	157.27	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.67	27.	142.17	0.89	5.470E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	4.911E+00	AC228
103.70	22.	142.60	0.90	5.626E-02	103.70	24.000	PBC<MDA	Np239
105.31	21.	148.47	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
140.51	20.	115.57	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	19.	163.94	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
162.66	20.	108.76	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
176.60	6.	317.43	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.72	112.	20.11	0.99	4.443E-02	185.72	54.000	2.601E+00	U235
193.51	40.	41.22	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	16.	108.44	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
227.00	7.	291.95	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.62	213.	12.59	1.42	3.602E-02	238.63	43.300	7.605E+00	PB212
242.03	90.	18.06	1.04	3.560E-02	242.00	7.430	1.884E+01	PB214
244.69	20.	166.88	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
263.70	4.	335.41	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	16.	84.04	1.08	3.172E-02	277.28	6.310	PBC<MDA	TL208
295.26	219.	9.78	1.50	3.009E-02	295.09	19.300	2.095E+01	PB214
					296.00	79.000	5.132E+00	TL210
296.00	13.	245.86	1.10	3.001E-02	296.00	79.000	PBC<MDA	TL210
299.82	30.	39.54	2.75	2.966E-02	300.03	3.280	1.736E+01	PB212
					300.07	2.460	2.315E+01	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	13.	248.13	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.699E+00	PA231
					300.18	6.200	3.850E+00	PA233
300.18	13.	251.27	1.10	2.965E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.699E+00	PA231
					300.18	6.200	3.850E+00	PA233
302.65	13.	253.79	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.315E+00	BA133
302.85	13.	256.80	1.11	2.943E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.315E+00	BA133
304.85	13.	259.36	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	8.676E-01	BI210M
304.90	6.	558.13	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.066E-01	BI210M
320.08	13.	257.02	1.13	2.807E-02	320.08	9.940	PBC<MDA	CR51
328.76	12.	114.26	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	103.57	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.68	94.	16.03	1.25	2.677E-02	338.32	12.010	1.616E+01	AC228
352.07	339.	6.89	1.62	2.587E-02	351.93	37.600	1.936E+01	PB214
383.84	13.	107.18	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
387.95	13.	113.72	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
391.69	3.	504.86	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	20.	52.08	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
453.88	5.	274.95	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	40.	31.07	1.27	2.040E-02	463.37	10.470	1.045E+01	SB125
477.60	11.	107.99	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
482.00	11.	115.78	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
487.02	10.	124.90	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
511.86	86.	22.86	2.56	1.870E-02	511.86	20.000	1.282E+01	RH106
537.26	7.	154.26	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	12.	100.71	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	107.82	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.049E+00	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.70	97.740	2.559E-01	BI207
569.70	3.	259.23	1.37	1.703E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.326E+00	PA234
					569.70	97.740	1.113E-01	BI207
584.24	97.	13.69	1.38	1.669E-02	583.02	84.500	3.829E+00	TL208
609.74	232.	7.23	1.22	1.605E-02	609.31	46.090	1.742E+01	BI214
					610.30	5.750	1.399E+02	RU103
636.97	10.	91.76	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
657.76	8.	97.24	1.45	1.500E-02	657.76	94.640	PBC<MDA	AG110M
696.54	9.	99.88	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
722.79	11.	79.92	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.657E-01	AG108M
					723.36	20.220	2.093E+00	EU154
722.94	11.	91.06	1.51	1.380E-02	722.79	10.810	3.913E+00	SB124
					722.94	90.840	4.657E-01	AG108M
					723.36	20.220	2.093E+00	EU154
723.36	9.	117.23	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.984E-01	AG108M
					723.36	20.220	1.791E+00	EU154
766.41	13.	84.10	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.904E+02	PA234M
785.42	3.	389.11	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	6.	173.21	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
818.50	9.	132.59	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
846.77	2.	426.47	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
860.56	11.	107.89	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
873.23	11.	85.51	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
889.28	10.	106.23	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
898.04	13.	49.04	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.61	64.	12.70	2.22	1.122E-02	911.07	29.000	1.093E+01	AC228
964.11	6.	79.91	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
970.55	8.	96.54	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
1063.66	2.	474.24	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	2.	634.67	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	7.	184.30	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1120.65	64.	12.50	1.83	9.311E-03	1120.29	15.100	2.529E+01	BI214
					1120.55	99.987	3.820E+00	Sc46
					1121.30	34.900	1.095E+01	Ta182
1121.30	6.	204.39	1.85	9.303E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.831E-01	Sc46
					1121.30	34.900	1.098E+00	Ta182
1238.28	13.	83.34	1.94	8.501E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	7.	62.45	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.301E+00	EU154
1274.54	3.	208.91	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	4.785E-01	EU154
1291.60	8.	109.13	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	89.16	1.99	8.059E-03	1313.00	21.000	PBC<MDA	TL210

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.50	2.	270.30	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	2.	488.62	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1461.19	213.	6.97	2.04	7.309E-03	1460.83	10.670	1.520E+02	K40
1596.21	5.	44.72	2.19	6.737E-03	1596.21	95.400	PBC<MDA	La140
1690.98	5.	44.72	2.25	6.388E-03	1690.98	47.790	PBC<MDA	SB124
1764.52	34.	17.26	2.29	6.141E-03	1764.49	15.400	1.990E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.43	77.22	304.	205.	4.190E+03	17.72	1.037	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	270.	-6.	-0.003	382.14	0.836s
TH-227	200.12	50.14	283.	-12.	-0.007	197.69	0.840
AM-241	237.70	59.54	233.	-22.	-0.012	123.54	0.850s
TH-234	252.71	63.29	376.	6.	0.004	432.01	0.854
Sn-126	256.68	64.28	338.	9.	0.005	304.64	0.856s
BA-133	323.52	80.99	1165.	-38.	-0.021	126.64	0.874s
Np-237	345.53	86.49	635.	25.	0.014	144.84	0.880s
EU-155	345.74	86.54	660.	25.	0.014	147.59	0.880s
Sn-126	347.33	86.94	685.	25.	0.014	150.25	0.880s
Sn-126	349.85	87.57	710.	25.	0.014	152.76	0.881s
Cd-109	351.73	88.04	735.	25.	0.014	155.28	0.881s
Nd-147	363.97	91.10	760.	25.	0.014	157.27	0.885s
TH-234	369.93	92.59	838.	-52.	-0.029	55.09	0.886
AC-228	372.97	93.35	717.	27.	0.015	142.17	0.887s
Gd-153	389.57	97.50	659.	-25.	-0.014	144.41	0.892s
Np-239	397.57	99.50	684.	-25.	-0.014	146.76	0.894s
Gd-153	412.38	103.20	710.	-26.	-0.014	148.79	0.898s
Np-239	414.38	103.70	485.	22.	0.012	142.60	0.898s
EU-155	420.83	105.31	489.	21.	0.012	148.47	0.900s
Np-239	424.10	106.13	599.	-25.	-0.014	140.65	0.901s
EU-152	486.69	121.78	205.	-3.	-0.002	677.41	0.918s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	487.83	122.06	208.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	190.	-12.	-0.007	158.69	0.919s
PA-234	524.77	131.29	338.	-14.	-0.007	194.37	0.928
HF-181	531.68	133.02	351.	0.	0.000	1000.00	0.930s
CE-144	533.74	133.54	351.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	351.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	327.	-10.	-0.005	261.95	0.933s
Tc-99m	561.63	140.51	253.	20.	0.011	115.57	0.938s
U-235	574.73	143.79	498.	19.	0.011	163.94	0.941s
CE-141	581.35	145.44	574.	-22.	-0.012	157.26	0.943s
Ba-140	650.24	162.66	234.	20.	0.011	108.76	0.961s
CE-139	663.01	165.85	232.	-7.	-0.004	325.19	0.965
Cf-251	706.00	176.60	114.	6.	0.004	317.43	0.976
U-235	742.49	185.72	114.	112.	0.062	20.11	0.986s
TH-229	773.64	193.51	66.	40.	0.022	41.22	0.994
U-235	820.94	205.33	81.	16.	0.009	108.44	1.007s
Cf-251	907.62	227.00	106.	7.	0.004	291.95	1.029s
PB-212	954.15	238.63	106.	206.	0.114	9.95	1.041D
PB-214	967.61	242.00	86.	90.	0.050	18.06	1.045D
EU-152	978.39	244.69	565.	20.	0.011	166.88	1.048s
TH-227	1024.59	256.24	84.	-9.	-0.005	186.96	1.060s
Cd-113m	1054.43	263.70	88.	4.	0.002	335.41	1.067s
BI-210M	1062.96	265.83	97.	-11.	-0.006	130.16	1.070s
TL-208	1108.77	277.28	80.	16.	0.009	84.04	1.081
Hg-203	1116.44	279.20	152.	-20.	-0.011	90.24	1.083s
I-131	1136.83	284.30	84.	-4.	-0.002	295.21	1.089s
PB-214	1180.70	295.26	48.	219.	0.122	9.78	1.496s
TL-210	1183.64	296.00	480.	13.	0.007	245.86	1.101s
PB-212	1198.91	299.82	33.	30.	0.017	39.54	2.747s
PA-231	1199.92	300.07	493.	13.	0.007	248.13	1.105s
PA-233	1200.36	300.18	506.	13.	0.007	251.27	1.105s
PA-231	1210.24	302.65	519.	13.	0.007	253.79	1.107s
BA-133	1211.05	302.85	531.	13.	0.007	256.80	1.108s
Ba-140	1219.04	304.85	544.	13.	0.007	259.36	1.110s
BI-210M	1219.23	304.90	557.	6.	0.003	558.13	1.110s
Ir-192	1233.41	308.44	563.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	563.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	570.	-14.	-0.008	251.43	1.122s
CR-51	1279.99	320.08	549.	13.	0.007	257.02	1.125s
La-140	1314.69	328.76	88.	12.	0.007	114.26	1.134s
Cf-249	1333.41	333.44	94.	14.	0.008	103.57	1.139s
AC-228	1354.39	338.68	27.	94.	0.052	16.03	1.246s
Cs-136	1361.93	340.57	250.	-16.	-0.009	138.34	1.146s
EU-152	1376.80	344.29	234.	-16.	-0.009	133.44	1.150s
HF-181	1382.97	345.83	239.	-18.	-0.010	84.54	1.151s
PB-214	1407.95	352.07	43.	339.	0.188	6.89	1.617s
BA-133	1423.66	356.00	426.	-6.	-0.003	488.19	1.162s
I-131	1457.59	364.48	76.	-18.	-0.010	131.31	1.170s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1535.03	383.84	92.	13.	0.007	107.18	1.189s
Cf-249	1551.47	387.95	105.	13.	0.007	113.72	1.193s
SN-113	1566.43	391.69	118.	3.	0.002	504.86	1.197s
SB-125	1711.18	427.88	25.	20.	0.011	52.08	1.233s
AG-108M	1735.43	433.94	69.	-18.	-0.010	58.21	1.239s
pm-146	1815.20	453.88	48.	5.	0.003	274.95	1.258s
SB-125	1853.15	463.37	58.	40.	0.022	31.07	1.268
Ir-192	1871.93	468.06	112.	-13.	-0.007	115.70	1.272s
BE-7	1910.07	477.60	64.	11.	0.006	107.99	1.282s
HF-181	1927.68	482.00	75.	11.	0.006	115.78	1.286s
La-140	1947.77	487.02	74.	10.	0.006	124.90	1.291s
RH-106	2047.15	511.86	47.	86.	0.048	22.86	2.565s
Nd-147	2123.70	531.00	52.	-16.	-0.009	95.01	1.333s
Ba-140	2148.74	537.26	26.	7.	0.004	154.26	1.339s
CS-134	2252.65	563.24	30.	12.	0.006	100.71	1.364s
CS-134	2276.99	569.32	30.	8.	0.004	107.82	1.369
PA-234	2277.59	569.47	44.	-5.	-0.003	205.54	1.370
BI-207	2278.51	569.70	36.	3.	0.002	259.23	1.370
TL-208	2331.79	583.02	21.	97.	0.054	13.69	1.382
SB-125	2401.71	600.50	439.	-16.	-0.009	185.42	1.399s
SB-124	2410.64	602.73	423.	-16.	-0.009	181.77	1.401s
CS-134	2418.55	604.71	407.	-16.	-0.009	178.10	1.403s
BI-214	2438.69	609.74	9.	232.	0.129	7.23	1.218s
RU-103	2440.91	610.30	391.	-16.	-0.009	173.96	1.408s
AG-108M	2456.84	614.28	374.	-16.	-0.009	169.94	1.412
PM-144	2471.96	618.06	358.	-16.	-0.009	165.88	1.415s
RH-106	2487.38	621.92	338.	-4.	-0.002	619.65	1.419s
I-131	2547.62	636.97	18.	10.	0.006	91.76	1.433s
AG-110M	2630.77	657.76	29.	8.	0.005	97.24	1.452s
CS-137	2646.36	661.66	63.	-14.	-0.008	82.77	1.455
PM-144	2785.90	696.54	14.	9.	0.005	99.88	1.487s
NB-94	2810.25	702.63	47.	-17.	-0.009	51.05	1.493s
SB-124	2890.87	722.79	30.	11.	0.006	79.92	1.511s
AG-108M	2891.48	722.94	41.	11.	0.006	91.06	1.511s
EU-154	2893.15	723.36	51.	9.	0.005	117.23	1.511s
BI-212	2908.41	727.17	68.	-6.	-0.004	183.01	1.515
pm-146	2942.61	735.72	33.	-11.	-0.006	78.37	1.523s
pm-146	2988.37	747.16	33.	-13.	-0.007	99.76	1.533s
AG-110M	3055.51	763.94	62.	-15.	-0.009	77.17	1.548s
NB-95	3062.89	765.79	87.	-3.	-0.001	499.37	1.549s
PA-234M	3065.38	766.41	55.	13.	0.007	84.10	1.550s
EU-152	3115.41	778.92	37.	-10.	-0.006	129.23	1.561s
BI-212	3141.41	785.42	23.	3.	0.001	389.11	1.567s
CS-134	3183.20	795.87	51.	6.	0.003	173.21	1.576
TL-210	3198.14	799.60	57.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	68.	-8.	-0.004	152.93	1.581s
CO-58	3242.84	810.78	58.	-14.	-0.008	84.11	1.589s
La-140	3262.82	815.77	72.	-1.	-0.001	818.69	1.593s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	3273.74	818.50	64.	9.	0.005	132.59	1.596s
MN-54	3339.13	834.85	47.	-16.	-0.009	95.89	1.610s
Co-56	3386.82	846.77	19.	2.	0.001	426.47	1.620s
TL-208	3442.00	860.56	25.	11.	0.006	107.89	1.632
NB-94	3484.13	871.10	48.	-16.	-0.009	66.14	1.641s
EU-154	3492.66	873.23	42.	11.	0.006	85.51	1.643s
PA-234	3521.86	880.53	52.	-13.	-0.007	84.06	1.649s
PA-234	3532.70	883.24	64.	-6.	-0.003	198.62	1.652s
AG-110M	3538.47	884.68	70.	0.	0.000	1000.00	1.653s
Sc-46	3556.86	889.28	51.	10.	0.006	106.23	1.657s
y-88	3591.90	898.04	5.	13.	0.007	49.04	1.664s
AC-228	3646.17	911.61	1.	64.	0.036	12.70	2.217s
AG-110M	3749.71	937.49	25.	-7.	-0.004	161.52	1.697s
PA-234	3783.82	946.02	25.	-2.	-0.001	554.15	1.704s
EU-152	3856.18	964.11	9.	6.	0.003	79.91	1.719s
AC-228	3875.62	968.97	24.	8.	0.004	96.54	1.724s
EU-154	4018.84	1004.77	31.	-15.	-0.008	85.56	1.753s
Co-56	4151.10	1037.84	35.	-15.	-0.008	60.25	1.780s
Cs-136	4192.02	1048.07	26.	-1.	-0.001	728.01	1.788s
RH-106	4201.18	1050.36	49.	-16.	-0.009	64.89	1.790s
BI-207	4254.38	1063.66	16.	2.	0.001	474.24	1.801s
Ga-68	4309.34	1077.40	27.	-10.	-0.005	125.61	1.812s
FE-59	4396.74	1099.25	21.	2.	0.001	634.67	1.829s
EU-152	4448.04	1112.07	88.	7.	0.004	184.30	1.839s
ZN-65	4461.92	1115.55	95.	0.	0.000	1000.00	1.842s
BI-214	4482.34	1120.65	0.	64.	0.036	12.50	1.833s
Sc-46	4481.94	1120.55	95.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	83.	6.	0.004	204.39	1.846s
CO-60	4692.68	1173.24	48.	-20.	-0.011	46.71	1.886s
Ta-182	4755.93	1189.05	27.	-2.	-0.001	708.52	1.899s
Ta-182	4885.37	1221.41	27.	-4.	-0.002	247.86	1.923s
Co-56	4952.84	1238.28	21.	13.	0.007	83.34	1.936s
NA-22	5097.84	1274.53	6.	7.	0.004	62.45	1.963s
EU-154	5097.89	1274.54	12.	3.	0.001	208.91	1.963s
FE-59	5166.10	1291.60	11.	8.	0.004	109.13	1.975s
TL-210	5251.71	1313.00	6.	7.	0.004	89.16	1.991s
CO-60	5329.71	1332.50	6.	2.	0.001	270.30	2.005s
AG-110M	5536.89	1384.30	17.	2.	0.001	488.62	2.042s
EU-152	5631.70	1408.00	17.	-6.	-0.003	166.25	2.059s
K-40	5844.45	1461.19	4.	213.	0.119	6.97	2.038
La-140	6384.49	1596.21	0.	5.	0.003	44.72	2.185s
SB-124	6763.55	1690.98	0.	5.	0.003	44.72	2.245s
BI-214	7057.56	1764.49	0.	34.	0.019	17.26	2.290s
Co-56	7084.99	1771.35	45.	-8.	-0.004	123.93	2.294s
y-88	7343.81	1836.06	0.	0.	0.000	1000.00	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample			COMMENTS
BE-7	C	2.9007E+00					5.31E+01		
			477.60	2.901E+00	(	1.063E+01	1.08E+02	1.05E+01	G
NA-22	C	4.5809E-01					9.50E+02		
			1274.53	4.581E-01	?(	9.266E-01	6.24E+01	9.99E+01	G
K-40	N	1.5203E+02					4.66E+11		
			1460.83	1.520E+02	(P	8.218E+00	6.97E+00	1.07E+01	G
Sc-46	F	4.8338E-01					8.38E+01		
			889.28	4.834E-01	?(	1.746E+00	1.06E+02	1.00E+02	G
			1120.55	0.000E+00	-	2.873E+00	1.00E+03	1.00E+02	G
CR-51	F	2.5832E+00					2.77E+01		
			320.08	2.583E+00	?(	2.229E+01	2.57E+02	9.94E+00	G
MN-54	C	-7.1739E-01					3.12E+02		
			834.85	-7.174E-01	?(	1.582E+00	9.59E+01	1.00E+02	G
FE-59	F	6.2028E-01					4.45E+01		
			1099.25	1.730E-01	?(	2.516E+00	6.35E+02	5.65E+01	G
			1291.60	1.205E+00	?(	2.892E+00	1.09E+02	4.32E+01	G
Co-56	C	5.8665E-01					7.73E+01		
			846.77	1.012E-01	?(P	1.064E+00	4.26E+02	9.99E+01	G
			1238.28	1.321E+00	?(P	2.402E+00	8.33E+01	6.61E+01	G
			1037.84	-5.985E+00	+ P	1.196E+01	6.02E+01	1.41E+01	G
			1771.35	-4.676E+00	+	1.989E+01	1.24E+02	1.55E+01	A
CO-58	C	-6.0678E-01					7.09E+01		
			810.78	-6.068E-01	?(	1.713E+00	8.41E+01	9.95E+01	G
CO-60	F	1.5019E-01					1.93E+03		
			1332.50	1.502E-01	?(P	9.772E-01	2.70E+02	1.00E+02	G
			1173.24	-1.230E+00	+ P	2.181E+00	4.67E+01	9.99E+01	G
NB-94	I	-6.7340E-01					7.41E+06		
			702.63	-6.734E-01	?(P	1.391E+00	5.10E+01	9.79E+01	G
			871.10	-7.618E-01	+	1.666E+00	6.61E+01	9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	-5.1339E-02					6.40E+01	
			756.73	-5.134E-02	%(	2.260E+00	1.82E+03	5.45E+01 G
			724.20	-8.745E-03	% P	3.548E+00	8.98E+03	4.42E+01 G
NB-95	I	-1.1327E-01					6.40E+01	
			765.79	-1.133E-01	?(	1.965E+00	4.99E+02	9.98E+01 G
RU-103	I	-4.2463E-02					3.93E+01	
			497.05	-4.246E-02	%(	1.063E+00	1.01E+03	9.09E+01 G
			610.30	-9.787E+00	+	5.716E+01	1.74E+02	5.75E+00 GA
RH-106	I	-1.4943E+00					3.74E+02	
			621.92	-1.494E+00	?(	3.138E+01	6.20E+02	9.93E+00 G
			1050.36	-5.940E+01	+	1.273E+02	6.49E+01	1.56E+00 G
			511.86	1.282E+01	?	5.130E+00	2.29E+01	2.00E+01 GA
AG-108M	C	-5.2407E-01					1.53E+05	
			433.94	-5.241E-01	?(P	1.175E+00	5.82E+01	9.05E+01 G
			722.94	4.657E-01	+	1.435E+00	9.11E+01	9.08E+01 G
			614.28	-6.316E-01	+	3.604E+00	1.70E+02	8.98E+01 G
AG-110M	F	2.3658E-01					2.50E+02	
			884.68	0.000E+00	?(	2.773E+00	1.00E+03	7.27E+01 G
			657.76	3.261E-01	?(	1.082E+00	9.72E+01	9.46E+01 G
			937.49	-1.035E+00	+	3.846E+00	1.62E+02	3.44E+01 G
			1384.30	5.958E-01	?(	6.531E+00	4.89E+02	2.43E+01 G
			763.94	-2.911E+00	+	7.499E+00	7.72E+01	2.23E+01 G
SN-113	F	1.1264E-01					1.15E+02	
			391.69	1.126E-01	?(P	1.961E+00	5.05E+02	6.40E+01 G
SB-124	F	1.9384E-01					6.02E+01	
			602.73	-5.636E-01	&(	3.439E+00	1.82E+02	9.83E+01 G
			1690.98	9.100E-01	?(	1.341E+00	4.47E+01	4.78E+01 G
			722.79	3.913E+00	?(	1.052E+01	7.99E+01	1.08E+01 G
SB-125	I	4.0294E+00					1.01E+03	
			427.88	1.757E+00	?(P	2.214E+00	5.21E+01	2.96E+01 G
			600.50	-3.086E+00	-	1.920E+01	1.85E+02	1.79E+01 G
			635.89	-1.059E-01	%	9.017E+00	2.34E+03	1.13E+01 G
			463.37	1.045E+01	&(P	9.920E+00	3.11E+01	1.05E+01 G
I-131	I	-3.9495E-02					8.02E+00	
			364.48	-4.819E-01	?(P	1.174E+00	1.31E+02	8.17E+01 G
			284.30	-1.310E+00	+ P	1.327E+01	2.95E+02	6.14E+00 G
			636.97	5.002E+00	(	1.119E+01	9.18E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-8.4679E-01					2.42E+02	
			97.50	-8.468E-01	(	4.082E+00	1.44E+02	3.00E+01 G
			103.20	-1.158E+00	&	5.750E+00	1.49E+02	2.18E+01 G
Ga-68	C	-1.9740E+01					4.71E-02	
			1077.40	-1.974E+01	?(	5.467E+01	1.26E+02	3.30E+00 G
Tc-99m	I	2.3835E-01					2.51E-01	
			140.51	2.383E-01	?(	9.229E-01	1.16E+02	8.93E+01 G
BA-133	F	1.3811E-01					3.85E+03	
			356.00	-2.096E-01	&(	3.455E+00	4.88E+02	6.20E+01 G
			302.85	1.315E+00	(	1.134E+01	2.57E+02	1.83E+01 G
			383.84	3.383E+00	?	1.225E+01	1.07E+02	8.94E+00 GA
			80.99	-1.237E+00	+	5.205E+00	1.27E+02	3.41E+01 GA
CS-134	I	1.6137E-01					7.54E+02	
			604.71	-5.697E-01	?(	3.406E+00	1.78E+02	9.76E+01 G
			795.87	3.077E-01	&(	1.846E+00	1.73E+02	8.55E+01 G
			569.32	1.625E+00	(	6.015E+00	1.08E+02	1.54E+01 G
			801.95	-3.981E+00	+	2.088E+01	1.53E+02	8.69E+00 G
			563.24	4.513E+00	?(	1.098E+01	1.01E+02	8.35E+00 G
CS-137	I	-6.2521E-01					1.10E+04	
			661.66	-6.252E-01	&(	1.734E+00	8.28E+01	8.52E+01 G
CE-139	F	-9.4968E-02					1.38E+02	
			165.85	-9.497E-02	(	1.049E+00	3.25E+02	7.99E+01 G
Ba-140	I	1.9828E+00					1.28E+01	
			537.26	8.851E-01	?(P	3.365E+00	1.54E+02	2.44E+01 G
			162.66	3.749E+00	(	1.365E+01	1.09E+02	6.22E+00 G
			304.85	5.662E+00	?(	4.931E+01	2.59E+02	4.29E+00 G
La-140	I	5.8358E-01					1.28E+01	
			1596.21	4.322E-01	?(	6.371E-01	4.47E+01	9.54E+01 G
			487.02	6.272E-01	&(	2.667E+00	1.25E+02	4.55E+01 G
			328.76	1.197E+00	&(	4.631E+00	1.14E+02	2.03E+01 G
			815.77	-2.829E-01	-	8.114E+00	8.19E+02	2.33E+01 G
CE-141	I	-4.7864E-01					3.25E+01	
			145.44	-4.786E-01	?(	2.517E+00	1.57E+02	4.82E+01 G
PM-144	C	3.3554E-01					3.63E+02	
			696.54	3.355E-01	?(P	8.033E-01	9.99E+01	9.90E+01 G
			618.06	-5.771E-01	&	3.215E+00	1.66E+02	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	1.1639E+00					4.94E+03	
			344.29	-1.310E+00	&(	5.877E+00	1.33E+02	2.65E+01 G
			1112.07	3.186E+00	?(	2.013E+01	1.84E+02	1.36E+01 G
			121.78	-1.040E-01	&	2.407E+00	6.77E+02	2.86E+01 G
			778.92	-3.436E+00	+	1.037E+01	1.29E+02	1.29E+01 G
			964.11	2.176E+00	?(	5.907E+00	7.99E+01	1.46E+01 G
			244.69	4.223E+00	?(P	2.358E+01	1.67E+02	7.58E+00 G
			1408.00	-2.099E+00	+	7.670E+00	1.66E+02	2.10E+01 GA
EU-154	I	2.7904E+00					3.14E+03	
			873.23	4.438E+00	?(	1.278E+01	8.55E+01	1.23E+01 G
			123.10	-3.042E-01	-	1.631E+00	1.59E+02	4.08E+01 G
			1274.54	4.785E-01	-	3.657E+00	2.09E+02	3.52E+01 G
			723.36	1.791E+00	?(	7.172E+00	1.17E+02	2.02E+01 G
			1004.77	-4.482E+00	+	8.562E+00	8.56E+01	1.80E+01 G
			996.33	-3.375E-01	%	1.642E+01	1.36E+03	1.06E+01 G
EU-155	I	9.0796E-01					1.81E+03	
			105.31	9.896E-01	(P	4.915E+00	1.48E+02	2.12E+01 G
			86.54	8.516E-01	*(	4.196E+00	1.48E+02	3.07E+01 G
HF-181	F	3.8342E-01					4.24E+01	
			482.00	3.834E-01	?(	1.507E+00	1.16E+02	8.05E+01 G
			133.02	0.000E+00	-	2.113E+00	1.00E+03	4.33E+01 G
			345.83	-2.493E+00	+ P	1.049E+01	8.45E+01	1.51E+01 G
			136.30	0.000E+00	-	1.579E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.0982E+00					1.14E+02	
			1121.30	1.098E+00	(	7.721E+00	2.04E+02	3.49E+01 G
			1221.41	-8.908E-01	+ P	6.407E+00	2.48E+02	2.70E+01 G
			1189.05	-6.480E-01	&	1.041E+01	7.09E+02	1.62E+01 G
Hg-203	F	-4.3094E-01					4.66E+01	
			279.20	-4.309E-01	&(	1.300E+00	9.02E+01	8.15E+01 G
TL-208	N	3.8878E+00					6.98E+02	
			583.02	3.829E+00	&(P	9.443E-01	1.37E+01	8.45E+01 G
			277.28	4.375E+00	(P	1.231E+01	8.40E+01	6.31E+00 G
			860.56	4.037E+00	(P	9.912E+00	1.08E+02	1.24E+01 G
pm-146	C	-1.5448E+00					2.02E+03	
			747.16	-1.545E+00	?(	3.579E+00	9.98E+01	3.40E+01 G
			735.72	-2.006E+00	+ P	5.361E+00	7.84E+01	2.25E+01 G
			453.88	2.057E-01	&	1.440E+00	2.75E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	6.5316E-01					1.07E+02	
			898.04	6.532E-01	?(P	7.103E-01	4.90E+01	9.37E+01 G
			1836.06	0.000E+00	-	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		1.1188E+03					5.33E+03	
			263.70	1.119E+03	?(	1.299E+04	3.35E+02	6.00E-03 K
Cd-109	F	6.8485E+00					4.53E+02	
			88.04	6.849E+00	?(	3.549E+01	1.55E+02	3.79E+00 G
Cf-251	T	4.4669E-01					3.28E+05	
			176.60	4.467E-01	?(	3.695E+00	3.17E+02	1.70E+01 G
			227.00	1.565E+00	*	1.192E+01	2.92E+02	6.30E+00 GA
Cf-249	T	7.2059E-01					1.28E+05	
			387.95	4.641E-01	&(	1.783E+00	1.14E+02	6.60E+01 G
			333.44	1.812E+00	?(	6.329E+00	1.04E+02	1.55E+01 G
Sn-126		1.2063E+00					3.65E+07	
			87.57	6.936E-01	*	3.537E+00	1.53E+02	3.75E+01 GA
			64.28	1.206E+00	(	1.241E+01	3.05E+02	9.70E+00 G
			86.94	2.886E+00	*	1.447E+01	1.50E+02	9.04E+00 GA
PB-210	N	-3.1897E+00					8.14E+03	
			46.54	-3.190E+00	*(P	4.175E+01	3.82E+02	4.25E+00 G
PB-212	N	7.3329E+00					6.98E+02	
			238.63	7.333E+00	(P	1.807E+00	9.95E+00	4.33E+01 G
			300.03	1.736E+01	+ P	1.674E+01	3.95E+01	3.28E+00 GA
PB-214	N	1.9899E+01					5.84E+05	
			351.93	1.936E+01	*(P	1.898E+00	6.89E+00	3.76E+01 G
			295.09	2.095E+01	*(	3.348E+00	9.78E+00	1.93E+01 G
			242.00	1.884E+01		9.663E+00	1.81E+01	7.43E+00 GA
BI-207	C	1.2732E-01					1.18E+04	
			569.70	1.113E-01	(	1.019E+00	2.59E+02	9.77E+01 G
			1063.66	1.484E-01	?(P	1.634E+00	4.74E+02	7.45E+01 G
BI-212	N	-3.4848E+00					6.98E+02	
			727.17	-3.485E+00	(	2.198E+01	1.83E+02	7.55E+00 G
			785.42	9.032E+00		8.542E+01	3.89E+02	1.28E+00 GA
U-235	N	2.6417E+00					2.57E+11	
			143.79	1.870E+00	&(P	1.026E+01	1.64E+02	1.10E+01 G
			205.33	4.330E+00	(P	1.213E+01	1.08E+02	5.01E+00 G
			163.38	3.832E-01	% P	1.749E+01	1.34E+03	5.08E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			185.72	2.601E+00	*	1.213E+00	2.01E+01	5.40E+01 GA
BI-214	N	1.8043E+01					5.84E+05	
			609.31	1.742E+01	*(	1.253E+00	7.23E+00	4.61E+01 G
			1120.29	2.529E+01	+	2.912E+00	1.25E+01	1.51E+01 G
			1764.49	1.990E+01	?(P	4.329E+00	1.73E+01	1.54E+01 G
BI-210M	T	-9.2341E-02					1.10E+09	
			265.83	-3.717E-01	?(	1.643E+00	1.30E+02	5.00E+01 G
			304.90	4.066E-01	?(	7.641E+00	5.58E+02	2.80E+01 G
AC-228	N	1.0934E+01					2.10E+03	
			911.07	1.093E+01	(P	1.258E+00	1.27E+01	2.90E+01 G
			968.97	2.300E+00	& P	7.593E+00	9.65E+01	1.75E+01 G
			338.32	1.616E+01	+ P	4.689E+00	1.60E+01	1.20E+01 G
			93.35	4.911E+00	&	2.329E+01	1.42E+02	5.56E+00 XA
TH-227	N	-2.9742E+00					7.95E+03	
			50.14	-2.974E+00	(	1.983E+01	1.98E+02	8.00E+00 G
			256.24	-2.184E+00	+	1.065E+01	1.87E+02	7.00E+00 G
TH-229	N	1.1749E+01					2.68E+06	
			193.51	1.175E+01	&(P	1.193E+01	4.12E+01	4.40E+00 G
			210.85	-1.550E-01	%	2.473E+01	6.08E+03	2.99E+00 G
TH-234	N	2.3236E+00					1.63E+12	
			63.29	2.324E+00	(P	3.387E+01	4.32E+02	3.81E+00 G
			92.59	-9.457E+00	+ P	2.512E+01	5.51E+01	5.58E+00 G
PA-231	N	8.9794E+00					1.20E+07	
			302.65	8.365E+00	(	7.130E+01	2.54E+02	2.88E+00 G
			300.07	9.699E+00	*(	8.086E+01	2.48E+02	2.46E+00 G
PA-233	C	5.6557E-01					7.82E+08	
			312.01	0.000E+00	?(	6.093E+00	1.00E+03	3.60E+01 G
			300.18	3.850E+00	*(	3.249E+01	2.51E+02	6.20E+00 G
PA-234	N	-7.5848E-01					1.63E+12	
			131.29	-7.585E-01	?(	4.962E+00	1.94E+02	1.80E+01 G
			946.02	-7.644E-01	+	9.941E+00	5.54E+02	1.34E+01 G
			569.47	-1.856E+00	+	1.332E+01	2.06E+02	8.20E+00 G
			883.24	-2.932E+00	+	2.013E+01	1.99E+02	9.60E+00 G
			880.53	-1.026E+01	+	2.898E+01	8.41E+01	6.00E+00 GA
PA-234M	N	4.7539E+01					1.63E+12	
			1001.00	-2.646E+00	%(P	2.113E+02	2.22E+03	8.37E-01 G
			766.41	1.904E+02	&(	5.377E+02	8.41E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T  -9.3376E-01                                      1.58E+05
                          59.54-9.338E-01 @(  3.089E+00 1.24E+02 3.59E+01 G

Np-237   F   1.9963E+00                                      2.14E+06
                          86.49 1.996E+00 &(  9.654E+00 1.45E+02 1.31E+01 G

Ir-192   F  -3.0420E-01                                      7.40E+01
                         316.49-3.042E-01 ?(  2.566E+00 2.51E+02 8.70E+01 G
                         468.06-7.078E-01 +   2.766E+00 1.16E+02 5.18E+01 G
                         308.44 0.000E+00 &   6.841E+00 1.00E+03 3.18E+01 G

Cs-136   F   3.9733E-01                                      1.30E+01
                         818.50 3.973E-01 ?(  1.801E+00 1.33E+02 1.00E+02 G
                        1048.07-7.022E-02 -   1.859E+00 7.28E+02 8.00E+01 G
                         340.57-7.310E-01 +   3.400E+00 1.38E+02 4.69E+01 G

Np-239   T  -1.0784E+00                                      2.36E+00
                         103.70 9.087E-01 &   4.333E+00 1.43E+02 2.40E+01 X
                         106.13-1.078E+00 &(  5.064E+00 1.41E+02 2.27E+01 G
                          99.50-1.689E+00 &   8.272E+00 1.47E+02 1.50E+01 X

Nd-147      -3.7882E+00                                      1.11E+01
                         531.00-3.788E+00 ?(  8.568E+00 9.50E+01 1.30E+01 G
                          91.10 9.059E-01 +   4.754E+00 1.57E+02 2.83E+01 G

TL-210   N   1.3203E-01                                      5.84E+05
                         799.60 0.000E+00 ?(  1.687E+00 1.00E+03 9.90E+01 G
                         296.00 2.974E-01 &(  2.457E+00 2.46E+02 7.90E+01 G
                        1313.00 2.272E+00 ?   4.531E+00 8.92E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
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} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	270.	-6.	-0.003	382.14	-3.190E+00	P
TH-227	50.14	283.	-12.	-0.007	197.69	-2.974E+00	
AM-241	59.54	233.	-22.	-0.012	123.54	-9.338E-01	
TH-234	63.29	376.	6.	0.004	432.01	2.324E+00	P
Sn-126	64.28	338.	9.	0.005	304.64	1.206E+00	
BA-133	80.99	1165.	-38.	-0.021	126.64	-1.237E+00	
Np-237	86.49	635.	25.	0.014	144.84	1.996E+00	
EU-155	86.54	660.	25.	0.014	147.59	8.516E-01	
Sn-126	86.94	685.	25.	0.014	150.25	2.886E+00	
Sn-126	87.57	710.	25.	0.014	152.76	6.936E-01	
Cd-109	88.04	735.	25.	0.014	155.28	6.849E+00	
Nd-147	91.10	760.	25.	0.014	157.27	9.059E-01	
TH-234	92.59	838.	-52.	-0.029	55.09	-9.457E+00	P
Gd-153	97.50	659.	-25.	-0.014	144.41	-8.468E-01	
Np-239	99.50	684.	-25.	-0.014	146.76	-1.689E+00	
Gd-153	103.20	710.	-26.	-0.014	148.79	-1.158E+00	
Np-239	103.70	485.	22.	0.012	142.60	9.087E-01	
EU-155	105.31	489.	21.	0.012	148.47	9.896E-01	P
Np-239	106.13	599.	-25.	-0.014	140.65	-1.078E+00	
EU-152	121.78	205.	-3.	-0.002	677.41	-1.040E-01	
EU-154	123.10	190.	-12.	-0.007	158.69	-3.042E-01	
PA-234	131.29	338.	-14.	-0.007	194.37	-7.585E-01	
CO-57	136.47	327.	-10.	-0.005	261.95	-9.456E-01	
Tc-99m	140.51	253.	20.	0.011	115.57	2.383E-01	
U-235	143.79	498.	19.	0.011	163.94	1.870E+00	P
CE-141	145.44	574.	-22.	-0.012	157.26	-4.786E-01	
Ba-140	162.66	234.	20.	0.011	108.76	3.749E+00	
CE-139	165.85	232.	-7.	-0.004	325.19	-9.497E-02	
Cf-251	176.60	114.	6.	0.004	317.43	4.467E-01	
U-235	185.72	114.	112.	0.062	20.11	2.601E+00	
TH-229	193.51	66.	40.	0.022	41.22	1.175E+01	P
U-235	205.33	81.	16.	0.009	108.44	4.330E+00	P
Cf-251	227.00	106.	7.	0.004	291.95	1.565E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	244.69	565.	20.	0.011	166.88	4.223E+00	P
TH-227	256.24	84.	-9.	-0.005	186.96	-2.184E+00	
Cd-113m	263.70	88.	4.	0.002	335.41	1.119E+03	
BI-210M	265.83	97.	-11.	-0.006	130.16	-3.717E-01	
Hg-203	279.20	152.	-20.	-0.011	90.24	-4.309E-01	
I-131	284.30	84.	-4.	-0.002	295.21	-1.310E+00	P
TL-210	296.00	480.	13.	0.007	245.86	2.974E-01	
PA-231	300.07	493.	13.	0.007	248.13	9.699E+00	
PA-233	300.18	506.	13.	0.007	251.27	3.850E+00	
PA-231	302.65	519.	13.	0.007	253.79	8.365E+00	
BA-133	302.85	531.	13.	0.007	256.80	1.315E+00	
Ba-140	304.85	544.	13.	0.007	259.36	5.662E+00	
BI-210M	304.90	557.	6.	0.003	558.13	4.066E-01	
Ir-192	316.49	570.	-14.	-0.008	251.43	-3.042E-01	
CR-51	320.08	549.	13.	0.007	257.02	2.583E+00	
La-140	328.76	88.	12.	0.007	114.26	1.197E+00	
Cf-249	333.44	94.	14.	0.008	103.57	1.812E+00	
Cs-136	340.57	250.	-16.	-0.009	138.34	-7.310E-01	
EU-152	344.29	234.	-16.	-0.009	133.44	-1.310E+00	
HF-181	345.83	239.	-18.	-0.010	84.54	-2.493E+00	P
BA-133	356.00	426.	-6.	-0.003	488.19	-2.096E-01	
I-131	364.48	76.	-18.	-0.010	131.31	-4.819E-01	P
BA-133	383.84	92.	13.	0.007	107.18	3.383E+00	
Cf-249	387.95	105.	13.	0.007	113.72	4.641E-01	
SN-113	391.69	118.	3.	0.002	504.86	1.126E-01	P
AG-108M	433.94	69.	-18.	-0.010	58.21	-5.241E-01	P
pm-146	453.88	48.	5.	0.003	274.95	2.057E-01	
Ir-192	468.06	112.	-13.	-0.007	115.70	-7.078E-01	
BE-7	477.60	64.	11.	0.006	107.99	2.901E+00	
HF-181	482.00	75.	11.	0.006	115.78	3.834E-01	
La-140	487.02	74.	10.	0.006	124.90	6.272E-01	
RH-106	511.86	47.	86.	0.048	22.86	1.282E+01	
Nd-147	531.00	52.	-16.	-0.009	95.01	-3.788E+00	
Ba-140	537.26	26.	7.	0.004	154.26	8.851E-01	P
CS-134	563.24	30.	12.	0.006	100.71	4.513E+00	
CS-134	569.32	30.	8.	0.004	107.82	1.625E+00	
PA-234	569.47	44.	-5.	-0.003	205.54	-1.856E+00	
BI-207	569.70	36.	3.	0.002	259.23	1.113E-01	
SB-124	602.73	423.	-16.	-0.009	181.77	-5.636E-01	
CS-134	604.71	407.	-16.	-0.009	178.10	-5.697E-01	
RU-103	610.30	391.	-16.	-0.009	173.96	-9.787E+00	
AG-108M	614.28	374.	-16.	-0.009	169.94	-6.316E-01	
PM-144	618.06	358.	-16.	-0.009	165.88	-5.771E-01	
RH-106	621.92	338.	-4.	-0.002	619.65	-1.494E+00	
I-131	636.97	18.	10.	0.006	91.76	5.002E+00	
AG-110M	657.76	29.	8.	0.005	97.24	3.261E-01	
CS-137	661.66	63.	-14.	-0.008	82.77	-6.252E-01	
PM-144	696.54	14.	9.	0.005	99.88	3.355E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	702.63	47.	-17.	-0.009	51.05	-6.734E-01	P
SB-124	722.79	30.	11.	0.006	79.92	3.913E+00	
AG-108M	722.94	41.	11.	0.006	91.06	4.657E-01	
EU-154	723.36	51.	9.	0.005	117.23	1.791E+00	
BI-212	727.17	68.	-6.	-0.004	183.01	-3.485E+00	
pm-146	735.72	33.	-11.	-0.006	78.37	-2.006E+00	P
pm-146	747.16	33.	-13.	-0.007	99.76	-1.545E+00	
AG-110M	763.94	62.	-15.	-0.009	77.17	-2.911E+00	
NB-95	765.79	87.	-3.	-0.001	499.37	-1.133E-01	
PA-234M	766.41	55.	13.	0.007	84.10	1.904E+02	
EU-152	778.92	37.	-10.	-0.006	129.23	-3.436E+00	
BI-212	785.42	23.	3.	0.001	389.11	9.032E+00	
CS-134	795.87	51.	6.	0.003	173.21	3.077E-01	
CS-134	801.95	68.	-8.	-0.004	152.93	-3.981E+00	
CO-58	810.78	58.	-14.	-0.008	84.11	-6.068E-01	
La-140	815.77	72.	-1.	-0.001	818.69	-2.829E-01	
Cs-136	818.50	64.	9.	0.005	132.59	3.973E-01	
MN-54	834.85	47.	-16.	-0.009	95.89	-7.174E-01	
Co-56	846.77	19.	2.	0.001	426.47	1.012E-01	P
NB-94	871.10	48.	-16.	-0.009	66.14	-7.618E-01	
EU-154	873.23	42.	11.	0.006	85.51	4.438E+00	
PA-234	880.53	52.	-13.	-0.007	84.06	-1.026E+01	
PA-234	883.24	64.	-6.	-0.003	198.62	-2.932E+00	
Sc-46	889.28	51.	10.	0.006	106.23	4.834E-01	
y-88	898.04	5.	13.	0.007	49.04	6.532E-01	P
AG-110M	937.49	25.	-7.	-0.004	161.52	-1.035E+00	
PA-234	946.02	25.	-2.	-0.001	554.15	-7.644E-01	
EU-152	964.11	9.	6.	0.003	79.91	2.176E+00	
EU-154	1004.77	31.	-15.	-0.008	85.56	-4.482E+00	
Co-56	1037.84	35.	-15.	-0.008	60.25	-5.985E+00	P
Cs-136	1048.07	26.	-1.	-0.001	728.01	-7.022E-02	
RH-106	1050.36	49.	-16.	-0.009	64.89	-5.940E+01	
BI-207	1063.66	16.	2.	0.001	474.24	1.484E-01	P
Ga-68	1077.40	27.	-10.	-0.005	125.61	-1.974E+01	
FE-59	1099.25	21.	2.	0.001	634.67	1.730E-01	
EU-152	1112.07	88.	7.	0.004	184.30	3.186E+00	
Ta-182	1121.30	83.	6.	0.004	204.39	1.098E+00	
CO-60	1173.24	48.	-20.	-0.011	46.71	-1.230E+00	P
Ta-182	1189.05	27.	-2.	-0.001	708.52	-6.480E-01	
Ta-182	1221.41	27.	-4.	-0.002	247.86	-8.908E-01	P
Co-56	1238.28	21.	13.	0.007	83.34	1.321E+00	P
NA-22	1274.53	6.	7.	0.004	62.45	4.581E-01	
EU-154	1274.54	12.	3.	0.001	208.91	4.785E-01	
FE-59	1291.60	11.	8.	0.004	109.13	1.205E+00	
TL-210	1313.00	6.	7.	0.004	89.16	2.272E+00	
CO-60	1332.50	6.	2.	0.001	270.30	1.502E-01	P
AG-110M	1384.30	17.	2.	0.001	488.62	5.958E-01	
EU-152	1408.00	17.	-6.	-0.003	166.25	-2.099E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	1596.21	0.	5.	0.003	44.72	4.322E-01	
SB-124	1690.98	0.	5.	0.003	44.72	9.100E-01	
Co-56	1771.35	45.	-8.	-0.004	123.93	-4.676E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.9007E+00	2.9007E+00	1.080E+02%	1.06E+01
NA-22	#A	4.5809E-01	4.5809E-01	6.245E+01%	9.27E-01
K-40		1.5203E+02	1.5203E+02	6.966E+00%	8.22E+00
Sc-46	#A	4.8338E-01	4.8338E-01	1.062E+02%	1.75E+00
CR-51	#A	2.5832E+00	2.5832E+00	2.570E+02%	2.23E+01
MN-54	#A	-7.1739E-01	-7.1739E-01	9.589E+01%	1.58E+00
FE-59	#A	6.2027E-01	6.2028E-01	1.091E+02%	2.52E+00
Co-56	#A	5.8665E-01	5.8665E-01	8.334E+01%	1.06E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.09E-01
CO-58	#A	-6.0678E-01	-6.0678E-01	8.411E+01%	1.71E+00
CO-60	#A	1.5019E-01	1.5019E-01	2.703E+02%	9.77E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.65E+00
NB-94	#A	-6.7340E-01	-6.7340E-01	5.105E+01%	1.39E+00
ZR-95	#A	-5.1338E-02	-5.1339E-02	1.823E+03%	2.26E+00
NB-95	#A	-1.1327E-01	-1.1327E-01	4.994E+02%	1.96E+00
RU-103	#A	-4.2463E-02	-4.2463E-02	1.011E+03%	1.06E+00
RH-106	#A	-1.4943E+00	-1.4943E+00	6.197E+02%	3.14E+01
AG-108M	#A	-5.2407E-01	-5.2407E-01	5.821E+01%	1.17E+00
AG-110M	#A	2.3658E-01	2.3658E-01	9.724E+01%	2.77E+00
SN-113	#A	1.1264E-01	1.1264E-01	5.049E+02%	1.96E+00
SB-124	#A	1.9384E-01	1.9384E-01	4.472E+01%	3.44E+00
SB-125	#	4.0294E+00	4.0294E+00	3.032E+01%	2.21E+00
I-131	#A	-3.9494E-02	-3.9495E-02	8.010E+01%	1.17E+00
Gd-153	#A	-8.4679E-01	-8.4679E-01	1.444E+02%	4.08E+00
Ga-68	#A	-1.9636E+01	-1.9740E+01	1.256E+02%	5.47E+01
Tc-99m	#A	2.3811E-01	2.3835E-01	1.156E+02%	9.23E-01
BA-133	#A	1.3811E-01	1.3811E-01	2.568E+02%	3.46E+00
CS-134	#A	1.6137E-01	1.6137E-01	7.224E+01%	3.41E+00
CS-137	#A	-6.2521E-01	-6.2521E-01	8.277E+01%	1.73E+00
CE-139	#A	-9.4968E-02	-9.4968E-02	3.252E+02%	1.05E+00
Ba-140	#A	1.9828E+00	1.9828E+00	1.069E+02%	3.37E+00
La-140	#A	5.8357E-01	5.8358E-01	4.472E+01%	6.37E-01
CE-141	#A	-4.7864E-01	-4.7864E-01	1.573E+02%	2.52E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.26E+00
PM-144	#A	3.3554E-01	3.3554E-01	9.988E+01%	8.03E-01
EU-152	#A	1.1639E+00	1.1639E+00	7.332E+01%	5.88E+00
EU-154	#A	2.7904E+00	2.7904E+00	7.255E+01%	1.28E+01

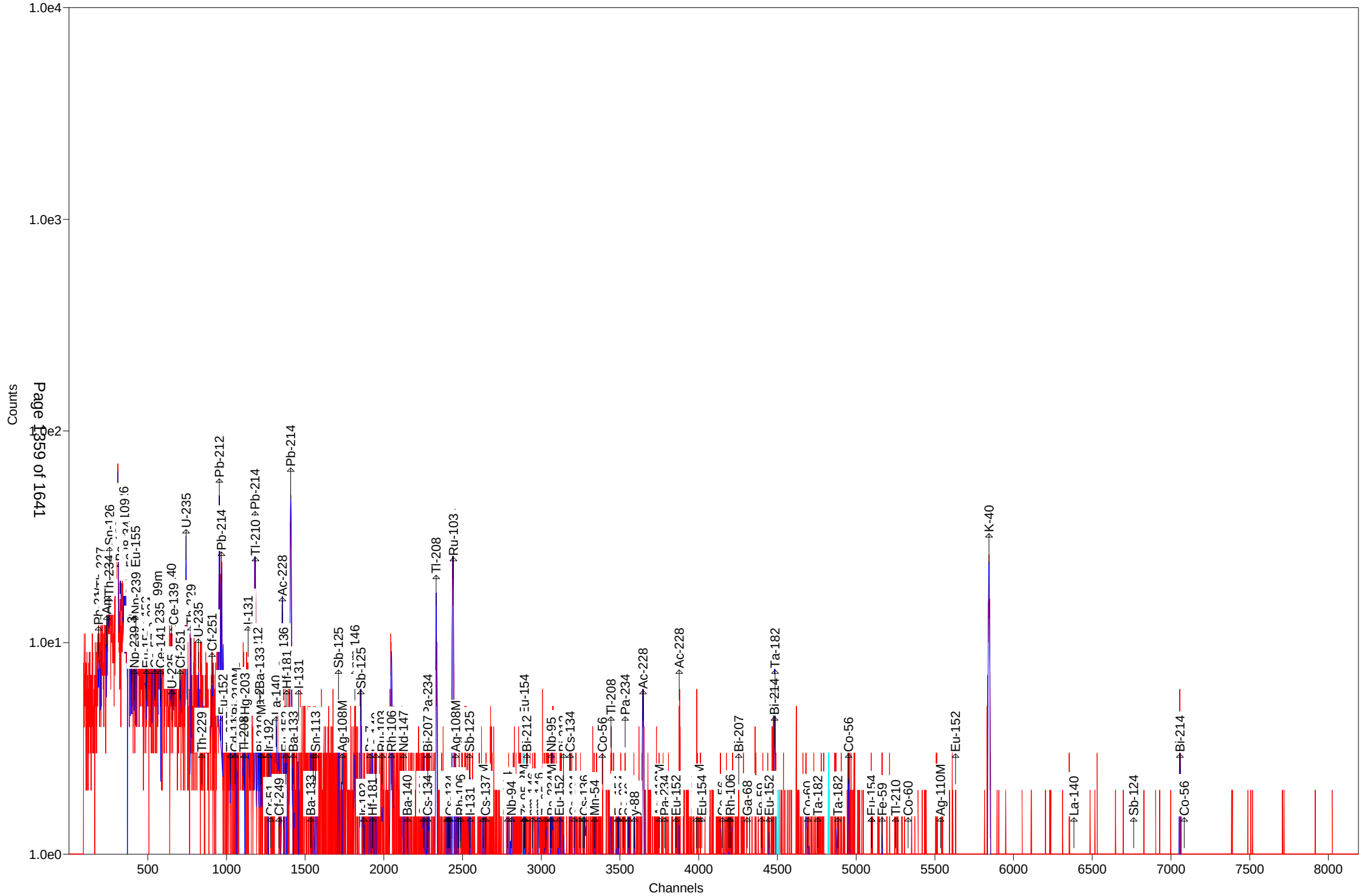
EU-155 #A	9.0796E-01	9.0796E-01	1.047E+02%		4.92E+00
HF-181 #A	3.8342E-01	3.8342E-01	1.158E+02%		1.51E+00
Ta-182 #A	1.0982E+00	1.0982E+00	2.044E+02%		7.72E+00
Hg-203 #A	-4.3094E-01	-4.3094E-01	9.024E+01%		1.30E+00
TL-208	3.8877E+00	3.8878E+00	1.369E+01%		9.44E-01
pm-146 #A	-1.5448E+00	-1.5448E+00	9.976E+01%		3.58E+00
y-88 #A	6.5316E-01	6.5316E-01	4.904E+01%		7.10E-01
Cd-113m#A	1.1188E+03	1.1188E+03	3.354E+02%		1.30E+04
Cd-109 #A	6.8485E+00	6.8485E+00	1.553E+02%		3.55E+01
Cf-251 #A	4.4669E-01	4.4669E-01	3.174E+02%		3.70E+00
Cf-249 #A	7.2059E-01	7.2059E-01	7.691E+01%		1.78E+00
Sn-126 #A	1.2063E+00	1.2063E+00	3.046E+02%		1.24E+01
PB-210 #A	-3.1897E+00	-3.1897E+00	3.821E+02%		4.17E+01
PB-212 #	7.3329E+00	7.3329E+00	9.950E+00%		1.81E+00
PB-214 #	1.9899E+01	1.9899E+01	5.983E+00%		1.90E+00
BI-207 #A	1.2732E-01	1.2732E-01	2.592E+02%		1.02E+00
BI-212 #A	-3.4848E+00	-3.4848E+00	1.830E+02%		2.20E+01
U-235 #A	2.6417E+00	2.6417E+00	9.828E+01%		1.03E+01
BI-214 #	1.8043E+01	1.8043E+01	7.232E+00%		1.25E+00
BI-210M#A	-9.2341E-02	-9.2341E-02	1.302E+02%		1.64E+00
AC-228 #	1.0934E+01	1.0934E+01	1.270E+01%		1.26E+00
TH-227 #A	-2.9742E+00	-2.9742E+00	1.977E+02%		1.98E+01
TH-229 #A	1.1749E+01	1.1749E+01	4.122E+01%		1.19E+01
TH-234 #A	2.3236E+00	2.3236E+00	4.320E+02%		3.39E+01
PA-231 #A	8.9794E+00	8.9794E+00	1.775E+02%		7.13E+01
PA-233 #A	5.6557E-01	5.6557E-01	2.513E+02%		6.09E+00
PA-234 #A	-7.5848E-01	-7.5848E-01	1.944E+02%		4.96E+00
PA-234M#A	4.7539E+01	4.7539E+01	8.410E+01%		2.11E+02
AM-241 #A	-9.3376E-01	-9.3376E-01	1.235E+02%		3.09E+00
Np-237 #A	1.9963E+00	1.9963E+00	1.448E+02%		9.65E+00
Ir-192 #A	-3.0420E-01	-3.0420E-01	2.514E+02%		2.57E+00
Cs-136 #A	3.9732E-01	3.9733E-01	1.326E+02%		1.80E+00
Np-239 #A	-1.0783E+00	-1.0784E+00	1.407E+02%		5.06E+00
Nd-147 #A	-3.7881E+00	-3.7882E+00	9.501E+01%		8.57E+00
TL-210 #A	1.3203E-01	1.3203E-01	2.459E+02%		1.69E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.121E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 2.1213176E+02 Bq/Sample

376766_Gamma_160-29521-B-20-B. 7_Gamma_20182941.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20182813

Sample Description: 376766_Gamma_160-29521-A-21-C
Detector: Detector # 8
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-A-21-C

Decay to Time: 8/9/2018 20:34 Live Time: 1800 sec
Acquisition Time: 8/9/2018 20:35:17 Real Time: 1847 sec
Analysis Time: 8/9/2018 21:06 Dead Time: 2.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-07-14_1855.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.615E+00	174.7	2.822E+00	2.823E+00	9.874E+00
NA-22	5.340E-02	505.0	2.697E-01	2.697E-01	1.079E+00
K-40	1.255E+02	8.4	1.054E+01	1.234E+01	9.546E+00
Sc-46	2.168E-01	133.5	2.894E-01	2.896E-01	1.324E+00
CR-51	3.075E+00	171.8	5.284E+00	5.287E+00	1.786E+01
MN-54	-3.721E-02	1380.2	5.136E-01	5.136E-01	1.275E+00
FE-59	4.416E-01	92.5	4.087E-01	4.093E-01	2.177E+00
Co-56	1.319E-01	207.0	2.730E-01	2.731E-01	7.221E-01
CO-57	-2.914E-01	97.7	2.848E-01	2.852E-01	9.539E-01
CO-58	-6.614E-01	87.0	5.753E-01	5.763E-01	1.937E+00
CO-60	3.491E-01	33.9	1.182E-01	1.195E-01	1.903E+00
ZN-65	8.523E-01	111.9	9.537E-01	9.546E-01	3.310E+00
NB-94	3.601E-01	96.2	3.464E-01	3.469E-01	8.362E-01
ZR-95	-1.406E-01	785.8	1.105E+00	1.105E+00	1.930E+00
NB-95	3.468E-02	839.6	2.912E-01	2.912E-01	1.090E+00
RU-103	1.041E-01	332.7	3.462E-01	3.463E-01	8.848E-01
RH-106	3.540E+00	188.5	6.673E+00	6.676E+00	2.279E+01
AG-108M	-1.355E-01	267.5	3.626E-01	3.626E-01	1.085E+00
AG-110M	2.727E-01	85.2	2.324E-01	2.328E-01	1.813E+00
SN-113	-8.721E-02	534.2	4.659E-01	4.660E-01	2.051E+00
SB-124	2.585E-01	258.4	6.679E-01	6.680E-01	2.290E+00
SB-125	9.367E-01	102.5	9.601E-01	9.613E-01	2.606E+00
I-131	5.460E-01	104.5	5.708E-01	5.715E-01	8.902E-01
Gd-153	6.356E-01	97.1	6.174E-01	6.186E-01	4.696E+00
Ga-68	0.000E+00	1.#INF	4.960E+00	4.960E+00	4.326E+01
Tc-99m	-3.008E-01	139.5	4.195E-01	4.199E-01	1.407E+00
BA-133	-6.123E-01	136.2	8.337E-01	8.343E-01	2.814E+00
CS-134	2.336E-01	86.3	2.015E-01	2.019E-01	2.367E+00
CS-137	-3.794E-01	222.0	8.424E-01	8.427E-01	1.612E+00
CE-139	2.652E-01	112.1	2.972E-01	2.983E-01	1.003E+00
Ba-140	-7.934E-01	212.9	1.689E+00	1.690E+00	4.200E+00
La-140	6.239E-01	42.3	2.636E-01	2.657E-01	7.522E-01
CE-141	2.480E-01	303.8	7.532E-01	7.533E-01	2.546E+00

CE-144	0.000E+00	1.#INF	8.779E-01	8.779E-01	9.766E+00
PM-144	-6.459E-02	773.4	4.995E-01	4.995E-01	1.222E+00
EU-152	1.068E+00	94.0	1.004E+00	1.006E+00	5.700E+00
EU-154	-2.610E+00	199.2	5.199E+00	5.201E+00	1.802E+01
EU-155	4.932E-01	186.3	9.190E-01	9.194E-01	3.022E+00
HF-181	1.681E-01	97.1	1.633E-01	1.635E-01	1.383E+00
Ta-182	1.241E+00	114.8	1.424E+00	1.426E+00	6.259E+00
Hg-203	1.089E-01	348.2	3.792E-01	3.792E-01	1.312E+00
TL-208	1.207E+00	31.8	3.839E-01	3.890E-01	9.021E-01
pm-146	5.483E-01	184.3	1.011E+00	1.011E+00	2.534E+00
y-88	0.000E+00	1.#INF	2.194E-01	2.194E-01	1.276E+00
Cd-113m	-5.975E+03	88.1	5.265E+03	5.279E+03	1.764E+04
Cd-109	-9.204E-01	1013.7	9.329E+00	9.330E+00	3.168E+01
Cf-251	2.298E+00	50.8	1.167E+00	1.185E+00	2.921E+00
Cf-249	4.865E-01	103.1	5.017E-01	5.023E-01	1.702E+00
Sn-126	-2.297E+00	176.4	4.054E+00	4.055E+00	1.368E+01
PB-210	8.153E+00	104.4	8.516E+00	8.530E+00	2.875E+01
PB-212	3.072E+00	19.4	5.963E-01	6.286E-01	1.625E+00
PB-214	7.010E+00	10.7	7.466E-01	8.308E-01	1.420E+00
BI-207	6.500E-01	27.9	1.815E-01	1.846E-01	1.282E+00
BI-212	4.535E+00	169.2	7.675E+00	7.679E+00	2.641E+01
U-235	-3.187E+00	59.2	1.886E+00	1.893E+00	1.164E+01
BI-214	4.336E+00	19.9	8.626E-01	8.915E-01	1.654E+00
BI-210M	5.415E-01	145.0	7.852E-01	7.859E-01	1.904E+00
AC-228	4.834E+00	28.5	1.379E+00	1.401E+00	2.647E+00
TH-227	-2.167E+00	239.6	5.192E+00	5.194E+00	1.773E+01
TH-229	8.973E+00	51.4	4.611E+00	4.666E+00	1.155E+01
TH-234	1.416E+01	34.1	4.823E+00	4.879E+00	2.294E+01
PA-231	-2.539E+00	759.8	1.929E+01	1.929E+01	6.568E+01
PA-233	8.783E-01	161.6	1.419E+00	1.420E+00	4.793E+00
PA-234	-2.154E-01	811.4	1.747E+00	1.747E+00	5.948E+00
PA-234M	-2.106E+01	164.7	3.469E+01	3.471E+01	2.633E+02
AM-241	2.472E-01	472.9	1.169E+00	1.169E+00	3.975E+00
Np-237	1.505E+00	195.0	2.934E+00	2.935E+00	9.867E+00
Ir-192	5.332E-01	114.2	6.088E-01	6.096E-01	2.064E+00
Cs-136	5.152E-01	112.1	5.776E-01	5.783E-01	1.969E+00
Np-239	-9.621E-01	104.6	1.007E+00	1.008E+00	3.382E+00
Nd-147	-9.829E-02	2555.4	2.512E+00	2.512E+00	6.520E+00
TL-210	2.578E-01	156.8	4.043E-01	4.046E-01	1.421E+00
Total	2.081E+02				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-A-21-C

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182813.An1

Acquisition information

Start time:	8/9/2018 8:35:17 PM
Live time:	1800
Real time:	1847
Dead time:	2.55 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_Soil_TunaCan.Clb

8_Soil_TunaCan_90099_032712

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	3/28/2012 10:35:20 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.39 %
Log(Eff):	-1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.71 %
Log(Eff):	-2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-07-14_1855.PBC 7/14/2018 6:55:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1711

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	13.	104.45	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
59.54	5.	472.90	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.35	34.	57.90	1.49	3.097E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	6.135E+00	Sn126
77.11	57.	27.68	0.77	3.699E-02				
86.49	14.	194.99	1.04	3.959E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.419E-01	EU155
					86.94	9.040	2.175E+00	Sn126
86.54	14.	198.61	1.04	3.961E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.419E-01	EU155
					86.94	9.040	2.175E+00	Sn126
92.72	53.	35.88	1.46	4.072E-02	92.59	5.584	1.298E+01	TH234
					93.35	5.561	1.300E+01	AC228
93.35	17.	179.60	1.05	4.083E-02	93.35	5.561	PBC<MDA	AC228
97.50	12.	261.98	1.05	4.133E-02	97.50	30.000	PBC<MDA	Gd153
103.20	13.	97.14	1.06	4.176E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	7.050E-01	Np239
103.70	13.	104.89	1.06	4.178E-02	103.20	21.800	PBC<MDA	Gd153
					103.70	24.000	7.052E-01	Np239
105.31	4.	315.36	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
123.10	17.	98.11	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
145.44	8.	303.75	1.09	3.874E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.85	14.	112.05	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
176.60	24.	50.78	1.11	3.460E-02	176.60	17.000	PBC<MDA	Cf251
185.72	13.	125.75	1.12	3.329E-02	185.72	54.000	PBC<MDA	U235
193.51	23.	51.39	1.13	3.226E-02	193.51	4.400	PBC<MDA	TH229
205.33	10.	129.84	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	474.15	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	9.	154.36	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.64	66.	19.41	1.16	2.744E-02	238.63	43.300	3.072E+00	PB212
242.00	32.	28.31	1.16	2.714E-02	242.00	7.430	8.722E+00	PB214
265.83	5.	243.27	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M
277.36	12.	112.34	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
279.20	4.	348.18	1.19	2.427E-02	279.20	81.460	PBC<MDA	Hg203
280.41	8.	51.54	0.69	2.419E-02				
295.18	54.	17.47	0.91	2.324E-02	295.09	19.300	6.689E+00	PB214
304.90	13.	157.84	1.21	2.265E-02	304.85	4.290	7.205E+00	Ba140
					304.90	28.000	1.104E+00	BI210M
308.44	13.	156.93	1.21	2.244E-02	308.44	31.750	PBC<MDA	Ir192
312.01	13.	161.56	1.21	2.224E-02	312.01	36.000	PBC<MDA	PA233
316.49	13.	165.93	1.22	2.199E-02	316.49	87.040	PBC<MDA	Ir192
320.08	12.	171.83	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
328.76	10.	140.15	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
337.66	2.	803.12	1.23	2.085E-02	338.32	12.010	PBC<MDA	AC228
345.83	9.	97.15	1.24	2.049E-02	345.83	15.070	PBC<MDA	HF181
352.09	98.	12.19	1.05	2.020E-02	351.93	37.600	7.175E+00	PB214
364.48	6.	176.98	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	2.	750.20	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	11.	103.13	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
463.37	8.	102.50	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
477.60	5.	174.70	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
487.02	5.	128.90	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	332.69	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	27.	78.71	2.61	1.494E-02	511.86	20.000	PBC<MDA	RH106
563.24	1.	742.74	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.70	4.	249.90	1.40	1.368E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.733E+00	PA234
					569.70	97.740	1.454E-01	BI207
583.45	25.	31.81	0.88	1.342E-02	583.02	84.500	1.207E+00	TL208
600.50	8.	183.36	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
602.73	6.	258.41	1.42	1.306E-02	602.73	98.260	PBC<MDA	SB124
608.68	47.	19.89	1.04	1.294E-02	609.31	46.090	4.336E+00	BI214
621.92	8.	188.51	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
636.97	7.	111.34	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	85.22	1.45	1.215E-02	657.76	94.640	PBC<MDA	AG110M
702.63	7.	96.21	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
727.17	7.	169.22	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
747.16	4.	184.30	1.51	1.093E-02	747.16	34.000	PBC<MDA	pm146
763.94	4.	128.89	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	839.64	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					766.41	0.294	1.178E+01	PA234M
795.87	8.	86.28	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
799.60	5.	156.83	1.55	1.032E-02	799.60	98.960	PBC<MDA	TL210
818.50	9.	112.10	1.56	1.012E-02	818.50	100.000	PBC<MDA	Cs136
846.77	2.	207.02	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.32	13.	29.24	1.59	9.703E-03	860.56	12.420	5.795E+00	TL208
880.53	18.	23.57	1.60	9.517E-03	880.53	6.000	1.751E+01	PA234
911.28	23.	28.54	1.62	9.247E-03	911.07	29.000	4.834E+00	AC228
968.91	8.	93.34	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1001.00	-3.	164.74	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1063.66	14.	27.92	1.71	8.106E-03	1063.66	74.500	1.312E+00	BI207
1112.07	6.	93.97	1.74	7.803E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	111.90	1.74	7.782E-03	1115.55	50.600	PBC<MDA	ZN65
1118.67	4.	168.44	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
1120.55	6.	133.46	1.74	7.752E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.243E+00	Ta182
1121.30	6.	144.97	1.74	7.748E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.243E+00	Ta182
1173.24	14.	33.85	1.77	7.453E-03	1173.24	99.900	1.007E+00	CO60
1221.41	4.	177.92	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	1.	504.98	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.517E-01	EU154
1291.60	6.	92.55	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1408.00	12.	29.14	1.90	6.366E-03	1408.00	21.005	4.961E+00	EU152
1460.65	149.	8.40	1.88	6.165E-03	1460.83	10.670	1.255E+02	K40
1596.21	6.	42.25	1.99	5.706E-03	1596.21	95.400	PBC<MDA	La140
1764.72	17.	26.73	2.07	5.226E-03	1764.49	15.400	1.183E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
308.25	77.11	64.	57.	1.541E+03	27.68	0.768	-	s
1121.77	280.41	9.	8.	3.352E+02	62.75	1.190	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	79.	13.	0.007	104.45	1.012s
TH-227	200.37	50.14	140.	-7.	-0.004	239.56	1.015s
AM-241	237.95	59.54	234.	5.	0.003	472.90	1.022s
TH-234	253.22	63.35	97.	34.	0.019	57.90	1.494s
Sn-126	256.93	64.28	242.	-13.	-0.007	176.45	1.026s
BA-133	323.77	80.99	302.	-23.	-0.013	106.99	1.039s
Np-237	345.77	86.49	368.	14.	0.008	194.99	1.043
EU-155	345.98	86.54	382.	14.	0.008	198.61	1.043
Sn-126	347.57	86.94	361.	-20.	-0.011	137.09	1.044
Sn-126	350.09	87.57	341.	-20.	-0.011	133.32	1.044
Nd-147	364.21	91.10	319.	0.	0.000	1000.00	1.047s
TH-234	370.71	92.72	104.	53.	0.030	35.88	1.463s
AC-228	373.21	93.35	463.	17.	0.009	179.60	1.049
Gd-153	389.81	97.50	480.	12.	0.007	261.98	1.052s
Gd-153	412.62	103.20	70.	13.	0.007	97.14	1.056s
Np-239	414.62	103.70	83.	13.	0.007	104.89	1.057s
EU-155	421.07	105.31	96.	4.	0.002	315.36	1.058s
Np-239	424.34	106.13	140.	-16.	-0.009	104.63	1.058s
EU-152	486.92	121.78	138.	-19.	-0.010	92.07	1.071s
CO-57	488.06	122.06	156.	-19.	-0.010	97.72	1.071s
EU-154	492.22	123.10	132.	17.	0.009	98.11	1.072s
PA-234	525.00	131.29	263.	-3.	-0.002	811.38	1.078
HF-181	531.92	133.02	266.	0.	0.000	1000.00	1.079s
CE-144	533.98	133.54	266.	0.	0.000	1000.00	1.080s
HF-181	545.02	136.30	266.	0.	0.000	1000.00	1.082s
CO-57	545.72	136.47	266.	0.	0.000	1000.00	1.082s
Tc-99m	561.86	140.51	323.	-18.	-0.010	139.46	1.085
U-235	574.97	143.79	347.	-25.	-0.014	59.16	1.087s
CE-141	581.59	145.44	316.	8.	0.005	303.75	1.089s
Ba-140	650.47	162.66	160.	-19.	-0.010	98.08	1.102s
U-235	653.35	163.38	183.	-23.	-0.013	64.63	1.102s
CE-139	663.24	165.85	113.	14.	0.008	112.05	1.104s
Cf-251	706.23	176.60	37.	24.	0.014	50.78	1.112s
U-235	742.71	185.72	85.	13.	0.007	125.75	1.119
TH-229	773.87	193.51	33.	23.	0.013	51.39	1.125s
U-235	821.17	205.33	44.	10.	0.005	129.84	1.134s
TH-229	843.24	210.85	52.	3.	0.002	474.15	1.138s
Cf-251	907.84	227.00	48.	9.	0.005	154.36	1.151s
PB-212	954.37	238.63	47.	66.	0.037	19.41	1.159D
PB-214	967.84	242.00	24.	32.	0.018	28.31	1.162D
EU-152	978.62	244.69	228.	-10.	-0.006	213.11	1.164s
TH-227	1024.81	256.24	60.	-15.	-0.008	104.35	1.172s
Cd-113m	1054.65	263.70	96.	-16.	-0.009	88.12	1.178s
BI-210M	1063.18	265.83	76.	5.	0.003	243.27	1.179s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.99	277.28	78.	12.	0.006	112.34	1.188s
Hg-203	1116.66	279.20	89.	4.	0.002	348.18	1.189
PB-214	1180.58	295.18	10.	54.	0.030	17.47	0.915
TL-210	1183.86	296.00	308.	-14.	-0.008	173.49	1.202s
PB-212	1199.98	300.03	294.	-15.	-0.008	169.05	1.205
PA-231	1200.14	300.07	279.	-15.	-0.008	164.92	1.205s
PA-233	1200.58	300.18	265.	-15.	-0.008	160.66	1.205s
PA-231	1210.46	302.65	258.	-3.	-0.002	759.83	1.207s
BA-133	1211.27	302.85	261.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	261.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	192.	13.	0.007	157.84	1.208s
Ir-192	1233.62	308.44	190.	13.	0.007	156.93	1.211s
PA-233	1247.91	312.01	203.	13.	0.007	161.56	1.214s
Ir-192	1265.82	316.49	215.	13.	0.007	165.93	1.217s
CR-51	1280.20	320.08	206.	12.	0.007	171.83	1.219s
La-140	1314.91	328.76	98.	10.	0.006	140.15	1.226s
Cf-249	1333.63	333.44	136.	-6.	-0.004	259.58	1.229
AC-228	1353.15	338.32	128.	2.	0.001	803.12	1.233s
Cs-136	1362.15	340.57	130.	0.	0.000	1000.00	1.234s
HF-181	1383.19	345.83	16.	9.	0.005	97.15	1.238s
PB-214	1408.25	352.09	13.	98.	0.055	12.19	1.055
BA-133	1423.87	356.00	167.	-14.	-0.008	136.17	1.245s
I-131	1457.81	364.48	24.	6.	0.003	176.98	1.252s
BA-133	1535.24	383.84	77.	2.	0.001	750.20	1.266s
Cf-249	1551.68	387.95	57.	11.	0.006	103.13	1.269s
SN-113	1566.64	391.69	78.	-2.	-0.001	534.24	1.271s
SB-125	1711.39	427.88	21.	-3.	-0.002	352.40	1.297s
AG-108M	1735.64	433.94	35.	-4.	-0.002	267.53	1.301s
pm-146	1815.41	453.88	27.	-12.	-0.007	85.76	1.315s
SB-125	1853.36	463.37	33.	8.	0.005	102.50	1.322s
Ir-192	1872.14	468.06	54.	-7.	-0.004	149.48	1.325s
BE-7	1910.28	477.60	33.	5.	0.003	174.70	1.332s
HF-181	1927.89	482.00	38.	0.	0.000	1000.00	1.335s
La-140	1947.98	487.02	16.	5.	0.003	128.90	1.339s
RU-103	1988.12	497.05	17.	3.	0.001	332.69	1.346s
RH-106	2047.36	511.86	63.	27.	0.015	78.71	2.606s
Ba-140	2148.95	537.26	26.	-5.	-0.003	212.92	1.373s
CS-134	2252.86	563.24	13.	1.	0.001	742.74	1.391s
CS-134	2277.20	569.32	22.	-1.	0.000	994.99	1.395s
PA-234	2277.80	569.47	32.	-8.	-0.004	108.45	1.395s
BI-207	2278.73	569.70	36.	4.	0.002	249.90	1.396s
TL-208	2333.74	583.45	11.	25.	0.014	31.81	0.876s
SB-125	2401.92	600.50	108.	8.	0.005	183.36	1.416s
SB-124	2410.85	602.73	116.	6.	0.003	258.41	1.418s
CS-134	2418.76	604.71	122.	0.	0.000	1000.00	1.419s
BI-214	2434.65	608.68	10.	47.	0.026	19.89	1.035s
RU-103	2441.12	610.30	122.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	122.	0.	0.000	1000.00	1.426

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2472.18	618.06	134.	-10.	-0.006	167.77	1.428s
RH-106	2487.60	621.92	111.	8.	0.004	188.51	1.431s
SB-125	2543.49	635.89	30.	-9.	-0.005	92.30	1.440s
I-131	2547.83	636.97	30.	7.	0.004	111.34	1.441s
AG-110M	2630.98	657.76	15.	7.	0.004	85.22	1.455s
CS-137	2646.58	661.66	34.	-7.	-0.004	222.03	1.457s
PM-144	2786.11	696.54	23.	-1.	-0.001	773.39	1.480s
NB-94	2810.46	702.63	9.	7.	0.004	96.21	1.484
SB-124	2891.09	722.79	54.	-14.	-0.008	79.90	1.497s
AG-108M	2891.70	722.94	67.	-4.	-0.002	302.64	1.498s
EU-154	2893.37	723.36	71.	0.	0.000	1000.00	1.498s
BI-212	2908.63	727.17	64.	7.	0.004	169.22	1.500s
pm-146	2942.83	735.72	19.	-3.	-0.001	349.11	1.506s
pm-146	2988.59	747.16	9.	4.	0.002	184.30	1.513s
ZR-95	3026.87	756.73	14.	-1.	-0.001	785.76	1.519s
AG-110M	3055.73	763.94	9.	4.	0.002	128.89	1.524s
NB-95	3063.11	765.79	15.	1.	0.000	839.64	1.525
PA-234M	3065.60	766.41	30.	-11.	-0.006	78.83	1.526s
EU-152	3115.64	778.92	24.	-12.	-0.007	96.05	1.534s
BI-212	3141.64	785.42	19.	-2.	-0.001	539.67	1.538
CS-134	3183.43	795.87	18.	8.	0.004	86.28	1.544s
TL-210	3198.36	799.60	25.	5.	0.003	156.83	1.547s
CS-134	3207.77	801.95	39.	-8.	-0.004	118.04	1.548s
CO-58	3243.06	810.78	49.	-12.	-0.007	86.98	1.554s
La-140	3263.04	815.77	61.	-9.	-0.005	126.24	1.557s
Cs-136	3273.97	818.50	51.	9.	0.005	112.10	1.559s
Co-56	3387.05	846.77	5.	2.	0.001	207.02	1.577s
TL-208	3442.23	860.56	0.	13.	0.007	29.24	1.585s
NB-94	3484.36	871.10	43.	-15.	-0.008	25.27	1.592s
EU-154	3492.89	873.23	58.	-6.	-0.003	199.19	1.593s
PA-234	3522.10	880.53	0.	18.	0.010	23.57	1.598s
PA-234	3532.94	883.24	18.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	18.	0.	0.000	1000.00	1.600s
Sc-46	3557.10	889.28	18.	0.	0.000	1000.00	1.603
y-88	3592.14	898.04	14.	0.	0.000	1000.00	1.608s
AC-228	3644.26	911.07	5.	23.	0.013	28.54	1.616s
AG-110M	3749.96	937.49	15.	-1.	-0.001	857.32	1.633s
PA-234	3784.07	946.02	10.	0.	0.000	1000.00	1.638s
EU-152	3856.43	964.11	40.	-8.	-0.004	117.26	1.649s
AC-228	3875.88	968.97	25.	8.	0.005	93.34	1.652s
EU-154	3985.31	996.33	42.	0.	0.000	1000.00	1.668s
PA-234M	4003.99	1001.00	45.	-3.	-0.002	164.74	1.671s
Co-56	4151.36	1037.84	15.	0.	0.000	1000.00	1.693s
Cs-136	4192.29	1048.07	25.	-11.	-0.006	69.48	1.698s
RH-106	4201.45	1050.36	38.	-1.	-0.001	418.97	1.700s
BI-207	4254.65	1063.66	1.	14.	0.008	27.92	1.708s
Ga-68	4309.61	1077.40	10.	0.	0.000	1000.00	1.716s
FE-59	4397.02	1099.25	10.	-1.	-0.001	702.38	1.728s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4448.32	1112.07	14.	6.	0.003	93.97	1.736s
ZN-65	4462.20	1115.55	20.	6.	0.003	111.90	1.738s
BI-214	4481.17	1120.29	25.	4.	0.002	168.44	1.740s
Sc-46	4482.22	1120.55	30.	6.	0.003	133.46	1.740s
Ta-182	4485.22	1121.30	35.	6.	0.003	144.97	1.741s
CO-60	4692.97	1173.24	4.	14.	0.007	33.85	1.770s
Ta-182	4756.23	1189.05	10.	-1.	-0.001	702.38	1.779s
Ta-182	4885.67	1221.41	11.	4.	0.002	177.92	1.797s
Co-56	4953.16	1238.28	27.	-7.	-0.004	180.28	1.806s
NA-22	5098.16	1274.53	5.	1.	0.000	504.98	1.826s
EU-154	5098.22	1274.54	6.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	5.	6.	0.004	92.55	1.835s
TL-210	5252.05	1313.00	16.	-7.	-0.004	135.27	1.847s
CO-60	5330.06	1332.50	19.	-4.	-0.002	171.00	1.857s
AG-110M	5537.25	1384.30	0.	0.	0.000	1000.00	1.884s
EU-152	5632.07	1408.00	0.	12.	0.007	29.14	1.896s
K-40	5842.66	1460.65	3.	149.	0.083	8.40	1.875
La-140	6384.93	1596.21	0.	6.	0.003	42.25	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
BI-214	7058.07	1764.49	2.	17.	0.010	26.73	2.067
Co-56	7085.51	1771.35	19.	0.	0.000	1000.00	2.070s
y-88	7344.36	1836.06	0.	0.	0.000	1000.00	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.6153E+00				5.31E+01	
			477.60	1.615E+00	?(P	9.874E+00	1.75E+02 1.05E+01 G
NA-22	C	5.3404E-02				9.50E+02	
			1274.53	5.340E-02	?(	1.079E+00	5.05E+02 9.99E+01 G
K-40	N	1.2550E+02				4.66E+11	
			1460.83	1.255E+02	(P	9.546E+00	8.40E+00 1.07E+01 G
Sc-46	F	2.1684E-01				8.38E+01	
			889.28	0.000E+00	?(	1.324E+00	1.00E+03 1.00E+02 G
			1120.55	4.337E-01	&(	2.011E+00	1.33E+02 1.00E+02 G
CR-51	F	3.0753E+00				2.77E+01	
			320.08	3.075E+00	?(	1.786E+01	1.72E+02 9.94E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-3.7213E-02					3.12E+02	
			834.85	-3.721E-02	&(	1.275E+00	1.38E+03	1.00E+02 G
FE-59	F	4.4158E-01					4.45E+01	
			1099.25	-1.248E-01	?(	2.177E+00	7.02E+02	5.65E+01 G
			1291.60	1.182E+00	?(P	2.539E+00	9.25E+01	4.32E+01 G
Co-56	C	1.3187E-01					7.73E+01	
			846.77	1.319E-01	?(	7.221E-01	2.07E+02	9.99E+01 G
			1238.28	-7.879E-01	+	3.164E+00	1.80E+02	6.61E+01 G
			1037.84	0.000E+00	-	9.860E+00	1.00E+03	1.41E+01 G
			1771.35	0.000E+00	-	1.587E+01	1.00E+03	1.55E+01 A
CO-57	C	-2.9140E-01					2.72E+02	
			122.06	-2.914E-01	?(	9.539E-01	9.77E+01	8.56E+01 G
			136.47	0.000E+00	&	1.023E+01	1.00E+03	1.07E+01 G
CO-58	C	-6.6137E-01					7.09E+01	
			810.78	-6.614E-01	?(	1.937E+00	8.70E+01	9.95E+01 G
CO-60	F	3.4912E-01					1.93E+03	
			1332.50	-3.086E-01	?(P	1.903E+00	1.71E+02	1.00E+02 G
			1173.24	1.007E+00	?(P	8.528E-01	3.39E+01	9.99E+01 G
ZN-65	F	8.5226E-01					2.44E+02	
			1115.55	8.523E-01	?(	3.310E+00	1.12E+02	5.06E+01 G
NB-94	I	3.6007E-01					7.41E+06	
			702.63	3.601E-01	?(	8.362E-01	9.62E+01	9.79E+01 G
			871.10	-8.538E-01	+ P	1.932E+00	2.53E+01	9.99E+01 G
ZR-95	I	-1.4060E-01					6.40E+01	
			756.73	-1.406E-01	?(P	1.930E+00	7.86E+02	5.45E+01 G
			724.20	-1.069E-02	% P	4.723E+00	1.64E+04	4.42E+01 G
NB-95	I	3.4677E-02					6.40E+01	
			765.79	3.468E-02	?(	1.090E+00	8.40E+02	9.98E+01 G
RU-103	I	1.0406E-01					3.93E+01	
			497.05	1.041E-01	&(P	8.848E-01	3.33E+02	9.09E+01 G
			610.30	0.000E+00	-	4.050E+01	1.00E+03	5.75E+00 GA
RH-106	I	3.5401E+00					3.74E+02	
			621.92	3.540E+00	&(P	2.279E+01	1.89E+02	9.93E+00 G
			1050.36	-4.748E+00	+ P	1.362E+02	4.19E+02	1.56E+00 G
			511.86	5.055E+00		7.383E+00	7.87E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C -1.3552E-01					1.53E+05	
		433.94	-1.355E-01	?(P	1.085E+00	2.68E+02	9.05E+01 G
		722.94	-2.120E-01	+	2.231E+00	3.03E+02	9.08E+01 G
		614.28	0.000E+00	+	2.606E+00	1.00E+03	8.98E+01 G
AG-110M	F 2.7268E-01					2.50E+02	
		884.68	0.000E+00	?(	1.813E+00	1.00E+03	7.27E+01 G
		657.76	3.456E-01	?(	1.003E+00	8.52E+01	9.46E+01 G
		937.49	-1.791E-01	+	3.719E+00	8.57E+02	3.44E+01 G
		1384.30	0.000E+00	-	2.609E+00	1.00E+03	2.43E+01 G
		763.94	8.525E-01	?(	3.940E+00	1.29E+02	2.23E+01 G
SN-113	F -8.7213E-02					1.15E+02	
		391.69	-8.721E-02	&(P	2.051E+00	5.34E+02	6.40E+01 G
SB-124	F 2.5847E-01					6.02E+01	
		602.73	2.585E-01	&(	2.290E+00	2.58E+02	9.83E+01 G
		1690.98	0.000E+00	-	1.579E+00	1.00E+03	4.78E+01 G
		722.79	-6.302E+00	+	1.686E+01	7.99E+01	1.08E+01 G
SB-125	I 9.3667E-01					1.01E+03	
		427.88	-3.101E-01	?(P	2.606E+00	3.52E+02	2.96E+01 G
		600.50	1.938E+00	?(P	1.214E+01	1.83E+02	1.79E+01 G
		635.89	-3.538E+00	+	1.110E+01	9.23E+01	1.13E+01 G
		463.37	2.753E+00	?(P	9.630E+00	1.02E+02	1.05E+01 G
I-131	I 5.4595E-01					8.02E+00	
		364.48	1.942E-01	?(P	8.902E-01	1.77E+02	8.17E+01 G
		284.30	-2.879E-01	% P	1.809E+01	1.71E+03	6.14E+00 G
		636.97	4.554E+00	?(	1.745E+01	1.11E+02	7.17E+00 G
Gd-153	F 6.3557E-01					2.42E+02	
		97.50	5.332E-01	?(	4.696E+00	2.62E+02	3.00E+01 G
		103.20	7.764E-01	?(	2.545E+00	9.71E+01	2.18E+01 G
Tc-99m	I -3.0083E-01					2.51E-01	
		140.51	-3.008E-01	&(	1.407E+00	1.39E+02	8.93E+01 G
BA-133	F -6.1226E-01					3.85E+03	
		356.00	-6.123E-01	?(	2.814E+00	1.36E+02	6.20E+01 G
		302.85	0.000E+00	+	1.038E+01	1.00E+03	1.83E+01 G
		383.84	5.493E-01	?	1.440E+01	7.50E+02	8.94E+00 GA
		80.99	-9.995E-01	+	3.573E+00	1.07E+02	3.41E+01 GA
CS-134	I 2.3358E-01					7.54E+02	
		604.71	0.000E+00	?(	2.367E+00	1.00E+03	9.76E+01 G
		795.87	4.760E-01	&(	1.398E+00	8.63E+01	8.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			569.32	-1.759E-01	+	6.439E+00	9.95E+02	1.54E+01 G
			801.95	-4.863E+00	+	1.971E+01	1.18E+02	8.69E+00 G
			563.24	4.818E-01	&(	9.400E+00	7.43E+02	8.35E+00 G
CS-137	I	-3.7943E-01					1.10E+04	
			661.66	-3.794E-01	?(P	1.612E+00	2.22E+02	8.52E+01 G
CE-139	F	2.6522E-01					1.38E+02	
			165.85	2.652E-01	(	1.003E+00	1.12E+02	7.99E+01 G
Ba-140	I	-7.9339E-01					1.28E+01	
			537.26	-7.934E-01	&(	4.200E+00	2.13E+02	2.44E+01 G
			162.66	-4.665E+00	+	1.533E+01	9.81E+01	6.22E+00 G
			304.85	0.000E+00	+	4.460E+01	1.00E+03	4.29E+00 G
La-140	I	6.2388E-01					1.28E+01	
			1596.21	5.999E-01	?(P	7.522E-01	4.23E+01	9.54E+01 G
			487.02	3.653E-01	?(	1.661E+00	1.29E+02	4.55E+01 G
			328.76	1.316E+00	?(P	6.271E+00	1.40E+02	2.03E+01 G
			815.77	-2.136E+00	-	9.212E+00	1.26E+02	2.33E+01 G
CE-141	I	2.4798E-01					3.25E+01	
			145.44	2.480E-01	?(	2.546E+00	3.04E+02	4.82E+01 G
PM-144	C	-6.4587E-02					3.63E+02	
			696.54	-6.459E-02	?(	1.222E+00	7.73E+02	9.90E+01 G
			618.06	-4.352E-01	+	2.481E+00	1.68E+02	9.91E+01 G
EU-152	F	1.0684E+00					4.94E+03	
			344.29	-3.605E-02	%(P	5.700E+00	4.08E+03	2.65E+01 G
			1112.07	3.214E+00	?(	1.040E+01	9.40E+01	1.36E+01 G
			121.78	-8.722E-01	+	2.688E+00	9.21E+01	2.86E+01 G
			778.92	-4.973E+00	+ P	1.032E+01	9.61E+01	1.29E+01 G
			964.11	-3.453E+00	+	1.389E+01	1.17E+02	1.46E+01 G
			244.69	-2.760E+00	+	1.991E+01	2.13E+02	7.58E+00 G
			1408.00	4.961E+00	? P	3.062E+00	2.91E+01	2.10E+01 GA
EU-154	I	-2.6104E+00					3.14E+03	
			873.23	-2.610E+00	?(	1.802E+01	1.99E+02	1.23E+01 G
			123.10	5.619E-01	+	1.850E+00	9.81E+01	4.08E+01 G
			1274.54	0.000E+00	+	3.213E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.030E+01	1.00E+03	2.02E+01 G
			1004.77	-2.417E-01	%	1.202E+01	1.39E+03	1.80E+01 G
			996.33	0.000E+00	+	2.012E+01	1.00E+03	1.06E+01 G
EU-155	I	4.9319E-01					1.81E+03	
			105.31	2.779E-01	(P	3.022E+00	3.15E+02	2.12E+01 G
			86.54	6.419E-01	&(	4.286E+00	1.99E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	1.6806E-01					4.24E+01	
			482.00	0.000E+00	?(	1.383E+00	1.00E+03	8.05E+01 G
			133.02	0.000E+00	?(	2.498E+00	1.00E+03	4.33E+01 G
			345.83	1.549E+00	?(	3.841E+00	9.71E+01	1.51E+01 G
			136.30	0.000E+00	-	1.867E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.2413E+00					1.14E+02	
			1121.30	1.243E+00	?(	6.259E+00	1.45E+02	3.49E+01 G
			1221.41	1.239E+00	?(	5.125E+00	1.78E+02	2.70E+01 G
			1189.05	-4.655E-01	-	8.121E+00	7.02E+02	1.62E+01 G
Hg-203	F	1.0890E-01					4.66E+01	
			279.20	1.089E-01	(	1.312E+00	3.48E+02	8.15E+01 G
TL-208	N	1.2067E+00					6.98E+02	
			583.02	1.207E+00	(P	9.021E-01	3.18E+01	8.45E+01 G
			277.28	4.149E+00	+ P	1.579E+01	1.12E+02	6.31E+00 G
			860.56	5.795E+00	+ P	3.397E+00	2.92E+01	1.24E+01 G
pm-146	C	5.4835E-01					2.02E+03	
			747.16	5.483E-01	?(	2.534E+00	1.84E+02	3.40E+01 G
			735.72	-5.949E-01	+	5.096E+00	3.49E+02	2.25E+01 G
			453.88	-6.150E-01	+ P	1.389E+00	8.58E+01	6.50E+01 G
Cd-113m		-5.9751E+03					5.33E+03	
			263.70	-5.975E+03	?(	1.764E+04	8.81E+01	6.00E-03 K
Cd-109	F	-9.2037E-01					4.53E+02	
			88.04	-9.204E-01	%(	3.168E+01	1.01E+03	3.79E+00 G
Cf-251	T	2.2984E+00					3.28E+05	
			176.60	2.298E+00	*(	2.921E+00	5.08E+01	1.70E+01 G
			227.00	2.782E+00	?	1.082E+01	1.54E+02	6.30E+00 GA
Cf-249	T	4.8646E-01					1.28E+05	
			387.95	4.865E-01	&(	1.702E+00	1.03E+02	6.60E+01 G
			333.44	-1.093E+00	+	9.702E+00	2.60E+02	1.55E+01 G
Sn-126		-2.2974E+00					3.65E+07	
			87.57	-7.396E-01	+	3.304E+00	1.33E+02	3.75E+01 GA
			64.28	-2.297E+00	?(	1.368E+01	1.76E+02	9.70E+00 G
			86.94	-3.077E+00	+	1.413E+01	1.37E+02	9.04E+00 GA
PB-210	N	8.1535E+00					8.14E+03	
			46.54	8.153E+00	&(P	2.875E+01	1.04E+02	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	3.0722E+00					6.98E+02	
			238.63	3.072E+00	(P	1.625E+00	1.94E+01	4.33E+01 G
			300.03	-1.071E+01	-	6.096E+01	1.69E+02	3.28E+00 GA
PB-214	N	7.0104E+00					5.84E+05	
			351.93	7.175E+00	(P	1.420E+00	1.22E+01	3.76E+01 G
			295.09	6.689E+00	(	2.161E+00	1.75E+01	1.93E+01 G
			242.00	8.722E+00		7.079E+00	2.83E+01	7.43E+00 GA
BI-207	C	6.4997E-01					1.18E+04	
			569.70	1.454E-01	?(	1.282E+00	2.50E+02	9.77E+01 G
			1063.66	1.312E+00	?(P	6.780E-01	2.79E+01	7.45E+01 G
BI-212	N	4.5355E+00					6.98E+02	
			727.17	4.535E+00	?(P	2.641E+01	1.69E+02	7.55E+00 G
			785.42	-9.051E+00	+ P	9.577E+01	5.40E+02	1.28E+00 GA
U-235	N	-3.1872E+00					2.57E+11	
			143.79	-3.187E+00	*(P	1.164E+01	5.92E+01	1.10E+01 G
			205.33	3.491E+00	& P	1.206E+01	1.30E+02	5.01E+00 G
			163.38	-7.024E+00	+ P	2.008E+01	6.46E+01	5.08E+00 G
			185.72	4.055E-01	+ P	1.410E+00	1.26E+02	5.40E+01 GA
BI-214	N	4.3360E+00					5.84E+05	
			609.31	4.336E+00	(P	1.654E+00	1.99E+01	4.61E+01 G
			1120.29	2.088E+00	& P	1.238E+01	1.68E+02	1.51E+01 G
			1764.49	1.183E+01	+ P	6.256E+00	2.67E+01	1.54E+01 G
BI-210M	T	5.4154E-01					1.10E+09	
			265.83	2.265E-01	?(P	1.904E+00	2.43E+02	5.00E+01 G
			304.90	1.104E+00	?(	5.887E+00	1.58E+02	2.80E+01 G
AC-228	N	4.8341E+00					2.10E+03	
			911.07	4.834E+00	?(	2.647E+00	2.85E+01	2.90E+01 G
			968.97	2.944E+00	-	9.374E+00	9.33E+01	1.75E+01 G
			338.32	4.436E-01	&	1.230E+01	8.03E+02	1.20E+01 G
			93.35	4.184E+00		2.520E+01	1.80E+02	5.56E+00 XA
TH-227	N	-2.1675E+00					7.95E+03	
			50.14	-2.167E+00	?(	1.773E+01	2.40E+02	8.00E+00 G
			256.24	-4.586E+00	+	1.186E+01	1.04E+02	7.00E+00 G
TH-229	N	8.9730E+00					2.68E+06	
			193.51	8.973E+00	(P	1.155E+01	5.14E+01	4.40E+00 G
			210.85	1.846E+00	-	2.234E+01	4.74E+02	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N   1.4159E+01                                     1.63E+12
                          63.29 1.589E+01  (P 2.294E+01 5.79E+01 3.81E+00 G
                          92.59 1.298E+01 *(P 1.227E+01 3.59E+01 5.58E+00 G

PA-231   N  -2.5390E+00                                     1.20E+07
                         302.65-2.539E+00 ?(  6.568E+01 7.60E+02 2.88E+00 G
                         300.07-1.429E+01 +   7.932E+01 1.65E+02 2.46E+00 G

PA-233   C   8.7835E-01                                     7.82E+08
                         312.01 8.783E-01 ?(  4.793E+00 1.62E+02 3.60E+01 G
                         300.18-5.671E+00 +   3.068E+01 1.61E+02 6.20E+00 G

PA-234   N  -2.1536E-01                                     1.63E+12
                         131.29-2.154E-01 ?(  5.948E+00 8.11E+02 1.80E+01 G
                         946.02 0.000E+00 +   8.076E+00 1.00E+03 1.34E+01 G
                         569.47-3.878E+00 +   1.443E+01 1.08E+02 8.20E+00 G
                         883.24 0.000E+00 +   1.371E+01 1.00E+03 9.60E+00 G
                         880.53 1.751E+01     7.170E+00 2.36E+01 6.00E+00 GA

PA-234M  N  -2.1058E+01                                     1.63E+12
                        1001.00-2.106E+01 &(P 2.633E+02 1.65E+02 8.37E-01 G
                         766.41-1.874E+02 +   4.963E+02 7.88E+01 2.94E-01 G

AM-241   T   2.4723E-01                                     1.58E+05
                          59.54 2.472E-01  (P 3.975E+00 4.73E+02 3.59E+01 G

Np-237   F   1.5047E+00                                     2.14E+06
                          86.49 1.505E+00 &(  9.867E+00 1.95E+02 1.31E+01 G

Ir-192   F   5.3316E-01                                     7.40E+01
                         316.49 3.684E-01 &(  2.064E+00 1.66E+02 8.70E+01 G
                         468.06-4.806E-01 +   2.474E+00 1.49E+02 5.18E+01 G
                         308.44 9.848E-01 ?(  5.221E+00 1.57E+02 3.18E+01 G

Cs-136   F   5.1524E-01                                     1.30E+01
                         818.50 5.152E-01 ?(  1.969E+00 1.12E+02 1.00E+02 G
                        1048.07-9.588E-01 +   2.214E+00 6.95E+01 8.00E+01 G
                         340.57 0.000E+00 &   3.189E+00 1.00E+03 4.69E+01 G

Np-239   T  -9.6214E-01                                     2.36E+00
                         103.70 7.052E-01 +   2.499E+00 1.05E+02 2.40E+01 X
                         106.13-9.621E-01 &(  3.382E+00 1.05E+02 2.27E+01 G
                          99.50 6.808E-07 &   9.466E+00 4.11E+08 1.50E+01 X

Nd-147      -9.8287E-02                                     1.11E+01
                         531.00-9.829E-02 %(  6.520E+00 2.56E+03 1.30E+01 G
                          91.10 0.000E+00 +   4.168E+00 1.00E+03 2.83E+01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N   2.5779E-01                                        5.84E+05
                          799.60 2.578E-01 ?(  1.421E+00 1.57E+02 9.90E+01 G
                          296.00-4.391E-01 +   2.563E+00 1.73E+02 7.90E+01 G
                         1313.00-2.738E+00 +   8.351E+00 1.35E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	79.	13.	0.007	104.45	8.153E+00	P
TH-227	50.14	140.	-7.	-0.004	239.56	-2.167E+00	
AM-241	59.54	234.	5.	0.003	472.90	2.472E-01	P
Sn-126	64.28	242.	-13.	-0.007	176.45	-2.297E+00	
BA-133	80.99	302.	-23.	-0.013	106.99	-9.995E-01	
Np-237	86.49	368.	14.	0.008	194.99	1.505E+00	
EU-155	86.54	382.	14.	0.008	198.61	6.419E-01	
Sn-126	86.94	361.	-20.	-0.011	137.09	-3.077E+00	
Sn-126	87.57	341.	-20.	-0.011	133.32	-7.396E-01	
Gd-153	97.50	480.	12.	0.007	261.98	5.332E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	103.20	70.	13.	0.007	97.14	7.764E-01	
Np-239	103.70	83.	13.	0.007	104.89	7.052E-01	
EU-155	105.31	96.	4.	0.002	315.36	2.779E-01	P
Np-239	106.13	140.	-16.	-0.009	104.63	-9.621E-01	
EU-152	121.78	138.	-19.	-0.010	92.07	-8.722E-01	
CO-57	122.06	156.	-19.	-0.010	97.72	-2.914E-01	
EU-154	123.10	132.	17.	0.009	98.11	5.619E-01	
PA-234	131.29	263.	-3.	-0.002	811.38	-2.154E-01	
Tc-99m	140.51	323.	-18.	-0.010	139.46	-3.008E-01	
U-235	143.79	347.	-25.	-0.014	59.16	-3.187E+00	P
CE-141	145.44	316.	8.	0.005	303.75	2.480E-01	
Ba-140	162.66	160.	-19.	-0.010	98.08	-4.665E+00	
U-235	163.38	183.	-23.	-0.013	64.63	-7.024E+00	P
CE-139	165.85	113.	14.	0.008	112.05	2.652E-01	
Cf-251	176.60	37.	24.	0.014	50.78	2.298E+00	
U-235	185.72	85.	13.	0.007	125.75	4.055E-01	P
TH-229	193.51	33.	23.	0.013	51.39	8.973E+00	P
U-235	205.33	44.	10.	0.005	129.84	3.491E+00	P
TH-229	210.85	52.	3.	0.002	474.15	1.846E+00	
Cf-251	227.00	48.	9.	0.005	154.36	2.782E+00	
EU-152	244.69	228.	-10.	-0.006	213.11	-2.760E+00	
TH-227	256.24	60.	-15.	-0.008	104.35	-4.586E+00	
Cd-113m	263.70	96.	-16.	-0.009	88.12	-5.975E+03	
BI-210M	265.83	76.	5.	0.003	243.27	2.265E-01	P
TL-210	296.00	308.	-14.	-0.008	173.49	-4.391E-01	
PA-231	300.07	279.	-15.	-0.008	164.92	-1.429E+01	
PA-233	300.18	265.	-15.	-0.008	160.66	-5.671E+00	
PA-231	302.65	258.	-3.	-0.002	759.83	-2.539E+00	
BI-210M	304.90	192.	13.	0.007	157.84	1.104E+00	
Ir-192	308.44	190.	13.	0.007	156.93	9.848E-01	
PA-233	312.01	203.	13.	0.007	161.56	8.783E-01	
Ir-192	316.49	215.	13.	0.007	165.93	3.684E-01	
CR-51	320.08	206.	12.	0.007	171.83	3.075E+00	
La-140	328.76	98.	10.	0.006	140.15	1.316E+00	P
Cf-249	333.44	136.	-6.	-0.004	259.58	-1.093E+00	
HF-181	345.83	16.	9.	0.005	97.15	1.549E+00	
BA-133	356.00	167.	-14.	-0.008	136.17	-6.123E-01	
I-131	364.48	24.	6.	0.003	176.98	1.942E-01	P
BA-133	383.84	77.	2.	0.001	750.20	5.493E-01	
Cf-249	387.95	57.	11.	0.006	103.13	4.865E-01	
SN-113	391.69	78.	-2.	-0.001	534.24	-8.721E-02	P
SB-125	427.88	21.	-3.	-0.002	352.40	-3.101E-01	P
AG-108M	433.94	35.	-4.	-0.002	267.53	-1.355E-01	P
pm-146	453.88	27.	-12.	-0.007	85.76	-6.150E-01	P
SB-125	463.37	33.	8.	0.005	102.50	2.753E+00	P
Ir-192	468.06	54.	-7.	-0.004	149.48	-4.806E-01	
BE-7	477.60	33.	5.	0.003	174.70	1.615E+00	P
La-140	487.02	16.	5.	0.003	128.90	3.653E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	497.05	17.	3.	0.001	332.69	1.041E-01	P
RH-106	511.86	63.	27.	0.015	78.71	5.055E+00	
Ba-140	537.26	26.	-5.	-0.003	212.92	-7.934E-01	
CS-134	563.24	13.	1.	0.001	742.74	4.818E-01	
CS-134	569.32	22.	-1.	0.000	994.99	-1.759E-01	
PA-234	569.47	32.	-8.	-0.004	108.45	-3.878E+00	
BI-207	569.70	36.	4.	0.002	249.90	1.454E-01	
SB-125	600.50	108.	8.	0.005	183.36	1.938E+00	P
SB-124	602.73	116.	6.	0.003	258.41	2.585E-01	
PM-144	618.06	134.	-10.	-0.006	167.77	-4.352E-01	
RH-106	621.92	111.	8.	0.004	188.51	3.540E+00	P
SB-125	635.89	30.	-9.	-0.005	92.30	-3.538E+00	
I-131	636.97	30.	7.	0.004	111.34	4.554E+00	
AG-110M	657.76	15.	7.	0.004	85.22	3.456E-01	
CS-137	661.66	34.	-7.	-0.004	222.03	-3.794E-01	P
PM-144	696.54	23.	-1.	-0.001	773.39	-6.459E-02	
NB-94	702.63	9.	7.	0.004	96.21	3.601E-01	
SB-124	722.79	54.	-14.	-0.008	79.90	-6.302E+00	
AG-108M	722.94	67.	-4.	-0.002	302.64	-2.120E-01	
BI-212	727.17	64.	7.	0.004	169.22	4.535E+00	P
pm-146	735.72	19.	-3.	-0.001	349.11	-5.949E-01	
pm-146	747.16	9.	4.	0.002	184.30	5.483E-01	
ZR-95	756.73	14.	-1.	-0.001	785.76	-1.406E-01	P
AG-110M	763.94	9.	4.	0.002	128.89	8.525E-01	
NB-95	765.79	15.	1.	0.000	839.64	3.468E-02	
PA-234M	766.41	30.	-11.	-0.006	78.83	-1.874E+02	
EU-152	778.92	24.	-12.	-0.007	96.05	-4.973E+00	P
BI-212	785.42	19.	-2.	-0.001	539.67	-9.051E+00	P
CS-134	795.87	18.	8.	0.004	86.28	4.760E-01	
TL-210	799.60	25.	5.	0.003	156.83	2.578E-01	
CS-134	801.95	39.	-8.	-0.004	118.04	-4.863E+00	
CO-58	810.78	49.	-12.	-0.007	86.98	-6.614E-01	
La-140	815.77	61.	-9.	-0.005	126.24	-2.136E+00	
Cs-136	818.50	51.	9.	0.005	112.10	5.152E-01	
Co-56	846.77	5.	2.	0.001	207.02	1.319E-01	
NB-94	871.10	43.	-15.	-0.008	25.27	-8.538E-01	P
EU-154	873.23	58.	-6.	-0.003	199.19	-2.610E+00	
PA-234	880.53	0.	18.	0.010	23.57	1.751E+01	
AG-110M	937.49	15.	-1.	-0.001	857.32	-1.791E-01	
EU-152	964.11	40.	-8.	-0.004	117.26	-3.453E+00	
PA-234M	1001.00	45.	-3.	-0.002	164.74	-2.106E+01	P
Cs-136	1048.07	25.	-11.	-0.006	69.48	-9.588E-01	
RH-106	1050.36	38.	-1.	-0.001	418.97	-4.748E+00	P
BI-207	1063.66	1.	14.	0.008	27.92	1.312E+00	P
FE-59	1099.25	10.	-1.	-0.001	702.38	-1.248E-01	
EU-152	1112.07	14.	6.	0.003	93.97	3.214E+00	
ZN-65	1115.55	20.	6.	0.003	111.90	8.523E-01	
Sc-46	1120.55	30.	6.	0.003	133.46	4.337E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1121.30	35.	6.	0.003	144.97	1.243E+00		
CO-60	1173.24	4.	14.	0.007	33.85	1.007E+00		P
Ta-182	1189.05	10.	-1.	-0.001	702.38	-4.655E-01		
Ta-182	1221.41	11.	4.	0.002	177.92	1.239E+00		
Co-56	1238.28	27.	-7.	-0.004	180.28	-7.879E-01		
NA-22	1274.53	5.	1.	0.000	504.98	5.340E-02		
FE-59	1291.60	5.	6.	0.004	92.55	1.182E+00		P
TL-210	1313.00	16.	-7.	-0.004	135.27	-2.738E+00		
CO-60	1332.50	19.	-4.	-0.002	171.00	-3.086E-01		P
EU-152	1408.00	0.	12.	0.007	29.14	4.961E+00		P
La-140	1596.21	0.	6.	0.003	42.25	5.999E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	1.6153E+00	1.6153E+00	1.747E+02%	9.87E+00
NA-22	#A	5.3404E-02	5.3404E-02	5.050E+02%	1.08E+00
K-40		1.2550E+02	1.2550E+02	8.399E+00%	9.55E+00
Sc-46	#A	2.1684E-01	2.1684E-01	1.335E+02%	1.32E+00
CR-51	#A	3.0752E+00	3.0753E+00	1.718E+02%	1.79E+01
MN-54	#A	-3.7213E-02	-3.7213E-02	1.380E+03%	1.28E+00
FE-59	#A	4.4158E-01	4.4158E-01	9.255E+01%	2.18E+00
Co-56	#A	1.3187E-01	1.3187E-01	2.070E+02%	7.22E-01
CO-57	#A	-2.9140E-01	-2.9140E-01	9.772E+01%	9.54E-01
CO-58	#A	-6.6136E-01	-6.6137E-01	8.698E+01%	1.94E+00
CO-60	#A	3.4912E-01	3.4912E-01	3.385E+01%	1.90E+00
ZN-65	#A	8.5226E-01	8.5226E-01	1.119E+02%	3.31E+00
NB-94	#A	3.6007E-01	3.6007E-01	9.621E+01%	8.36E-01
ZR-95	#A	-1.4060E-01	-1.4060E-01	7.858E+02%	1.93E+00
NB-95	#A	3.4677E-02	3.4677E-02	8.396E+02%	1.09E+00
RU-103	#A	1.0406E-01	1.0406E-01	3.327E+02%	8.85E-01
RH-106	#A	3.5401E+00	3.5401E+00	1.885E+02%	2.28E+01
AG-108M	#A	-1.3552E-01	-1.3552E-01	2.675E+02%	1.09E+00
AG-110M	#A	2.7268E-01	2.7268E-01	8.522E+01%	1.81E+00
SN-113	#A	-8.7213E-02	-8.7213E-02	5.342E+02%	2.05E+00
SB-124	#A	2.5846E-01	2.5847E-01	2.584E+02%	2.29E+00
SB-125	#A	9.3667E-01	9.3667E-01	1.025E+02%	2.61E+00
I-131	#A	5.4591E-01	5.4595E-01	1.045E+02%	8.90E-01
Gd-153	#A	6.3556E-01	6.3557E-01	9.714E+01%	4.70E+00
Ga-68	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.33E+01
Tc-99m	#A	-3.0009E-01	-3.0083E-01	1.395E+02%	1.41E+00
BA-133	#A	-6.1226E-01	-6.1226E-01	1.362E+02%	2.81E+00
CS-134	#A	2.3358E-01	2.3358E-01	8.628E+01%	2.37E+00
CS-137	#A	-3.7943E-01	-3.7943E-01	2.220E+02%	1.61E+00

CE-139 #A	2.6522E-01	2.6522E-01	1.121E+02%	1.00E+00
Ba-140 #A	-7.9335E-01	-7.9339E-01	2.129E+02%	4.20E+00
La-140 #A	6.2385E-01	6.2388E-01	4.225E+01%	7.52E-01
CE-141 #A	2.4797E-01	2.4798E-01	3.038E+02%	2.55E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	9.77E+00
PM-144 #A	-6.4587E-02	-6.4587E-02	7.734E+02%	1.22E+00
EU-152 #A	1.0684E+00	1.0684E+00	9.397E+01%	5.70E+00
EU-154 #A	-2.6104E+00	-2.6104E+00	1.992E+02%	1.80E+01
EU-155 #A	4.9319E-01	4.9319E-01	1.863E+02%	3.02E+00
HF-181 #A	1.6806E-01	1.6806E-01	9.715E+01%	1.38E+00
Ta-182 #A	1.2413E+00	1.2413E+00	1.148E+02%	6.26E+00
Hg-203 A	1.0890E-01	1.0890E-01	3.482E+02%	1.31E+00
TL-208	1.2067E+00	1.2067E+00	3.181E+01%	9.02E-01
pm-146 #A	5.4835E-01	5.4835E-01	1.843E+02%	2.53E+00
y-88 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.28E+00
Cd-113m#A	-5.9751E+03	-5.9751E+03	8.812E+01%	1.76E+04
Cd-109 #A	-9.2037E-01	-9.2037E-01	1.014E+03%	3.17E+01
Cf-251 #A	2.2984E+00	2.2984E+00	5.078E+01%	2.92E+00
Cf-249 #A	4.8646E-01	4.8646E-01	1.031E+02%	1.70E+00
Sn-126 #A	-2.2974E+00	-2.2974E+00	1.764E+02%	1.37E+01
PB-210 #A	8.1535E+00	8.1535E+00	1.044E+02%	2.87E+01
PB-212	3.0722E+00	3.0722E+00	1.941E+01%	1.62E+00
PB-214	7.0104E+00	7.0104E+00	1.065E+01%	1.42E+00
BI-207 #A	6.4997E-01	6.4997E-01	2.792E+01%	1.28E+00
BI-212 #A	4.5355E+00	4.5355E+00	1.692E+02%	2.64E+01
U-235 #A	-3.1872E+00	-3.1872E+00	5.916E+01%	1.16E+01
BI-214	4.3360E+00	4.3360E+00	1.989E+01%	1.65E+00
BI-210M#A	5.4154E-01	5.4154E-01	1.450E+02%	1.90E+00
AC-228	4.8341E+00	4.8341E+00	2.854E+01%	2.65E+00
TH-227 #A	-2.1675E+00	-2.1675E+00	2.396E+02%	1.77E+01
TH-229 #A	8.9730E+00	8.9730E+00	5.139E+01%	1.15E+01
TH-234 A	1.4159E+01	1.4159E+01	3.406E+01%	2.29E+01
PA-231 #A	-2.5390E+00	-2.5390E+00	7.598E+02%	6.57E+01
PA-233 #A	8.7835E-01	8.7835E-01	1.616E+02%	4.79E+00
PA-234 #A	-2.1536E-01	-2.1536E-01	8.114E+02%	5.95E+00
PA-234M#A	-2.1058E+01	-2.1058E+01	1.647E+02%	2.63E+02
AM-241 #A	2.4723E-01	2.4723E-01	4.729E+02%	3.97E+00
Np-237 #A	1.5047E+00	1.5047E+00	1.950E+02%	9.87E+00
Ir-192 #A	5.3316E-01	5.3316E-01	1.142E+02%	2.06E+00
Cs-136 #A	5.1522E-01	5.1524E-01	1.121E+02%	1.97E+00
Np-239 #A	-9.6188E-01	-9.6214E-01	1.046E+02%	3.38E+00
Nd-147 #A	-9.8282E-02	-9.8287E-02	2.555E+03%	6.52E+00
TL-210 #A	2.5779E-01	2.5779E-01	1.568E+02%	1.42E+00

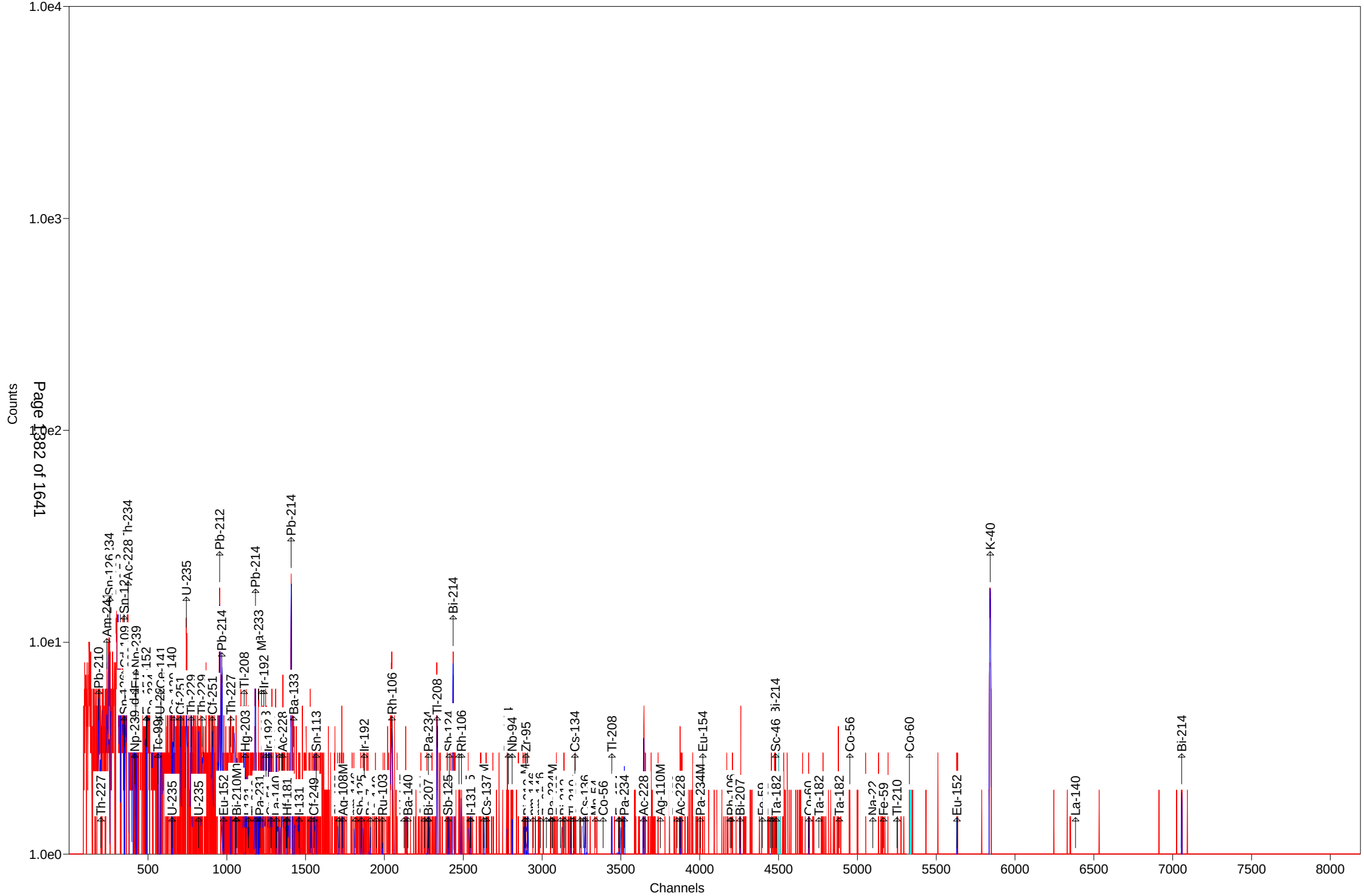
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.601E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.6011719E+02 Bq/Sample

376766_Gamma_160-29521-A-21-C. 8_Gamma_20182813.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20183378

Sample Description: 376766_Gamma_160-29521-A-22-B
Detector: Detector # 9
Batch ID: 376766
Work Order Number: Gamma
Lot Number: 160-29521-A-22-B

Decay to Time: 8/9/2018 20:36 Live Time: 1800 sec
Acquisition Time: 8/9/2018 20:36:52 Real Time: 1803 sec
Analysis Time: 8/9/2018 21:07 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev14.lib
Bkgd Correction File: 9_2018-07-14_1810.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.222E+00	100.7	2.237E+00	2.240E+00	7.607E+00
NA-22	3.235E-01	66.4	2.147E-01	2.153E-01	7.050E-01
K-40	1.600E+02	5.9	9.476E+00	1.252E+01	8.205E+00
Sc-46	1.817E-01	122.6	2.228E-01	2.230E-01	1.044E+00
CR-51	-2.104E+00	110.2	2.317E+00	2.320E+00	7.853E+00
MN-54	2.198E-01	122.9	2.700E-01	2.702E-01	6.390E-01
FE-59	-1.340E+00	44.4	5.946E-01	5.984E-01	2.663E+00
Co-56	5.927E-01	25.0	1.482E-01	1.513E-01	2.730E-01
CO-57	1.579E-01	159.6	2.520E-01	2.521E-01	7.432E-01
CO-58	2.953E-01	84.6	2.500E-01	2.504E-01	8.479E-01
CO-60	1.882E-02	2237.8	4.212E-01	4.212E-01	9.848E-01
ZN-65	0.000E+00	1.#INF	1.283E-01	1.283E-01	3.410E+00
NB-94	2.104E-01	66.1	1.391E-01	1.395E-01	1.006E+00
ZR-95	5.523E-01	102.1	5.640E-01	5.648E-01	1.300E+00
NB-95	-3.435E-02	953.9	3.277E-01	3.277E-01	1.167E+00
RU-103	2.369E-01	103.8	2.459E-01	2.462E-01	6.045E-01
RH-106	3.048E+00	112.7	3.436E+00	3.440E+00	1.976E+01
AG-108M	-3.707E-01	93.9	3.481E-01	3.486E-01	8.313E-01
AG-110M	3.373E-01	36.6	1.235E-01	1.247E-01	1.419E+00
SN-113	3.329E-01	121.3	4.037E-01	4.041E-01	1.373E+00
SB-124	-8.026E-02	54.7	4.390E-02	4.410E-02	2.125E+00
SB-125	1.405E+00	21.2	2.983E-01	3.068E-01	2.140E+00
I-131	1.616E-01	260.2	4.206E-01	4.207E-01	7.510E-01
Gd-153	-2.696E-07	433132961.3	1.168E+00	1.168E+00	3.944E+00
Ga-68	-5.286E-01	3154.4	1.667E+01	1.668E+01	3.843E+01
Tc-99m	1.782E-01	163.4	2.911E-01	2.913E-01	9.806E-01
BA-133	-4.459E-01	141.0	6.286E-01	6.290E-01	2.120E+00
CS-134	-5.932E-02	81.6	4.840E-02	4.850E-02	2.079E+00
CS-137	2.613E-01	100.0	2.613E-01	2.617E-01	8.960E-01
CE-139	-3.001E-01	94.6	2.840E-01	2.854E-01	9.496E-01
Ba-140	0.000E+00	1.#INF	2.157E-01	2.157E-01	2.855E+00
La-140	2.543E-01	117.0	2.974E-01	2.977E-01	4.733E-01
CE-141	-5.311E-01	143.2	7.603E-01	7.608E-01	2.541E+00

CE-144	1.357E+00	150.8	2.047E+00	2.048E+00	6.900E+00
PM-144	2.857E-02	853.8	2.440E-01	2.440E-01	8.836E-01
EU-152	8.318E-01	107.9	8.974E-01	8.984E-01	4.696E+00
EU-154	5.662E-01	231.6	1.312E+00	1.312E+00	7.451E+00
EU-155	-1.643E-02	5433.9	8.926E-01	8.926E-01	3.351E+00
HF-181	5.275E-01	68.4	3.607E-01	3.617E-01	1.100E+00
Ta-182	6.866E-02	2049.2	1.407E+00	1.407E+00	4.983E+00
Hg-203	-9.482E-02	273.3	2.592E-01	2.592E-01	8.967E-01
TL-208	1.790E+00	19.8	3.546E-01	3.666E-01	6.417E-01
pm-146	3.035E-01	94.8	2.877E-01	2.881E-01	2.260E+00
y-88	-2.523E-01	52.6	1.326E-01	1.332E-01	9.971E-01
Cd-113m	-1.061E+03	276.1	2.931E+03	2.932E+03	1.022E+04
Cd-109	0.000E+00	1.#INF	9.887E+00	9.887E+00	3.308E+01
Cf-251	7.184E-01	155.2	1.115E+00	1.117E+00	2.915E+00
Cf-249	-2.814E-01	171.5	4.825E-01	4.828E-01	1.645E+00
Sn-126	2.155E+00	131.8	2.841E+00	2.843E+00	9.569E+00
PB-210	7.779E+00	108.1	8.408E+00	8.420E+00	2.830E+01
PB-212	3.848E+00	11.8	4.536E-01	5.174E-01	9.865E-01
PB-214	5.769E+00	12.5	7.210E-01	7.809E-01	1.198E+00
BI-207	9.038E-02	315.5	2.851E-01	2.852E-01	9.969E-01
BI-212	-1.277E-01	3222.6	4.116E+00	4.116E+00	1.472E+01
U-235	-3.743E-01	64.6	2.420E-01	2.427E-01	1.147E+01
BI-214	6.188E+00	12.1	7.461E-01	8.124E-01	1.229E+00
BI-210M	-9.606E-02	428.2	4.113E-01	4.113E-01	1.430E+00
AC-228	3.399E+00	30.3	1.031E+00	1.045E+00	2.357E+00
TH-227	-1.996E+00	224.8	4.487E+00	4.488E+00	1.526E+01
TH-229	3.112E+00	106.0	3.300E+00	3.310E+00	1.111E+01
TH-234	3.409E+00	217.3	7.408E+00	7.410E+00	2.513E+01
PA-231	0.000E+00	1.#INF	2.975E+00	2.976E+00	4.850E+01
PA-233	-2.305E-02	4757.0	1.096E+00	1.096E+00	3.965E+00
PA-234	5.155E-01	220.6	1.137E+00	1.138E+00	4.021E+00
PA-234M	3.074E+01	117.6	3.614E+01	3.617E+01	1.253E+02
AM-241	-2.397E-01	380.5	9.121E-01	9.122E-01	3.102E+00
Np-237	3.428E+00	26.5	9.078E-01	9.277E-01	2.637E+00
Ir-192	6.218E-02	351.2	2.184E-01	2.184E-01	7.659E-01
Cs-136	2.099E-01	128.4	2.695E-01	2.698E-01	9.382E-01
Np-239	-4.599E-02	1878.8	8.640E-01	8.640E-01	2.968E+00
Nd-147	1.605E+00	98.6	1.582E+00	1.584E+00	3.914E+00
TL-210	2.999E-01	92.6	2.777E-01	2.782E-01	9.501E-01
Total	2.498E+02				

Analyst: Morgan Reichert

Sample description
376766_Gamma_160-29521-A-22-B

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20183378.An1

Acquisition information
Start time: 8/9/2018 8:36:52 PM
Live time: 1800
Real time: 1803
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/9/2018 8:36:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-07-14_1810.PBC 7/14/2018 6:10:12 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1507

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	15.	108.09	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
63.29	9.	217.32	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
65.11	15.	131.82	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
77.28	69.	21.94	0.85	4.684E-02				
86.77	40.	26.48	1.04	5.008E-02	86.49	13.100	3.428E+00	Np237
					86.54	30.700	1.462E+00	EU155
					86.94	9.040	4.955E+00	Sn126
87.85	13.	104.32	1.04	5.038E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	3.764E+00	Cd109
92.98	38.	40.46	0.33	5.171E-02	93.35	5.561	PBC<MDA	AC228
99.50	16.	121.19	1.05	5.266E-02	99.50	15.000	PBC<MDA	Np239
123.10	4.	364.81	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
131.29	8.	262.31	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
133.02	14.	146.07	1.08	5.195E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.357E+00	CE144
133.54	14.	150.80	1.08	5.189E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.357E+00	CE144
136.30	14.	155.08	1.08	5.152E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.424E+00	CO57
136.47	14.	159.59	1.08	5.150E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.424E+00	CO57
140.51	14.	163.38	1.09	5.091E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.54	10.	155.24	1.12	4.549E-02	176.60	17.000	PBC<MDA	Cf251
185.72	31.	51.44	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	14.	106.03	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
205.33	16.	101.25	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	543.55	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
227.00	12.	100.60	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
238.48	116.	15.49	1.16	3.734E-02	238.63	43.300	3.971E+00	PB212
241.87	33.	32.75	1.18	3.697E-02	242.00	7.430	6.636E+00	PB214
284.30	3.	474.15	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
294.78	9.	244.12	1.23	3.232E-02	295.09	19.300	PBC<MDA	PB214
296.00	14.	158.81	1.23	3.225E-02	296.00	79.000	PBC<MDA	TL210
300.03	13.	180.99	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.036E+00	PA231
					300.18	6.200	3.586E+00	PA233
316.49	3.	351.19	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
338.40	10.	198.36	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228
345.83	12.	131.52	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181
351.78	112.	12.50	1.27	2.860E-02	351.93	37.600	5.769E+00	PB214
364.48	5.	260.21	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
391.69	10.	121.28	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
453.88	10.	94.80	1.37	2.388E-02	453.88	65.000	PBC<MDA	pm146
463.37	34.	21.23	1.38	2.352E-02	463.37	10.470	7.594E+00	SB125
477.60	10.	100.68	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
482.00	10.	110.18	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	150.04	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
497.05	9.	103.77	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	65.	26.83	2.67	2.188E-02	511.86	20.000	8.251E+00	RH106
531.00	8.	98.56	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
569.70	3.	315.47	1.47	2.023E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.077E+00	PA234
					569.70	97.740	PBC<MDA	BI207
583.08	54.	19.81	1.33	1.989E-02	583.02	84.500	1.790E+00	TL208
609.21	99.	12.06	1.47	1.925E-02	609.31	46.090	6.188E+00	BI214
657.76	7.	97.07	1.54	1.818E-02	657.76	94.640	PBC<MDA	AG110M
661.66	7.	100.00	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
696.54	1.	853.80	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
702.63	3.	287.19	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
722.79	10.	78.20	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.476E-01	AG108M
					723.36	20.220	1.562E+00	EU154
722.94	10.	90.52	1.60	1.693E-02	722.79	10.810	2.920E+00	SB124
					722.94	90.840	3.476E-01	AG108M
					723.36	20.220	1.562E+00	EU154
723.36	2.	415.28	1.60	1.692E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	8.148E-02	AG108M
					723.36	20.220	3.662E-01	EU154
747.16	2.	398.21	1.62	1.651E-02	747.16	34.000	PBC<MDA	pm146
756.73	9.	102.13	1.62	1.635E-02	756.73	54.460	PBC<MDA	ZR95

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	11.	95.30	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	8.	81.58	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
799.60	8.	95.29	1.66	1.568E-02	799.60	98.960	PBC<MDA	TL210
810.78	8.	84.64	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
815.77	7.	116.95	1.67	1.544E-02	815.77	23.280	PBC<MDA	La140
818.50	6.	128.36	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
834.85	6.	122.85	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
846.77	16.	25.00	1.70	1.501E-02	846.77	99.935	5.927E-01	Co56
871.10	8.	66.12	1.71	1.468E-02	871.10	99.890	PBC<MDA	NB94
873.23	3.	231.64	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
911.33	29.	30.32	1.75	1.418E-02	911.07	29.000	3.918E+00	AC228
946.02	2.	354.73	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
964.11	9.	107.87	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
969.33	11.	83.15	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
1001.00	6.	117.56	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M
1050.36	8.	112.73	1.85	1.269E-02	1050.36	1.560	PBC<MDA	RH106
1112.07	2.	501.09	1.89	1.213E-02	1112.07	13.644	PBC<MDA	EU152
1120.29	8.	121.86	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	8.	122.65	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.826E-01	Sc46
					1121.30	34.900	1.097E+00	Ta182
1238.28	4.	276.06	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	66.37	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	9.187E-01	EU154
1384.30	8.	36.60	2.08	1.018E-02	1384.30	24.290	1.902E+00	AG110M
1408.00	6.	46.74	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1460.54	300.	5.92	2.08	9.749E-03	1460.83	10.670	1.600E+02	K40
1764.12	5.	122.93	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.73	77.28	57.	69.	1.477E+03	21.94	0.847	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	130.	15.	0.009	108.09	0.998s
TH-227	200.20	50.14	171.	-8.	-0.005	224.82	1.001s
AM-241	237.77	59.54	230.	-6.	-0.003	380.54	1.010s
TH-234	252.77	63.29	194.	9.	0.005	217.32	1.014s
Sn-126	256.74	64.28	188.	15.	0.008	131.82	1.015s
BA-133	323.56	80.99	349.	-25.	-0.014	72.19	1.031s
Np-237	345.55	86.49	37.	40.	0.022	26.48	1.037D
EU-155	345.76	86.54	610.	-20.	-0.011	175.64	1.036
Sn-126	347.35	86.94	590.	-20.	-0.011	172.74	1.037
Sn-126	349.87	87.57	546.	13.	0.007	104.32	1.037D
Cd-109	351.75	88.04	570.	0.	0.000	169.63	1.038A
Nd-147	363.99	91.10	528.	-18.	-0.010	186.77	1.041s
TH-234	369.94	92.59	546.	0.	0.000	1000.00	1.042s
AC-228	371.50	92.98	61.	38.	0.021	40.46	0.332s
Np-239	397.58	99.50	180.	16.	0.009	121.19	1.049s
Gd-153	412.37	103.20	196.	0.	0.000	1000.00	1.052s
Np-239	414.37	103.70	196.	0.	0.000	1000.00	1.053s
EU-152	486.65	121.78	144.	-11.	-0.006	157.20	1.070s
CO-57	487.80	122.06	155.	0.	0.000	1000.00	1.070s
EU-154	491.95	123.10	132.	4.	0.002	364.81	1.071s
PA-234	524.72	131.29	196.	8.	0.004	262.31	1.079
HF-181	531.64	133.02	204.	14.	0.008	146.07	1.081s
CE-144	533.69	133.54	218.	14.	0.008	150.80	1.081s
HF-181	544.74	136.30	232.	14.	0.008	155.08	1.084s
CO-57	545.43	136.47	246.	14.	0.008	159.59	1.084s
Tc-99m	561.57	140.51	260.	14.	0.008	163.38	1.088s
U-235	574.67	143.79	571.	-25.	-0.014	80.41	1.091s
CE-141	581.29	145.44	535.	-23.	-0.013	143.16	1.092s
Ba-140	650.15	162.66	150.	-14.	-0.008	146.21	1.108s
U-235	653.03	163.38	163.	0.	0.000	1000.00	1.109s
CE-139	662.92	165.85	177.	-20.	-0.011	94.62	1.111
Cf-251	705.90	176.60	66.	10.	0.006	155.24	1.122s
U-235	742.37	185.72	62.	31.	0.017	51.44	1.130s
TH-229	773.52	193.51	56.	14.	0.008	106.03	1.137s
U-235	820.80	205.33	64.	16.	0.009	101.25	1.148s
TH-229	842.87	210.85	81.	3.	0.002	543.55	1.153s
Cf-251	907.45	227.00	36.	12.	0.007	100.60	1.168
PB-212	953.97	238.63	31.	112.	0.062	11.79	1.179D
PB-214	967.43	242.00	41.	33.	0.018	32.75	1.182D
EU-152	978.21	244.69	328.	-19.	-0.010	137.60	1.185s
TH-227	1024.40	256.24	84.	-19.	-0.011	97.01	1.195
Cd-113m	1054.23	263.70	59.	-4.	-0.002	276.13	1.202s
BI-210M	1062.75	265.83	81.	-3.	-0.002	428.17	1.204s
TL-208	1108.55	277.28	61.	-7.	-0.004	169.71	1.215s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1116.22	279.20	79.	-5.	-0.003	273.30	1.216s
I-131	1136.61	284.30	52.	3.	0.002	474.15	1.221s
PB-214	1179.77	295.09	238.	9.	0.005	244.12	1.231
TL-210	1183.41	296.00	247.	14.	0.008	158.81	1.231s
PB-212	1199.52	300.03	261.	13.	0.007	180.99	1.235
PA-233	1200.12	300.18	274.	0.	0.000	1000.00	1.235s
PA-231	1210.00	302.65	274.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	274.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	274.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	274.	0.	0.000	1000.00	1.240
Ir-192	1233.16	308.44	274.	0.	0.000	1000.00	1.243s
Ir-192	1265.35	316.49	54.	3.	0.002	351.19	1.250s
CR-51	1279.73	320.08	74.	-12.	-0.006	110.16	1.253s
La-140	1314.43	328.76	184.	-5.	-0.003	399.32	1.261s
Cf-249	1333.15	333.44	179.	0.	0.000	1000.00	1.265s
AC-228	1352.66	338.32	179.	10.	0.005	198.36	1.270s
Cs-136	1361.66	340.57	179.	0.	0.000	1000.00	1.272s
EU-152	1376.53	344.29	179.	0.	0.000	1000.00	1.275s
HF-181	1382.70	345.83	113.	12.	0.007	131.52	1.276s
PB-214	1406.49	351.78	19.	112.	0.062	12.50	1.273
BA-133	1423.37	356.00	191.	-14.	-0.008	140.97	1.285s
I-131	1457.31	364.48	36.	5.	0.003	260.21	1.293s
BA-133	1534.73	383.84	99.	-16.	-0.009	77.94	1.310s
Cf-249	1551.17	387.95	113.	-9.	-0.005	171.47	1.314s
SN-113	1566.12	391.69	71.	10.	0.006	121.28	1.317s
SB-125	1710.86	427.88	30.	-10.	-0.006	118.75	1.349s
AG-108M	1735.10	433.94	43.	-15.	-0.008	93.89	1.354s
pm-146	1814.87	453.88	17.	10.	0.005	94.80	1.372s
SB-125	1852.82	463.37	9.	34.	0.019	21.23	1.380s
Ir-192	1871.59	468.06	87.	-13.	-0.007	107.20	1.384s
BE-7	1909.73	477.60	43.	10.	0.005	100.68	1.392s
HF-181	1927.34	482.00	52.	10.	0.005	110.18	1.396s
La-140	1947.43	487.02	61.	8.	0.004	150.04	1.400
RU-103	1987.56	497.05	17.	9.	0.005	103.77	1.409s
RH-106	2046.81	511.86	35.	65.	0.036	26.83	2.672s
Nd-147	2123.35	531.00	13.	8.	0.004	98.56	1.438s
Ba-140	2148.39	537.26	26.	0.	0.000	1000.00	1.444s
CS-134	2252.30	563.24	28.	0.	0.000	1000.00	1.466s
CS-134	2276.64	569.32	37.	-12.	-0.007	75.63	1.471
PA-234	2277.24	569.47	50.	0.	0.000	1000.00	1.471
BI-207	2278.16	569.70	49.	3.	0.002	315.47	1.471s
TL-208	2331.67	583.08	13.	54.	0.030	19.81	1.329s
SB-125	2401.36	600.50	240.	-14.	-0.008	161.54	1.497s
SB-124	2410.29	602.73	227.	-14.	-0.008	76.52	1.499
CS-134	2418.21	604.71	213.	-14.	-0.008	151.92	1.500s
BI-214	2436.22	609.21	13.	99.	0.055	12.06	1.473
RU-103	2440.56	610.30	199.	-9.	-0.005	220.84	1.505s
AG-108M	2456.49	614.28	190.	0.	0.000	1000.00	1.508s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	2471.62	618.06	190.	0.	0.000	1000.00	1.512s
RH-106	2487.04	621.92	190.	0.	0.000	1000.00	1.515s
SB-125	2542.94	635.89	17.	0.	0.000	1000.00	1.526s
I-131	2547.28	636.97	22.	-5.	-0.003	253.17	1.527s
AG-110M	2630.43	657.76	10.	7.	0.004	97.07	1.544s
CS-137	2646.03	661.66	23.	7.	0.004	100.00	1.548
PM-144	2785.58	696.54	28.	1.	0.000	853.80	1.576s
NB-94	2809.93	702.63	36.	3.	0.002	287.19	1.581s
SB-124	2890.57	722.79	24.	10.	0.005	78.20	1.598s
AG-108M	2891.17	722.94	33.	10.	0.005	90.52	1.598s
EU-154	2892.85	723.36	43.	2.	0.001	415.28	1.598s
ZR-95	2896.22	724.20	70.	-15.	-0.008	84.84	1.599s
pm-146	2942.31	735.72	28.	-6.	-0.003	191.49	1.608s
pm-146	2988.08	747.16	19.	2.	0.001	398.21	1.617s
ZR-95	3026.36	756.73	15.	9.	0.005	102.13	1.625s
AG-110M	3055.23	763.94	36.	-7.	-0.004	126.97	1.631s
NB-95	3062.61	765.79	45.	-1.	-0.001	953.94	1.632s
PA-234M	3065.10	766.41	48.	0.	0.000	1000.00	1.633s
EU-152	3115.14	778.92	25.	-9.	-0.005	126.60	1.643s
BI-212	3141.15	785.42	46.	11.	0.006	95.30	1.648
CS-134	3182.95	795.87	18.	8.	0.005	81.58	1.656s
TL-210	3197.88	799.60	26.	8.	0.005	95.29	1.659s
CS-134	3207.29	801.95	61.	-13.	-0.007	90.15	1.661s
CO-58	3242.59	810.78	20.	8.	0.005	84.64	1.668s
La-140	3262.58	815.77	28.	7.	0.004	116.95	1.672s
Cs-136	3273.50	818.50	25.	6.	0.003	128.36	1.674s
MN-54	3338.91	834.85	10.	6.	0.003	122.85	1.687s
Co-56	3386.61	846.77	0.	16.	0.009	25.00	1.696s
TL-208	3441.80	860.56	51.	-19.	-0.011	14.36	1.707s
NB-94	3483.94	871.10	11.	8.	0.005	66.12	1.715s
EU-154	3492.47	873.23	21.	3.	0.002	231.64	1.717s
PA-234	3532.53	883.24	33.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	27.	-1.	-0.001	741.62	1.725s
y-88	3591.74	898.04	21.	-6.	-0.003	52.56	1.736s
AC-228	3643.88	911.07	10.	29.	0.016	30.32	1.746s
AG-110M	3749.60	937.49	25.	-7.	-0.004	161.52	1.766s
PA-234	3783.72	946.02	10.	2.	0.001	354.73	1.772s
EU-152	3856.11	964.11	40.	9.	0.005	107.87	1.786s
AC-228	3875.56	968.97	35.	11.	0.006	83.15	1.790s
EU-154	3985.03	996.33	43.	-13.	-0.007	78.60	1.810s
PA-234M	4003.71	1001.00	23.	6.	0.003	117.56	1.814s
EU-154	4018.82	1004.77	6.	0.	0.000	1000.00	1.816s
Co-56	4151.13	1037.84	16.	-3.	-0.002	223.20	1.841s
Cs-136	4192.07	1048.07	33.	-9.	-0.005	93.40	1.848s
RH-106	4201.23	1050.36	37.	8.	0.004	112.73	1.850s
BI-207	4254.46	1063.66	33.	-17.	-0.009	43.59	1.860s
FE-59	4396.88	1099.25	43.	-17.	-0.009	44.38	1.886s
EU-152	4448.20	1112.07	54.	2.	0.001	501.09	1.895s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4462.09	1115.55	56.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	41.	8.	0.004	121.86	1.901s
Sc-46	4482.12	1120.55	48.	8.	0.005	122.65	1.901s
CO-60	4692.96	1173.24	17.	-6.	-0.003	172.98	1.938s
Ta-182	4756.25	1189.05	17.	-3.	-0.002	327.45	1.949s
Ta-182	4885.75	1221.41	34.	-13.	-0.007	108.79	1.972
Co-56	4953.27	1238.28	23.	4.	0.002	276.06	1.984s
NA-22	5098.35	1274.53	6.	6.	0.004	66.37	2.008s
EU-154	5098.40	1274.54	12.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	40.	-17.	-0.009	91.95	2.020
TL-210	5252.32	1313.00	17.	-4.	-0.002	246.86	2.034s
AG-110M	5537.69	1384.30	1.	8.	0.005	36.60	2.082s
EU-152	5632.56	1408.00	1.	6.	0.003	46.74	2.097s
K-40	5842.86	1460.54	7.	300.	0.166	5.92	2.078
SB-124	6765.35	1690.98	19.	-11.	-0.006	159.14	2.272s
BI-214	7059.65	1764.49	14.	5.	0.003	122.93	2.314s
Co-56	7087.11	1771.35	8.	0.	0.000	1000.00	2.318s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.2217E+00					5.31E+01	
			477.60	2.222E+00	?(	7.607E+00	1.01E+02	1.05E+01 G
NA-22	C	3.2349E-01					9.50E+02	
			1274.53	3.235E-01	?(	7.050E-01	6.64E+01	9.99E+01 G
K-40	N	1.6003E+02					4.66E+11	
			1460.83	1.600E+02	(P	8.205E+00	5.92E+00	1.07E+01 G
Sc-46	F	1.8167E-01					8.38E+01	
			889.28	-1.923E-02	%(	1.044E+00	1.49E+03	1.00E+02 G
			1120.55	3.826E-01	&(	1.608E+00	1.23E+02	1.00E+02 G
CR-51	F	-2.1035E+00					2.77E+01	
			320.08	-2.104E+00	?(	7.853E+00	1.10E+02	9.94E+00 G
MN-54	C	2.1977E-01					3.12E+02	
			834.85	2.198E-01	?(	6.390E-01	1.23E+02	1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	-1.3397E+00					4.45E+01	
			1099.25	-1.340E+00	?(P	2.663E+00	4.44E+01	5.65E+01 G
			1291.60	-1.991E+00	+	3.829E+00	9.19E+01	4.32E+01 G
Co-56	C	5.9274E-01					7.73E+01	
			846.77	5.927E-01	&(	2.730E-01	2.50E+01	9.99E+01 G
			1238.28	3.110E-01	- P	1.887E+00	2.76E+02	6.61E+01 G
			1037.84	-9.930E-01	- P	6.595E+00	2.23E+02	1.41E+01 G
			1771.35	0.000E+00	-	6.870E+00	1.00E+03	1.55E+01 A
CO-57	C	1.5790E-01					2.72E+02	
			122.06	0.000E+00	(	7.432E-01	1.00E+03	8.56E+01 G
			136.47	1.424E+00	*(	7.654E+00	1.60E+02	1.07E+01 G
CO-58	C	2.9531E-01					7.09E+01	
			810.78	2.953E-01	?(	8.479E-01	8.46E+01	9.95E+01 G
CO-60	F	1.8823E-02					1.93E+03	
			1332.50	1.882E-02	%(P	9.848E-01	2.24E+03	1.00E+02 G
			1173.24	-2.644E-01	+ P	1.036E+00	1.73E+02	9.99E+01 G
NB-94	I	2.1036E-01					7.41E+06	
			702.63	9.902E-02	?(P	1.006E+00	2.87E+02	9.79E+01 G
			871.10	3.195E-01	?(	6.969E-01	6.61E+01	9.99E+01 G
ZR-95	I	5.5226E-01					6.40E+01	
			756.73	5.523E-01	?(P	1.300E+00	1.02E+02	5.45E+01 G
			724.20	-1.095E+00	+	3.114E+00	8.48E+01	4.42E+01 G
NB-95	I	-3.4353E-02					6.40E+01	
			765.79	-3.435E-02	?(	1.167E+00	9.54E+02	9.98E+01 G
RU-103	I	2.3693E-01					3.93E+01	
			497.05	2.369E-01	?(	6.045E-01	1.04E+02	9.09E+01 G
			610.30	-4.594E+00	+	3.441E+01	2.21E+02	5.75E+00 GA
RH-106	I	3.0480E+00					3.74E+02	
			621.92	0.000E+00	?(	1.976E+01	1.00E+03	9.93E+00 G
			1050.36	2.245E+01	?(	8.679E+01	1.13E+02	1.56E+00 G
			511.86	8.251E+00	?	3.843E+00	2.68E+01	2.00E+01 GA
AG-108M	C	-3.7074E-01					1.53E+05	
			433.94	-3.707E-01	?(	8.313E-01	9.39E+01	9.05E+01 G
			722.94	3.476E-01	+	1.067E+00	9.05E+01	9.08E+01 G
			614.28	0.000E+00	+	2.164E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	3.3732E-01				2.50E+02		
			884.68	-5.269E-02	?(	1.419E+00	7.42E+02	7.27E+01 G
			657.76	2.354E-01	?(P	5.547E-01	9.71E+01	9.46E+01 G
			937.49	-8.160E-01	+	3.032E+00	1.62E+02	3.44E+01 G
			1384.30	1.902E+00	?(P	1.655E+00	3.66E+01	2.43E+01 G
			763.94	-1.075E+00	+	4.710E+00	1.27E+02	2.23E+01 G
SN-113	F	3.3290E-01				1.15E+02		
			391.69	3.329E-01	?(P	1.373E+00	1.21E+02	6.40E+01 G
SB-124	F	-8.0258E-02				6.02E+01		
			602.73	-4.104E-01	?(P	2.125E+00	7.65E+01	9.83E+01 G
			1690.98	-1.501E+00	+ P	3.107E+00	1.59E+02	4.78E+01 G
			722.79	2.920E+00	?(	7.679E+00	7.82E+01	1.08E+01 G
SB-125	I	1.4049E+00				1.01E+03		
			427.88	-7.844E-01	?(P	2.140E+00	1.19E+02	2.96E+01 G
			600.50	-2.201E+00	+	1.199E+01	1.62E+02	1.79E+01 G
			635.89	0.000E+00	+	5.776E+00	1.00E+03	1.13E+01 G
			463.37	7.594E+00	?(P	3.696E+00	2.12E+01	1.05E+01 G
I-131	I	1.6163E-01				8.02E+00		
			364.48	1.122E-01	&(P	7.510E-01	2.60E+02	8.17E+01 G
			284.30	8.188E-01	(	9.912E+00	4.74E+02	6.14E+00 G
			636.97	-1.966E+00	+ P	1.017E+01	2.53E+02	7.17E+00 G
Gd-153	F	-2.6963E-07				2.42E+02		
			97.50	-2.696E-07	%(	3.944E+00	4.33E+08	3.00E+01 G
			103.20	0.000E+00	+	3.265E+00	1.00E+03	2.18E+01 G
Ga-68	C	-5.2863E-01				4.71E-02		
			1077.40	-5.286E-01	%(	3.843E+01	3.15E+03	3.30E+00 G
Tc-99m	I	1.7819E-01				2.51E-01		
			140.51	1.782E-01	&(	9.806E-01	1.63E+02	8.93E+01 G
BA-133	F	-4.4587E-01				3.85E+03		
			356.00	-4.459E-01	?(	2.120E+00	1.41E+02	6.20E+01 G
			302.85	0.000E+00	+	7.623E+00	1.00E+03	1.83E+01 G
			383.84	-3.587E+00	+ P	1.136E+01	7.79E+01	8.94E+00 GA
			80.99	-8.457E-01	+ P	3.033E+00	7.22E+01	3.41E+01 GA
CS-134	I	-5.9324E-02				7.54E+02		
			604.71	-4.058E-01	?(	2.079E+00	1.52E+02	9.76E+01 G
			795.87	3.362E-01	&(	9.279E-01	8.16E+01	8.55E+01 G
			569.32	-2.201E+00	+	5.565E+00	7.56E+01	1.54E+01 G
			801.95	-5.277E+00	+	1.602E+01	9.01E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	0.000E+00	+	8.926E+00	1.00E+03	8.35E+00 G
CS-137	I	2.6130E-01					1.10E+04	
			661.66	2.613E-01	(P	8.960E-01	1.00E+02	8.52E+01 G
CE-139	F	-3.0010E-01					1.38E+02	
			165.85	-3.001E-01	(	9.496E-01	9.46E+01	7.99E+01 G
La-140	I	2.5429E-01					1.28E+01	
			1596.21	-1.407E-02	%(P	4.733E-01	8.11E+03	9.54E+01 G
			487.02	4.096E-01	?(	2.111E+00	1.50E+02	4.55E+01 G
			328.76	-4.410E-01	+	6.012E+00	3.99E+02	2.03E+01 G
			815.77	1.051E+00	?(	4.243E+00	1.17E+02	2.33E+01 G
CE-141	I	-5.3105E-01					3.25E+01	
			145.44	-5.311E-01	&(	2.541E+00	1.43E+02	4.82E+01 G
CE-144	I	1.3573E+00					2.85E+02	
			133.54	1.357E+00	?(	6.900E+00	1.51E+02	1.11E+01 G
PM-144	C	2.8575E-02					3.63E+02	
			696.54	2.857E-02	?(P	8.836E-01	8.54E+02	9.90E+01 G
			618.06	0.000E+00	&	1.971E+00	1.00E+03	9.91E+01 G
EU-152	F	8.3184E-01					4.94E+03	
			344.29	0.000E+00	?(	4.696E+00	1.00E+03	2.65E+01 G
			1112.07	7.025E-01	?(P	1.239E+01	5.01E+02	1.36E+01 G
			121.78	-4.031E-01	+	2.148E+00	1.57E+02	2.86E+01 G
			778.92	-2.415E+00	+	6.980E+00	1.27E+02	1.29E+01 G
			964.11	2.462E+00	?(	9.072E+00	1.08E+02	1.46E+01 G
			244.69	-3.768E+00	+	1.739E+01	1.38E+02	7.58E+00 G
			1408.00	1.597E+00	? P	1.941E+00	4.67E+01	2.10E+01 GA
EU-154	I	5.6620E-01					3.14E+03	
			873.23	8.958E-01	?(	7.451E+00	2.32E+02	1.23E+01 G
			123.10	1.157E-01	-	1.449E+00	3.65E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.735E+00	1.00E+03	3.52E+01 G
			723.36	3.662E-01	?(	5.386E+00	4.15E+02	2.02E+01 G
			1004.77	0.000E+00	-	3.378E+00	1.00E+03	1.80E+01 G
			996.33	-4.989E+00	+	1.313E+01	7.86E+01	1.06E+01 G
EU-155	I	-1.6427E-02					1.81E+03	
			105.31	-1.643E-02	%(P	3.351E+00	5.43E+03	2.12E+01 G
			86.54	-7.244E-01	+	4.256E+00	1.76E+02	3.07E+01 G
HF-181	F	5.2749E-01					4.24E+01	
			482.00	2.930E-01	?(	1.100E+00	1.10E+02	8.05E+01 G
			133.02	3.471E-01	?(	1.709E+00	1.46E+02	4.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			345.83	1.495E+00	&(	6.661E+00	1.32E+02	1.51E+01 G
			136.30	2.598E+00	*(	1.358E+01	1.55E+02	5.85E+00 G
Ta-182	F	6.8661E-02					1.14E+02	
			1121.30	6.866E-02	%(	4.983E+00	2.05E+03	3.49E+01 G
			1221.41	-2.375E+00	+	5.460E+00	1.09E+02	2.70E+01 G
			1189.05	-8.943E-01	+	6.535E+00	3.27E+02	1.62E+01 G
Hg-203	F	-9.4824E-02					4.66E+01	
			279.20	-9.482E-02	&(	8.967E-01	2.73E+02	8.15E+01 G
TL-208	N	1.7904E+00					6.98E+02	
			583.02	1.790E+00	(P	6.417E-01	1.98E+01	8.45E+01 G
			277.28	-1.741E+00	-	1.018E+01	1.70E+02	6.31E+00 G
			860.56	-5.849E+00	- P	1.082E+01	1.44E+01	1.24E+01 G
pm-146	C	3.0348E-01					2.02E+03	
			747.16	2.309E-01	&(	2.260E+00	3.98E+02	3.40E+01 G
			735.72	-8.867E-01	+	4.045E+00	1.91E+02	2.25E+01 G
			453.88	3.414E-01	?(	7.915E-01	9.48E+01	6.50E+01 G
y-88	F	-2.5231E-01					1.07E+02	
			898.04	-2.523E-01	?(P	9.971E-01	5.26E+01	9.37E+01 G
			1836.06	-8.693E-03	% P	5.109E-01	4.56E+03	9.92E+01 G
Cd-113m		-1.0615E+03					5.33E+03	
			263.70	-1.061E+03	(	1.022E+04	2.76E+02	6.00E-03 K
Cf-251	T	7.1844E-01					3.28E+05	
			176.60	7.184E-01	?(	2.915E+00	1.55E+02	1.70E+01 G
			227.00	2.784E+00		7.009E+00	1.01E+02	6.30E+00 GA
Cf-249	T	-2.8142E-01					1.28E+05	
			387.95	-2.814E-01	?(	1.645E+00	1.71E+02	6.60E+01 G
			333.44	0.000E+00	&	7.846E+00	1.00E+03	1.55E+01 G
Sn-126		2.1550E+00					3.65E+07	
			87.57	3.814E-01	}	3.280E+00	1.04E+02	3.75E+01 GA
			64.28	2.155E+00	&(	9.569E+00	1.32E+02	9.70E+00 G
			86.94	-2.455E+00	+	1.419E+01	1.73E+02	9.04E+00 GA
PB-210	N	7.7789E+00					8.14E+03	
			46.54	7.779E+00	*(	2.830E+01	1.08E+02	4.25E+00 G
PB-212	N	3.8475E+00					6.98E+02	
			238.63	3.848E+00	(	9.865E-01	1.18E+01	4.33E+01 G
			300.03	6.776E+00	+	4.136E+01	1.81E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	5.7692E+00					5.84E+05	
			351.93	5.769E+00	(P	1.198E+00	1.25E+01	3.76E+01 G
			295.09	8.050E-01	- P	6.645E+00	2.44E+02	1.93E+01 G
			242.00	6.636E+00	P	6.596E+00	3.27E+01	7.43E+00 GA
BI-207	C	9.0379E-02					1.18E+04	
			569.70	9.038E-02	?(P	9.969E-01	3.15E+02	9.77E+01 G
			1063.66	-1.006E+00	+ P	1.752E+00	4.36E+01	7.45E+01 G
BI-212	N	-1.2771E-01					6.98E+02	
			727.17	-1.277E-01	%(	1.472E+01	3.22E+03	7.55E+00 G
			785.42	2.912E+01	?	9.401E+01	9.53E+01	1.28E+00 GA
U-235	N	-3.7432E-01					2.57E+11	
			143.79	-2.508E+00	?(P	1.147E+01	8.04E+01	1.10E+01 G
			205.33	4.294E+00	&(	1.075E+01	1.01E+02	5.01E+00 G
			163.38	0.000E+00	&	1.455E+01	1.00E+03	5.08E+00 G
			185.72	7.166E-01		9.230E-01	5.14E+01	5.40E+01 GA
BI-214	N	6.1884E+00					5.84E+05	
			609.31	6.188E+00	(P	1.229E+00	1.21E+01	4.61E+01 G
			1120.29	2.377E+00	& P	9.918E+00	1.22E+02	1.51E+01 G
			1764.49	1.999E+00	- P	8.638E+00	1.23E+02	1.54E+01 G
BI-210M	T	-9.6055E-02					1.10E+09	
			265.83	-9.606E-02	?(	1.430E+00	4.28E+02	5.00E+01 G
			304.90	0.000E+00	+	5.014E+00	1.00E+03	2.80E+01 G
AC-228	N	3.3989E+00					2.10E+03	
			911.07	3.918E+00	?(	2.357E+00	3.03E+01	2.90E+01 G
			968.97	2.538E+00	?(	7.107E+00	8.31E+01	1.75E+01 G
			338.32	1.521E+00	-	1.024E+01	1.98E+02	1.20E+01 G
			93.35	7.406E+00	@	7.536E+00	4.05E+01	5.56E+00 XA
TH-227	N	-1.9957E+00					7.95E+03	
			50.14	-1.996E+00	?(	1.526E+01	2.25E+02	8.00E+00 G
			256.24	-4.247E+00	+	1.013E+01	9.70E+01	7.00E+00 G
TH-229	N	3.1123E+00					2.68E+06	
			193.51	4.215E+00	?(P	1.111E+01	1.06E+02	4.40E+00 G
			210.85	1.490E+00	?(P	2.045E+01	5.44E+02	2.99E+00 G
TH-234	N	3.4087E+00					1.63E+12	
			63.29	3.409E+00	?(	2.513E+01	2.17E+02	3.81E+00 G
			92.59	0.000E+00	-	2.153E+01	1.00E+03	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	-2.3046E-02					7.82E+08	
			312.01	-2.305E-02	%(P	3.965E+00	4.76E+03	3.60E+01 G
			300.18	0.000E+00	&	2.240E+01	1.00E+03	6.20E+00 G
PA-234	N	5.1554E-01					1.63E+12	
			131.29	4.511E-01	&(P	4.021E+00	2.62E+02	1.80E+01 G
			946.02	6.020E-01	?(	5.252E+00	3.55E+02	1.34E+01 G
			569.47	0.000E+00	-	1.190E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	1.174E+01	1.00E+03	9.60E+00 G
			880.53	3.180E-01	%	1.862E+01	1.62E+03	6.00E+00 GA
PA-234M	N	3.0737E+01					1.63E+12	
			1001.00	3.074E+01	?(P	1.253E+02	1.18E+02	8.37E-01 G
			766.41	0.000E+00	-	4.083E+02	1.00E+03	2.94E-01 G
AM-241	T	-2.3968E-01					1.58E+05	
			59.54	-2.397E-01	(	3.102E+00	3.81E+02	3.59E+01 G
Np-237	F	3.4283E+00					2.14E+06	
			86.49	3.428E+00	(	2.637E+00	2.65E+01	1.31E+01 G
Ir-192	F	6.2179E-02					7.40E+01	
			316.49	6.218E-02	&(	7.659E-01	3.51E+02	8.70E+01 G
			468.06	-5.853E-01	+	2.120E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	4.457E+00	1.00E+03	3.18E+01 G
Cs-136	F	2.0995E-01					1.30E+01	
			818.50	2.099E-01	?(	9.382E-01	1.28E+02	1.00E+02 G
			1048.07	-5.099E-01	+	1.618E+00	9.34E+01	8.00E+01 G
			340.57	0.000E+00	&	2.633E+00	1.00E+03	4.69E+01 G
Np-239	T	-4.5988E-02					2.36E+00	
			103.70	0.000E+00	&	2.964E+00	1.00E+03	2.40E+01 X
			106.13	-4.599E-02	%(	2.968E+00	1.88E+03	2.27E+01 G
			99.50	1.125E+00	&	4.589E+00	1.21E+02	1.50E+01 X
Nd-147		1.6048E+00					1.11E+01	
			531.00	1.605E+00	?(	3.914E+00	9.86E+01	1.30E+01 G
			91.10	-6.724E-01	-	4.208E+00	1.87E+02	2.83E+01 G
TL-210	N	2.9985E-01					5.84E+05	
			799.60	2.921E-01	?(	9.501E-01	9.53E+01	9.90E+01 G
			296.00	3.096E-01	?(	1.656E+00	1.59E+02	7.90E+01 G
			1313.00	-9.958E-01	+	5.458E+00	2.47E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

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  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	130.	15.	0.009	108.09	7.779E+00	
TH-227	50.14	171.	-8.	-0.005	224.82	-1.996E+00	
AM-241	59.54	230.	-6.	-0.003	380.54	-2.397E-01	
TH-234	63.29	194.	9.	0.005	217.32	3.409E+00	
BA-133	80.99	349.	-25.	-0.014	72.19	-8.457E-01	P
EU-155	86.54	610.	-20.	-0.011	175.64	-7.244E-01	
Nd-147	91.10	528.	-18.	-0.010	186.77	-6.724E-01	
Np-239	99.50	180.	16.	0.009	121.19	1.125E+00	
EU-152	121.78	144.	-11.	-0.006	157.20	-4.031E-01	
EU-154	123.10	132.	4.	0.002	364.81	1.157E-01	
PA-234	131.29	196.	8.	0.004	262.31	4.511E-01	P
HF-181	133.02	204.	14.	0.008	146.07	3.471E-01	
CE-144	133.54	218.	14.	0.008	150.80	1.357E+00	
HF-181	136.30	232.	14.	0.008	155.08	2.598E+00	
CO-57	136.47	246.	14.	0.008	159.59	1.424E+00	
Tc-99m	140.51	260.	14.	0.008	163.38	1.782E-01	
U-235	143.79	571.	-25.	-0.014	80.41	-2.508E+00	P
CE-141	145.44	535.	-23.	-0.013	143.16	-5.311E-01	
Ba-140	162.66	150.	-14.	-0.008	146.21	-2.615E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-139	165.85	177.	-20.	-0.011	94.62	-3.001E-01	
U-235	185.72	62.	31.	0.017	51.44	7.166E-01	
TH-229	193.51	56.	14.	0.008	106.03	4.215E+00	P
U-235	205.33	64.	16.	0.009	101.25	4.294E+00	
TH-229	210.85	81.	3.	0.002	543.55	1.490E+00	P
EU-152	244.69	328.	-19.	-0.010	137.60	-3.768E+00	
TH-227	256.24	84.	-19.	-0.011	97.01	-4.247E+00	
Cd-113m	263.70	59.	-4.	-0.002	276.13	-1.061E+03	
BI-210M	265.83	81.	-3.	-0.002	428.17	-9.606E-02	
Hg-203	279.20	79.	-5.	-0.003	273.30	-9.482E-02	
I-131	284.30	52.	3.	0.002	474.15	8.188E-01	
TL-210	296.00	247.	14.	0.008	158.81	3.096E-01	
Ir-192	316.49	54.	3.	0.002	351.19	6.218E-02	
CR-51	320.08	74.	-12.	-0.006	110.16	-2.104E+00	
La-140	328.76	184.	-5.	-0.003	399.32	-4.410E-01	
HF-181	345.83	113.	12.	0.007	131.52	1.495E+00	
BA-133	356.00	191.	-14.	-0.008	140.97	-4.459E-01	
I-131	364.48	36.	5.	0.003	260.21	1.122E-01	P
BA-133	383.84	99.	-16.	-0.009	77.94	-3.587E+00	P
Cf-249	387.95	113.	-9.	-0.005	171.47	-2.814E-01	
SN-113	391.69	71.	10.	0.006	121.28	3.329E-01	P
SB-125	427.88	30.	-10.	-0.006	118.75	-7.844E-01	P
AG-108M	433.94	43.	-15.	-0.008	93.89	-3.707E-01	
pm-146	453.88	17.	10.	0.005	94.80	3.414E-01	
SB-125	463.37	9.	34.	0.019	21.23	7.594E+00	P
Ir-192	468.06	87.	-13.	-0.007	107.20	-5.853E-01	
BE-7	477.60	43.	10.	0.005	100.68	2.222E+00	
HF-181	482.00	52.	10.	0.005	110.18	2.930E-01	
La-140	487.02	61.	8.	0.004	150.04	4.096E-01	
RU-103	497.05	17.	9.	0.005	103.77	2.369E-01	
RH-106	511.86	35.	65.	0.036	26.83	8.251E+00	
Nd-147	531.00	13.	8.	0.004	98.56	1.605E+00	
CS-134	569.32	37.	-12.	-0.007	75.63	-2.201E+00	
BI-207	569.70	49.	3.	0.002	315.47	9.038E-02	P
SB-125	600.50	240.	-14.	-0.008	161.54	-2.201E+00	
SB-124	602.73	227.	-14.	-0.008	76.52	-4.104E-01	P
CS-134	604.71	213.	-14.	-0.008	151.92	-4.058E-01	
RU-103	610.30	199.	-9.	-0.005	220.84	-4.594E+00	
I-131	636.97	22.	-5.	-0.003	253.17	-1.966E+00	P
AG-110M	657.76	10.	7.	0.004	97.07	2.354E-01	P
PM-144	696.54	28.	1.	0.000	853.80	2.857E-02	P
NB-94	702.63	36.	3.	0.002	287.19	9.902E-02	P
SB-124	722.79	24.	10.	0.005	78.20	2.920E+00	
AG-108M	722.94	33.	10.	0.005	90.52	3.476E-01	
EU-154	723.36	43.	2.	0.001	415.28	3.662E-01	
ZR-95	724.20	70.	-15.	-0.008	84.84	-1.095E+00	
pm-146	735.72	28.	-6.	-0.003	191.49	-8.867E-01	
pm-146	747.16	19.	2.	0.001	398.21	2.309E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	756.73	15.	9.	0.005	102.13	5.523E-01	P
AG-110M	763.94	36.	-7.	-0.004	126.97	-1.075E+00	
NB-95	765.79	45.	-1.	-0.001	953.94	-3.435E-02	
EU-152	778.92	25.	-9.	-0.005	126.60	-2.415E+00	
BI-212	785.42	46.	11.	0.006	95.30	2.912E+01	
CS-134	795.87	18.	8.	0.005	81.58	3.362E-01	
TL-210	799.60	26.	8.	0.005	95.29	2.921E-01	
CS-134	801.95	61.	-13.	-0.007	90.15	-5.277E+00	
CO-58	810.78	20.	8.	0.005	84.64	2.953E-01	
La-140	815.77	28.	7.	0.004	116.95	1.051E+00	
Cs-136	818.50	25.	6.	0.003	128.36	2.099E-01	
MN-54	834.85	10.	6.	0.003	122.85	2.198E-01	
NB-94	871.10	11.	8.	0.005	66.12	3.195E-01	
EU-154	873.23	21.	3.	0.002	231.64	8.958E-01	
AG-110M	884.68	27.	-1.	-0.001	741.62	-5.269E-02	
y-88	898.04	21.	-6.	-0.003	52.56	-2.523E-01	P
AG-110M	937.49	25.	-7.	-0.004	161.52	-8.160E-01	
PA-234	946.02	10.	2.	0.001	354.73	6.020E-01	
EU-152	964.11	40.	9.	0.005	107.87	2.462E+00	
EU-154	996.33	43.	-13.	-0.007	78.60	-4.989E+00	
PA-234M	1001.00	23.	6.	0.003	117.56	3.074E+01	P
Cs-136	1048.07	33.	-9.	-0.005	93.40	-5.099E-01	
RH-106	1050.36	37.	8.	0.004	112.73	2.245E+01	
BI-207	1063.66	33.	-17.	-0.009	43.59	-1.006E+00	P
FE-59	1099.25	43.	-17.	-0.009	44.38	-1.340E+00	P
EU-152	1112.07	54.	2.	0.001	501.09	7.025E-01	P
Sc-46	1120.55	48.	8.	0.005	122.65	3.826E-01	
CO-60	1173.24	17.	-6.	-0.003	172.98	-2.644E-01	P
Ta-182	1189.05	17.	-3.	-0.002	327.45	-8.943E-01	
Ta-182	1221.41	34.	-13.	-0.007	108.79	-2.375E+00	
NA-22	1274.53	6.	6.	0.004	66.37	3.235E-01	
FE-59	1291.60	40.	-17.	-0.009	91.95	-1.991E+00	
TL-210	1313.00	17.	-4.	-0.002	246.86	-9.958E-01	
AG-110M	1384.30	1.	8.	0.005	36.60	1.902E+00	P
EU-152	1408.00	1.	6.	0.003	46.74	1.597E+00	P
SB-124	1690.98	19.	-11.	-0.006	159.14	-1.501E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.2217E+00	2.2217E+00	1.007E+02%	7.61E+00
NA-22	#A	3.2349E-01	3.2349E-01	6.637E+01%	7.05E-01
K-40		1.6003E+02	1.6003E+02	5.922E+00%	8.20E+00
Sc-46	#A	1.8167E-01	1.8167E-01	1.226E+02%	1.04E+00

CR-51	#A	-2.1035E+00	-2.1035E+00	1.102E+02%	7.85E+00
MN-54	#A	2.1977E-01	2.1977E-01	1.229E+02%	6.39E-01
FE-59	#A	-1.3397E+00	-1.3397E+00	4.438E+01%	2.66E+00
Co-56	#	5.9274E-01	5.9274E-01	2.500E+01%	2.73E-01
CO-57	#A	1.5790E-01	1.5790E-01	1.596E+02%	7.43E-01
CO-58	#A	2.9530E-01	2.9531E-01	8.464E+01%	8.48E-01
CO-60	#A	1.8823E-02	1.8823E-02	2.238E+03%	9.85E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.41E+00
NB-94	#A	2.1036E-01	2.1036E-01	6.612E+01%	1.01E+00
ZR-95	#A	5.5225E-01	5.5226E-01	1.021E+02%	1.30E+00
NB-95	#A	-3.4353E-02	-3.4353E-02	9.539E+02%	1.17E+00
RU-103	#A	2.3693E-01	2.3693E-01	1.038E+02%	6.04E-01
RH-106	#A	3.0480E+00	3.0480E+00	1.127E+02%	1.98E+01
AG-108M	#A	-3.7074E-01	-3.7074E-01	9.389E+01%	8.31E-01
AG-110M	#A	3.3732E-01	3.3732E-01	3.660E+01%	1.42E+00
SN-113	#A	3.3290E-01	3.3290E-01	1.213E+02%	1.37E+00
SB-124	#A	-8.0257E-02	-8.0258E-02	5.470E+01%	2.12E+00
SB-125	#A	1.4049E+00	1.4049E+00	2.123E+01%	2.14E+00
I-131	#A	1.6162E-01	1.6163E-01	2.602E+02%	7.51E-01
Gd-153	#A	-2.6963E-07	-2.6963E-07	4.331E+08%	3.94E+00
Ga-68	#A	-5.2397E-01	-5.2863E-01	3.154E+03%	3.84E+01
Tc-99m	#A	1.7789E-01	1.7819E-01	1.634E+02%	9.81E-01
BA-133	#A	-4.4587E-01	-4.4587E-01	1.410E+02%	2.12E+00
CS-134	#A	-5.9324E-02	-5.9324E-02	8.158E+01%	2.08E+00
CS-137	A	2.6130E-01	2.6130E-01	1.000E+02%	8.96E-01
CE-139	#A	-3.0010E-01	-3.0010E-01	9.462E+01%	9.50E-01
Ba-140	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.85E+00
La-140	#A	2.5428E-01	2.5429E-01	1.170E+02%	4.73E-01
CE-141	#A	-5.3105E-01	-5.3105E-01	1.432E+02%	2.54E+00
CE-144	#A	1.3573E+00	1.3573E+00	1.508E+02%	6.90E+00
PM-144	#A	2.8575E-02	2.8575E-02	8.538E+02%	8.84E-01
EU-152	#A	8.3184E-01	8.3184E-01	1.079E+02%	4.70E+00
EU-154	#A	5.6620E-01	5.6620E-01	2.316E+02%	7.45E+00
EU-155	#A	-1.6427E-02	-1.6427E-02	5.434E+03%	3.35E+00
HF-181	#A	5.2749E-01	5.2749E-01	6.839E+01%	1.10E+00
Ta-182	#A	6.8660E-02	6.8661E-02	2.049E+03%	4.98E+00
Hg-203	#A	-9.4823E-02	-9.4824E-02	2.733E+02%	8.97E-01
TL-208	#	1.7904E+00	1.7904E+00	1.981E+01%	6.42E-01
pm-146	#A	3.0348E-01	3.0348E-01	9.480E+01%	2.26E+00
y-88	#A	-2.5231E-01	-2.5231E-01	5.256E+01%	9.97E-01
Cd-113m	#A	-1.0615E+03	-1.0615E+03	2.761E+02%	1.02E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.31E+01
Cf-251	A	7.1844E-01	7.1844E-01	1.552E+02%	2.91E+00
Cf-249	#A	-2.8142E-01	-2.8142E-01	1.715E+02%	1.64E+00
Sn-126	A	2.1550E+00	2.1550E+00	1.318E+02%	9.57E+00
PB-210	#A	7.7789E+00	7.7789E+00	1.081E+02%	2.83E+01
PB-212		3.8475E+00	3.8475E+00	1.179E+01%	9.86E-01
PB-214		5.7692E+00	5.7692E+00	1.250E+01%	1.20E+00
BI-207	#A	9.0379E-02	9.0379E-02	3.155E+02%	9.97E-01

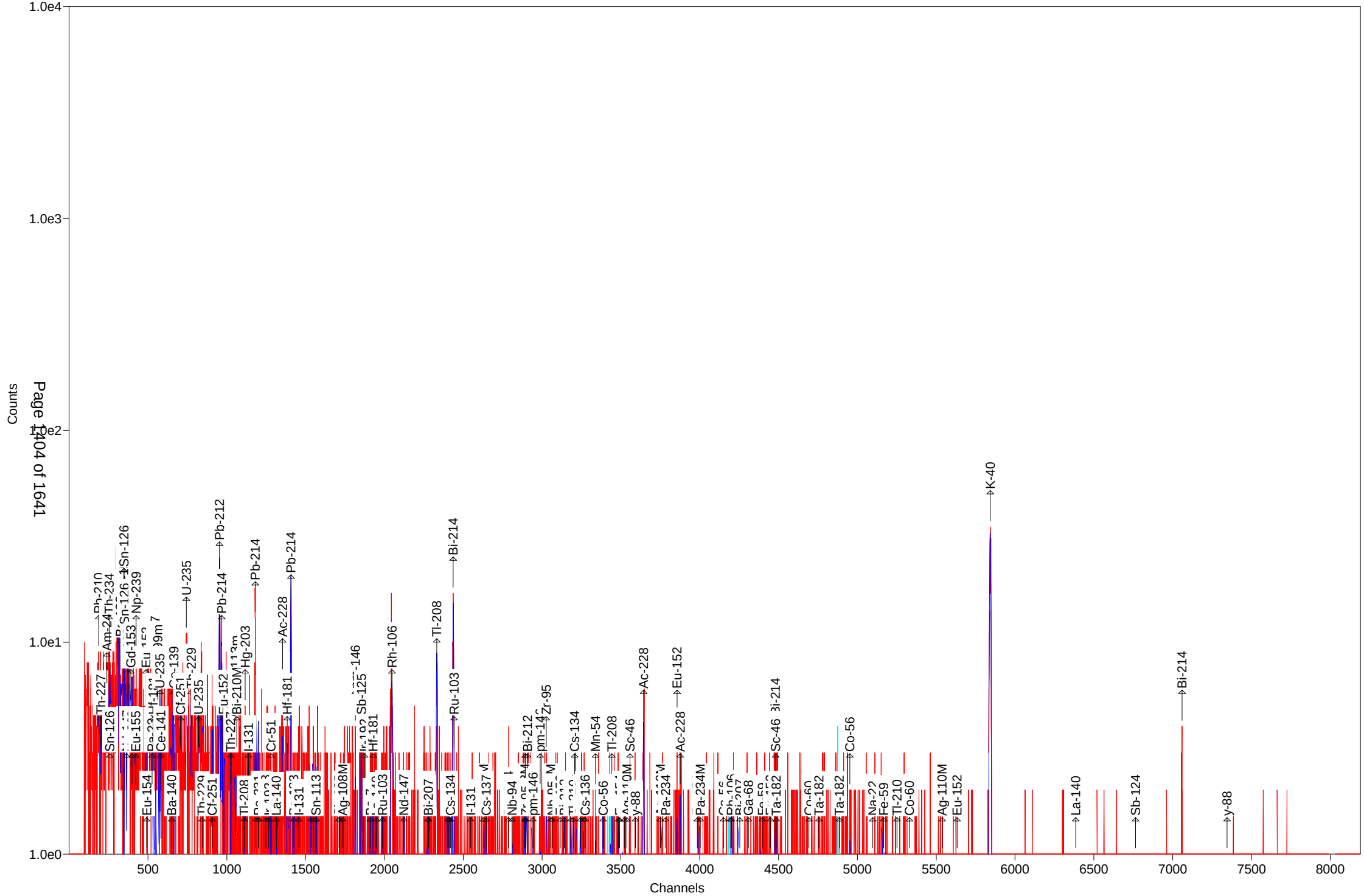
BI-212 #A	-1.2771E-01	-1.2771E-01	3.223E+03%	1.47E+01
U-235 #A	-3.7432E-01	-3.7432E-01	6.465E+01%	1.15E+01
BI-214	6.1884E+00	6.1884E+00	1.206E+01%	1.23E+00
BI-210M#A	-9.6055E-02	-9.6055E-02	4.282E+02%	1.43E+00
AC-228 #	3.3989E+00	3.3989E+00	3.032E+01%	2.36E+00
TH-227 #A	-1.9957E+00	-1.9957E+00	2.248E+02%	1.53E+01
TH-229 #A	3.1123E+00	3.1123E+00	1.060E+02%	1.11E+01
TH-234 #A	3.4087E+00	3.4087E+00	2.173E+02%	2.51E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	4.85E+01
PA-233 #A	-2.3046E-02	-2.3046E-02	4.757E+03%	3.97E+00
PA-234 #A	5.1554E-01	5.1554E-01	2.206E+02%	4.02E+00
PA-234M#A	3.0737E+01	3.0737E+01	1.176E+02%	1.25E+02
AM-241 #A	-2.3968E-01	-2.3968E-01	3.805E+02%	3.10E+00
Np-237	3.4283E+00	3.4283E+00	2.648E+01%	2.64E+00
Ir-192 #A	6.2179E-02	6.2179E-02	3.512E+02%	7.66E-01
Cs-136 #A	2.0994E-01	2.0995E-01	1.284E+02%	9.38E-01
Np-239 #A	-4.5980E-02	-4.5988E-02	1.879E+03%	2.97E+00
Nd-147 #A	1.6048E+00	1.6048E+00	9.856E+01%	3.91E+00
TL-210 #A	2.9985E-01	2.9985E-01	9.260E+01%	9.50E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.3 keV) 1.845E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.8445256E+02 Bq/Sample

376766_Gamma_160-29521-A-22-B. 9_Gamma_20183378.spc.



Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 5_20180809001_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 8/9/2018 12:26:03 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.75	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.94	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.38	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-2.10	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.68	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.91	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-0.95	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 5_20180809002_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:45:40 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.43	1.55	1.60	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 7_20180809001_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 8/9/2018 12:24:57 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.50	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	3.35	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.94	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.13	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.86	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.27	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.04	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 7_20180809002_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:44:30 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.34	1.40	1.45	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 8_20180808025_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 8/9/2018 12:23:22 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.92	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-3.43	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.41	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	1.01	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.42	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.87	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.60	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 8_20180809001_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:43:47 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.56	1.68	1.74	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

(Page 1 of 1)

Test America
St. Louis
Quality Control Check

Spectrum: 9_20180808026_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 8/9/2018 12:21:08 AM
Detector: Detector # 9
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.96	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	-2.38	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.47	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	-1.33	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.35	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	1.96	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-0.61	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 9_20180809001_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:42:48 AM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.77	2.14	2.26	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 12_20180809001_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 8/9/2018 12:22:02 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.84	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.70	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.42	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.35	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.55	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.05	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.09	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 12_20180809002_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:41:53 AM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	1.95	2.07	2.10	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 14_20180808029_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:00:40 AM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.77	1.90	1.94	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 14_20180809001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 8/9/2018 1:02:56 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.89	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	0.88	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.42	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.28	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.90	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	3.17	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 14_20180809022_BG
Description: Background Contamination Check
Acquired: 8/10/2018 12:00:46 AM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.78	1.90	1.94	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 14_20180810002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 8/10/2018 1:07:09 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.90	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.51	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.42	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.26	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.87	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-2.82	4.00	5.00	PASS

Analyst: conrad.reuscher Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 15_20180809001_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:01:37 AM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.70	1.74	1.77	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 15_20180809002_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 8/9/2018 1:36:32 AM
Detector: Detector #15
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.95	0.00	0.00	0.95	2.05	2.15	PASS
ActivityDiff	670.56	-5.00	-4.00	0.49	4.00	5.00	PASS
QA-662							
FWHM	1.51	0.00	0.00	1.46	3.21	3.31	PASS
ActivityDiff	668.76	-5.00	-4.00	-0.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.72	1333.01	1333.26	PASS
FWHM	1.99	0.00	0.00	1.85	4.19	4.29	PASS
ActivityDiff	1277.79	-5.00	-4.00	1.17	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 17_20180809001_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:03:08 AM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.29	2.42	2.46	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 17_20180809002_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 8/9/2018 1:02:29 AM
Detector: Detector #17
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.78	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.36	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	-2.83	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.58	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.81	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-3.20	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Quality Control Check

Spectrum: 19_20180808026_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 8/9/2018 12:21:10 AM
Detector: Detector #19
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.73	59.79	60.04	PASS
FWHM	0.89	0.00	0.00	0.90	1.99	2.09	PASS
ActivityDiff	663.00	-5.00	-4.00	-0.95	4.00	5.00	PASS
QA-662							
FWHM	1.47	0.00	0.00	1.45	3.17	3.27	PASS
ActivityDiff	633.00	-5.00	-4.00	-1.00	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.70	1333.01	1333.26	PASS
FWHM	1.92	0.00	0.00	1.89	4.12	4.22	PASS
ActivityDiff	1222.00	-5.00	-4.00	-1.41	4.00	5.00	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Test America
St. Louis
Background Check

Spectrum: 19_20180809001_BG
Description: Background Contamination Check
Acquired: 8/9/2018 12:40:22 AM
Detector: Detector #19
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.30	2.15	2.20	2.26	2.39	2.44	PASS

Analyst: Morgan Reichert Reviewer: Morgan Reichert

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq				COMMENTS
Pb-210	N	1.4353E+04						8.15E+03		
			46.54	1.435E+04	(	1.958E+02	7.44E-01	4.25E+00	G	
AM-241		1.2302E+03						1.58E+05		
			59.54	1.230E+03	(	1.659E+01	7.44E-01	3.57E+01	G	
CD-109		1.6101E+04						4.63E+02		
			88.03	1.610E+04	(	1.343E+02	5.28E-01	3.61E+00	G	
CO-57		3.4772E+02						2.72E+02		
			122.06	3.477E+02	(	4.399E+00	7.60E-01	8.56E+01	G	

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	==========	Knee	==========
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  2/28/2014 11:43:43 AM
TestAmerica                      Spectrum name: 7_TunaCan_20120388.An1

Sample description
     7_TunaCan_90099_030512


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
       Start time:                 3/5/2012 2:07:36 PM
       Live time:               3600
       Real time:               3721
       Dead time:                  3.25 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0324

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4726E+04					8.15E+03
			46.54	1.473E+04	(	1.744E+02	6.52E-01 4.25E+00 G
AM-241		1.2416E+03					1.58E+05
			59.54	1.242E+03	(	1.457E+01	6.49E-01 3.57E+01 G
CD-109		1.5976E+04					4.63E+02
			88.03	1.598E+04	(	1.088E+02	4.29E-01 3.61E+00 G
CO-57		3.4677E+02					2.72E+02
			122.06	3.468E+02	(	4.144E+00	7.08E-01 8.56E+01 G

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3948E+02					1.38E+02	
		165.85	5.395E+02	(	4.586E+00	5.65E-01	7.99E+01 G
Hg-203	1.1992E+03					4.66E+01	
		279.17	1.199E+03	(	9.415E+00	5.92E-01	8.15E+01 G
SN-113	9.7676E+02					1.15E+02	
		391.69	9.768E+02	(	8.153E+00	6.55E-01	6.40E+01 G
CS-137	4.6766E+02					1.10E+04	
		661.66	4.677E+02	(	5.584E+00	7.73E-01	8.52E+01 G
Y-898	1.5673E+03					1.07E+02	
		898.02	1.567E+03	(	1.056E+01	6.29E-01	9.37E+01 G
Co-1173	7.2623E+02					1.93E+03	
		1173.24	7.262E+02	(	6.394E+00	8.53E-01	9.99E+01 G
Co-1332	7.1964E+02					1.93E+03	
		1332.50	7.196E+02	(	6.072E+00	8.54E-01	1.00E+02 G
Y-1836	1.6357E+03					1.07E+02	
		1836.01	1.636E+03	(	5.819E+00	7.02E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
Pb-210	1.4646E+04	1.4726E+04	6.521E-01%	1.74E+02
AM-241	1.2413E+03	1.2416E+03	6.489E-01%	1.46E+01
CD-109	1.4512E+04	1.5976E+04	4.292E-01%	1.09E+02
CO-57	2.9445E+02	3.4677E+02	7.076E-01%	4.14E+00
Ce-139	3.9059E+02	5.3948E+02	5.652E-01%	4.59E+00
Hg-203	4.6224E+02	1.1992E+03	5.917E-01%	9.42E+00
SN-113	6.6381E+02	9.7676E+02	6.552E-01%	8.15E+00
CS-137	4.6577E+02	4.6766E+02	7.730E-01%	5.58E+00
Y-898	1.0329E+03	1.5673E+03	6.291E-01%	1.06E+01
Co-1173	7.0966E+02	7.2623E+02	8.534E-01%	6.39E+00
Co-1332	7.0321E+02	7.1964E+02	8.542E-01%	6.07E+00
Y-1836	1.0780E+03	1.6357E+03	7.017E-01%	5.82E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (701.8 to 2000.2 keV) 3.620E+04 Bq
Total Decayed Activity (701.8 to 2000.2 keV) 4.0121711E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4960E+04					8.15E+03
			46.54	1.496E+04	(	2.033E+02 7.55E-01 4.25E+00	G
AM-241		1.2405E+03					1.58E+05
			59.54	1.240E+03	(	1.715E+01 7.72E-01 3.57E+01	G
CD-109		1.6066E+04					4.63E+02
			88.03	1.607E+04	(	1.353E+02 5.26E-01 3.61E+00	G
CO-57		3.4512E+02					2.72E+02
			122.06	3.451E+02	(	4.486E+00 7.68E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                 5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                  1.65 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4240E+04					8.15E+03		
			46.54	1.424E+04	(	1.646E+02	6.67E-01	4.25E+00	G
AM-241		1.2445E+03					1.58E+05		
			59.54	1.245E+03	(	1.388E+01	6.60E-01	3.57E+01	G
CD-109		1.5902E+04					4.63E+02		
			88.03	1.590E+04	(	1.190E+02	4.84E-01	3.61E+00	G
CO-57		3.4748E+02					2.72E+02		
			122.06	3.475E+02	(	4.159E+00	7.31E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3587E+02					1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01 G
Hg-203	1.2167E+03					4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01 G
SN-113	9.7065E+02					1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01 G
CS-137	4.6658E+02					1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01 G
Y-898	1.5525E+03					1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01 G
Co-1173	7.2712E+02					1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01 G
Co-1332	7.1975E+02					1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02 G
Y-1836	1.6388E+03					1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: **Ge12**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: **#1402359 / Tuna Can_2018_00001**

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1261	99.0
Cd-109	79700	17596	18250	103.7
Co-57	1809	399	393.1	98.4
Ce-139	2723	601	585.9	97.5
Hg-203	5868	1296	1312	101.3
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	509.8	101.1
Y-88	7810	1724	1705	98.9
Co-60	3574	789	776.5	98.4
Co-60	3574	789	765.4	97.0
Y-88	7810	1724	1769	102.6

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 11:53:01 AM
Efficiency Calibration Date: 4/20/2018 Time: 11:53:09 AM

Calibration Description:
12_TunaCan_108513

Energy Calibration Fit
Energy = 0.0591 +0.250183*Channel -3.73476e-008*Channel**2
FWHM (ch) = 3.2115 +0.001032*Channel -1.75096e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.58	-0.09%	0.84	0.85	-1.23%
237.82	59.54	59.56	-0.03%	0.86	0.86	-0.65%
351.66	88.03	88.03	-0.01%	0.89	0.89	-0.96%
487.75	122.06	122.08	-0.01%	0.92	0.93	-0.62%
662.97	165.85	165.91	-0.03%	0.97	0.97	0.22%
1115.42	279.17	279.07	0.04%	1.11	1.09	2.13%
1565.35	391.69	391.59	0.02%	1.20	1.20	0.60%
2645.53	661.66	661.66	-0.00%	1.49	1.45	2.30%
3591.22	898.02	898.04	-0.00%	1.66	1.67	-0.91%
4692.62	1173.24	1173.25	-0.00%	1.85	1.92	-3.60%
5330.40	1332.50	1332.57	-0.01%	2.09	2.05	1.92%
7346.34	1836.01	1835.97	0.00%	2.46	2.46	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0201 %
Coefficients:
-0.363508 -4.707999 0.462125 -0.051256 0.002384 -0.000043

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8052E-002	1.7999E-002	0.29%
59.54	2.7878E-002	2.8172E-002	-1.06%
88.03	3.7143E-002	3.5814E-002	3.58%
122.06	3.6658E-002	3.7240E-002	-1.59%
165.85	3.3189E-002	3.4052E-002	-2.60%
279.17	2.4853E-002	2.4494E-002	1.45%
391.69	1.9499E-002	1.8934E-002	2.90%
661.66	1.2936E-002	1.2789E-002	1.13%
898.02	1.0139E-002	1.0253E-002	-1.13%
1173.24	8.2922E-003	8.4265E-003	-1.62%
1332.50	7.4182E-003	7.6470E-003	-3.08%
1836.01	6.0193E-003	5.8663E-003	2.54%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 12_TunaCan_20180005

Sample Description: 12_TunaCan_108513
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 4/18/2018 13:54:19 Real Time: 3652 sec
Analysis Time: 4/20/2018 11:55 Dead Time: 1.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.600E+04	0.6	9.485E+01	1.031E+03	1.853E+02
AM-241	1.261E+03	0.7	9.223E+00	8.039E+01	1.659E+01
CD-109	1.825E+04	0.4	7.598E+01	1.135E+03	1.134E+02
CO-57	3.931E+02	0.8	3.042E+00	2.279E+01	5.110E+00
Ce-139	5.859E+02	0.7	4.357E+00	3.335E+01	6.791E+00
Hg-203	1.312E+03	1.1	1.414E+01	7.659E+01	2.206E+01
SN-113	1.059E+03	0.9	9.013E+00	6.310E+01	1.205E+01
CS-137	5.098E+02	0.9	4.734E+00	2.665E+01	6.233E+00
Y-898	1.705E+03	0.8	1.331E+01	8.765E+01	1.505E+01
Co-1173	7.765E+02	0.9	6.740E+00	3.922E+01	6.891E+00
Co-1332	7.654E+02	0.8	6.419E+00	3.866E+01	6.071E+00
Y-1836	1.769E+03	0.8	1.413E+01	1.018E+02	8.211E+00
Total	4.438E+04				

Analyst: Jody Watson

Sample description
12_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180005.An1

Acquisition information

Start time:	4/18/2018 1:54:19 PM
Live time:	3600
Real time:	3652
Dead time:	1.41 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0332

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
27.87	601.	9.86	0.70	3.939E-03				
33.44	3191.	3.58	0.84	8.062E-03				
36.78	534.	21.42	0.84	1.059E-02				
38.00	764.	15.14	0.84	1.151E-02				
46.62	43669.	0.59	0.85	1.805E-02	46.54	4.250	1.600E+04	Pb210
49.75	200.	71.91	0.85	2.153E-02				
59.56	45621.	0.73	0.86	2.818E-02	59.54	35.700	1.261E+03	AM241
70.78	903.	16.81	0.88	3.227E-02				
72.97	1715.	8.94	0.88	3.286E-02				
74.88	161.	95.77	0.88	3.334E-02				
77.23	29.	497.10	0.88	3.389E-02				
82.47	1429.	10.54	0.89	3.493E-02				
84.79	2014.	7.84	0.89	3.532E-02				
88.06	72330.	0.42	0.89	3.581E-02	88.03	3.610	1.825E+04	CD109
90.37	144.	87.05	0.90	3.612E-02				
122.08	34326.	0.77	0.92	3.724E-02	122.06	85.600	3.931E+02	CO57
136.51	4200.	4.35	0.96	3.651E-02				
165.91	33460.	0.74	0.97	3.405E-02	165.85	79.900	5.859E+02	Ce139
206.00	117.	63.94	0.45	3.024E-02				
238.46	443.	25.54	0.90	2.744E-02				
255.00	1168.	12.03	0.88	2.617E-02				
279.07	19187.	1.08	1.11	2.450E-02	279.17	81.500	1.312E+03	Hg203
286.67	107.	74.95	0.64	2.401E-02				
351.85	322.	30.50	1.33	2.056E-02				
391.59	24235.	0.85	1.20	1.894E-02	391.69	64.000	1.059E+03	SN113
500.18	113.	56.68	0.53	1.573E-02				
583.01	248.	32.33	0.89	1.403E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
601.08	176.	44.64	0.64	1.372E-02				
643.04	164.	48.09	0.69	1.306E-02				
661.66	19866.	0.93	1.49	1.279E-02	661.66	85.210	5.098E+02	CS137
695.58	154.	52.24	0.30	1.233E-02				
712.59	169.	39.74	0.69	1.212E-02				
814.18	641.	15.80	1.86	1.101E-02				
890.80	44.	76.23	0.45	1.031E-02				
898.03	29383.	0.78	1.66	1.025E-02	898.02	93.700	1.705E+03	Y898
924.59	170.	51.69	2.08	1.004E-02				
1059.91	148.	40.90	0.51	9.087E-03				
1173.24	22640.	0.87	1.85	8.426E-03	1173.24	99.900	7.765E+02	Co1173
1217.40	45.	61.22	0.33	8.195E-03				
1271.51	36.	60.60	1.04	7.928E-03				
1301.67	34.	60.56	0.43	7.787E-03				
1332.57	20270.	0.84	2.09	7.647E-03	1332.50	99.982	7.654E+02	Co1332
1491.52	180.	28.09	0.33	6.994E-03				
1835.92	18468.	0.80	2.47	5.867E-03	1836.01	99.200	1.769E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
111.16	27.87	1248.	601.	1.526E+05	9.86	0.703	-	s
133.41	33.32	4927.	3191.	3.959E+05	3.58	0.838	-	sD
146.77	36.66	6263.	534.	5.040E+04	21.42	0.841	-	sD
151.64	37.88	6317.	764.	6.642E+04	15.14	0.842	-	sD
198.79	49.71	10292.	213.	9.912E+03	67.59	0.855	-	sc
282.69	70.80	11078.	903.	2.799E+04	16.81	0.876	-	D
291.44	72.99	10900.	1715.	5.219E+04	8.94	0.878	-	D
299.07	74.90	11841.	161.	4.837E+03	95.77	0.880	-	c
308.48	77.26	10683.	29.	8.685E+02	497.10	0.883	-	c
329.43	82.44	10620.	1431.	4.097E+04	10.52	0.888	-	D
338.70	84.76	11438.	2016.	5.707E+04	7.83	0.890	-	sD
361.04	90.35	7839.	145.	4.014E+03	86.78	0.896	-	sc
545.45	136.51	7622.	4200.	1.150E+05	4.35	0.964	-	
823.26	206.00	2348.	117.	3.869E+03	63.94	0.454	-	s
953.03	238.46	3718.	443.	1.615E+04	25.54	0.897	-	s
1019.19	255.00	4459.	1168.	4.464E+04	12.03	0.878	-	
1145.82	286.67	2108.	107.	4.456E+03	74.95	0.636	-	s
1406.43	351.85	2440.	322.	1.569E+04	30.50	1.334	-	
1999.63	500.18	1252.	113.	7.164E+03	56.68	0.530	-	s
2330.90	583.01	1545.	248.	1.767E+04	32.33	0.894	-	s
2403.19	601.08	1564.	176.	1.283E+04	44.64	0.638	-	s
2571.03	643.04	1587.	164.	1.258E+04	48.09	0.694	-	s
2781.20	695.58	1652.	154.	1.250E+04	52.24	0.304	-	s
2849.27	712.59	1184.	169.	1.395E+04	39.74	0.695	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3255.67	814.18	1648.	641.	5.823E+04	15.80	1.859	- s
3562.26	890.80	503.	44.	4.283E+03	76.23	0.452	- sc
3697.47	924.59	1556.	170.	1.690E+04	51.69	2.082	- s
4239.01	1059.91	879.	148.	1.629E+04	40.90	0.508	- s
4869.35	1217.40	238.	45.	5.491E+03	61.22	0.330	- s
5085.97	1271.51	165.	36.	4.541E+03	60.60	1.043	- s
5206.71	1301.67	156.	34.	4.366E+03	60.56	0.434	- s
5966.81	1491.52	462.	180.	2.581E+04	28.09	0.329	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	11653.	43669.	12.130	0.59	0.851D
AM-241	237.82	59.56	16449.	45621.	12.672	0.73	0.859
CD-109	351.65	88.03	9195.	72330.	20.092	0.42	0.894D
CO-57	487.75	122.08	9060.	34326.	9.535	0.77	0.923
Ce-139	662.97	165.91	6830.	33460.	9.295	0.74	0.975
Hg-203	1115.42	279.07	4712.	19187.	5.330	1.08	1.109
SN-113	1565.35	391.59	3432.	24235.	6.732	0.85	1.204
CS-137	2645.53	661.66	2656.	19866.	5.518	0.93	1.489
Y-898	3591.19	898.03	3033.	29383.	8.162	0.78	1.658
Co-1173	4692.59	1173.24	1810.	22640.	6.289	0.87	1.852
Co-1332	5330.41	1332.57	1150.	20270.	5.631	0.84	2.092
Y-1836	7346.14	1835.92	317.	18468.	5.130	0.80	2.475

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(P	1.853E+02 5.93E-01 4.25E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.2606E+03					1.58E+05	
		59.54	1.261E+03	(	1.659E+01	7.32E-01	3.57E+01 G
CD-109	1.8246E+04					4.63E+02	
		88.03	1.825E+04	(	1.134E+02	4.16E-01	3.61E+00 G
CO-57	3.9307E+02					2.72E+02	
		122.06	3.931E+02	(	5.110E+00	7.74E-01	8.56E+01 G
Ce-139	5.8589E+02					1.38E+02	
		165.85	5.859E+02	(	6.791E+00	7.44E-01	7.99E+01 G
Hg-203	1.3123E+03					4.66E+01	
		279.17	1.312E+03	(	2.206E+01	1.08E+00	8.15E+01 G
SN-113	1.0590E+03					1.15E+02	
		391.69	1.059E+03	(	1.205E+01	8.51E-01	6.40E+01 G
CS-137	5.0981E+02					1.10E+04	
		661.66	5.098E+02	(	6.233E+00	9.29E-01	8.52E+01 G
Y-898	1.7049E+03					1.07E+02	
		898.02	1.705E+03	(	1.505E+01	7.81E-01	9.37E+01 G
Co-1173	7.7646E+02					1.93E+03	
		1173.24	7.765E+02	(	6.891E+00	8.68E-01	9.99E+01 G
Co-1332	7.6541E+02					1.93E+03	
		1332.50	7.654E+02	(	6.071E+00	8.39E-01	1.00E+02 G
Y-1836	1.7690E+03					1.07E+02	
		1836.01	1.769E+03	(	8.211E+00	7.99E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5857E+04	1.6003E+04	5.927E-01%	1.85E+02
AM-241	1.2600E+03	1.2606E+03	7.317E-01%	1.66E+01
CD-109	1.5540E+04	1.8246E+04	4.164E-01%	1.13E+02
CO-57	2.9911E+02	3.9307E+02	7.739E-01%	5.11E+00
Ce-139	3.4161E+02	5.8589E+02	7.437E-01%	6.79E+00
Hg-203	2.6699E+02	1.3123E+03	1.078E+00%	2.21E+01
SN-113	5.5555E+02	1.0590E+03	8.510E-01%	1.20E+01
CS-137	5.0637E+02	5.0981E+02	9.286E-01%	6.23E+00
Y-898	8.4955E+02	1.7049E+03	7.808E-01%	1.50E+01
Co-1173	7.4709E+02	7.7646E+02	8.681E-01%	6.89E+00
Co-1332	7.3646E+02	7.6541E+02	8.386E-01%	6.07E+00
Y-1836	8.8152E+02	1.7690E+03	7.985E-01%	8.21E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 3.784E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.4384840E+04 Bq/Sample

Gamma Verification per Geometry

Detector: Ge14

Geometry: 100mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 166

lab ID# of cal standard 6700

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count results	%recovery
Pb-210	3094	331	0.0425	7797	7740	99.3
Am-241	2037	218	0.359	608	614.28	101.1
Cd-109	2881	309	0.0361	8547	8648.2	101.2
Co-57	1511	162	0.856	189	185.92	98.3
Ce-139	2139	229	0.799	287	279.5	97.5
Hg-203	4651	498	0.8146	611	635.22	103.9
Sn-113	3015	323	0.64	505	507.33	100.6
Cs-137	1938	208	0.851	244	245.7	100.7
Y-88	7264	778	0.937	830	800.83	96.5
Co-60	3580	383	0.99974	384	380.19	99.1
Co-60	3581	384	0.999856	384	380.55	99.2
Y-88	7690	824	0.992	830	852.59	102.7

Reviewed By: Megan McAfee

Date: 4/13/2012

Calibration Data from file: 14_Soil_100ml.Clb
Energy Calibration Date: 4/12/2012 Time: 10:42:45 AM
Efficiency Calibration Date: 4/12/2012 Time: 10:42:57 AM

Calibration Description:
14_100mLSoild_90099_022012

Energy Calibration Fit
Energy = 0.1417 +0.250086*Channel -1.93447e-008*Channel**2
FWHM (ch) = 2.7917 +0.001009*Channel -1.98868e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.03	46.54	46.66	-0.27%	0.72	0.74	-2.91%
237.88	59.54	59.63	-0.15%	0.74	0.76	-1.83%
351.32	88.03	88.00	0.03%	0.80	0.79	1.24%
487.13	122.06	121.96	0.08%	0.82	0.82	0.35%
662.33	165.85	165.77	0.05%	0.88	0.86	2.25%
1115.72	279.17	279.14	0.01%	0.98	0.97	0.78%
1565.66	391.69	391.64	0.01%	1.09	1.08	0.46%
2645.79	661.66	661.68	-0.00%	1.32	1.33	-0.55%
3591.45	898.02	898.06	-0.00%	1.55	1.54	0.63%
4692.53	1173.24	1173.25	-0.00%	1.73	1.77	-2.33%
5329.80	1332.50	1332.50	0.00%	1.93	1.90	1.41%
7345.06	1836.01	1835.99	0.00%	2.28	2.28	0.01%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3856 %
Ln(Eff) = -0.0127 -0.436548*Ln(Eng) -0.0308772*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.5409 %
Ln(Eff) = -13.8607 +4.872649*Ln(Eng) -0.53981*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	4.4356E-002	4.4632E-002	-0.62%
59.54	5.1967E-002	5.1660E-002	0.59%
88.03	5.7546E-002	5.6954E-002	1.03%
122.06	5.3489E-002	5.4443E-002	-1.78%
165.85	========== Knee ==========		
165.85	4.6163E-002	4.7332E-002	-2.53%
279.17	3.2991E-002	3.1726E-002	3.84%
391.69	2.4369E-002	2.4239E-002	0.53%
661.66	1.5861E-002	1.5757E-002	0.65%
898.02	1.1735E-002	1.2165E-002	-3.67%
1173.24	9.5740E-003	9.6543E-003	-0.84%
1332.50	8.5556E-003	8.6346E-003	-0.92%
1836.01	6.6624E-003	6.4900E-003	2.59%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	7788.20	331.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	610.64	218.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	8559.60	309.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	189.25	162.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	286.61	229.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	611.04	498.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	504.69	323.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	244.10	208.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	830.31	778.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	383.38	383.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	384.08	384.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	830.65	824.00	4.00%	1/1/2012 11:00:00 AM

14_100mlSoild_20120136

```
     ORTEC g v - i (1087) Env32  G53W4.25  4/12/2012 10:44:03 AM   Page  1
TestAmerica, Inc.               Spectrum name: 14_100mlSoild_20120136.An1

Sample description
     14_100mlSoild_90099_022012


Spectrum Filename: C:\User\SPC\Det14\14_100mlSoild_20120136.An1

Acquisition information
       Start time:                 2/20/2012 11:05:42 AM
       Live time:               3600
       Real time:               3669
       Dead time:                  1.87 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_100ml.Clb
     14_100mLSoild_90099_022012


       Energy Calibration
            Created:               4/12/2012 10:42:45 AM
            Zero offset:           0.142 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.934E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 10:42:57 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.272938E-02 + (-4.365475E-01*Log(E) ) +
                                   ( -3.087719E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.54 %
            Log(Eff):             -1.386068E+01 + ( 4.872649E+00*Log(E) ) +
                                   ( -5.398101E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  1999.59keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  4/12/2012 10:44:03 AM   Page  2
TestAmerica, Inc.               Spectrum name: 14_100mlSoild_20120136.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0554

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    Bq
_____________________________________________________________________________
   46.66    52630.   0.61   0.72  4.472E-02    46.54   4.250  7.740E+03 Pb210
   59.63    40775.   0.72   0.74  5.170E-02    59.54  35.700  6.143E+02 AM241
   70.85     2134.   6.25   0.77  5.506E-02
   72.91     3404.   4.01   0.77  5.547E-02
   88.00    59391.   0.50   0.80  5.695E-02    88.03   3.610  8.648E+03 CD109
  121.96    27458.   0.78   0.82  5.446E-02   122.06  85.600  1.859E+02 CO57
  136.35     3538.   4.22   0.91  5.223E-02
  165.77    29582.   0.73   0.88  4.701E-02   165.85  79.900  2.795E+02 Ce139
  255.00     1095.   9.08   1.05  3.405E-02
  279.14    28118.   0.74   0.98  3.173E-02   279.17  81.500  6.352E+02 Hg203
  391.64    20965.   0.82   1.09  2.424E-02   391.69  64.000  5.073E+02 SN113
  661.68    11839.   1.35   1.32  1.576E-02   661.66  85.210  2.457E+02 CS137
  898.06    23741.   0.74   1.55  1.216E-02   898.02  93.700  8.008E+02 Y898
 1173.25    12965.   0.99   1.73  9.654E-03  1173.24  99.900  3.802E+02 Co1173
 1332.50    11616.   1.12   1.93  8.635E-03  1332.50  99.982  3.806E+02 Co1332
 1836.00    14276.   0.86   2.28  6.490E-03  1836.01  99.200  8.526E+02 Y1836


************ U N I D E N T I F I E D     P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  282.75    70.85      8025.      1934. 3.512E+04    7.90   0.777  -       D
  290.98    72.91      7633.      3172. 5.718E+04    4.84   0.727  -       D
  544.66   136.35      5370.      3538. 6.773E+04    4.22   0.906  -
 1019.15   255.00      2510.      1095. 3.216E+04    9.08   1.050  -      s
```


s - Peak fails shape tests.

D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.03	46.66	13988.	52630.	14.619	0.61	0.724
AM-241	237.88	59.63	12333.	40775.	11.326	0.72	0.744
CD-109	351.32	88.00	8629.	59391.	16.498	0.50	0.796
CO-57	487.13	121.96	5451.	27458.	7.627	0.78	0.823
Ce-139	662.33	165.77	4485.	29582.	8.217	0.73	0.883
Hg-203	1115.72	279.14	3101.	28118.	7.811	0.74	0.981
SN-113	1565.66	391.64	1907.	20965.	5.824	0.82	1.086
CS-137	2645.79	661.68	2310.	11839.	3.289	1.35	1.323
Y-898	3591.45	898.06	1266.	23741.	6.595	0.74	1.549
Co-1173	4692.53	1173.25	610.	12965.	3.601	0.99	1.731
Co-1332	5329.82	1332.50	663.	11616.	3.227	1.12	1.927
Y-1836	7345.07	1836.00	102.	14276.	3.965	0.86	2.280

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	7.7400E+03					8.15E+03
			46.54	7.740E+03	(	8.145E+01 6.06E-01 4.25E+00	G
AM-241		6.1428E+02					1.58E+05
			59.54	6.143E+02	(	7.837E+00 7.19E-01 3.57E+01	G
CD-109		8.6482E+03					4.63E+02
			88.03	8.648E+03	(	6.343E+01 5.00E-01 3.61E+00	G
CO-57		1.8592E+02					2.72E+02
			122.06	1.859E+02	(	2.348E+00 7.78E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	2.7950E+02					1.38E+02
		165.85	2.795E+02	(	2.974E+00 7.31E-01 7.99E+01	G
Hg-203	6.3522E+02					4.66E+01
		279.17	6.352E+02	(	5.924E+00 7.38E-01 8.15E+01	G
SN-113	5.0733E+02					1.15E+02
		391.69	5.073E+02	(	4.990E+00 8.24E-01 6.40E+01	G

```
CS-137       2.4570E+02                                      1.10E+04
                          661.66 2.457E+02  (  4.704E+00 1.35E+00 8.52E+01 G

Y-898        8.0083E+02                                      1.07E+02
                          898.02 8.008E+02  (  5.685E+00 7.43E-01 9.37E+01 G

Co-1173      3.8019E+02                                      1.93E+03
                         1173.24 3.802E+02  (  3.455E+00 9.95E-01 9.99E+01 G

Co-1332      3.8055E+02                                      1.93E+03
                         1332.50 3.806E+02  (  4.019E+00 1.12E+00 1.00E+02 G

Y-1836       8.5259E+02                                      1.07E+02
                         1836.01 8.526E+02  (  2.980E+00 8.60E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq
```

Pb-210	7.7071E+03	7.7400E+03	6.056E-01%	8.15E+01
AM-241	6.1414E+02	6.1428E+02	7.192E-01%	7.84E+00
CD-109	8.0239E+03	8.6482E+03	4.999E-01%	6.34E+01
CO-57	1.6366E+02	1.8592E+02	7.779E-01%	2.35E+00
Ce-139	2.1728E+02	2.7950E+02	7.311E-01%	2.97E+00
Hg-203	3.0207E+02	6.3522E+02	7.384E-01%	5.92E+00
SN-113	3.7541E+02	5.0733E+02	8.243E-01%	4.99E+00
CS-137	2.4493E+02	2.4570E+02	1.354E+00%	4.70E+00
Y-898	5.7854E+02	8.0083E+02	7.432E-01%	5.69E+00
Co-1173	3.7341E+02	3.8019E+02	9.945E-01%	3.45E+00
Co-1332	3.7376E+02	3.8055E+02	1.116E+00%	4.02E+00
Y-1836	6.1593E+02	8.5259E+02	8.602E-01%	2.98E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.6 keV) 1.959E+04 Bq
Total Decayed Activity (37.7 to 1999.6 keV) 2.1270275E+04 Bq

Gamma Verification per Geometry

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
       Start time:                 4/23/2012 9:56:44 AM
       Live time:               3600
       Real time:               3665
       Dead time:                  1.77 %
       Detector ID:                   14

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1
                                      Page 1
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       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0575
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4422E+04					8.15E+03	
			46.54	1.442E+04	(	1.659E+02	6.42E-01 4.25E+00	G
AM-241		1.2225E+03					1.58E+05	
			59.54	1.223E+03	(	1.449E+01	6.65E-01 3.57E+01	G
CD-109		1.6145E+04					4.63E+02	
			88.03	1.614E+04	(	1.179E+02	4.73E-01 3.61E+00	G
CO-57		3.4928E+02					2.72E+02	
			122.06	3.493E+02	(	4.431E+00	7.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3852E+02					1.38E+02	
		165.85	5.385E+02	(	5.643E+00	6.97E-01 7.99E+01	G
Hg-203	1.2059E+03					4.66E+01	
		279.17	1.206E+03	(	2.002E+01	1.05E+00 8.15E+01	G
SN-113	9.7136E+02					1.15E+02	
		391.69	9.714E+02	(	1.115E+01	8.54E-01 6.40E+01	G
CS-137	4.6565E+02					1.10E+04	
		661.66	4.657E+02	(	5.571E+00	9.21E-01 8.52E+01	G
Y-898	1.5700E+03					1.07E+02	

```
                          898.02 1.570E+03  (  1.261E+01 7.43E-01 9.37E+01 G

Co-1173      7.2416E+02                                        1.93E+03
                         1173.24 7.242E+02  (  5.275E+00 7.99E-01 9.99E+01 G

Co-1332      7.2060E+02                                        1.93E+03
                         1332.50 7.206E+02  (  4.737E+00 8.09E-01 1.00E+02 G

Y-1836       1.6340E+03                                        1.07E+02
                         1836.01 1.634E+03  (  6.084E+00 8.27E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4284E+04    1.4422E+04    6.417E-01%                1.66E+02
 AM-241       1.2219E+03    1.2225E+03    6.654E-01%                1.45E+01
 CD-109       1.3631E+04    1.6145E+04    4.729E-01%                1.18E+02
```

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector:	Ge15
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1

Sample description
     15_TunaCan_90099_032212


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
       Start time:                 3/22/2012 11:06:02 AM
       Live time:               3600
       Real time:               3653
       Dead time:                  1.44 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0249
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	- D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4410E+04				8.15E+03	
			46.54	1.441E+04	(	1.957E+02 7.55E-01 4.25E+00	G
AM-241		1.2069E+03				1.58E+05	
			59.54	1.207E+03	(	1.577E+01 7.22E-01 3.57E+01	G
CD-109		1.6069E+04				4.63E+02	
			88.03	1.607E+04	(	1.399E+02 5.44E-01 3.61E+00	G
CO-57		3.5606E+02				2.72E+02	
			122.06	3.561E+02	(	4.647E+00 7.84E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3881E+02				1.38E+02	
		165.85	5.388E+02	(	6.551E+00 7.82E-01 7.99E+01	G
Hg-203	1.2024E+03				4.66E+01	
		279.17	1.202E+03	(	1.514E+01 8.77E-01 8.15E+01	G
SN-113	9.7462E+02				1.15E+02	
		391.69	9.746E+02	(	1.034E+01 8.20E-01 6.40E+01	G
CS-137	4.6543E+02				1.10E+04	
		661.66	4.654E+02	(	7.413E+00 1.16E+00 8.52E+01	G
Y-898	1.5737E+03				1.07E+02	

```
                          898.02 1.574E+03  (  1.260E+01 7.45E-01 9.37E+01 G

Co-1173      7.1644E+02                                        1.93E+03
                         1173.24 7.164E+02  (  7.050E+00 9.39E-01 9.99E+01 G

Co-1332      7.2655E+02                                        1.93E+03
                         1332.50 7.266E+02  (  7.301E+00 9.83E-01 1.00E+02 G

Y-1836       1.6332E+03                                        1.07E+02
                         1836.01 1.633E+03  (  8.923E+00 8.49E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



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   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4311E+04    1.4410E+04    7.549E-01%                1.96E+02
 AM-241       1.2065E+03    1.2069E+03    7.219E-01%                1.58E+01
 CD-109       1.4233E+04    1.6069E+04    5.439E-01%                1.40E+02
```

CO-57	2.8961E+02	3.5606E+02	7.837E-01%	4.65E+00
Ce-139	3.5832E+02	5.3881E+02	7.816E-01%	6.55E+00
Hg-203	3.6068E+02	1.2024E+03	8.771E-01%	1.51E+01
SN-113	5.9836E+02	9.7462E+02	8.201E-01%	1.03E+01
CS-137	4.6306E+02	4.6543E+02	1.155E+00%	7.41E+00
Y-898	9.2933E+02	1.5737E+03	7.445E-01%	1.26E+01
Co-1173	6.9585E+02	7.1644E+02	9.390E-01%	7.05E+00
Co-1332	7.0567E+02	7.2655E+02	9.834E-01%	7.30E+00
Y-1836	9.6449E+02	1.6332E+03	8.486E-01%	8.92E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 1999.6 keV) 3.512E+04 Bq
Total Decayed Activity (82.3 to 1999.6 keV) 3.9873703E+04 Bq

Gamma Verification per Geometry

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14476	97.0
Am-241	2037	418	0.3590	1163	1217.3	104.6
Cd-109	2881	591	0.0361	16363	16121	98.5
Co-57	1511	310	0.8560	362	351.58	97.1
Ce-139	2139	439	0.7990	549	540.43	98.5
Hg-203	4651	954	0.8146	1171	1200.7	102.6
Sn-113	3015	618	0.6400	966	969.38	100.4
Cs-137	1938	397	0.8510	467	466.08	99.8
Y-88	7264	1489	0.9370	1589	1562.4	98.3
Co-60	3580	734	0.9997	734	724.88	98.7
Co-60	3581	734	0.9999	734	733.12	99.8
Y-88	7690	1577	0.9920	1589	1616.3	101.7

Reviewed By: Megan McAfee

Date: 4/13/2012

Calibration Data from file: 17_Soil_TunaCan.Clb
Energy Calibration Date: 4/12/2012 Time: 9:28:30 AM
Efficiency Calibration Date: 4/12/2012 Time: 9:28:42 AM

Calibration Description:
17_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1178 +0.250077*Channel -2.37566e-008*Channel**2
FWHM (ch) = 2.9772 +0.000994*Channel -3.22638e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.96	46.54	46.62	-0.17%	0.77	0.79	-3.16%
237.92	59.54	59.61	-0.12%	0.78	0.80	-3.33%
351.79	88.03	88.09	-0.07%	0.82	0.83	-1.16%
487.44	122.06	122.01	0.04%	0.89	0.86	3.09%
662.32	165.85	165.74	0.07%	0.93	0.91	2.22%
1115.65	279.17	279.09	0.03%	1.03	1.01	2.15%
1565.90	391.69	391.66	0.01%	1.10	1.11	-0.78%
2646.02	661.66	661.66	-0.00%	1.37	1.35	1.74%
3591.93	898.02	898.07	-0.01%	1.52	1.53	-0.67%
4693.19	1173.24	1173.25	-0.00%	1.72	1.73	-0.81%
5330.69	1332.50	1332.53	-0.00%	1.82	1.84	-0.74%
7346.32	1836.01	1835.98	0.00%	2.14	2.13	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9072 %
Ln(Eff) = -0.5264 -0.402416*Ln(Eng) -0.0260446*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.0020 %
Ln(Eff) = -23.4389 +8.582715*Ln(Eng) -0.907543*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0383E-002	2.1004E-002	-3.05%
59.54	3.0743E-002	2.9571E-002	3.81%
88.03	3.9976E-002	4.0594E-002	-1.55%
122.06	4.1510E-002	4.2756E-002	-3.00%
165.85	========== Knee ==========		
165.85	3.7629E-002	3.8252E-002	-1.65%
279.17	2.7514E-002	2.6814E-002	2.54%
391.69	2.1207E-002	2.1122E-002	0.40%
661.66	1.4433E-002	1.4427E-002	0.04%
898.02	1.1287E-002	1.1478E-002	-1.69%
1173.24	9.2333E-003	9.3589E-003	-1.36%
1332.50	8.4692E-003	8.4809E-003	-0.14%
1836.01	6.7041E-003	6.5931E-003	1.66%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  1
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det17\17_TunaCan_20120263.An1

Acquisition information
       Start time:                 3/26/2012 6:29:58 AM
       Live time:               3600
       Real time:               3672
       Dead time:                  1.95 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  2
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1
                                      Page 1
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```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0522
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.62	46187.	0.69	0.77	2.106E-02	46.54	4.250	1.448E+04	Pb210
59.61	46245.	0.74	0.78	2.961E-02	59.54	35.700	1.217E+03	AM241
72.97	2852.	5.64	0.82	3.610E-02				
88.09	74900.	0.46	0.82	4.061E-02	88.03	3.610	1.612E+04	CD109
122.01	37313.	0.73	0.89	4.276E-02	122.06	85.600	3.516E+02	CO57
136.40	4536.	4.09	0.81	4.164E-02				
165.74	38793.	0.66	0.93	3.765E-02	165.85	79.900	5.404E+02	Ce139
255.04	1259.	9.59	1.07	2.855E-02				
279.09	26776.	0.82	1.03	2.682E-02	279.17	81.500	1.201E+03	Hg203
391.66	28306.	0.76	1.11	2.112E-02	391.69	64.000	9.694E+02	SN113
661.66	20517.	0.91	1.37	1.443E-02	661.66	85.210	4.661E+02	CS137
898.07	34851.	0.63	1.52	1.148E-02	898.02	93.700	1.562E+03	Y898
1173.25	23664.	0.80	1.72	9.359E-03	1173.24	99.900	7.249E+02	Co1173
1332.52	21706.	0.78	1.83	8.481E-03	1332.50	99.982	7.331E+02	Co1332
1835.97	21924.	0.70	2.15	6.593E-03	1836.01	99.200	1.616E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.30	72.97	10374.	2884.	7.989E+04	5.33	0.816	-	D
544.98	136.40	8136.	4536.	1.089E+05	4.09	0.813	-	
1019.46	255.04	3805.	1259.	4.410E+04	9.59	1.072	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.

C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.96	46.62	15035.	46187.	12.830	0.69	0.766
AM-241	237.92	59.61	17361.	46245.	12.846	0.74	0.777
CD-109	351.79	88.09	12661.	74900.	20.806	0.46	0.821
CO-57	487.44	122.01	9755.	37313.	10.365	0.73	0.891
Ce-139	662.32	165.74	6828.	38793.	10.776	0.66	0.926
Hg-203	1115.65	279.09	4528.	26776.	7.438	0.82	1.034
SN-113	1565.90	391.66	3496.	28306.	7.863	0.76	1.105
CS-137	2646.02	661.66	2816.	20517.	5.699	0.91	1.369
Y-898	3591.91	898.07	2257.	34851.	9.681	0.63	1.523
Co-1173	4693.17	1173.25	1531.	23664.	6.573	0.80	1.720
Co-1332	5330.69	1332.52	1002.	21706.	6.029	0.78	1.825
Y-1836	7346.26	1835.97	205.	21924.	6.090	0.70	2.146

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4476E+04				8.15E+03	
			46.54	1.448E+04	(	1.799E+02 6.89E-01 4.25E+00	G
AM-241		1.2173E+03				1.58E+05	
			59.54	1.217E+03	(	1.623E+01 7.35E-01 3.57E+01	G
CD-109		1.6121E+04				4.63E+02	
			88.03	1.612E+04	(	1.134E+02 4.57E-01 3.61E+00	G
CO-57		3.5158E+02				2.72E+02	
			122.06	3.516E+02	(	4.362E+00 7.33E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.4043E+02				1.38E+02	
		165.85	5.404E+02	(	5.402E+00 6.57E-01 7.99E+01	G
Hg-203	1.2007E+03				4.66E+01	
		279.17	1.201E+03	(	1.418E+01 8.17E-01 8.15E+01	G
SN-113	9.6938E+02				1.15E+02	
		391.69	9.694E+02	(	9.529E+00 7.56E-01 6.40E+01	G
CS-137	4.6608E+02				1.10E+04	
		661.66	4.661E+02	(	5.679E+00 9.07E-01 8.52E+01	G

```
Y-898        1.5624E+03                                        1.07E+02
                          898.02 1.562E+03  (  1.005E+01 6.29E-01 9.37E+01 G

Co-1173      7.2488E+02                                        1.93E+03
                         1173.24 7.249E+02  (  5.668E+00 7.98E-01 9.99E+01 G

Co-1332      7.3312E+02                                        1.93E+03
                         1332.50 7.331E+02  (  5.074E+00 7.81E-01 1.00E+02 G

Y-1836       1.6163E+03                                        1.07E+02
                         1836.01 1.616E+03  (  5.123E+00 7.01E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4372E+04    1.4476E+04    6.891E-01%                1.80E+02
```

AM-241	1.2168E+03	1.2173E+03	7.355E-01%	1.62E+01
CD-109	1.4197E+04	1.6121E+04	4.569E-01%	1.13E+02
CO-57	2.8320E+02	3.5158E+02	7.325E-01%	4.36E+00
Ce-139	3.5257E+02	5.4043E+02	6.571E-01%	5.40E+00
Hg-203	3.4034E+02	1.2007E+03	8.175E-01%	1.42E+01
SN-113	5.8164E+02	9.6938E+02	7.559E-01%	9.53E+00
CS-137	4.6359E+02	4.6608E+02	9.066E-01%	5.68E+00
Y-898	9.0011E+02	1.5624E+03	6.288E-01%	1.00E+01
Co-1173	7.0308E+02	7.2488E+02	7.979E-01%	5.67E+00
Co-1332	7.1107E+02	7.3312E+02	7.808E-01%	5.07E+00
Y-1836	9.3113E+02	1.6163E+03	7.012E-01%	5.12E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (77.1 to 1999.2 keV) 3.505E+04 Bq
Total Decayed Activity (77.1 to 1999.2 keV) 3.9979633E+04 Bq

Gamma Verification per Geometry

Detector: **Ge19**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: #1402359 / Tuna Can_2018_00001

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1262	99.1
Cd-109	79700	17596	18110	102.9
Co-57	1809	399	392.1	98.2
Ce-139	2723	601	592.2	98.5
Hg-203	5868	1296	1308	101.0
Sn-113	4658	1028	1045	101.6
Cs-137	2283	504	518.1	102.8
Y-88	7810	1724	1691	98.1
Co-60	3574	789	778.3	98.6
Co-60	3574	789	770.3	97.6
Y-88	7810	1724	1762	102.2

Reviewed By: Jody Watson

Date: 4/17/2018

Calibration Data from file: 19_Soil_TunaCan.Clb
Energy Calibration Date: 4/16/2018 Time: 12:11:10 PM
Efficiency Calibration Date: 4/16/2018 Time: 12:11:21 PM

Calibration Description:
19_TunaCan_108513

Energy Calibration Fit
Energy = 0.1766 +0.250204*Channel -3.73478e-008*Channel**2
FWHM (ch) = 3.5649 +0.000922*Channel -2.36904e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.55	46.54	46.60	-0.13%	0.89	0.93	-4.67%
237.43	59.54	59.58	-0.07%	0.92	0.95	-2.49%
351.31	88.03	88.07	-0.05%	0.99	0.97	1.45%
487.25	122.06	122.08	-0.02%	1.02	1.00	1.42%
662.37	165.85	165.89	-0.02%	1.07	1.04	2.92%
1114.62	279.17	279.01	0.06%	1.17	1.14	2.29%
1564.53	391.69	391.54	0.04%	1.23	1.24	-0.87%
2644.90	661.66	661.68	-0.00%	1.46	1.46	0.15%
3590.43	898.02	898.04	-0.00%	1.63	1.64	-0.77%
4691.85	1173.24	1173.27	-0.00%	1.84	1.84	-0.05%
5329.60	1332.50	1332.60	-0.01%	1.94	1.95	-0.29%
7345.15	1836.01	1835.95	0.00%	2.27	2.26	0.25%

Efficiency Calibration Fit
Polynomial Uncertainty = 0.8405 %
Coefficients:
-0.371612 -4.869309 0.466742 -0.049787 0.002234 -0.000039

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7090E-002	1.7048E-002	0.25%
59.54	2.5898E-002	2.6134E-002	-0.91%
88.03	3.4294E-002	3.3195E-002	3.21%
122.06	3.3380E-002	3.3999E-002	-1.85%
165.85	3.0076E-002	3.0529E-002	-1.51%
279.17	2.1644E-002	2.1412E-002	1.07%
391.69	1.6644E-002	1.6371E-002	1.64%
661.66	1.1237E-002	1.0933E-002	2.71%
898.02	8.5558E-003	8.7213E-003	-1.93%
1173.24	7.0410E-003	7.1383E-003	-1.38%
1332.50	6.3120E-003	6.4652E-003	-2.43%
1836.01	5.0415E-003	4.9331E-003	2.15%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 19_TunaCan_20180020

Sample Description: 19_TunaCan_108513
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 3/14/2018 15:23:10 Real Time: 3652 sec
Analysis Time: 4/16/2018 13:51 Dead Time: 1.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2017-05-03_0244.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.600E+04	0.6	9.827E+01	1.032E+03	1.956E+02
AM-241	1.262E+03	0.8	9.764E+00	8.057E+01	1.778E+01
CD-109	1.811E+04	0.4	7.707E+01	1.127E+03	1.177E+02
CO-57	3.921E+02	0.9	3.334E+00	2.277E+01	5.681E+00
Ce-139	5.922E+02	0.7	4.306E+00	3.370E+01	6.700E+00
Hg-203	1.308E+03	0.8	1.088E+01	7.580E+01	1.542E+01
SN-113	1.045E+03	0.8	8.323E+00	6.221E+01	1.083E+01
CS-137	5.181E+02	1.1	5.945E+00	2.731E+01	8.219E+00
Y-898	1.691E+03	0.7	1.196E+01	8.678E+01	1.289E+01
Co-1173	7.783E+02	0.9	6.815E+00	3.933E+01	6.923E+00
Co-1332	7.703E+02	1.0	7.560E+00	3.911E+01	7.892E+00
Y-1836	1.762E+03	0.8	1.428E+01	1.014E+02	1.026E+01
Total	4.424E+04				

Analyst: Jody Watson

TestAmerica Inc Spectrum name: 19_TunaCan_20180020.An1

Sample description
19_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180020.An1

Acquisition information

Start time:	3/14/2018 3:23:10 PM
Live time:	3600
Real time:	3652
Dead time:	1.43 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2017-05-03_0244.PBC 5/3/2017 2:44:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0474

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	41485.	0.61	0.93	1.711E-02	46.54	4.250	1.600E+04	Pb210
49.66	185.	79.61	0.94	2.004E-02				
59.58	42387.	0.77	0.92	2.615E-02	59.54	35.700	1.262E+03	AM241
70.77	1497.	10.76	0.96	2.996E-02				
72.98	2850.	5.71	0.96	3.053E-02				
77.04	130.	105.86	0.96	3.144E-02				
82.61	1804.	9.10	0.97	3.245E-02				
84.89	1999.	8.21	0.97	3.279E-02				
88.09	70129.	0.43	0.97	3.320E-02	88.03	3.610	1.811E+04	CD109
109.95	270.	55.08	0.90	3.432E-02				
122.08	34171.	0.85	1.02	3.400E-02	122.06	85.600	3.921E+02	CO57
136.52	4531.	4.35	1.04	3.311E-02				
156.45	191.	70.26	0.48	3.141E-02				
165.89	36156.	0.73	1.07	3.053E-02	165.85	79.900	5.922E+02	Ce139
255.00	1262.	10.74	1.03	2.296E-02				
279.01	28100.	0.83	1.17	2.142E-02	279.17	81.500	1.308E+03	Hg203
374.53	40.	110.13	0.47	1.696E-02				
391.54	25531.	0.80	1.23	1.638E-02	391.69	64.000	1.045E+03	SN113
438.33	68.	61.86	0.55	1.498E-02				
450.42	51.	90.94	0.45	1.466E-02				
579.11	37.	118.27	1.39	1.208E-02				
583.45	143.	40.12	1.40	1.201E-02				
590.49	120.	62.06	0.55	1.191E-02				
602.94	89.	61.09	0.46	1.172E-02				
608.99	230.	39.38	0.89	1.163E-02				
634.72	58.	97.26	0.36	1.128E-02				
661.68	17295.	1.15	1.46	1.093E-02	661.66	85.210	5.181E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
680.83	293.	36.47	0.98	1.070E-02				
701.88	76.	74.94	0.28	1.046E-02				
813.88	662.	13.53	1.81	9.378E-03				
898.02	31118.	0.71	1.63	8.721E-03	898.02	93.700	1.691E+03	Y898
919.02	96.	39.05	0.43	8.573E-03				
973.55	110.	43.13	1.47	8.215E-03				
1173.23	19468.	0.88	1.84	7.138E-03	1173.24	99.900	7.783E+02	Co1173
1311.47	54.	70.42	0.52	6.547E-03				
1332.58	17466.	0.98	1.95	6.465E-03	1332.50	99.982	7.703E+02	Co1332
1426.68	175.	38.25	0.53	6.121E-03				
1515.29	59.	39.89	1.20	5.826E-03				
1553.02	72.	48.79	0.62	5.708E-03				
1619.47	59.	52.31	0.50	5.509E-03				
1835.90	19413.	0.81	2.27	4.933E-03	1836.01	99.200	1.762E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
197.98	49.61	10751.	205.	1.023E+04	71.88	0.937	-	c
282.14	70.75	12228.	1497.	4.997E+04	10.76	0.956	-	D
290.98	72.96	11800.	2850.	9.335E+04	5.71	0.958	-	D
307.22	77.02	9412.	130.	4.137E+03	105.86	0.962	-	c
329.65	82.59	12567.	1809.	5.576E+04	9.07	0.967	-	sD
338.75	84.87	12449.	2015.	6.145E+04	8.14	0.969	-	sD
438.78	109.95	7282.	270.	7.868E+03	55.08	0.905	-	s
544.98	136.52	8574.	4531.	1.368E+05	4.35	1.039	-	s
624.64	156.45	5607.	191.	6.070E+03	70.26	0.482	-	s
1018.60	255.00	4278.	1262.	5.496E+04	10.74	1.030	-	
1496.54	374.53	900.	40.	2.387E+03	110.13	0.471	-	c
1751.63	438.33	774.	68.	4.506E+03	61.86	0.545	-	s
1800.00	450.42	900.	51.	3.478E+03	90.94	0.447	-	sc
2314.63	579.33	954.	37.	3.086E+03	118.27	1.393	-	sc
2331.99	583.67	1569.	143.	1.188E+04	40.12	1.396	-	sD
2360.15	590.49	1480.	120.	1.008E+04	62.06	0.550	-	s
2409.97	602.94	1012.	89.	7.593E+03	61.09	0.464	-	s
2434.16	608.99	1840.	230.	1.977E+04	39.38	0.887	-	s
2537.07	634.72	1084.	58.	5.099E+03	97.26	0.355	-	sc
2721.49	680.83	2304.	293.	2.739E+04	36.47	0.976	-	s
2805.71	701.88	1056.	76.	7.264E+03	74.94	0.285	-	s
3253.74	813.88	1425.	662.	7.059E+04	13.53	1.808	-	s
3674.40	919.02	530.	96.	1.126E+04	39.05	0.432	-	s
3892.57	973.55	682.	110.	1.345E+04	43.13	1.468	-	s
5245.01	1311.47	348.	54.	8.248E+03	70.42	0.522	-	s
5706.21	1426.68	646.	175.	2.859E+04	38.25	0.525	-	s
6061.00	1515.29	198.	59.	1.013E+04	39.89	1.199	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
6212.08	1553.02	345.	72.	1.256E+04	48.79	0.621	- s
6478.17	1619.47	284.	59.	1.074E+04	52.31	0.497	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.31	46.54	11710.	41485.	11.524	0.61	0.935D
AM-241	237.43	59.58	16272.	42387.	11.774	0.77	0.923
CD-109	351.15	88.03	9451.	70129.	19.480	0.43	0.972D
CO-57	487.25	122.08	11165.	34171.	9.492	0.85	1.017
Ce-139	662.37	165.89	7603.	36156.	10.043	0.73	1.073
Hg-203	1114.62	279.01	4975.	28100.	7.806	0.83	1.168
SN-113	1564.53	391.54	3156.	25531.	7.092	0.80	1.227
CS-137	2644.90	661.68	3399.	17295.	4.804	1.15	1.461
Y-898	3590.36	898.02	2532.	31118.	8.644	0.71	1.632
Co-1173	4691.69	1173.23	1338.	19468.	5.408	0.88	1.845
Co-1332	5329.52	1332.58	1430.	17466.	4.852	0.98	1.948
Y-1836	7344.98	1835.90	561.	19413.	5.392	0.81	2.273

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(	1.956E+02 6.14E-01 4.25E+00 G	
AM-241		1.2624E+03				1.58E+05	
			59.54	1.262E+03	(	1.778E+01 7.73E-01 3.57E+01 G	
CD-109		1.8113E+04				4.63E+02	
			88.03	1.811E+04	(	1.177E+02 4.25E-01 3.61E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	3.9206E+02						2.72E+02
		122.06	3.921E+02	(	5.681E+00	8.50E-01	8.56E+01 G
Ce-139	5.9221E+02						1.38E+02
		165.85	5.922E+02	(	6.700E+00	7.27E-01	7.99E+01 G
Hg-203	1.3079E+03						4.66E+01
		279.17	1.308E+03	(	1.542E+01	8.32E-01	8.15E+01 G
SN-113	1.0455E+03						1.15E+02
		391.69	1.045E+03	(	1.083E+01	7.96E-01	6.40E+01 G
CS-137	5.1806E+02						1.10E+04
		661.66	5.181E+02	(	8.219E+00	1.15E+00	8.52E+01 G
Y-898	1.6914E+03						1.07E+02
		898.02	1.691E+03	(	1.289E+01	7.07E-01	9.37E+01 G
Co-1173	7.7829E+02						1.93E+03
		1173.24	7.783E+02	(	6.923E+00	8.76E-01	9.99E+01 G
Co-1332	7.7032E+02						1.93E+03
		1332.50	7.703E+02	(	7.892E+00	9.81E-01	1.00E+02 G
Y-1836	1.7620E+03						1.07E+02
		1836.01	1.762E+03	(	1.026E+01	8.10E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5905E+04	1.6003E+04	6.141E-01%	1.96E+02
AM-241	1.2620E+03	1.2624E+03	7.734E-01%	1.78E+01
CD-109	1.6256E+04	1.8113E+04	4.255E-01%	1.18E+02
CO-57	3.2615E+02	3.9206E+02	8.503E-01%	5.68E+00
Ce-139	4.1173E+02	5.9221E+02	7.271E-01%	6.70E+00
Hg-203	4.4729E+02	1.3079E+03	8.318E-01%	1.54E+01
SN-113	6.7689E+02	1.0455E+03	7.961E-01%	1.08E+01
CS-137	5.1570E+02	5.1806E+02	1.148E+00%	8.22E+00
Y-898	1.0578E+03	1.6914E+03	7.071E-01%	1.29E+01
Co-1173	7.5832E+02	7.7829E+02	8.756E-01%	6.92E+00
Co-1332	7.5056E+02	7.7032E+02	9.814E-01%	7.89E+00
Y-1836	1.1019E+03	1.7620E+03	8.103E-01%	1.03E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 3.947E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 4.4235852E+04 Bq/Sample

Initial Calibration Verifications

2nd Source Verification

Detector:	Ge5
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

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TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
     5_TunaCan2nd_Rad10_032712


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
       Start time:                 3/27/2012 10:12:05 AM
       Live time:               7200
       Real time:               7250
       Dead time:                  0.69 %
       Detector ID:                    5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  2
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	- s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	- sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	- s

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TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4212E+04				8.15E+03	
			46.54	1.421E+04	(P	1.177E+02 4.91E-01 4.25E+00	G
AM-241		1.1609E+03				1.58E+05	
			59.54	1.161E+03	(	8.959E+00 4.87E-01 3.57E+01	G
CD-109		1.5419E+04				4.63E+02	
			88.03	1.542E+04	(	1.658E+02 6.81E-01 3.61E+00	G
CO-57		3.3478E+02				2.72E+02	
			122.06	3.348E+02	(	1.063E+01 1.66E+00 8.56E+01	G
Ce-139		5.3191E+02				1.38E+02	
			165.85	5.319E+02	(	7.689E+01 6.14E+00 7.99E+01	G
Hg-203		-6.5193E-03				4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00 8.22E+03 8.15E+01	G
SN-113		9.5011E+02				1.15E+02	
			391.69	9.501E+02	(	3.682E+02 1.63E+01 6.40E+01	G
CS-137		4.4236E+02				1.10E+04	
			661.66	4.424E+02	(P	3.020E+00 7.12E-01 8.52E+01	G
Y-898		1.6655E+03				1.07E+02	
			898.02	1.665E+03	(	6.908E+02 1.92E+01 9.37E+01	G
Co-1173		7.0021E+02				1.93E+03	
			1173.24	7.002E+02	(	4.056E+00 7.32E-01 9.99E+01	G
Co-1332		7.0186E+02				1.93E+03	
			1332.50	7.019E+02	(	1.651E+00 7.07E-01 1.00E+02	G
Y-1836		1.6424E+03				1.07E+02	
			1836.01	1.642E+03	(	1.392E+02 7.47E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%		1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%		8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%		1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%		1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%		7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00	
SN-113	6.9747E+00	9.5011E+02	1.633E+01%		3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%		3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%		6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%		4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%		1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%		1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 8:52:25 AM
TestAmerica                      Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
     7_TunaCan2ndSource_81427-334_032712


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
       Start time:                 3/27/2012 3:25:25 PM
       Live time:               3600
       Real time:               3684
       Dead time:                  2.28 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	876.	[illegible]	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name    Code  Activity     Energy   Activity Code MDA Value
              Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

Pb-210    N   1.3857E+04                                      8.15E+03
                            46.54 1.386E+04  (P 1.480E+02 6.34E-01 4.25E+00 G

AM-241        1.1504E+03                                      1.58E+05
                            59.54 1.150E+03  (  1.036E+01 5.81E-01 3.57E+01 G

CD-109        1.5217E+04                                      4.63E+02
                            88.03 1.522E+04  (  1.799E+02 7.73E-01 3.61E+00 G

CO-57         3.1712E+02                                      2.72E+02
                           122.06 3.171E+02  (  1.205E+01 2.04E+00 8.56E+01 G

Ce-139        5.1801E+02                                      1.38E+02
                           165.85 5.180E+02  (  7.941E+01 6.45E+00 7.99E+01 G

Hg-203       -4.5441E-01                                      4.66E+01
                           279.17-4.544E-01 ?(  2.347E+00 1.56E+02 8.15E+01 G

SN-113        9.3315E+02                                      1.15E+02
                           391.69 9.332E+02  (  4.178E+02 1.96E+01 6.40E+01 G

CS-137        4.4047E+02                                      1.10E+04
                           661.66 4.405E+02  (  3.706E+00 8.56E-01 8.52E+01 G

Y-898         1.6944E+03                                      1.07E+02
                           898.02 1.694E+03  (  8.216E+02 2.35E+01 9.37E+01 G

Co-1173       6.8172E+02                                      1.93E+03
                          1173.24 6.817E+02  (  4.436E+00 8.58E-01 9.99E+01 G

Co-1332       6.9210E+02                                      1.93E+03
                          1332.50 6.921E+02  (  2.586E+00 8.49E-01 1.00E+02 G

Y-1836        1.7801E+03                                      1.07E+02
                          1836.01 1.780E+03  (  2.065E+02 9.19E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 3
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.4221E+04                                     8.15E+03
                            46.54 1.422E+04  (  1.806E+02 7.43E-01 4.25E+00 G

AM-241       1.1754E+03                                     1.58E+05
                            59.54 1.175E+03  (  1.311E+01 7.10E-01 3.57E+01 G

CD-109       1.5223E+04                                     4.63E+02
                            88.03 1.522E+04  (  2.071E+02 8.83E-01 3.61E+00 G

CO-57        3.3494E+02                                     2.72E+02
                           122.06 3.349E+02  (  1.600E+01 2.55E+00 8.56E+01 G

Ce-139       6.0766E+02                                     1.38E+02
                           165.85 6.077E+02 *(  1.153E+02 8.62E+00 7.99E+01 G

Hg-203       6.1671E-01                                     4.66E+01
                           279.17 6.167E-01  (  2.689E+00 1.31E+02 8.15E+01 G

SN-113       1.0157E+03                                     1.15E+02
                           391.69 1.016E+03  (  4.390E+02 1.79E+01 6.40E+01 G

CS-137       4.4661E+02                                     1.10E+04
                           661.66 4.466E+02  (P 3.489E+00 8.85E-01 8.52E+01 G

Y-898        2.5543E+03                                     1.07E+02
                           898.02 2.554E+03  (  9.046E+02 1.79E+01 9.37E+01 G

Co-1173      6.9722E+02                                     1.93E+03
                          1173.24 6.972E+02  (  4.649E+00 9.19E-01 9.99E+01 G

Co-1332      6.9192E+02                                     1.93E+03
                          1332.50 6.919E+02  (  2.515E+00 9.18E-01 1.00E+02 G

Y-1836       1.7236E+03                                     1.07E+02
                          1836.01 1.724E+03  (  1.542E+02 9.00E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

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TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  2
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

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TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.3971E+04                                     8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                     1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                     4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                     2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                     1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                     4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                     1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                     1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                     1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                     1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                     1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                     1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

```
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
Hg-203     280.29      2362.       -52.    -0.014   133.84   0.000E+00
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                Bq/Sample

_____________________________________________________________________________
Pb-210       1.2947E+04    1.3971E+04    6.459E-01%                 1.48E+02
AM-241       1.1648E+03    1.1694E+03    6.156E-01%                 1.09E+01
CD-109       4.0954E+03    1.5657E+04    8.713E-01%                 2.12E+02
CO-57        3.3792E+01    3.3118E+02    2.862E+00%                 1.73E+01
Ce-139       5.9752E+00    5.4173E+02    1.074E+01%                 1.36E+02
Hg-203 #A   -5.2429E-01 >12 Halflives   1.3384E+02%   2.3272E+00
SN-113 #     4.3447E+00    9.5260E+02    2.438E+01%                 7.50E+02
CS-137       4.2011E+02    4.4452E+02    7.635E-01%                 3.20E+00
Y-898  #     7.1422E+00    2.4057E+03    2.361E+01%                 1.12E+03
Co-1173      4.9827E+02    6.8772E+02    8.087E-01%                 4.55E+00
Co-1332      5.0178E+02    6.9256E+02    7.487E-01%                 2.04E+00
Y-1836       5.1813E+00    1.7452E+03    1.023E+01%                 2.39E+02
```



```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ---------------------------
Total Activity (  379.7 to  1999.7 keV)     1.968E+04  Bq/Sample
Total Decayed Activity (  379.7 to  1999.7 keV) 3.8598309E+04  Bq/Sample
```

2nd Source Verification

Detector: **Ge12**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1288	103.1
Cs-137	1926	425	0.851	499	509.9	102.1
Co-60	3612	797	0.999856	797	833.8	104.6

Reviewed By: Jody Watson

Date: 4/24/2018

Test America St. Louis Spectrum ID: 12_TunaCan_20180012

Sample Description: 12_TunaCan_ICV
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/24/2018 09:26:18 Real Time: 5018 sec
Analysis Time: 4/24/2018 10:50 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.634E+04	0.6	9.464E+01	1.053E+03	1.764E+02
AM-241	1.288E+03	0.4	5.772E+00	8.177E+01	8.914E+00
CD-109	2.726E+04	25.0	6.823E+03	7.030E+03	1.764E+04
CO-57	1.000E+100	153.6	5.398E-01	5.402E-01	1.425E+00
Ce-139	1.000E+100	106.9	5.267E-01	5.274E-01	1.390E+00
Hg-203	1.000E+100	297.5	6.855E-01	6.856E-01	1.730E+00
SN-113	1.000E+100	692.4	1.143E+00	1.143E+00	2.762E+00
CS-137	5.099E+02	0.8	3.904E+00	2.652E+01	3.285E+00
Y-898	1.000E+100	140.9	1.086E+00	1.086E+00	2.342E+00
Co-1173	8.106E+02	1.3	1.069E+01	4.173E+01	9.187E+00
Co-1332	8.338E+02	1.3	1.078E+01	4.290E+01	6.803E+00
Y-1836	1.000E+100	127.2	4.662E-01	4.667E-01	9.202E-01
Total	6.000E+100				

Analyst: Jody Watson

Sample description
12_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180012.An1

Acquisition information

Start time:	4/24/2018 9:26:18 AM
Live time:	5000
Real time:	5018
Dead time:	0.36 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 25.3541

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
28.13	58.	46.71	0.75	4.137E-03				
32.13	394.	18.65	0.81	7.163E-03				
36.69	330.	25.31	0.84	1.059E-02				
46.66	43625.	0.58	0.85	1.811E-02	46.54	4.250	1.634E+04	Pb210
49.83	321.	44.33	0.85	2.160E-02				
59.65	63562.	0.45	0.86	2.820E-02	59.54	35.700	1.288E+03	AM241
70.53	127.	49.58	1.39	3.219E-02				
74.86	220.	28.10	0.88	3.333E-02				
77.21	369.	16.72	0.88	3.387E-02				
87.68	350.	23.71	0.81	3.578E-02	88.03	3.610	3.034E+04	CD109
93.18	213.	27.98	1.16	3.644E-02				
165.85	67.	106.94	0.97	3.405E-02	165.85	79.900	HL>Cutoff	Ce139
238.54	388.	19.10	0.88	2.744E-02				
279.17	23.	297.48	1.09	2.449E-02	279.17	81.500	HL>Cutoff	Hg203
307.48	44.	92.73	0.49	2.278E-02				
312.92	63.	62.15	0.30	2.248E-02				
320.20	50.	55.24	0.61	2.209E-02				
355.42	79.	51.62	0.51	2.040E-02				
384.05	22.	98.42	0.50	1.922E-02				
428.92	42.	63.02	0.59	1.766E-02				
454.01	126.	41.89	2.09	1.692E-02				
493.21	76.	56.00	0.64	1.589E-02				
583.05	231.	19.93	1.19	1.403E-02				
609.57	255.	15.76	1.66	1.358E-02				
661.72	21282.	0.77	1.42	1.279E-02	661.66	85.210	5.099E+02	CS137
898.02	37.	140.94	1.67	1.025E-02	898.02	93.700	HL>Cutoff	Y898
1173.31	7459.	1.32	1.92	8.426E-03	1173.24	99.900	8.106E+02	Co1173

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.58	6951.	1.30	1.98	7.647E-03	1332.50	99.982	8.318E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
112.21	28.13	314.	58.	1.406E+04	46.71	0.750	-	s
128.21	32.13	1577.	394.	5.496E+04	18.65	0.810	-	
146.44	36.67	3332.	330.	3.120E+04	25.31	0.841	-	sD
199.29	49.79	9113.	333.	1.539E+04	40.96	0.855	-	sD
281.70	70.53	1447.	127.	3.956E+03	49.58	1.387	-	s
299.02	74.84	1784.	220.	6.587E+03	28.10	0.880	-	D
308.40	77.19	1706.	369.	1.088E+04	16.72	0.883	-	sD
372.24	93.18	1248.	213.	5.837E+03	27.98	1.163	-	sM
953.35	238.54	1339.	388.	1.414E+04	19.10	0.882	-	s
1229.01	307.48	572.	44.	1.931E+03	92.73	0.491	-	sc
1250.75	312.92	513.	63.	2.788E+03	62.15	0.295	-	s
1279.88	320.20	329.	50.	2.263E+03	55.24	0.611	-	s
1420.71	355.42	528.	79.	3.873E+03	51.62	0.511	-	s
1535.20	384.00	232.	22.	1.118E+03	98.42	0.497	-	sc
1714.62	428.92	312.	42.	2.406E+03	63.02	0.590	-	s
1814.96	454.01	760.	126.	7.448E+03	41.89	2.094	-	s
1971.76	493.21	502.	76.	4.813E+03	56.00	0.640	-	s
2331.07	583.05	403.	231.	1.644E+04	19.93	1.194	-	
2437.14	609.57	326.	255.	1.877E+04	15.76	1.660	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	10103.	43625.	8.725	0.58	0.851D
AM-241	237.76	59.54	8808.	63562.	12.712	0.45	0.865D
CD-109	350.62	87.77	1861.	315.	0.063	25.03	0.760s
CO-57	487.68	122.06	2320.	-56.	-0.011	153.64	0.928
Ce-139	662.74	165.85	1600.	67.	0.013	106.94	0.973s
Hg-203	1115.81	279.17	1331.	23.	0.005	297.48	1.086s
SN-113	1565.74	391.69	1248.	-10.	-0.002	692.39	1.196s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.75	661.72	832.	21282.	4.256	0.77	1.422
Y-898	3591.15	898.02	555.	37.	0.007	140.94	1.672s
Co-1173	4692.85	1173.31	308.	7459.	1.492	1.32	1.921
Co-1332	5330.42	1332.58	135.	6968.	1.394	1.29	1.978
Y-1836	7346.49	1836.01	27.	-11.	-0.002	127.17	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6338E+04				8.15E+03	
			46.54	1.634E+04	(P	1.764E+02 5.79E-01 4.25E+00	G
AM-241		1.2876E+03				1.58E+05	
			59.54	1.288E+03	(	8.914E+00 4.48E-01 3.57E+01	G
CD-109		2.7262E+04				4.63E+02	
			88.03	2.726E+04	*(	1.764E+04 2.50E+01 3.61E+00	G
CO-57		-3.5134E-01				2.72E+02	
			122.06	-3.513E-01	(	1.425E+00 1.54E+02 8.56E+01	G
Ce-139		4.9250E-01				1.38E+02	
			165.85	4.925E-01	?(	1.390E+00 1.07E+02 7.99E+01	G
Hg-203		2.3043E-01				4.66E+01	
			279.17	2.304E-01	&(	1.730E+00 2.97E+02 8.15E+01	G
SN-113		-1.6505E-01				1.15E+02	
			391.69	-1.650E-01	&(	2.762E+00 6.92E+02 6.40E+01	G
CS-137		5.0987E+02				1.10E+04	
			661.66	5.099E+02	(	3.285E+00 7.66E-01 8.52E+01	G
Y-898		7.7025E-01				1.07E+02	
			898.02	7.703E-01	&(	2.342E+00 1.41E+02 9.37E+01	G
Co-1173		8.1058E+02				1.93E+03	
			1173.24	8.106E+02	(	9.187E+00 1.32E+00 9.99E+01	G
Co-1332		8.3376E+02				1.93E+03	
			1332.50	8.338E+02	(	6.803E+00 1.29E+00 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-1836	-3.6659E-01					1.07E+02	
		1836.01	-3.666E-01	?(	9.202E-01	1.27E+02	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
CO-57	122.06	2320.	-56.	-0.011	153.64	0.000E+00
Ce-139	165.85	1600.	67.	0.013	106.94	0.000E+00
Hg-203	279.17	1331.	23.	0.005	297.48	0.000E+00
SN-113	391.69	1248.	-10.	-0.002	692.39	0.000E+00
Y-898	898.02	555.	37.	0.007	140.94	0.000E+00
Y-1836	1836.01	27.	-11.	-0.002	127.17	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.1406E+04	1.6338E+04	5.793E-01%	1.76E+02
AM-241	1.2640E+03	1.2876E+03	4.483E-01%	8.91E+00
CD-109 #	4.8702E+01	2.7262E+04	2.503E+01%	1.76E+04
CO-57 #A	-3.5134E-01	>12 Halflives	1.536E+02%	1.43E+00
Ce-139 #A	4.9250E-01	>12 Halflives	1.069E+02%	1.39E+00
Hg-203 #A	2.3043E-01	>12 Halflives	2.975E+02%	1.73E+00
SN-113 #A	-1.6505E-01	>12 Halflives	6.924E+02%	2.76E+00
CS-137	3.9058E+02	5.0987E+02	7.657E-01%	3.29E+00
Y-898 #A	7.7025E-01	>12 Halflives	1.409E+02%	2.34E+00
Co-1173	1.7721E+02	8.1058E+02	1.318E+00%	9.19E+00
Co-1332	1.8227E+02	8.3376E+02	1.293E+00%	6.80E+00
Y-1836 #A	-3.6659E-01	>12 Halflives	1.272E+02%	9.20E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 1.347E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.7041629E+04 Bq/Sample

2nd Source Verification

Detector: Ge14

Geometry: 100mL solid

Reference date 1/1/2011

Source: 83814-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 166.06

lab ID# of cal standard 6668

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3021	324	0.0425	7615	7272.8	95.5
Am-241	2090	224	0.359	624	625.97	100.4
Cd-109	2873	308	0.0361	8526	8432.8	98.9
Co-57	1475	158	0.856	185	179.72	97.4
Cs-137	1877	201	0.851	236	229.41	97.1
Co-60	3626	388	0.99974	389	373.57	96.1
Co-60	3627	389	0.999856	389	380.41	97.9

Reviewed By: Megan McAfee

Date: 4/13/2012

14_100mLSolid2nd_20120138

```
     ORTEC g v - i (3263) Env32  G53W4.25  4/12/2012 10:46:41 AM   Page  1
TestAmerica, Inc.               Spectrum name: 14_100mLSolid2nd_20120138.An1

Sample description
     14_100mLSolid2nd_83814_022012


Spectrum Filename: C:\User\SPC\Det14\14_100mLSolid2nd_20120138.An1

Acquisition information
       Start time:                 2/20/2012 6:53:54 PM
       Live time:               7200
       Real time:               7281
       Dead time:                  1.11 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_100ml.Clb
     14_100mLSoild_90099_022012


       Energy Calibration
            Created:               4/12/2012 10:42:45 AM
            Zero offset:           0.142 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.934E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 10:42:57 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.272938E-02 + (-4.365475E-01*Log(E) ) +
                                   ( -3.087719E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.54 %
            Log(Eff):             -1.386068E+01 + ( 4.872649E+00*Log(E) ) +
                                   ( -5.398101E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  1999.59keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  4/12/2012 10:46:41 AM   Page  2
TestAmerica, Inc.               Spectrum name: 14_100mLSolid2nd_20120138.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-01-27_0528.PBC 1/27/2012 5:28:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0702

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.71	1360.	9.33	0.73	3.641E-02				
38.01	63.	221.28	0.74	3.765E-02				
40.38	292.	48.10	0.75	3.982E-02				
46.66	95970.	0.42	0.73	4.471E-02	46.54	4.250	7.273E+03	Pb210
49.53	1318.	14.13	0.93	4.660E-02				
59.61	82969.	0.46	0.74	5.169E-02	59.54	35.700	6.260E+02	AM241
74.71	282.	41.37	0.77	5.579E-02				
77.20	359.	34.67	0.78	5.615E-02				
81.14	241.	51.44	0.38	5.657E-02				
87.99	66999.	0.48	0.78	5.695E-02	88.03	3.610	8.433E+03	CD109
92.86	238.	41.59	0.55	5.698E-02				
121.95	20910.	0.87	0.82	5.446E-02	122.06	85.600	1.797E+02	CO57
136.36	2504.	3.89	0.90	5.223E-02				
165.76	9321.	1.50	0.88	4.701E-02	165.85	79.900	2.772E+02	Ce139
170.03	58.	81.92	0.32	4.645E-02				
199.08	199.	38.52	0.35	4.121E-02				
238.47	390.	17.57	0.95	3.587E-02				
243.24	61.	89.13	0.43	3.533E-02				
255.14	297.	26.36	0.80	3.404E-02				
279.25	286.	19.99	0.97	3.172E-02	279.17	81.500	7.383E+02	Hg203
312.24	110.	54.38	0.65	2.905E-02				
391.66	4526.	2.53	1.09	2.424E-02	391.69	64.000	4.943E+02	SN113
458.43	169.	43.21	0.27	2.134E-02				
661.70	21604.	0.77	1.33	1.576E-02	661.66	85.210	2.294E+02	CS137
898.12	4401.	2.88	1.50	1.216E-02	898.02	93.700	7.985E+02	Y898
981.61	32.	74.21	0.47	1.127E-02				
1065.55	53.	52.84	0.52	1.050E-02				
1173.30	22338.	0.73	1.75	9.654E-03	1173.24	99.900	3.736E+02	Co1173
1332.56	20362.	0.72	1.83	8.634E-03	1332.50	99.982	3.804E+02	Co1332
1836.09	2553.	2.11	2.11	6.490E-03	1836.01	99.200	8.200E+02	Y1836

14_100mLSolid2nd_20120138

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.27	36.68	7386.	1337.	3.673E+04	9.49	0.735	- D
151.45	37.98	8483.	413.	1.097E+04	31.90	0.736	- D
160.91	40.38	8980.	292.	7.336E+03	48.10	0.752	-

ORTEC g v - i (3263) Env32 G53W4.25 4/12/2012 10:46:41 AM Page 3
TestAmerica, Inc. Spectrum name: 14_100mLSolid2nd_20120138.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
197.50	49.53	11783.	1318.	2.829E+04	14.13	0.927	- s
298.55	74.80	6015.	274.	4.911E+03	45.16	0.745	-
308.48	77.29	8673.	533.	9.489E+03	31.40	0.823	- s
323.91	81.14	6051.	241.	4.260E+03	51.44	0.376	- s
370.77	92.86	3360.	238.	4.168E+03	41.59	0.545	- s
544.72	136.36	2322.	2504.	4.794E+04	3.89	0.900	-
679.37	170.03	998.	58.	1.238E+03	81.92	0.315	- c
795.54	199.08	1892.	199.	4.828E+03	38.52	0.349	- s
953.06	238.47	1524.	390.	1.089E+04	17.57	0.945	-
972.13	243.24	1158.	61.	1.727E+03	89.13	0.432	- c
1019.73	255.14	1745.	297.	8.716E+03	26.36	0.799	-
1248.10	312.24	1156.	110.	3.787E+03	54.38	0.652	- s
1832.79	458.43	1408.	169.	7.920E+03	43.21	0.268	- s
3925.73	981.61	266.	32.	2.840E+03	74.21	0.470	- sc
4261.56	1065.55	309.	53.	5.017E+03	52.84	0.525	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.00	46.66	20751.	95878.	13.316	0.42	0.731
AM-241	237.81	59.61	16150.	82969.	11.523	0.46	0.737
CD-109	351.27	87.99	9302.	66999.	9.305	0.48	0.782
CO-57	487.09	121.95	3582.	20910.	2.904	0.87	0.816
Ce-139	662.27	165.76	2686.	9321.	1.295	1.50	0.878
Hg-203	1116.13	279.25	1122.	286.	0.040	19.99	0.970
SN-113	1565.74	391.66	1918.	4526.	0.629	2.53	1.089
CS-137	2645.88	661.70	1212.	21604.	3.001	0.77	1.331
Y-898	3591.68	898.12	1835.	4401.	0.611	2.88	1.501
Co-1173	4692.71	1173.30	728.	22338.	3.103	0.73	1.745
Co-1332	5330.04	1332.56	204.	20362.	2.828	0.72	1.833
Y-1836	7345.45	1836.09	39.	2553.	0.355	2.11	2.112

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 4/12/2012 10:46:41 AM Page 4
Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   7.2728E+03                                      8.15E+03
                            46.54 7.273E+03  (P 5.113E+01 4.23E-01 4.25E+00 G

AM-241       6.2597E+02                                      1.58E+05
                            59.54 6.260E+02  (  4.488E+00 4.59E-01 3.57E+01 G

CD-109       8.4328E+03                                      4.63E+02
                            88.03 8.433E+03  (  5.691E+01 4.78E-01 3.61E+00 G

CO-57        1.7972E+02                                      2.72E+02
                           122.06 1.797E+02  (  2.421E+00 8.75E-01 8.56E+01 G

Ce-139       2.7720E+02                                      1.38E+02
                           165.85 2.772E+02  (  7.263E+00 1.50E+00 7.99E+01 G

Hg-203       7.3828E+02                                      4.66E+01
                           279.17 7.383E+02  (  4.094E+02 2.00E+01 8.15E+01 G

SN-113       4.9433E+02                                      1.15E+02
                           391.69 4.943E+02  (  2.259E+01 2.53E+00 6.40E+01 G

CS-137       2.2941E+02                                      1.10E+04
                           661.66 2.294E+02  (  1.752E+00 7.70E-01 8.52E+01 G

Y-898        7.9846E+02                                      1.07E+02
                           898.02 7.985E+02  (  3.670E+01 2.88E+00 9.37E+01 G

Co-1173      3.7357E+02                                      1.93E+03
                          1173.24 3.736E+02  (  2.149E+00 7.33E-01 9.99E+01 G

Co-1332      3.8041E+02                                      1.93E+03
                          1332.50 3.804E+02  (  1.293E+00 7.23E-01 1.00E+02 G

Y-1836       8.1996E+02                                      1.07E+02
                          1836.01 8.200E+02  (  1.024E+01 2.11E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	7.0202E+03	7.2728E+03	4.235E-01%	5.11E+01
AM-241	6.2483E+02	6.2597E+02	4.588E-01%	4.49E+00
CD-109	4.5259E+03	8.4328E+03	4.782E-01%	5.69E+01
CO-57	6.2315E+01	1.7972E+02	8.747E-01%	2.42E+00
Ce-139	3.4232E+01	2.7720E+02	1.503E+00%	7.26E+00
Hg-203	1.5381E+00	7.3828E+02	1.999E+01%	4.09E+02
SN-113	4.0521E+01	4.9433E+02	2.534E+00%	2.26E+01
CS-137	2.2348E+02	2.2941E+02	7.699E-01%	1.75E+00
Y-898	5.3628E+01	7.9846E+02	2.876E+00%	3.67E+01
Co-1173	3.2169E+02	3.7357E+02	7.333E-01%	2.15E+00
Co-1332	3.2758E+02	3.8041E+02	7.232E-01%	1.29E+00
Y-1836	5.5073E+01	8.1996E+02	2.109E+00%	1.02E+01

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TestAmerica, Inc. Spectrum name: 14_100mLSolid2nd_20120138.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (40.2 to 1999.6 keV) 1.329E+04 Bq/Sample
Total Decayed Activity (40.2 to 1999.6 keV) 2.0622883E+04 Bq/Sample

2nd Source Verification

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
     14_TunaCan2nd_rad10_042412


Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
       Start time:                 4/24/2012 8:12:45 AM
       Live time:               3600
       Real time:               3635
       Dead time:                  0.95 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1
                                      Page 1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	-	s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	-	s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-	
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	-	s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	-	s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	-	s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	-	sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	-	s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	-	s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210   N   1.3845E+04                                        8.15E+03
                            46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241       1.1408E+03                                        1.58E+05
                            59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109       1.5678E+04                                        4.63E+02
                            88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57        3.2838E+02                                        2.72E+02
                           122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139       5.8018E+02                                        1.38E+02
                           165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203      -5.1862E-01                                        4.66E+01
                           279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113       1.0438E+03                                        1.15E+02
                           391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137       4.4755E+02                                        1.10E+04
                           661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898        2.2899E+03                                        1.07E+02
                           898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173      6.9001E+02                                        1.93E+03
                          1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332      6.9961E+02                                        1.93E+03
                          1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836       1.8162E+03                                        1.07E+02
                          1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
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I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%		1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%		1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%		2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%		1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%		1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00	
SN-113	6.4765E+00	1.0438E+03	1.791E+01%		4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%		3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%		9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%		4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%		2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%		1.60E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

2nd Source Verification

Detector:	Ge 15
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
     15_TunaCan2nd_rad10_032312


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
       Start time:                 3/23/2012 6:10:28 AM
       Live time:               7200
       Real time:               7248
       Dead time:                  0.66 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_Soil_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2012-02-26_0425.PBC 2/26/2012 4:25:10 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 26.5953

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

Page 2

145.78	36.48	5577.	1231.	9.786E+04	11.17	1.202	-	s
198.43	49.65	13746.	1514.	7.010E+04	14.37	1.248	-	sM
370.24	92.63	3274.	219.	5.791E+03	44.56	0.421	-	s

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 3
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
544.93	136.33	3516.	1390.	3.731E+04	8.77	1.130	-	s
952.92	238.39	2518.	480.	1.849E+04	20.10	1.422	-	sM
1042.01	260.67	968.	81.	3.328E+03	57.86	0.332	-	sM
1407.66	352.13	1248.	110.	5.749E+03	54.66	0.679	-	s
1472.16	368.26	1252.	125.	6.736E+03	49.84	0.459	-	s
1601.36	400.57	843.	73.	4.224E+03	61.58	0.543	-	s
3017.75	754.74	768.	100.	9.719E+03	52.53	0.393	-	s
3618.39	904.89	752.	86.	9.741E+03	54.53	0.363	-	s
4001.87	1000.75	476.	82.	1.015E+04	43.22	0.582	-	s
4385.05	1096.51	621.	181.	2.415E+04	26.16	0.796	-	s
4905.82	1226.66	215.	98.	1.445E+04	36.87	0.740	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.62	46.44	19930.	76355.	10.605	0.51	0.907
AM-241	237.58	59.44	16824.	80694.	11.208	0.48	0.935
CD-109	351.67	87.99	9695.	43578.	6.052	0.68	0.972
CO-57	487.63	122.00	4069.	10133.	1.407	1.58	1.014
Ce-139	662.95	165.85	3411.	1699.	0.236	7.29	1.054
Hg-203	1116.56	279.32	3139.	56.	0.008	141.32	1.144
SN-113	1565.32	391.56	1615.	581.	0.081	13.59	1.282
CS-137	2645.11	661.57	2071.	29285.	4.067	0.71	1.459
Y-898	3591.24	898.10	1317.	516.	0.072	14.74	1.959
Co-1173	4691.69	1173.15	1159.	26111.	3.627	0.71	1.803
Co-1332	5329.20	1332.45	323.	23674.	3.288	0.68	1.945
Y-1836	7345.58	1836.14	48.	260.	0.036	8.96	1.181s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210    N   1.3663E+04                                        8.15E+03
                              46.54 1.366E+04  (P 1.182E+02 5.11E-01 4.25E+00 G

AM-241        1.1510E+03                                        1.58E+05
                              59.54 1.151E+03  (  8.660E+00 4.81E-01 3.57E+01 G

CD-109        1.5268E+04                                        4.63E+02
                              88.03 1.527E+04  (  1.617E+02 6.78E-01 3.61E+00 G

CO-57         3.3887E+02                                        2.72E+02
                             122.06 3.389E+02  (  1.003E+01 1.58E+00 8.56E+01 G

Ce-139        5.1921E+02                                        1.38E+02
                             165.85 5.192E+02  (  8.400E+01 7.29E+00 7.99E+01 G

Hg-203        4.1717E-01                                        4.66E+01
                             279.17 4.172E-01  (  1.954E+00 1.41E+02 8.15E+01 G

SN-113        9.4771E+02                                        1.15E+02
                             391.69 9.477E+02  (  3.099E+02 1.36E+01 6.40E+01 G

CS-137        4.3518E+02                                        1.10E+04
                             661.66 4.352E+02  (  3.191E+00 7.12E-01 8.52E+01 G

Y-898         1.6812E+03                                        1.07E+02
                             898.02 1.681E+03  (  5.598E+02 1.47E+01 9.37E+01 G

Co-1173       6.8716E+02                                        1.93E+03
                            1173.24 6.872E+02  (  4.246E+00 7.12E-01 9.99E+01 G

Co-1332       6.9646E+02                                        1.93E+03
                            1332.50 6.965E+02  (  2.544E+00 6.82E-01 1.00E+02 G

Y-1836        1.5036E+03                                        1.07E+02
                            1836.01 1.504E+03  (  2.033E+02 8.96E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

```
      ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  5
 TestAmerica, Inc.              Spectrum name: 15_TunaCan2nd_20120288.An1

   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
                                       Page 4
```

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210		1.2751E+04	1.3663E+04	5.115E-01%	1.18E+02
AM-241		1.1469E+03	1.1510E+03	4.812E-01%	8.66E+00
CD-109		4.5239E+03	1.5268E+04	6.776E-01%	1.62E+02
CO-57		4.2749E+01	3.3887E+02	1.583E+00%	1.00E+01
Ce-139		8.7071E+00	5.1921E+02	7.291E+00%	8.40E+01
Hg-203	A	4.1717E-01	>12 Halflives	1.4132E+02%	1.9540E+00
SN-113		7.1340E+00	9.4771E+02	1.359E+01%	3.10E+02
CS-137		4.1344E+02	4.3518E+02	7.117E-01%	3.19E+00
Y-898		8.5738E+00	1.6812E+03	1.474E+01%	5.60E+02
Co-1173		5.1301E+02	6.8716E+02	7.125E-01%	4.25E+00
Co-1332		5.1995E+02	6.9646E+02	6.817E-01%	2.54E+00
Y-1836		7.6681E+00	1.5036E+03	8.962E+00%	2.03E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 6
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.6 keV) 1.994E+04 Bq/Sample
Total Decayed Activity (37.5 to 1999.6 keV) 3.6891324E+04 Bq/Sample

2nd Source Verification

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.2	97.9
Cs-137	1926	396	0.851	465	440.98	94.8
Co-60	3611	742	0.99974	742	682.05	91.9
Co-60	3612	742	0.999856	742	689.63	92.9

Reviewed By: Megan McAfee

Date: 4/13/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  1
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1

Sample description
     17_Tuna2nd_81427_032612


Spectrum Filename: C:\User\SPC\Det17\17_Tuna2nd_20120265.An1

Acquisition information
       Start time:                 3/26/2012 9:29:21 AM
       Live time:               3600
       Real time:               3637
       Dead time:                  1.02 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  2
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-02-26_0520.PBC 2/26/2012 5:20:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0590

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.64	681.	13.12	0.69	1.356E-02				
40.87	116.	86.09	0.16	1.677E-02				
46.62	41004.	0.69	0.76	2.106E-02	46.54	4.250	1.365E+04	Pb210
49.59	775.	17.97	0.63	2.318E-02				
59.61	43179.	0.65	0.77	2.961E-02	59.54	35.700	1.140E+03	AM241
77.20	214.	40.60	1.02	3.765E-02				
88.08	23344.	0.86	0.81	4.060E-02	88.03	3.610	1.500E+04	CD109
121.99	5536.	2.31	0.89	4.276E-02	122.06	85.600	3.357E+02	CO57
136.39	771.	11.84	0.71	4.164E-02				
162.22	87.	50.79	0.72	3.820E-02				
165.73	964.	7.35	1.09	3.765E-02	165.85	79.900	5.310E+02	Ce139
216.43	116.	39.82	0.95	3.196E-02				
217.94	83.	57.15	0.95	3.181E-02				
238.21	247.	27.84	0.94	2.992E-02				
265.99	94.	61.67	0.61	2.773E-02				
301.12	44.	67.34	0.41	2.544E-02				
340.53	91.	61.26	0.55	2.333E-02				
351.73	148.	32.96	0.62	2.280E-02				
391.54	336.	18.56	0.91	2.113E-02	391.69	64.000	9.356E+02	SN113
464.58	72.	65.99	1.18	1.868E-02				
466.04	44.	93.25	1.18	1.864E-02				
582.96	167.	29.62	0.45	1.584E-02				
661.66	18538.	0.82	1.37	1.443E-02	661.66	85.210	4.410E+02	CS137
738.88	57.	57.41	0.44	1.329E-02				
833.91	110.	41.26	0.51	1.214E-02				
856.69	111.	46.51	0.75	1.189E-02				
898.10	352.	17.10	1.23	1.148E-02	898.02	93.700	1.818E+03	Y898
1026.09	89.	47.19	0.52	1.037E-02				
1173.27	17119.	0.83	1.74	9.359E-03	1173.24	99.900	6.820E+02	Co1173
1332.53	15698.	0.82	1.79	8.481E-03	1332.50	99.982	6.896E+02	Co1332
1835.81	220.	7.55	1.96	6.593E-03	1836.01	99.200	1.873E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.04	36.64	2578.	681.	5.025E+04	13.12	0.695	-
162.95	40.87	4224.	116.	6.916E+03	86.09	0.161	- c
197.82	49.59	6204.	775.	3.343E+04	17.97	0.635	- sM
308.25	77.20	2934.	214.	5.685E+03	40.60	1.020	- s

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:25:36 AM Page 3
TestAmerica, Inc. Spectrum name: 17_Tuna2nd_20120265.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.96	136.39	1975.	771.	1.852E+04	11.84	0.713	-
648.26	162.22	793.	87.	2.269E+03	50.79	0.719	- s
865.04	216.40	1003.	116.	3.620E+03	39.82	0.953	- D
871.09	217.91	1078.	83.	2.603E+03	57.15	0.955	- D
952.16	238.21	1349.	247.	8.265E+03	27.84	0.937	- s
1063.26	265.99	1020.	94.	3.372E+03	61.67	0.615	- s
1203.77	301.12	417.	44.	1.730E+03	67.34	0.412	- sc
1361.41	340.53	898.	91.	3.887E+03	61.26	0.553	- s
1406.20	351.73	744.	148.	6.491E+03	32.96	0.618	- s
1857.60	464.69	1086.	72.	3.842E+03	65.99	1.178	- sc
1863.46	466.15	839.	44.	2.387E+03	93.25	1.179	- sc
2331.15	582.96	570.	167.	1.054E+04	29.62	0.448	- s
2954.96	738.88	338.	57.	4.289E+03	57.41	0.442	- s
3335.20	833.91	507.	110.	9.049E+03	41.26	0.506	- s
3426.35	856.69	611.	111.	9.318E+03	46.51	0.755	- s
4104.24	1026.09	453.	89.	8.549E+03	47.19	0.517	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.95	46.62	10512.	40927.	11.369	0.69	0.761
AM-241	237.89	59.61	9192.	43179.	11.994	0.65	0.771
CD-109	351.75	88.08	4394.	23344.	6.484	0.86	0.812
CO-57	487.38	121.99	2606.	5536.	1.538	2.31	0.891
Ce-139	662.30	165.73	1283.	964.	0.268	7.35	1.085
Hg-203	1119.82	280.13	1632.	-52.	-0.015	109.81	1.012s
SN-113	1565.42	391.54	971.	336.	0.093	18.56	0.910s
CS-137	2646.04	661.66	840.	18538.	5.149	0.82	1.373
Y-898	3592.05	898.10	753.	352.	0.098	17.10	1.228
Co-1173	4693.24	1173.27	496.	17119.	4.755	0.83	1.743
Co-1332	5330.69	1332.53	136.	15698.	4.361	0.82	1.789
Y-1836	7345.64	1835.81	10.	220.	0.061	7.55	1.956s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.3650E+04				8.15E+03	
			46.54	1.365E+04	(P	1.603E+02 6.87E-01 4.25E+00	G
AM-241		1.1402E+03				1.58E+05	
			59.54	1.140E+03	(	1.187E+01 6.55E-01 3.57E+01	G
CD-109		1.5004E+04				4.63E+02	
			88.03	1.500E+04	(	2.003E+02 8.59E-01 3.61E+00	G
CO-57		3.3573E+02				2.72E+02	
			122.06	3.357E+02	(	1.459E+01 2.31E+00 8.56E+01	G
Ce-139		5.3096E+02				1.38E+02	
			165.85	5.310E+02	(	9.338E+01 7.35E+00 7.99E+01	G
Hg-203		-6.6653E-01				4.66E+01	
			279.17	-6.665E-01	?(	2.427E+00 1.10E+02 8.15E+01	G
SN-113		9.3563E+02				1.15E+02	
			391.69	9.356E+02	@(	4.114E+02 1.86E+01 6.40E+01	G
CS-137		4.4098E+02				1.10E+04	
			661.66	4.410E+02	(	3.277E+00 8.23E-01 8.52E+01	G
Y-898		1.8177E+03				1.07E+02	
			898.02	1.818E+03	(	6.751E+02 1.71E+01 9.37E+01	G
Co-1173		6.8205E+02				1.93E+03	
			1173.24	6.820E+02	(	4.243E+00 8.31E-01 9.99E+01	G
Co-1332		6.8963E+02				1.93E+03	
			1332.50	6.896E+02	(	2.503E+00 8.22E-01 1.00E+02	G
Y-1836		1.8728E+03				1.07E+02	
			1836.01	1.873E+03	(	1.462E+02 7.55E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.13	1632.	-52.	-0.015	109.81	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma		MDA Bq/Sample
Pb-210	1.2735E+04	1.3650E+04	6.879E-01%		1.60E+02
AM-241	1.1361E+03	1.1402E+03	6.548E-01%		1.19E+01
CD-109	4.4248E+03	1.5004E+04	8.588E-01%		2.00E+02
CO-57	4.2016E+01	3.3573E+02	2.313E+00%		1.46E+01
Ce-139	8.7645E+00	5.3096E+02	7.352E+00%		9.34E+01
Hg-203 #A	-6.6653E-01	>12 Halflives	1.0981E+02%	2.4271E+00	
SN-113 #	6.9111E+00	9.3563E+02	1.856E+01%		4.11E+02
CS-137	4.1887E+02	4.4098E+02	8.234E-01%		3.28E+00
Y-898	9.0827E+00	1.8177E+03	1.710E+01%		6.75E+02
Co-1173	5.0861E+02	6.8205E+02	8.315E-01%		4.24E+00
Co-1332	5.1427E+02	6.8963E+02	8.225E-01%		2.50E+00
Y-1836 #	9.3579E+00	1.8728E+03	7.550E+00%		1.46E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

17_Tuna2nd_20120265

---------- S U M M A R Y ----------

Total Activity (582.9 to 1999.2 keV) 1.981E+04 Bq/Sample

Total Decayed Activity (582.9 to 1999.2 keV) 3.7099195E+04 Bq/Sample

2nd Source Verification

Detector: **Ge19**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1313	105.1
Cs-137	1926	425	0.851	499	520	104.2
Co-60	3612	797	0.999856	797	852.3	107.0

Reviewed By: Jody Watson

Date: 4/20/2018

Sample description
19_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180077.An1

Acquisition information

Start time:	4/20/2018 11:09:29 AM
Live time:	5000
Real time:	5017
Dead time:	0.33 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Test America St. Louis Spectrum ID: 19_TunaCan_20180077

Sample Description: 19_TunaCan_ICV
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/20/2018 11:09:29 Real Time: 5017 sec
Analysis Time: 4/20/2018 14:51 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2018-04-08_1846.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.650E+04	0.6	9.640E+01	1.063E+03	1.744E+02
AM-241	1.313E+03	0.5	6.894E+00	8.344E+01	9.974E+00
CD-109	3.738E+04	20.7	7.737E+03	8.077E+03	1.896E+04
CO-57	1.000E+100	211.0	6.331E-01	6.334E-01	1.592E+00
Ce-139	1.000E+100	99.6	6.348E-01	6.358E-01	1.593E+00
Hg-203	1.000E+100	373.3	7.558E-01	7.559E-01	2.516E+00
SN-113	1.000E+100	155.7	8.400E-01	8.406E-01	3.066E+00
CS-137	5.203E+02	0.8	4.133E+00	2.709E+01	3.044E+00
Y-898	1.000E+100	101.0	1.285E+00	1.287E+00	2.765E+00
Co-1173	8.308E+02	1.4	1.173E+01	4.298E+01	9.972E+00
Co-1332	8.523E+02	1.3	1.136E+01	4.394E+01	5.252E+00
Y-1836	1.000E+100	870.9	3.744E+00	3.744E+00	1.054E+00
Total	6.000E+100				

Analyst: Jody Watson

Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-04-08_1846.PBC 4/8/2018 6:46:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.0720

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
44.25	824.	17.08	0.93	1.551E-02				
46.68	41733.	0.58	0.93	1.715E-02	46.54	4.250	1.650E+04	Pb210
49.79	341.	39.16	0.94	2.016E-02				
59.62	60109.	0.53	0.90	2.617E-02	59.54	35.700	1.313E+03	AM241
74.97	186.	31.71	0.96	3.099E-02				
77.20	287.	21.92	0.96	3.147E-02				
87.56	402.	20.70	1.81	3.319E-02	88.03	3.610	3.738E+04	CD109
165.85	78.	99.62	1.04	3.053E-02	165.85	79.900	HL>Cutoff	Ce139
182.09	60.	62.86	0.35	2.898E-02				
238.45	394.	15.79	1.44	2.415E-02				
274.68	114.	32.95	1.42	2.168E-02				
302.83	39.	62.96	0.34	2.009E-02				
352.06	200.	22.00	1.15	1.782E-02				
438.49	43.	83.30	0.29	1.498E-02				
533.21	81.	44.24	0.90	1.287E-02				
661.74	18571.	0.79	1.47	1.093E-02	661.66	85.210	5.203E+02	CS137
862.76	25.	64.29	0.63	8.983E-03				
878.66	89.	46.18	0.42	8.863E-03				
1173.34	6485.	1.41	1.82	7.138E-03	1173.24	99.900	8.308E+02	Co1173
1332.62	6030.	1.33	1.85	6.465E-03	1332.50	99.982	8.523E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
176.55	44.21	10886.	853.	5.501E+04	17.63	0.932	-	sD
198.69	49.75	8765.	357.	1.770E+04	37.47	0.937	-	sD
298.95	74.97	1637.	186.	5.997E+03	31.71	0.960	-	sD
307.87	77.19	1825.	287.	9.107E+03	21.92	0.962	-	sD
727.12	182.09	591.	60.	2.082E+03	62.86	0.346	-	s
952.44	238.45	1002.	394.	1.631E+04	15.79	1.438	-	s
1097.28	274.68	483.	114.	5.242E+03	32.95	1.420	-	s
1209.83	302.83	282.	39.	1.942E+03	62.96	0.340	-	sc
1406.67	352.06	549.	200.	1.122E+04	22.00	1.153	-	
1752.27	438.49	465.	43.	2.871E+03	83.30	0.289	-	c
2131.09	533.21	325.	81.	6.269E+03	44.24	0.897	-	s
3449.28	862.76	100.	25.	2.783E+03	64.29	0.628	-	s
3512.90	878.66	320.	89.	1.004E+04	46.18	0.424	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.31	46.54	8855.	41733.	8.347	0.58	0.935D
AM-241	237.59	59.62	9494.	60109.	12.022	0.53	0.904
CD-109	349.28	87.56	1868.	402.	0.080	20.70	1.808s
CO-57	487.17	122.06	2413.	-44.	-0.009	210.99	1.003s
Ce-139	662.22	165.85	1690.	78.	0.016	99.62	1.042
Hg-203	1115.25	279.17	2166.	-18.	-0.004	373.28	1.141s
SN-113	1565.13	391.69	1148.	-28.	-0.006	155.72	1.238s
CS-137	2645.14	661.74	517.	18571.	3.714	0.79	1.469
Y-898	3590.37	898.02	560.	-52.	-0.010	101.01	1.642s
Co-1173	4692.11	1173.34	260.	6485.	1.297	1.41	1.816
Co-1332	5329.67	1332.62	55.	6030.	1.206	1.33	1.853
Y-1836	7345.40	1836.01	25.	-11.	-0.002	870.90	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6496E+04					8.15E+03
			46.54	1.650E+04	(P	1.744E+02 5.84E-01 4.25E+00 G	
AM-241		1.3126E+03					1.58E+05
			59.54	1.313E+03	(	9.974E+00 5.25E-01 3.57E+01 G	
CD-109		3.7383E+04					4.63E+02
			88.03	3.738E+04	*(	1.896E+04 2.07E+01 3.61E+00 G	
CO-57		-3.0008E-01					2.72E+02
			122.06	-3.001E-01	?(	1.592E+00 2.11E+02 8.56E+01 G	
Ce-139		6.3720E-01					1.38E+02
			165.85	6.372E-01	&(	1.593E+00 9.96E+01 7.99E+01 G	
Hg-203		-2.0247E-01					4.66E+01
			279.17	-2.025E-01	?(	2.516E+00 3.73E+02 8.15E+01 G	
SN-113		-5.3940E-01					1.15E+02
			391.69	-5.394E-01	&(P	3.066E+00 1.56E+02 6.40E+01 G	
CS-137		5.2035E+02					1.10E+04
			661.66	5.203E+02	(	3.044E+00 7.94E-01 8.52E+01 G	
Y-898		-1.2727E+00					1.07E+02
			898.02	-1.273E+00	?(	2.765E+00 1.01E+02 9.37E+01 G	
Co-1173		8.3078E+02					1.93E+03
			1173.24	8.308E+02	(P	9.972E+00 1.41E+00 9.99E+01 G	
Co-1332		8.5225E+02					1.93E+03
			1332.50	8.523E+02	(	5.252E+00 1.33E+00 1.00E+02 G	
Y-1836		-4.2991E-01					1.07E+02
			1836.01	-4.299E-01	?(P	1.054E+00 8.71E+02 9.92E+01 G	

(- This peak used in the nuclide activity average.

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? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
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F - Fast Neutron Activation
I - Fission Product
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P - Photon Reaction
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Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
CO-57	122.06	2413.	-44.	-0.009	210.99	0.000E+00	
Ce-139	165.85	1690.	78.	0.016	99.62	0.000E+00	
Hg-203	279.17	2166.	-18.	-0.004	373.28	0.000E+00	
SN-113	391.69	1148.	-28.	-0.006	155.72	0.000E+00	P
Y-898	898.02	560.	-52.	-0.010	101.01	0.000E+00	
Y-1836	1836.01	25.	-11.	-0.002	870.90	0.000E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.1520E+04	1.6496E+04	5.844E-01%	1.74E+02
AM-241	1.2885E+03	1.3126E+03	5.252E-01%	9.97E+00
CD-109 #	6.7177E+01	3.7383E+04	2.070E+01%	1.90E+04
CO-57 #A	-3.0008E-01	>12 Halflives	2.110E+02%	1.59E+00
Ce-139 #A	6.3720E-01	>12 Halflives	9.962E+01%	1.59E+00
Hg-203 #A	-2.0247E-01	>12 Halflives	3.733E+02%	2.52E+00
SN-113 #A	-5.3940E-01	>12 Halflives	1.557E+02%	3.07E+00
CS-137	3.9871E+02	5.2035E+02	7.943E-01%	3.04E+00
Y-898 #A	-1.2727E+00	>12 Halflives	1.010E+02%	2.77E+00

Co-1173	1.8188E+02	8.3078E+02	1.412E+00%	9.97E+00
Co-1332	1.8658E+02	8.5225E+02	1.333E+00%	5.25E+00
Y-1836 #A	-4.2991E-01	>12 Halflives	8.709E+02%	1.05E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.364E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 5.7394852E+04 Bq/Sample

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 5_20180713019_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:26:49 PM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.43	1.55	1.60	PASS

Analyst: Mike Aldridge Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20180713019_BGLong.An1

Acquisition information

Start time:	7/13/2018 10:26:49 PM
Live time:	72000
Real time:	72253
Dead time:	0.35 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:03:22 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

(Page 2 of 8)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1457

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.56	560.	9.38	0.67	5.679E-02	46.54	4.250	3.222E+00	PB210
59.38	178.	21.15	0.61	7.399E-02	59.54	35.900	9.298E-02	AM241
63.35	596.	7.58	0.77	7.932E-02	63.29	3.810	2.742E+00	TH234
84.45	200.	24.07	1.16	1.076E-01				
92.58	878.	5.88	0.89	1.129E-01	92.59	5.584	1.935E+00	TH234
					93.35	5.561	1.942E+00	AC228
185.95	438.	9.74	0.88	9.602E-02	185.72	54.000	1.171E-01	U235
					185.99	3.280	1.930E+00	Ra226
238.70	173.	19.51	0.72	8.322E-02	238.63	43.300	6.667E-02	PB212
351.96	180.	23.10	1.42	5.573E-02	351.93	37.600	1.191E-01	PB214
511.33	1781.	4.78	2.15	3.834E-02	511.86	20.000	3.229E+00	RH106
602.92	90.	29.59	2.45	3.242E-02	602.73	98.260	3.909E-02	SB124
					600.50	17.860	2.141E-01	SB125
					604.71	97.620	3.951E-02	CS134
609.59	152.	27.19	1.06	3.199E-02	609.31	46.090	1.432E-01	BI214
					610.30	5.750	1.150E+00	RU103
661.88	202.	18.67	1.65	2.860E-02	661.66	85.210	1.154E-01	CS137
1120.80	78.	29.74	1.36	1.646E-02	1120.29	15.100	4.358E-01	BI214
					1120.55	99.987	6.583E-02	Sc46
					1121.30	34.900	1.888E-01	Ta182
1461.10	140.	14.70	1.33	1.300E-02	1460.83	10.670	1.399E+00	K40
1764.84	77.	18.23	3.05	1.105E-02	1764.49	15.400	6.283E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
337.45	84.45	605.	200.	1.858E+03	24.07	1.161	- s
2045.93	511.33	608.	1781.	4.646E+04	4.78	2.152	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.56	628.	560.	0.008	9.38	0.669s
AM-241	237.11	59.38	467.	178.	0.002	21.15	0.608
TH-234	252.99	63.35	482.	596.	0.008	7.58	0.768
TH-234	370.02	92.58	566.	878.	0.012	5.88	0.893s
Ra-226	743.77	185.95	436.	438.	0.006	9.74	0.877
PB-212	954.89	238.70	341.	173.	0.002	19.51	0.718s
PB-214	1408.21	351.96	402.	180.	0.002	23.10	1.420s
SB-124	2412.38	602.92	184.	90.	0.001	29.59	2.446s
BI-214	2439.05	609.59	322.	152.	0.002	27.19	1.059
CS-137	2648.23	661.88	238.	202.	0.003	18.67	1.648s
BI-214	4483.56	1120.80	92.	78.	0.001	29.74	1.365
K-40	5843.82	1461.10	48.	140.	0.002	14.70	1.332s
BI-214	7057.44	1764.84	20.	77.	0.001	18.23	3.046s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS
K-40	N	1.3987E+00				4.66E+11	
			1460.83	1.399E+00	@(	3.516E-01 1.47E+01 1.07E+01	G

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	3.9095E-02					6.02E+01	
			602.73	3.909E-02	(	2.877E-02	2.96E+01	9.83E+01 G
			1690.98	0.000E+00	%	6.958E-02	1.00E+03	4.78E+01 G
			722.79	0.000E+00	%	2.144E-01	1.00E+03	1.08E+01 G
CS-137	I	1.1539E-01					1.10E+04	
			661.66	1.154E-01	*(	4.247E-02	1.87E+01	8.52E+01 G
PB-210	N	3.2216E+00					8.14E+03	
			46.54	3.222E+00	@(	6.878E-01	9.38E+00	4.25E+00 G
PB-212	N	6.6671E-02					6.98E+02	
			238.63	6.667E-02	(	3.421E-02	1.95E+01	4.33E+01 G
			300.03	0.000E+00	%	3.625E-01	8.04E+01	3.28E+00 GA
PB-214	N	1.1908E-01					5.84E+05	
			351.93	1.191E-01	(	6.375E-02	2.31E+01	3.76E+01 G
			295.09	0.000E+00	&	6.676E-02	2.49E+02	1.93E+01 G
			242.00	0.000E+00	@	2.167E-01	0.00E+00	7.43E+00 GA
BI-214	N	1.4317E-01					5.84E+05	
			609.31	1.432E-01	(	8.131E-02	2.72E+01	4.61E+01 G
			1120.29	4.358E-01	+	2.649E-01	2.97E+01	1.51E+01 G
			1764.49	6.283E-01	+	1.922E-01	1.82E+01	1.54E+01 G
TH-234	N	2.7421E+00					1.63E+12	
			63.29	2.742E+00	(	4.832E-01	7.58E+00	3.81E+00 G
			92.59	1.935E+00	-	2.501E-01	5.88E+00	5.58E+00 G
Ra-226		1.9296E+00					5.84E+05	
			185.99	1.930E+00	(	4.409E-01	9.74E+00	3.28E+00 G
AM-241	T	9.2984E-02					1.58E+05	
			59.54	9.298E-02	(	5.390E-02	2.12E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.5353E-01		
NA-22	<	4.3965E-02		
K-40	#	1.3987E+00	1.4702E+01%	3.516E-01
Sc-46	<	2.2274E-02		
CR-51	<	1.1439E-01		
MN-54	<	2.3949E-02		
FE-59	<	5.1814E-02		
Co-56	<	2.6290E-02		
CO-57	<	7.1209E-03		
CO-58	<	1.9592E-02		
CO-60	<	3.4146E-02		
ZN-65	<	7.4913E-02		
NB-94	<	2.4006E-02		
ZR-95	<	4.1001E-02		
NB-95	<	2.1763E-02		
RU-103	<	1.7526E-02		
RH-106	<	2.1377E-01		
AG-108M	<	1.6248E-02		
AG-110M	<	4.8748E-02		
SN-113	<	2.2094E-02		
SB-124	#	3.9095E-02	2.9593E+01%	2.877E-02

SB-125	<	4.7850E-02		
I-131	<	1.6644E-02		
BA-133	<	3.5190E-02		
CS-134	<	1.3683E-02		
CS-137	#	1.1539E-01	1.8672E+01%	4.247E-02
CE-139	<	1.2018E-02		
Ba-140	<	7.7138E-02		
La-140	<	3.1494E-02		
CE-141	<	1.8132E-02		
CE-144	<	9.8076E-02		
PM-144	<	2.6374E-02		
EU-152	<	5.4752E-02		
EU-154	<	1.9971E-01		
EU-155	<	3.9500E-02		
HF-181	<	1.9127E-02		
Ta-182	<	1.5359E-01		
Hg-203	<	1.3926E-02		
TL-208	<	2.4485E-02		
pm-146	<	6.5882E-02		
y-88	<	2.8025E-02		
PB-210	#	3.2216E+00	9.3825E+00%	6.878E-01
PB-212		6.6671E-02	1.9510E+01%	3.421E-02
PB-214		1.1908E-01	2.3096E+01%	6.375E-02
BI-207	<	3.4960E-02		
BI-212	<	4.5552E-01		
BI-214		1.4317E-01	2.7192E+01%	8.131E-02
BI-210M	<	2.2013E-02		
RA-224	<	4.1532E-01		
AC-228	<	8.4638E-02		
TH-227	<	1.4406E-01		
TH-229	<	2.3361E-01		
TH-234		2.7421E+00	7.5820E+00%	4.832E-01
PA-231	<	5.5357E-01		
PA-233	<	3.4973E-02		
PA-234	<	6.2070E-02		
PA-234M	<	5.9114E+00		
Ra-226		1.9296E+00	9.7420E+00%	4.409E-01
U-235	<	7.9967E-02		
AM-241		9.2984E-02	2.1151E+01%	5.390E-02
Np-237	<	9.6818E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (37.6 to 2000.8 keV) 9.868E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20180713007_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:25:42 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.30	1.40	1.45	PASS

Analyst: Mike Aldridge Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20180713007_BGLong.An1

Acquisition information

Start time:	7/13/2018 10:25:42 PM
Live time:	72000
Real time:	73491
Dead time:	2.03 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration

Filename:	7_QC.Clb

Ge7_QC

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:06:10 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.13keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2133

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.63	462.	12.01	1.38	8.134E-02	46.54	4.250	1.863E+00	PB210
63.26	801.	7.95	1.16	1.228E-01	63.29	3.810	2.377E+00	TH234
92.63	977.	7.17	1.64	1.861E-01	92.59	5.584	1.306E+00	TH234
					93.35	5.561	1.310E+00	AC228
185.70	480.	12.77	2.17	1.633E-01	185.72	54.000	7.560E-02	U235
					185.99	3.280	1.245E+00	Ra226
238.71	300.	15.92	2.08	1.417E-01	238.63	43.300	6.802E-02	PB212
352.14	117.	30.00	1.86	9.542E-02	351.93	37.600	4.529E-02	PB214
583.97	139.	24.56	1.83	5.624E-02	583.02	84.500	4.062E-02	TL208
1461.28	144.	18.04	2.61	1.997E-02	1460.83	10.670	9.355E-01	K40

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.06	46.63	715.	462.	0.006	12.01	1.383s
TH-234	252.59	63.26	750.	801.	0.011	7.95	1.155s
TH-234	370.07	92.63	907.	977.	0.014	7.17	1.640s
Ra-226	742.83	185.81	630.	458.	0.006	11.92	2.162s
PB-212	954.47	238.71	518.	300.	0.004	15.92	2.076s
PB-214	1408.22	352.14	304.	117.	0.002	30.00	1.862s
TL-208	2335.57	583.97	220.	139.	0.002	24.56	1.829s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	5844.80	1461.28	64.	144.	0.002	18.04	2.605s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	9.3553E-01					4.66E+11	
			1460.83	9.355E-01	(	2.617E-01	1.80E+01 1.07E+01	G
TL-208	N	4.0622E-02					6.98E+02	
			583.02	4.062E-02	&(	2.099E-02	2.46E+01 8.45E+01	G
			277.28	0.000E+00	&	9.702E-02	6.45E+01 6.31E+00	G
			860.56	0.000E+00	%	1.100E-01	7.58E+01 1.24E+01	G
PB-210	N	1.8625E+00					8.14E+03	
			46.54	1.863E+00	*(	5.128E-01	1.20E+01 4.25E+00	G
PB-212	N	6.8024E-02					6.98E+02	
			238.63	6.802E-02	*(	2.463E-02	1.59E+01 4.33E+01	G
			300.03	0.000E+00	%	2.034E-01	4.03E+02 3.28E+00	GA
PB-214	N	4.5293E-02					5.84E+05	
			351.93	4.529E-02	*(	3.250E-02	3.00E+01 3.76E+01	G
			295.09	0.000E+00	%	3.655E-02	1.00E+03 1.93E+01	G
			242.00	0.000E+00	?	1.287E-01	0.00E+00 7.43E+00	GA
TH-234	N	2.3768E+00					1.63E+12	
			63.29	2.377E+00	*(	3.867E-01	7.95E+00 3.81E+00	G
			92.59	1.306E+00	-	1.912E-01	7.17E+00 5.58E+00	G
Ra-226		1.1883E+00					5.84E+05	
			185.99	1.188E+00	*(	3.105E-01	1.19E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

```
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                    MDA
              DPS
_____________________________________________________________________________
BE-7    <    5.2457E-02
NA-22   <    3.2394E-02
K-40         9.3553E-01   1.8041E+01%               2.617E-01
Sc-46   <    1.5154E-02
CR-51   <    7.5388E-02
MN-54   <    1.5772E-02
FE-59   <    3.1684E-02
Co-56   <    1.5158E-02
CO-57   <    8.2044E-03
CO-58   <    2.0537E-02
CO-60   <    1.9268E-02
ZN-65   <    5.0763E-02
NB-94   <    1.2973E-02
ZR-95   <    2.7362E-02
NB-95   <    2.3028E-02
RU-103  <    1.1767E-02
RH-106  <    1.6719E-01
AG-108M <    8.5396E-03
AG-110M <    2.1114E-02
```

SN-113	<	1.2285E-02		
SB-124	<	2.0724E-02		
SB-125	<	2.4642E-02		
I-131	<	8.5992E-03		
BA-133	<	1.9395E-02		
CS-134	<	8.0309E-03		
CS-137	<	1.6077E-02		
CE-139	<	6.7740E-03		
Ba-140	<	4.3245E-02		
La-140	<	2.0591E-02		
CE-141	<	1.0595E-02		
CE-144	<	6.2688E-02		
PM-144	<	1.4672E-02		
EU-152	<	2.6123E-02		
EU-154	<	1.3075E-01		
EU-155	<	2.1831E-02		
HF-181	<	1.6421E-02		
Ta-182	<	9.2669E-02		
Hg-203	<	1.0124E-02		
TL-208	#	4.0622E-02	2.4562E+01%	2.099E-02
pm-146	<	4.1284E-02		
y-88	<	1.5507E-02		
PB-210	#	1.8625E+00	1.2009E+01%	5.128E-01
PB-212	#	6.8024E-02	1.5918E+01%	2.463E-02
PB-214	#	4.5293E-02	2.9996E+01%	3.250E-02
BI-207	<	1.8104E-02		
BI-212	<	2.2959E-01		
BI-214	<	5.9246E-02		
BI-210M	<	1.1806E-02		
RA-224	<	1.8209E-01		
AC-228	<	6.6323E-02		
TH-227	<	6.5654E-02		
TH-229	<	1.1500E-01		
TH-234	#	2.3768E+00	7.9460E+00%	3.867E-01
PA-231	<	3.8542E-01		
PA-233	<	1.9224E-02		
PA-234	<	3.2651E-02		
PA-234M	<	2.1134E+00		
Ra-226	#	1.1883E+00	1.1915E+01%	3.105E-01
U-235	<	4.7743E-02		
AM-241	<	3.6191E-02		
Np-237	<	5.0739E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.1 keV)     6.517E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 8_20180713018_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:24:35 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.58	1.68	1.74	PASS

Analyst: Mike Aldridge Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20180713018_BGLong.An1

Acquisition information

Start time:	7/13/2018 10:24:35 PM
Live time:	72000
Real time:	73793
Dead time:	2.43 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_QC.Clb

Ge8_QC

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:07:20 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1071

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.50	467.	9.06	1.02	8.675E-02	59.54	35.900	2.077E-01	AM241
63.31	1105.	4.50	1.03	9.237E-02	63.29	3.810	4.358E+00	TH234
92.65	2002.	3.92	1.14	1.295E-01	92.59	5.584	3.845E+00	TH234
					93.35	5.561	3.858E+00	AC228
143.82	240.	18.77	1.09	1.248E-01	143.79	10.960	2.434E-01	U235
163.30	169.	24.41	1.20	1.171E-01	163.38	5.080	3.941E-01	U235
					162.66	6.220	3.211E-01	Ba140
185.76	1169.	6.49	1.05	1.108E-01	185.72	54.000	2.714E-01	U235
					185.99	3.280	4.472E+00	Ra226
238.71	377.	16.39	1.07	9.637E-02	238.63	43.300	1.255E-01	PB212
351.78	154.	28.04	1.69	6.558E-02	351.93	37.600	8.693E-02	PB214
510.86	1473.	6.03	2.70	4.531E-02	511.86	20.000	2.262E+00	RH106
582.93	134.	25.65	1.27	3.958E-02	583.02	84.500	5.585E-02	TL208
609.39	138.	27.03	1.97	3.750E-02	609.31	46.090	1.105E-01	BI214
					610.30	5.750	8.876E-01	RU103
661.63	235.	16.24	1.57	3.334E-02	661.66	85.210	1.150E-01	CS137
1001.15	108.	20.31	0.97	2.158E-02	1001.00	0.837	8.331E+00	PA234M
1120.35	66.	25.17	0.67	1.933E-02	1120.29	15.100	3.140E-01	BI214
					1120.55	99.987	4.743E-02	Sc46
1173.12	140.	17.73	1.50	1.834E-02	1173.24	99.900	1.061E-01	CO60
1333.17	108.	22.25	1.63	1.637E-02	1332.50	99.980	9.191E-02	CO60
1461.11	136.	17.85	1.59	1.543E-02	1460.83	10.670	1.148E+00	K40
1764.87	74.	20.20	3.17	1.319E-02	1764.49	15.400	5.084E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
2043.35	510.86	654.	1473.	3.252E+04	6.03	2.701	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.54	703.	467.	0.006	9.26	1.022D
TH-234	252.96	63.29	683.	1105.	0.015	4.50	1.025D
TH-234	370.40	92.65	994.	2002.	0.028	3.92	1.139
U-235	575.11	143.82	563.	240.	0.003	18.77	1.091
U-235	653.05	163.30	483.	169.	0.002	24.41	1.198s
U-235	742.71	185.72	1007.	1048.	0.015	4.57	1.119D
PB-212	954.69	238.71	737.	377.	0.005	16.39	1.066
PB-214	1407.01	351.78	397.	154.	0.002	28.04	1.693s
TL-208	2331.63	582.93	234.	134.	0.002	25.65	1.272
BI-214	2437.50	609.39	276.	138.	0.002	27.03	1.969s
CS-137	2646.45	661.63	230.	235.	0.003	16.24	1.570s
PA-234M	4004.60	1001.15	87.	108.	0.002	20.31	0.967s
BI-214	4481.41	1120.35	60.	66.	0.001	25.17	0.667s
CO-60	4692.52	1173.12	84.	140.	0.002	17.73	1.500
CO-60	5332.74	1333.17	75.	108.	0.002	22.25	1.628
K-40	5844.50	1461.11	68.	136.	0.002	17.85	1.594
BI-214	7059.59	1764.87	23.	74.	0.001	20.20	3.166s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	1.1475E+00				4.66E+11	
			1460.83	1.148E+00	(	3.471E-01 1.79E+01 1.07E+01	G
CO-60	F	9.9028E-02				1.93E+03	
			1332.50	9.191E-02	(	3.646E-02 2.23E+01 1.00E+02	G
			1173.24	1.061E-01	?(	3.444E-02 1.77E+01 9.99E+01	G
CS-137	I	1.1505E-01				1.10E+04	
			661.66	1.150E-01	*(	3.585E-02 1.62E+01 8.52E+01	G
TL-208	N	5.5851E-02				6.98E+02	
			583.02	5.585E-02	(	3.076E-02 2.56E+01 8.45E+01	G
			277.28	0.000E+00	&	1.572E-01 2.39E+02 6.31E+00	G
			860.56	0.000E+00	%	1.593E-01 6.54E+01 1.24E+01	G
PB-212	N	1.2546E-01				6.98E+02	
			238.63	1.255E-01	(	4.300E-02 1.64E+01 4.33E+01	G
			300.03	0.000E+00	&	5.172E-01 0.00E+00 3.28E+00	GA
PB-214	N	8.6932E-02				5.84E+05	
			351.93	8.693E-02	@(	5.380E-02 2.80E+01 3.76E+01	G
			295.09	0.000E+00	!	8.482E-02 0.00E+00 1.93E+01	G
			242.00	0.000E+00	?	2.145E-01 0.00E+00 7.43E+00	GA
BI-214	N	1.1050E-01				5.84E+05	
			609.31	1.105E-01	(	6.445E-02 2.70E+01 4.61E+01	G
			1120.29	3.140E-01	+	1.846E-01 2.52E+01 1.51E+01	G
			1764.49	5.084E-01	+	1.703E-01 2.02E+01 1.54E+01	G
TH-234	N	4.3587E+00				1.63E+12	
			63.29	4.359E+00	(	4.908E-01 4.50E+00 3.81E+00	G
			92.59	3.845E+00	-	2.874E-01 3.92E+00 5.58E+00	G
PA-234M	N	8.3312E+00				1.63E+12	
			1001.00	8.331E+00	(	3.545E+00 2.03E+01 8.37E-01	G
			766.41	0.000E+00	%	7.256E+00 1.00E+03 2.94E-01	G
U-235	N	2.4342E-01				2.57E+11	
			185.72	2.434E-01	}	3.497E-02 4.57E+00 5.40E+01	GA
			143.79	2.434E-01	(	1.151E-01 1.88E+01 1.10E+01	G
			205.33	0.000E+00	%	1.800E-01 3.11E+01 5.01E+00	G
			163.38	3.941E-01	+	2.454E-01 2.44E+01 5.08E+00	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AM-241   T   2.0804E-01                                      1.58E+05
                            59.54 2.080E-01  (  5.619E-02 9.26E+00 3.59E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
 Nuclide    Activity        Counting                   MDA
               DPS
 ____________________________________________________________________________
 BE-7    <    1.3967E-01
 NA-22   <    2.4943E-02
 K-40         1.1475E+00   1.7850E+01%               3.471E-01
 Sc-46   <    3.0900E-02
```

CR-51	<	1.0669E-01		
MN-54	<	2.1634E-02		
FE-59	<	4.6045E-02		
Co-56	<	2.4290E-02		
CO-57	<	1.4977E-02		
CO-58	<	1.5978E-02		
CO-60		9.9028E-02	1.4226E+01%	3.646E-02
ZN-65	<	7.5066E-02		
NB-94	<	2.0891E-02		
ZR-95	<	3.4150E-02		
NB-95	<	2.7846E-02		
RU-103	<	1.6527E-02		
RH-106	<	1.7293E-01		
AG-108M	<	1.6570E-02		
AG-110M	<	2.6129E-02		
SN-113	<	2.3372E-02		
SB-124	<	2.1076E-02		
SB-125	<	4.5142E-02		
I-131	<	1.6911E-02		
BA-133	<	3.0017E-02		
CS-134	<	2.2465E-02		
CS-137	#	1.1505E-01	1.6238E+01%	3.585E-02
CE-139	<	1.7837E-02		
Ba-140	<	6.4360E-02		
La-140	<	2.7168E-02		
CE-141	<	2.2826E-02		
CE-144	<	1.0884E-01		
PM-144	<	2.2660E-02		
EU-152	<	4.3126E-02		
EU-154	<	1.6293E-01		
EU-155	<	3.6604E-02		
HF-181	<	1.8097E-02		
Ta-182	<	1.1337E-01		
Hg-203	<	2.0764E-02		
TL-208		5.5851E-02	2.5645E+01%	3.076E-02
pm-146	<	6.0218E-02		
y-88	<	2.4589E-02		
PB-210	<	4.0405E-01		
PB-212		1.2546E-01	1.6386E+01%	4.300E-02
PB-214	#	8.6932E-02	2.8044E+01%	5.380E-02
BI-207	<	3.3249E-02		
BI-212	<	2.5248E-01		
BI-214		1.1050E-01	2.7034E+01%	6.445E-02
BI-210M	<	1.7747E-02		
RA-224	<	3.4868E-01		
AC-228	<	1.1975E-01		
TH-227	<	5.5686E-02		
TH-229	<	2.0012E-01		
TH-234		4.3587E+00	4.4971E+00%	4.908E-01

PA-231	<	4.5367E-01		
PA-233	<	3.2111E-02		
PA-234	<	4.6511E-02		
PA-234M#		8.3312E+00	2.0305E+01%	3.545E+00
U-235		2.4342E-01	1.8769E+01%	1.151E-01
AM-241		2.0804E-01	9.2594E+00%	5.619E-02
Np-237	<	9.3752E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.488E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 9_20180713016_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:07:09 PM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.78	2.14	2.26	PASS

Analyst: Mike Aldridge Reviewer: Rachel Mueller

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Test America
St. Louis
Background Check

Spectrum: 12_20180713018_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:08:10 PM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	1.98	2.07	2.10	PASS

Analyst: Mike Aldridge Reviewer: Rachel Mueller

(Page 1 of 1)

Test America
St. Louis
Background Check

Spectrum: 14_20180713019_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 9:57:39 PM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.76	1.90	1.94	PASS

Analyst: Mike Aldridge Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20180713019_BGLong.An1

Acquisition information
Start time: 7/13/2018 9:57:39 PM
Live time: 72000
Real time: 72116
Dead time: 0.16 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

(Page 2 of 7)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1812

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.56	692.	8.37	0.88	6.125E-02	46.54	4.250	3.696E+00	PB210
63.32	666.	9.73	0.87	8.542E-02	63.29	3.810	2.842E+00	TH234
74.98	224.	19.10	0.78	1.022E-01				
77.22	170.	23.82	0.78	1.055E-01				
92.66	871.	7.36	1.09	1.215E-01	92.59	5.584	1.784E+00	TH234
					93.35	5.561	1.790E+00	AC228
185.42	530.	9.80	1.05	1.072E-01	185.72	54.000	1.272E-01	U235
238.26	318.	13.49	1.27	9.399E-02	238.63	43.300	1.086E-01	PB212
294.65	199.	24.16	0.62	7.984E-02	295.09	19.300	1.796E-01	PB214
351.47	293.	15.87	1.53	6.546E-02	351.93	37.600	1.655E-01	PB214
510.68	1731.	4.67	2.66	4.542E-02	511.86	20.000	2.653E+00	RH106
583.08	135.	24.65	1.57	3.930E-02	583.02	84.500	5.645E-02	TL208
608.97	312.	13.79	1.40	3.708E-02	609.31	46.090	2.535E-01	BI214
					610.30	5.750	2.037E+00	RU103
1460.44	143.	15.64	0.90	1.557E-02	1460.83	10.670	1.195E+00	K40
1764.28	98.	18.31	2.17	1.327E-02	1764.49	15.400	6.649E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.30	74.97	800.	224.	2.188E+03	19.10	0.777	- sD
308.27	77.21	731.	170.	1.608E+03	23.82	0.780	- D
2041.85	510.68	588.	1731.	3.811E+04	4.67	2.665	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.68	46.56	841.	692.	0.010	8.37	0.877s
TH-234	252.69	63.32	1008.	666.	0.009	9.73	0.874s
TH-234	369.98	92.66	973.	871.	0.012	7.36	1.087s
U-235	740.96	185.42	651.	530.	0.007	9.80	1.052s
PB-212	952.25	238.26	481.	318.	0.004	13.49	1.269s
PB-214	1177.95	294.69	504.	190.	0.003	24.29	0.617s
PB-214	1405.05	351.47	450.	293.	0.004	15.87	1.535s
TL-208	2331.44	583.08	243.	135.	0.002	24.65	1.565s
BI-214	2435.01	608.97	308.	312.	0.004	13.79	1.395s
K-40	5841.99	1460.44	55.	143.	0.002	15.64	0.902s
BI-214	7058.22	1764.28	36.	98.	0.001	18.31	2.165

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.1952E+00					4.66E+11	
			1460.83	1.195E+00	*(	3.115E-01	1.56E+01	1.07E+01 G
TL-208	N	5.6453E-02					6.98E+02	
			583.02	5.645E-02	(	3.151E-02	2.46E+01	8.45E+01 G
			277.28	0.000E+00	%	1.608E-01	3.82E+01	6.31E+00 G
			860.56	0.000E+00	%	1.612E-01	3.53E+02	1.24E+01 G
PB-210	N	3.6963E+00					8.14E+03	
			46.54	3.696E+00	*(	7.358E-01	8.37E+00	4.25E+00 G
PB-212	N	1.0864E-01					6.98E+02	
			238.63	1.086E-01	(	3.584E-02	1.35E+01	4.33E+01 G
			300.03	0.000E+00	%	3.440E-01	1.37E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.6744E-01					5.84E+05	
			351.93	1.655E-01	*(	5.729E-02	1.59E+01	3.76E+01 G
			295.09	1.712E-01	*(	9.691E-02	2.43E+01	1.93E+01 G
			242.00	0.000E+00	&	2.153E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.5354E-01					5.84E+05	
			609.31	2.535E-01	*(	6.866E-02	1.38E+01	4.61E+01 G
			1120.29	0.000E+00	%	1.766E-01	4.72E+01	1.51E+01 G
			1764.49	6.649E-01	+	2.089E-01	1.83E+01	1.54E+01 G
TH-234	N	2.8419E+00					1.63E+12	
			63.29	2.842E+00	(	6.432E-01	9.73E+00	3.81E+00 G
			92.59	1.784E+00	-	3.032E-01	7.36E+00	5.58E+00 G
U-235	N	1.2720E-01					2.57E+11	
			185.72	1.272E-01		2.919E-02	9.80E+00	5.40E+01 GA
			143.79	0.000E+00	%	9.481E-02	4.23E+01	1.10E+01 G
			205.33	0.000E+00	%	1.944E-01	3.63E+01	5.01E+00 G
			163.38	0.000E+00	%	1.978E-01	9.55E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.3349E-01		
NA-22	<	4.4957E-02		
K-40	#	1.1952E+00	1.5645E+01%	3.115E-01
Sc-46	<	2.1465E-02		
CR-51	<	1.1251E-01		
MN-54	<	2.1825E-02		
FE-59	<	4.8141E-02		
Co-56	<	2.1303E-02		
CO-57	<	1.5666E-02		
CO-58	<	2.9048E-02		
CO-60	<	2.4747E-02		
ZN-65	<	8.6204E-02		
NB-94	<	2.2918E-02		
ZR-95	<	3.4617E-02		
NB-95	<	1.9161E-02		
RU-103	<	1.5789E-02		
RH-106	<	1.9903E-01		
AG-108M	<	1.3628E-02		
AG-110M	<	2.7804E-02		
SN-113	<	2.0174E-02		
SB-124	<	2.9127E-02		
SB-125	<	4.2537E-02		
I-131	<	1.3971E-02		
BA-133	<	3.3069E-02		
CS-134	<	2.2986E-02		
CS-137	<	2.3684E-02		
CE-139	<	2.0721E-02		
Ba-140	<	6.1065E-02		
La-140	<	2.6263E-02		
CE-141	<	2.4340E-02		
CE-144	<	1.3250E-01		
PM-144	<	2.5794E-02		
EU-152	<	4.5502E-02		
EU-154	<	1.7311E-01		
EU-155	<	3.7399E-02		

HF-181	<	2.9392E-02		
Ta-182	<	1.2940E-01		
Hg-203	<	1.9175E-02		
TL-208		5.6453E-02	2.4646E+01%	3.151E-02
pm-146	<	5.7583E-02		
y-88	<	2.4313E-02		
PB-210	#	3.6963E+00	8.3656E+00%	7.358E-01
PB-212		1.0864E-01	1.3493E+01%	3.584E-02
PB-214	#	1.6744E-01	1.4508E+01%	5.729E-02
BI-207	<	3.0478E-02		
BI-212	<	2.7260E-01		
BI-214		2.5354E-01	1.3793E+01%	6.866E-02
BI-210M	<	2.0249E-02		
RA-224	<	4.1625E-01		
AC-228	<	9.3638E-02		
TH-227	<	9.3651E-02		
TH-229	<	2.2992E-01		
TH-234	#	2.8419E+00	9.7286E+00%	6.432E-01
PA-231	<	5.3008E-01		
PA-233	<	3.1903E-02		
PA-234	<	6.3030E-02		
PA-234M	<	2.7232E+00		
Ra-226	<	5.9538E-01		
U-235	#	1.2720E-01	9.8041E+00%	2.919E-02
AM-241	<	5.7681E-02		
Np-237	<	6.5199E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 8.447E+00 DPS

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Test America
St. Louis
Background Check

Spectrum: 15_20180720002_BGLong
Description: Background Long PBC Count
Acquired: 7/20/2018 2:08:23 PM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.71	1.74	1.77	PASS

Analyst: Jody Watson Reviewer: Rachel Mueller

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20180720002_BGLong.An1

Acquisition information

Start time:	7/20/2018 2:08:23 PM
Live time:	72000
Real time:	72185
Dead time:	0.26 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_QC.Clb

15_QC_83725-334_SOURCE F_2011

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	8/2/2011 8:55:45 AM	
Knee Energy:	0.00 keV	
Above the Knee:	Interpolative	Uncertainty = 0.00 %
Below the Knee:	Interpolative	Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.60	506.	14.15	2.34	6.063E-02	46.54	4.250	2.730E+00	PB210
63.48	411.	18.68	1.60	8.225E-02	63.29	3.810	1.828E+00	TH234
92.78	729.	11.72	2.10	1.142E-01	92.59	5.584	1.588E+00	TH234
					93.35	5.561	1.594E+00	AC228
186.13	430.	14.74	2.27	9.774E-02	185.72	54.000	PBC<MDA	U235
					185.99	3.280	1.863E+00	Ra226
238.74	315.	19.35	1.70	8.501E-02	238.63	43.300	1.187E-01	PB212
609.94	235.	20.91	1.52	3.215E-02	609.31	46.090	2.196E-01	BI214
					610.30	5.750	1.764E+00	RU103
1462.43	101.	25.69	3.91	1.314E-02	1460.83	10.670	1.001E+00	K40
1765.72	107.	20.11	3.42	1.107E-02	1764.49	15.400	8.693E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
370.66	92.78	1577.	729.	6.385E+03	11.72	2.099	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.07	46.60	1204.	506.	0.007	14.15	2.337s
TH-234	253.15	63.38	1456.	375.	0.005	20.60	1.598s
Ra-226	743.83	186.13	897.	430.	0.006	14.74	2.270s
PB-212	954.15	238.74	783.	315.	0.004	19.35	1.702s
BI-214	2438.43	609.94	407.	235.	0.003	20.91	1.520s
K-40	5849.41	1462.43	88.	101.	0.001	25.69	3.911s
BI-214	7063.67	1765.72	49.	107.	0.001	20.11	3.422s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	1.0006E+00				4.66E+11	
			1460.83	1.001E+00	&(	4.599E-01 2.57E+01 1.07E+01	G
PB-210	N	2.7300E+00				8.14E+03	
			46.54	2.730E+00	*(	8.874E-01 1.41E+01 4.25E+00	G
PB-212	N	1.1873E-01				6.98E+02	
			238.63	1.187E-01	*(	5.023E-02 1.94E+01 4.33E+01	G
			300.03	0.000E+00	%	3.665E-01 1.36E+02 3.28E+00	GA
BI-214	N	2.1962E-01				5.84E+05	
			609.31	2.196E-01	*(	9.056E-02 2.09E+01 4.61E+01	G
			1120.29	0.000E+00	&	2.273E-01 5.66E+01 1.51E+01	G
			1764.49	8.693E-01	&	2.888E-01 2.01E+01 1.54E+01	G
TH-234	N	1.6656E+00				1.63E+12	
			63.29	1.666E+00	*(	8.026E-01 2.06E+01 3.81E+00	G
			92.59	0.000E+00	%	4.252E-01 0.00E+00 5.58E+00	G
Ra-226		1.8629E+00				5.84E+05	
			185.99	1.863E+00	*(	6.164E-01 1.47E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.6847E-01		
NA-22	<	5.2591E-02		
K-40		1.0006E+00	2.5685E+01%	4.599E-01
Sc-46	<	2.3727E-02		
CR-51	<	1.2090E-01		
MN-54	<	2.6492E-02		
FE-59	<	5.8316E-02		
Co-56	<	2.7163E-02		
CO-57	<	1.6794E-02		
CO-58	<	2.4199E-02		
CO-60	<	3.2082E-02		
ZN-65	<	5.4251E-02		
NB-94	<	2.4736E-02		
ZR-95	<	4.1421E-02		

NB-95	<	2.0772E-02		
RU-103	<	2.1106E-02		
RH-106	<	2.5239E-01		
AG-108M	<	2.0530E-02		
AG-110M	<	3.6635E-02		
SN-113	<	2.7069E-02		
SB-124	<	4.4546E-02		
SB-125	<	5.9818E-02		
I-131	<	1.6521E-02		
BA-133	<	1.6259E-02		
CS-134	<	1.8357E-02		
CS-137	<	4.4933E-02		
CE-139	<	9.8331E-03		
Ba-140	<	7.9537E-02		
La-140	<	3.6861E-02		
CE-141	<	2.8964E-02		
CE-144	<	1.7087E-01		
PM-144	<	2.7695E-02		
EU-152	<	5.0840E-02		
EU-154	<	2.9700E-01		
EU-155	<	5.1870E-02		
HF-181	<	2.4272E-02		
Ta-182	<	1.3587E-01		
Hg-203	<	2.0632E-02		
TL-208	<	2.6629E-02		
pm-146	<	7.3925E-02		
y-88	<	2.8286E-02		
PB-210	#	2.7300E+00	1.4148E+01%	8.874E-01
PB-212	#	1.1873E-01	1.9355E+01%	5.023E-02
PB-214	<	6.9994E-02		
BI-207	<	4.1057E-02		
BI-212	<	5.0131E-01		
BI-214		2.1962E-01	2.0907E+01%	9.056E-02
BI-210M	<	2.2051E-02		
RA-224	<	4.4286E-01		
AC-228	<	1.2946E-01		
TH-227	<	1.1381E-01		
TH-229	<	2.5339E-01		
TH-234	#	1.6656E+00	2.0601E+01%	8.026E-01
PA-231	<	5.6918E-01		
PA-233	<	3.4917E-02		
PA-234	<	5.9315E-02		
PA-234M	<	3.5594E+00		
Ra-226	#	1.8629E+00	1.4741E+01%	6.164E-01
U-235	<	9.5998E-02		
AM-241	<	6.7949E-02		
Np-237	<	1.2199E-01		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     7.597E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 17_20180713006_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:01:27 PM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.29	2.42	2.46	PASS

Analyst: Mike Aldridge Reviewer:

(Page 1 of 8)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20180713006_BGLong.An1

Acquisition information
Start time: 7/13/2018 10:01:27 PM
Live time: 72000
Real time: 73862
Dead time: 2.52 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1855

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.67	1098.	7.14	0.69	5.957E-02	46.54	4.250	6.043E+00	PB210
63.37	1109.	6.63	0.77	8.046E-02	63.29	3.810	5.030E+00	TH234
75.01	311.	14.92	0.80	9.504E-02				
77.28	191.	24.05	0.80	9.788E-02				
84.73	254.	22.10	1.58	1.072E-01				
92.65	1625.	4.71	0.98	1.119E-01	92.59	5.584	3.613E+00	TH234
					93.35	5.561	3.625E+00	AC228
143.89	201.	26.32	0.84	1.093E-01	143.79	10.960	2.330E-01	U235
163.38	272.	21.18	2.44	1.038E-01	163.38	5.080	7.153E-01	U235
					162.66	6.220	5.830E-01	Ba140
185.61	889.	7.99	1.07	9.859E-02	185.72	54.000	2.319E-01	U235
					185.99	3.280	3.820E+00	Ra226
198.24	213.	25.30	0.80	9.572E-02				
238.64	460.	11.79	1.06	8.654E-02	238.63	43.300	1.703E-01	PB212
351.90	246.	19.51	0.76	6.081E-02	351.93	37.600	1.496E-01	PB214
511.16	2273.	4.13	2.35	4.372E-02	511.86	20.000	3.615E+00	RH106
583.56	230.	15.99	1.45	3.887E-02	583.02	84.500	9.718E-02	TL208
609.46	262.	13.88	1.24	3.709E-02	609.31	46.090	2.125E-01	BI214
					610.30	5.750	1.707E+00	RU103
803.52	124.	22.72	1.49	2.769E-02				
911.76	107.	24.20	1.89	2.355E-02	911.16	29.000	2.183E-01	AC228
1001.47	121.	28.75	1.26	2.198E-02	1001.00	0.837	9.136E+00	PA234M
1120.79	119.	25.91	1.73	1.989E-02	1120.29	15.100	5.503E-01	BI214
					1120.55	99.987	8.312E-02	Sc46
					1121.30	34.900	2.383E-01	Ta182
1461.40	318.	9.09	1.89	1.608E-02	1460.83	10.670	2.575E+00	K40
1765.06	122.	16.69	1.47	1.381E-02	1764.49	15.400	7.947E-01	BI214

pk energy area uncert fwhm corr nuclide brnch. act. nuc

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.46	75.02	919.	311.	3.269E+03	14.92	0.802	- D
308.53	77.28	956.	191.	1.948E+03	24.05	0.804	- sD
338.34	84.73	1019.	254.	2.366E+03	22.10	1.584	- s
792.18	198.24	810.	213.	2.229E+03	25.30	0.804	- s
2043.52	511.16	785.	2273.	5.200E+04	4.13	2.353	-
3212.99	803.52	176.	124.	4.490E+03	22.72	1.488	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.14	46.67	1318.	1098.	0.015	7.14	0.693
TH-234	252.90	63.37	1230.	1109.	0.015	6.63	0.774
TH-234	369.98	92.65	1272.	1625.	0.023	4.71	0.976s
U-235	574.84	143.89	866.	201.	0.003	26.32	0.838s
U-235	652.79	163.38	868.	272.	0.004	21.18	2.438s
U-235	742.10	185.72	1082.	823.	0.011	6.03	1.075D
PB-212	953.69	238.64	708.	460.	0.006	11.79	1.057
PB-214	1406.62	351.90	563.	246.	0.003	19.51	0.756s
TL-208	2333.09	583.56	269.	230.	0.003	15.99	1.451s
BI-214	2436.70	609.46	317.	262.	0.004	13.88	1.238
AC-228	3645.99	911.76	155.	107.	0.001	24.20	1.893s
PA-234M	4004.94	1001.47	198.	121.	0.002	28.75	1.257
BI-214	4482.37	1120.79	156.	119.	0.002	25.91	1.725
K-40	5845.51	1461.40	76.	318.	0.004	9.09	1.889
BI-214	7061.13	1765.06	51.	122.	0.002	16.69	1.469s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	2.5748E+00					4.66E+11	
			1460.83	2.575E+00	(	3.503E-01	9.09E+00	1.07E+01 G
TL-208	N	9.7184E-02					6.98E+02	
			583.02	9.718E-02	*(	3.347E-02	1.60E+01	8.45E+01 G
			277.28	0.000E+00	%	2.074E-01	3.10E+01	6.31E+00 G
			860.56	0.000E+00	%	2.107E-01	3.25E+02	1.24E+01 G
PB-210	N	6.0430E+00					8.14E+03	
			46.54	6.043E+00	(	9.454E-01	7.14E+00	4.25E+00 G
PB-212	N	1.7031E-01					6.98E+02	
			238.63	1.703E-01	(	4.695E-02	1.18E+01	4.33E+01 G
			300.03	0.000E+00	%	4.089E-01	7.58E+01	3.28E+00 GA
PB-214	N	1.4965E-01					5.84E+05	
			351.93	1.496E-01	(	6.880E-02	1.95E+01	3.76E+01 G
			295.09	0.000E+00	%	7.063E-02	3.34E+01	1.93E+01 G
			242.00	0.000E+00		2.582E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.1254E-01					5.84E+05	
			609.31	2.125E-01	(	6.963E-02	1.39E+01	4.61E+01 G
			1120.29	5.503E-01	+	2.817E-01	2.59E+01	1.51E+01 G
			1764.49	7.947E-01	+	2.358E-01	1.67E+01	1.54E+01 G
AC-228	N	2.1829E-01					2.10E+03	
			911.16	2.183E-01	(	1.234E-01	2.42E+01	2.90E+01 G
			968.97	0.000E+00	%	1.593E-01	1.00E+02	1.75E+01 G
			338.32	0.000E+00	%	1.219E-01	3.00E+01	1.20E+01 G
			93.35	0.000E+00	?	5.227E-01	0.00E+00	5.56E+00 XA
TH-234	N	5.0305E+00					1.63E+12	
			63.29	5.030E+00	(	7.536E-01	6.63E+00	3.81E+00 G
			92.59	3.613E+00	-	3.754E-01	4.71E+00	5.58E+00 G
PA-234M	N	9.1359E+00					1.63E+12	
			1001.00	9.136E+00	(	5.155E+00	2.87E+01	8.37E-01 G
			766.41	0.000E+00	%	8.241E+00	6.93E+01	2.94E-01 G
U-235	N	2.3297E-01					2.57E+11	
			185.72	2.147E-01	}	4.071E-02	6.03E+00	5.40E+01 GA
			143.79	2.330E-01	(	1.621E-01	2.63E+01	1.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		205.33	0.000E+00 %		2.497E-01	5.93E+01	5.01E+00 G
		163.38	7.153E-01 +		3.687E-01	2.12E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	2.8909E-01		
NA-22	<	4.0049E-02		
K-40		2.5748E+00	9.0895E+00%	3.503E-01
Sc-46	<	3.2830E-02		
CR-51	<	1.3977E-01		

MN-54	<	2.6557E-02		
FE-59	<	5.1268E-02		
Co-56	<	2.7217E-02		
CO-57	<	2.1329E-02		
CO-58	<	2.1257E-02		
CO-60	<	2.9327E-02		
ZN-65	<	6.8083E-02		
NB-94	<	2.5232E-02		
ZR-95	<	3.8318E-02		
NB-95	<	3.5562E-02		
RU-103	<	1.6667E-02		
RH-106	<	2.1508E-01		
AG-108M	<	1.8099E-02		
AG-110M	<	2.5276E-02		
SN-113	<	2.5389E-02		
SB-124	<	2.4884E-02		
SB-125	<	5.9079E-02		
I-131	<	1.9513E-02		
BA-133	<	2.9952E-02		
CS-134	<	4.6320E-02		
CS-137	<	2.3980E-02		
CE-139	<	1.6311E-02		
Ba-140	<	7.2236E-02		
La-140	<	3.8681E-02		
CE-141	<	1.8291E-02		
CE-144	<	1.1219E-01		
PM-144	<	2.7285E-02		
EU-152	<	5.2813E-02		
EU-154	<	2.2162E-01		
EU-155	<	4.3944E-02		
HF-181	<	2.5975E-02		
Ta-182	<	1.2198E-01		
Hg-203	<	1.6180E-02		
TL-208	#	9.7184E-02	1.5995E+01%	3.347E-02
pm-146	<	6.8647E-02		
y-88	<	2.6986E-02		
PB-210		6.0430E+00	7.1384E+00%	9.454E-01
PB-212		1.7031E-01	1.1792E+01%	4.695E-02
PB-214		1.4965E-01	1.9509E+01%	6.880E-02
BI-207	<	3.5696E-02		
BI-212	<	3.9911E-01		
BI-214		2.1254E-01	1.3882E+01%	6.963E-02
BI-210M	<	2.4509E-02		
RA-224	<	2.8291E-01		
AC-228		2.1829E-01	2.4196E+01%	1.234E-01
TH-227	<	1.3160E-01		
TH-229	<	2.9009E-01		
TH-234		5.0305E+00	6.6348E+00%	7.536E-01
PA-231	<	6.7288E-01		

PA-233	<	3.6885E-02		
PA-234	<	6.9363E-02		
PA-234M		9.1359E+00	2.8748E+01%	5.155E+00
U-235	#	2.3297E-01	2.6321E+01%	1.621E-01
AM-241	<	4.0280E-02		
Np-237	<	8.8788E-02		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.387E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 19_20180713018_BGLong
Description: Background Long PBC Count
Acquired: 7/13/2018 10:22:52 PM
Detector: Detector #19
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.30	2.15	2.20	2.26	2.39	2.44	PASS

Analyst: Mike Aldridge Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det19\19_20180713018_BGLong.An1

Acquisition information
Start time: 7/13/2018 10:22:52 PM
Live time: 72000
Real time: 72080
Dead time: 0.11 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_QC.Clb
19_QC_Source F_83725-334

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/17/2018 2:50:57 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.71keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1221

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.64	1384.	5.12	1.01	5.743E-02	46.54	4.250	7.894E+00	PB210
63.35	778.	9.40	1.04	7.727E-02	63.29	3.810	3.674E+00	TH234
74.98	236.	22.00	1.01	9.107E-02				
87.26	225.	22.73	0.93	1.057E-01	86.49	13.100	2.274E-01	Np237
					86.54	30.700	9.699E-02	EU155
92.76	1141.	7.85	1.12	1.128E-01	92.59	5.584	2.521E+00	TH234
					93.35	5.561	2.509E+00	AC228
144.27	251.	26.73	1.06	1.466E-01	143.79	10.960	2.173E-01	U235
185.67	541.	11.86	0.96	1.371E-01	185.72	54.000	1.014E-01	U235
					185.99	3.280	1.670E+00	Ra226
238.41	489.	12.16	1.24	1.252E-01	238.63	43.300	1.252E-01	PB212
497.44	106.	27.92	0.79	6.689E-02	497.05	90.900	2.421E-02	RU103
609.12	249.	19.97	0.95	4.161E-02	609.31	46.090	1.805E-01	BI214
					610.30	5.750	1.455E+00	RU103
1461.14	324.	10.87	2.03	1.343E-02	1460.83	10.670	3.140E+00	K40
1764.62	136.	16.33	1.76	9.848E-03	1764.49	15.400	1.245E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.98	74.98	984.	236.	2.591E+03	22.00	1.005	-	M
348.08	87.26	893.	225.	2.126E+03	22.73	0.933	-	M

(Page 3 of 7)

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.70	46.64	1090.	1384.	0.019	5.12	1.005
TH-234	252.52	63.35	1305.	778.	0.011	9.40	1.038
TH-234	370.06	92.76	1650.	1141.	0.016	7.85	1.121s
U-235	575.97	144.27	1163.	251.	0.003	26.73	1.056s
U-235	741.65	185.72	973.	511.	0.007	9.09	0.965D
PB-212	952.30	238.41	793.	489.	0.007	12.16	1.236
RU-103	1988.04	497.44	220.	106.	0.001	27.92	0.788s
BI-214	2434.67	609.12	460.	249.	0.003	19.97	0.948s
K-40	5844.20	1461.14	110.	324.	0.004	10.87	2.027s
BI-214	7059.46	1764.62	55.	136.	0.002	16.33	1.757

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	3.1402E+00				4.66E+11	
			1460.83	3.140E+00	@(	5.000E-01 1.09E+01 1.07E+01	G
RU-103	I	2.4212E-02				3.93E+01	
			497.05	2.421E-02	(	1.641E-02 2.79E+01 9.09E+01	G
			610.30	0.000E+00	%	6.126E-01 0.00E+00 5.75E+00	GA
PB-210	N	7.8938E+00				8.14E+03	
			46.54	7.894E+00	(	8.926E-01 5.12E+00 4.25E+00	G
PB-212	N	1.2520E-01				6.98E+02	
			238.63	1.252E-01	(	3.432E-02 1.22E+01 4.33E+01	G
			300.03	0.000E+00	%	2.604E-01 1.31E+02 3.28E+00	GA

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214 N	1.8052E-01					5.84E+05	
		609.31	1.805E-01	(	7.442E-02	2.00E+01	4.61E+01 G
		1120.29	0.000E+00	%	2.202E-01	4.11E+01	1.51E+01 G
		1764.49	1.245E+00	+	3.413E-01	1.63E+01	1.54E+01 G
TH-234 N	3.6740E+00					1.63E+12	
		63.29	3.674E+00	(	8.078E-01	9.40E+00	3.81E+00 G
		92.59	2.521E+00	-	4.242E-01	7.85E+00	5.58E+00 G
U-235 N	2.1726E-01					2.57E+11	
		185.72	9.589E-02	}	2.778E-02	9.09E+00	5.40E+01 GA
		143.79	2.173E-01	*(	1.397E-01	2.67E+01	1.10E+01 G
		205.33	0.000E+00	%	1.754E-01	4.88E+01	5.01E+00 G
		163.38	0.000E+00	%	1.752E-01	5.61E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	9.0460E-02		
NA-22	<	2.5852E-02		
K-40	#	3.1402E+00	1.0871E+01%	5.000E-01
Sc-46	<	3.3022E-02		
CR-51	<	8.5514E-02		
MN-54	<	2.3868E-02		
FE-59	<	5.3911E-02		
Co-56	<	2.4675E-02		
CO-57	<	1.9380E-02		
CO-58	<	2.3264E-02		
CO-60	<	3.3455E-02		
ZN-65	<	9.6629E-02		
NB-94	<	2.8576E-02		
ZR-95	<	4.0654E-02		
NB-95	<	4.7014E-02		
RU-103	#	2.4212E-02	2.7922E+01%	1.641E-02
RH-106	<	1.9520E-01		
AG-108M	<	1.2708E-02		
AG-110M	<	5.6915E-02		
SN-113	<	1.4610E-02		
SB-124	<	3.9018E-02		
SB-125	<	3.8202E-02		
I-131	<	1.0692E-02		
BA-133	<	1.6881E-02		
CS-134	<	2.4248E-02		
CS-137	<	1.5466E-02		
CE-139	<	1.7378E-02		
Ba-140	<	5.2733E-02		
La-140	<	3.6269E-02		
CE-141	<	1.7115E-02		
CE-144	<	6.0279E-02		
PM-144	<	3.0460E-02		
EU-152	<	5.2117E-02		
EU-154	<	1.1845E-01		
EU-155	<	5.1194E-02		
HF-181	<	8.5069E-03		

Ta-182	<	1.6795E-01		
Hg-203	<	1.1115E-02		
TL-208	<	1.9939E-02		
pm-146	<	6.8112E-02		
y-88	<	3.3839E-02		
PB-210		7.8938E+00	5.1164E+00%	8.926E-01
PB-212		1.2520E-01	1.2158E+01%	3.432E-02
PB-214	<	3.8459E-02		
BI-207	<	2.9037E-02		
BI-212	<	5.2915E-01		
BI-214		1.8052E-01	1.9969E+01%	7.442E-02
BI-210M	<	1.7121E-02		
RA-224	<	3.0161E-01		
AC-228	<	1.2780E-01		
TH-227	<	8.3217E-02		
TH-229	<	2.0618E-01		
TH-234		3.6740E+00	9.3975E+00%	8.078E-01
PA-231	<	2.1873E-01		
PA-233	<	2.3369E-02		
PA-234	<	7.3394E-02		
PA-234M	<	3.9002E+00		
U-235	#	2.1726E-01	2.6733E+01%	1.397E-01
AM-241	<	8.3830E-02		
Np-237	<	1.3807E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.526E+01 DPS

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Run Logs

Gamma Spectroscopy Run Log

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
12/07/16 01:00		CCB 160-282801/1		282801			
12/07/16 01:42		CCV 160-282801/2		282801			
12/07/16 02:04		CCV 160-282801/3		282801			
12/07/16 07:35	30	ZZZZZ		282801			
12/07/16 08:34	30	ZZZZZ		282801			
12/07/16 09:33		ACVTOP 160-282801/6		282801			KLS
12/07/16 09:33		ACVTOP 160-282835/1		282835			PS
07/13/18 22:26		ICB 160-375693/1		375693			RTM
08/09/18 00:03		CCV 160-381208/1		381208			
08/09/18 00:26		CCV 160-381208/2		381208			KLS
08/09/18 00:45		CCB 160-381208/3		381208			KLS
08/09/18 01:19	30	ZZZZZ		381208			
08/09/18 06:39	30	160-29521-2	CRC-B9-2022	381208	376740	901.1	KLS
08/09/18 07:19	30	ZZZZZ		381208			
08/09/18 08:30	30	ZZZZZ		381208			
08/09/18 09:10	30	ZZZZZ		381208			
08/09/18 10:03	30	ZZZZZ		381208			
08/09/18 10:51	30	ZZZZZ		381208			
08/09/18 11:47	30	ZZZZZ		381208			
08/09/18 12:42	30	ZZZZZ		381208			
08/09/18 13:24	30	ZZZZZ		381208			
08/09/18 14:13	30	ZZZZZ		381208			
08/09/18 14:54	30	ZZZZZ		381208			
08/09/18 15:31	30	ZZZZZ		381208			
08/09/18 16:28	30	ZZZZZ		381208			
08/09/18 17:13	30	160-29569-A-1-C DU		381208	376765	901.1	KLS
08/09/18 18:12	30	ZZZZZ		381208			
08/09/18 18:45	30	ZZZZZ		381208			
08/09/18 19:19	30	ZZZZZ		381208			
08/09/18 20:00	30	ZZZZZ		381208			
08/09/18 20:33	30	160-29521-19	CRC-B19-0204	381208	376766	901.1	KLS
08/09/18 21:21	30	ZZZZZ		381208			
08/09/18 21:58	30	ZZZZZ		381208			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 14:07		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
12/06/16 16:15		ACVTOP 160-282836/1		282836			PS
07/13/18 22:25		ICB 160-375691/1		375691			RTM
08/09/18 00:02		CCV 160-381209/1		381209			
08/09/18 00:24		CCV 160-381209/2		381209			CDR
08/09/18 00:44		CCB 160-381209/3		381209			CDR
08/09/18 01:22	30	ZZZZZ		381209			
08/09/18 06:38	30	160-29521-1	CRC-B9-1416	381209	376740	901.1	CDR
08/09/18 07:18	30	160-29521-9	CRC-B13-0608	381209	376740	901.1	CDR
08/09/18 08:31	30	ZZZZZ		381209			
08/09/18 09:07	30	ZZZZZ		381209			
08/09/18 10:01	30	ZZZZZ		381209			
08/09/18 10:49	30	ZZZZZ		381209			

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/09/18 11:41	30	ZZZZZ		381209			
08/09/18 12:43	30	ZZZZZ		381209			
08/09/18 13:25	30	ZZZZZ		381209			
08/09/18 14:13	30	ZZZZZ		381209			
08/09/18 14:55	30	ZZZZZ		381209			
08/09/18 15:33	30	ZZZZZ		381209			
08/09/18 16:29	30	ZZZZZ		381209			
08/09/18 17:14	30	ZZZZZ		381209			
08/09/18 18:16	30	ZZZZZ		381209			
08/09/18 18:49	30	ZZZZZ		381209			
08/09/18 19:22		ZZZZZ		381209			
08/09/18 20:28	30	160-29521-20	CRC-B19-0810	381209	376766	901.1	CDR
08/09/18 21:15	120	ZZZZZ		381209			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
12/06/16 10:28		ACVTOP 160-282755/1		282755			PS
07/13/18 22:24		ICB 160-375692/1		375692			RTM
08/09/18 00:01		CCV 160-381210/1		381210			
08/09/18 00:23		CCV 160-381210/2		381210			CDR
08/09/18 00:43		CCB 160-381210/3		381210			CDR
08/09/18 01:23	60	ZZZZZ		381210			
08/09/18 06:37	30	ZZZZZ		381210			
08/09/18 07:17	30	160-29521-8	CRC-B13-0305	381210	376740	901.1	CDR
08/09/18 08:33	30	ZZZZZ		381210			
08/09/18 09:14	30	ZZZZZ		381210			
08/09/18 10:01	30	ZZZZZ		381210			
08/09/18 10:48	30	ZZZZZ		381210			
08/09/18 11:40	30	ZZZZZ		381210			
08/09/18 12:44	30	ZZZZZ		381210			
08/09/18 13:26	30	ZZZZZ		381210			
08/09/18 14:15	30	ZZZZZ		381210			
08/09/18 14:56	30	ZZZZZ		381210			
08/09/18 15:34	30	ZZZZZ		381210			
08/09/18 16:30	30	ZZZZZ		381210			
08/09/18 17:15	30	ZZZZZ		381210			
08/09/18 18:12	30	ZZZZZ		381210			
08/09/18 18:46	30	ZZZZZ		381210			
08/09/18 19:21	30	160-29521-17	CRC-B18-0608	381210	376766	901.1	CDR
08/09/18 20:02	30	160-29521-18	CRC-B18-0809	381210	376766	901.1	CDR
08/09/18 20:35	30	160-29521-21	CRC-B19-1618	381210	376766	901.1	CDR
08/09/18 21:19	30	ZZZZZ		381210			
08/09/18 21:59	30	ZZZZZ		381210			
08/09/18 22:48	30	ZZZZZ		381210			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW

Gamma Spectroscopy Run Log

Detector: GV9 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/05/16 11:08		ACVTOP 160-282744/1		282744			PS
07/13/18 22:07		ICB 160-375695/1		375695			RTM
08/09/18 00:00		CCV 160-381204/1		381204			
08/09/18 00:21		CCV 160-381204/2		381204			KLS
08/09/18 00:42		CCB 160-381204/3		381204			KLS
08/09/18 01:18	30	ZZZZZ		381204			
08/09/18 06:35	30	160-29479-A-2-E DU		381204	376740	901.1	KLS
08/09/18 07:15	30	160-29521-3	CRC-B6-1618	381204	376740	901.1	KLS
08/09/18 08:24	30	ZZZZZ		381204			
08/09/18 09:09	30	ZZZZZ		381204			
08/09/18 09:59	30	ZZZZZ		381204			
08/09/18 10:42	30	ZZZZZ		381204			
08/09/18 11:31		ZZZZZ		381204			
08/09/18 11:43	30	ZZZZZ		381204			
08/09/18 12:43	30	ZZZZZ		381204			
08/09/18 13:22		TCCLBA 160-381336/1-A		381204	381336	901.1	KLS
08/09/18 13:36		TCCLBC 160-381336/3-A		381204	381336	901.1	KLS
08/09/18 13:51		TCCLBB 160-381336/2-A		381204	381336	901.1	KLS
08/09/18 14:14	30	ZZZZZ		381204			
08/09/18 14:54	30	ZZZZZ		381204			
08/09/18 15:32	30	ZZZZZ		381204			
08/09/18 16:28	30	ZZZZZ		381204			
08/09/18 17:13	30	ZZZZZ		381204			
08/09/18 18:09	30	ZZZZZ		381204			
08/09/18 18:43	30	160-29521-15	CRC-B16-1416	381204	376765	901.1	KLS
08/09/18 19:16	30	ZZZZZ		381204			
08/09/18 19:56		ZZZZZ		381204			
08/09/18 20:08		ZZZZZ		381204			
08/09/18 20:21		ZZZZZ		381204			
08/09/18 20:36	30	160-29521-22	CRC-B19-2224	381204	376766	901.1	KLS
08/09/18 21:19	30	ZZZZZ		381204			
08/09/18 21:57	30	ZZZZZ		381204			
08/09/18 22:28	30	ZZZZZ		381204			
08/09/18 23:04	30	ZZZZZ		381204			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/18/18 13:54		IC 160-364854/1		364854			JLW
04/24/18 09:26		ICV 160-364854/2		364854			JLW
07/13/18 22:08		ICB 160-375694/1		375694			RTM
08/09/18 00:01		CCV 160-381202/1		381202			
08/09/18 00:22		CCV 160-381202/2		381202			CDR
08/09/18 00:41		CCB 160-381202/3		381202			CDR
08/09/18 01:24	30	MB 160-376740/1-A		381202	376740	901.1	CDR
08/09/18 06:36	30	ZZZZZ		381202			
08/09/18 07:17	30	160-29521-4	CRC-B6-2426	381202	376740	901.1	CDR
08/09/18 08:25	30	ZZZZZ		381202			
08/09/18 09:14	30	ZZZZZ		381202			
08/09/18 10:00	30	ZZZZZ		381202			

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/09/18 10:43	30	ZZZZZ		381202			
08/09/18 11:32		ZZZZZ		381202			
08/09/18 11:44	30	ZZZZZ		381202			
08/09/18 12:45	30	ZZZZZ		381202			
08/09/18 13:23		TCCLBB 160-381336/2-A		381202	381336	901.1	CDR
08/09/18 13:38		TCCLBA 160-381336/1-A		381202	381336	901.1	CDR
08/09/18 13:52		TCCLBC 160-381336/3-A		381202	381336	901.1	CDR
08/09/18 14:15	30	ZZZZZ		381202			
08/09/18 14:56	30	ZZZZZ		381202			
08/09/18 15:33	30	ZZZZZ		381202			
08/09/18 16:30	30	ZZZZZ		381202			
08/09/18 17:15	30	ZZZZZ		381202			
08/09/18 18:07	30	160-29521-10	CRC-B15-0204	381202	376765	901.1	CDR
08/09/18 18:41	60	MB 160-376766/1-A		381202	376766	901.1	CDR
08/09/18 19:42		ZZZZZ		381202			
08/09/18 19:54		ZZZZZ		381202			
08/09/18 20:10		ZZZZZ		381202			
08/09/18 20:23		ZZZZZ		381202			
08/09/18 20:40	60	160-29527-A-1-B DU		381202	376766	901.1	CDR
08/09/18 21:47	60	ZZZZZ		381202			
08/09/18 22:50	60	ZZZZZ		381202			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
02/20/12 11:05		IC 160-12353/1		12353			JLW
02/20/12 18:53		ICV 160-12353/2		12353			JLW
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
12/06/16 19:00		ACVTOP 160-282843/1		282843			PS
07/13/18 21:57		ICB 160-375697/1		375697			RTM
08/09/18 00:00		CCB 160-381203/1		381203			KLS
08/09/18 00:42		CCV 160-381203/2		381203			
08/09/18 01:02		CCV 160-381203/3		381203			KLS
08/09/18 01:26	60	ZZZZZ		381203			
08/09/18 06:36	30	ZZZZZ		381203			
08/09/18 07:09	30	ZZZZZ		381203			
08/09/18 08:23	30	ZZZZZ		381203			
08/09/18 09:15	30	ZZZZZ		381203			
08/09/18 09:59	30	ZZZZZ		381203			
08/09/18 10:47	30	ZZZZZ		381203			
08/09/18 11:39	30	ZZZZZ		381203			
08/09/18 12:42	30	ZZZZZ		381203			
08/09/18 13:24	30	ZZZZZ		381203			
08/09/18 14:13	30	ZZZZZ		381203			
08/09/18 14:54	30	ZZZZZ		381203			
08/09/18 15:32	30	ZZZZZ		381203			
08/09/18 16:28	30	MB 160-376765/1-A		381203	376765	901.1	KLS
08/09/18 17:13	30	ZZZZZ		381203			
08/09/18 18:09	30	160-29521-11	CRC-B15-0608	381203	376765	901.1	KLS

Gamma Spectroscopy Run Log

Detector: GV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/09/18 18:42	60	LCS 160-376766/2-A		381203	376766	901.1	KLS
08/09/18 19:44	120	ZZZZZ		381203			
08/09/18 21:49	60	ZZZZZ		381203			
08/09/18 22:51	60	ZZZZZ		381203			
08/10/18 00:00		CCB 160-381549/1		381549			KLS
08/10/18 00:45		CCV 160-381549/2		381549			
08/10/18 01:07		CCV 160-381549/3		381549			KLS
08/10/18 01:27	60	160-29521-16	CRC-B18-0204	381549	376766	901.1	KLS
08/10/18 06:11	60	ZZZZZ		381549			
08/10/18 07:40	60	ZZZZZ		381549			
08/10/18 09:10	60	ZZZZZ		381549			
08/10/18 10:23	30	ZZZZZ		381549			
08/10/18 11:00	30	ZZZZZ		381549			
08/10/18 11:44	30	ZZZZZ		381549			
08/10/18 12:46	30	ZZZZZ		381549			
08/10/18 13:22	30	ZZZZZ		381549			
08/10/18 13:58	30	ZZZZZ		381549			
08/10/18 14:35	30	ZZZZZ		381549			
08/10/18 15:18	30	ZZZZZ		381549			

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
12/02/16 13:12		ACVTOP 160-282704/1		282704			PS
07/20/18 14:08		ICB 160-377268/1		377268			JLW
08/09/18 00:01		CCB 160-381205/1		381205			CDR
08/09/18 01:15		CCV 160-381205/2		381205			
08/09/18 01:36		CCV 160-381205/3		381205			CDR
08/09/18 02:03	30	ZZZZZ		381205			
08/09/18 06:37	30	ZZZZZ		381205			
08/09/18 07:16	30	160-29521-5	CRC-B3-0204	381205	376740	901.1	CDR
08/09/18 08:24	30	ZZZZZ		381205			
08/09/18 09:17	30	ZZZZZ		381205			
08/09/18 10:00	30	ZZZZZ		381205			
08/09/18 10:48	30	ZZZZZ		381205			
08/09/18 11:39	30	ZZZZZ		381205			
08/09/18 12:43	30	ZZZZZ		381205			
08/09/18 13:25	30	ZZZZZ		381205			
08/09/18 14:14	30	ZZZZZ		381205			
08/09/18 14:55	30	ZZZZZ		381205			
08/09/18 15:33	30	ZZZZZ		381205			
08/09/18 16:29	30	LCS 160-376765/2-A		381205	376765	901.1	CDR
08/09/18 17:14	30	ZZZZZ		381205			
08/09/18 18:11	30	160-29521-12	CRC-B15-1214	381205	376765	901.1	CDR
08/09/18 18:42	30	ZZZZZ		381205			
08/09/18 19:17	30	ZZZZZ		381205			
08/09/18 19:58		ZZZZZ		381205			
08/09/18 21:16	120	ZZZZZ		381205			

Gamma Spectroscopy Run Log

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:29		IC 160-12390/1		12390			JLW
03/26/12 09:29		ICV 160-12390/2		12390			JLW
11/30/16 17:05		ACVTOP 160-282698/1		282698			PS
07/13/18 22:01		ICB 160-375698/1		375698			RTM
08/09/18 00:03		CCB 160-381206/1		381206			CDR
08/09/18 00:41		CCV 160-381206/2		381206			
08/09/18 01:02		CCV 160-381206/3		381206			CDR
08/09/18 01:27	30	ZZZZZ		381206			
08/09/18 06:42	30	ZZZZZ		381206			
08/09/18 07:16	30	160-29521-6	CRC-B3-0608	381206	376740	901.1	CDR
08/09/18 08:27	30	ZZZZZ		381206			
08/09/18 09:20	30	ZZZZZ		381206			
08/09/18 10:03	30	ZZZZZ		381206			
08/09/18 10:52	30	ZZZZZ		381206			
08/09/18 11:42	30	ZZZZZ		381206			
08/09/18 12:45	30	ZZZZZ		381206			
08/09/18 13:26	30	ZZZZZ		381206			
08/09/18 14:15	30	ZZZZZ		381206			
08/09/18 14:57	30	ZZZZZ		381206			
08/09/18 15:34	30	ZZZZZ		381206			
08/09/18 16:30	30	ZZZZZ		381206			
08/09/18 17:16	30	ZZZZZ		381206			
08/09/18 18:08	30	160-29521-13	CRC-B16-0608	381206	376765	901.1	CDR
08/09/18 18:44	30	ZZZZZ		381206			
08/09/18 19:17	60	ZZZZZ		381206			
08/09/18 20:24	30	ZZZZZ		381206			
08/09/18 21:14	120	ZZZZZ		381206			

Detector: GV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/14/18 10:55		ZZZZZ		364044			
03/14/18 15:23		IC 160-364044/1		364044			JLW
04/20/18 09:45		ICV 160-364044/3		364044			JLW
07/13/18 22:22		ICB 160-375699/1		375699			RTM
08/09/18 00:00		CCV 160-381207/1		381207			
08/09/18 00:21		CCV 160-381207/2		381207			CDR
08/09/18 00:40		CCB 160-381207/3		381207			CDR
08/09/18 01:24	30	LCS 160-376740/2-A		381207	376740	901.1	CDR
08/09/18 06:37	30	ZZZZZ		381207			
08/09/18 07:16	30	160-29521-7	CRC-B3-1618	381207	376740	901.1	CDR
08/09/18 08:27	30	ZZZZZ		381207			
08/09/18 09:21	30	ZZZZZ		381207			
08/09/18 09:59	30	ZZZZZ		381207			
08/09/18 10:48	30	ZZZZZ		381207			
08/09/18 11:39	30	ZZZZZ		381207			
08/09/18 12:45	30	ZZZZZ		381207			
08/09/18 13:23		TCCLBC 160-381336/3-A		381207	381336	901.1	CDR
08/09/18 13:37		TCCLBB 160-381336/2-A		381207	381336	901.1	CDR
08/09/18 14:06		TCCLBA 160-381336/1-A		381207			

Gamma Spectroscopy Run Log

Detector: GV19 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/09/18 14:17	30	ZZZZZ		381207			
08/09/18 14:57	30	ZZZZZ		381207			
08/09/18 15:33	30	ZZZZZ		381207			
08/09/18 16:31	30	ZZZZZ		381207			
08/09/18 17:15	30	ZZZZZ		381207			
08/09/18 18:06		TCCLBA 160-381336/1-A		381207	381336	901.1	CDR
08/09/18 18:17	30	160-29521-14	CRC-B16-0204	381207	376765	901.1	CDR
08/09/18 18:53	60	ZZZZZ		381207			
08/09/18 19:56		ZZZZZ		381207			
08/09/18 20:09		ZZZZZ		381207			
08/09/18 20:22		ZZZZZ		381207			
08/09/18 20:39	60	ZZZZZ		381207			
08/09/18 21:53	60	ZZZZZ		381207			
08/09/18 22:57	60	ZZZZZ		381207			

Radiological
Pre-Preparation Data

Radiological
Pre-Preparation Data

Radiological
Pre-Preparation Data

Radiological
Pre-Preparation Data

Shipping and Receiving Documents

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Phone: 314.298.8566 Fax: 314.298.8757

Chain of Custody Record

215032

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

Client Contact			
Company Name: Tetra Tech	Project Manager: Kris Schnoes	Site Contact: Kris Schnoes	Date: ~~7/12/18~~ 7/13/18
Address: 1 S. Wacker Dr Ste 3700	Tel/Fax: 773 759-8058	Lab Contact:	Carrier: FedEx
City/State/Zip: Chicago, IL 60606	Analysis Turnaround Time		COC No: 1 of 2 COCs
Phone: (773) 759-8058	☐ CALENDAR DAYS ☐ WORKING DAYS		Sampler:
Fax:	TAT if different from Below		For Lab Use Only:
Project Name: Carotite Reduction Co	☒ 2 weeks		Walk-In Client:
Site: Chicago, IL	☐ 1 week		Lab Sampling:
P.O.#	☐ 2 days		Job / SDG No.
	☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Ra-226, -228	Ur-alpha spec	Th-230	Sample Specific Notes
CRC-B9-1416	7/12/18	800	G	S	2			X	X	X	
CRC-B9-2022	7/12/18 ~~7/11/18~~	830	G	S	2			X	X	X	Centrifuge
CRC-B6-~~1416~~ 1618	7/11/18	1640	G	S	2			X	X	X	
CRC-B6-2426	7/11/18	1705	G	S	2			X	X	X	
CRC-B3-0204	7/12/18	1710	G	S	1			X	X	X	
CRC-B3-0608	7/12/18	1720	G	S	1			X	X	X	
CRC-B3-1618	7/12/18	1730	G	S	1			X	X	X	
CRC-B13-0305	7/12/18	1510	G	S	1			X	X	X	
CRC-B13-0608	7/12/18	1520	G	S	2			X	X	X	
CRC-B15-0204	7/13/18	1010	G	S	1			X	X	X	
CRC-B15-0608	7/13/18	1015	G	S	1			X	X	X	
CRC-B15-1214	7/13/18	1020	G	S	2			X	X	X	

160-29521 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No. | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Kristine Schnoes	Tetra Tech	7/13/18 1700	[signature]	TA STL	071418 0825
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

~~2417 Bond Street, University Park, IL 60484~~ St. Louis
~~Phone: 708.534.5200 Fax: 708.534.5211~~

(optional)
Report To
Contact: Kris Schnoes
Company: Tetra Tech
Address: 1 S. Wacker Dr.
Address: Ste 3100, Chicago, IL
Phone: 773/759-8058
Fax:
E-Mail: kris.schnoes@tetratech.com

(optional)
Bill To:
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#

Chain of Custody Record

Page 2 of 2

Lab Job #:
Chain of Custody Number:
Page ____ of ____
Temperature °C of Cooler:

Client: Tetra Tech
Client Project #:
Project Name: Carnotite Reduction Co.
Project Location/State: Chicago, IL
Lab Project #:
Sampler: Kris Schnoes
Lab PM:

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix	Ra-226, -228	Isotopic U Alpha Spec	Th-230							Comments
		CRC-B16-0608	7/13/18	750	2	S	X	X	X							
		CRC-B16-0204	7/13/18	740	1	S	X	X	X							
		CRC-B16-1416	7/13/18	800	2	S	X	X	X							
		CRC-B18-0204	7/13/18	1240	2	S	X	X	X							
		CRC-B18-0608	7/13/18	1250	2	S	X	X	X							
		CRC-B18-0809	7/13/18	1255	2	S	X	X	X							
		CRC-B19-0204	7/13/18	1550	2	S	X	X	X							
		CRC-B19-0810	7/13/18	1600	2	S	X	X	X							
		CRC-B19-1618	7/13/18	1610	2	S	X	X	X							
		CRC-B19-2224	7/13/18	1620	2	S	X	X	X							

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days X 10 Days ___ 15 Days ___ Other
Requested Due Date: ____

Sample Disposal
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Kristene Schnoes	Tetra Tech	7/13/18	1700	[signature]	TASTL	071418	0825
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier
Shipped
Hand Delivered

Matrix Key
WW - Wastewater
W - Water
S - Soil
SL - Sludge
MS - Miscellaneous
OL - Oil
A - Air
SE - Sediment
SO - Soil
L - Leachate
WI - Wipe
DW - Drinking Water
O - Other

Client Comments

Lab Comments

TA_4124-500 (1209)

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 160-29521-1

Login Number: 29521
List Number: 1
Creator: McKinney, Gerrod E

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	17.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

Job Number: 160-29881-1

Job Description: Former Carnotite Site - Non-Rad Analysis

For:
Tetra Tech, Inc.
1 South Wacker Dr.
Suite 3700
Chicago, IL 60606

Attention: Ms. Kristine Schnoes

Approved for release.
Chenise Y Lambert-Sykes
Project Manager I
8/31/2018 7:13 PM

Chenise Y Lambert-Sykes, Project Manager I
13715 Rider Trail North, Earth City, MO, 63045
(314)298-8566
chenise.lambert-sykes@testamericainc.com
08/31/2018

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. Pursuant to NELAP, this report shall not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of TestAmerica and its client. All questions regarding this report should be directed to the TestAmerica Project Manager.

Louisiana Lab Certification ID (Non-Potable, Solid/Haz. Material): 106151
Florida Lab Certification ID (Drinking Water): E87689.

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Definitions/Glossary

Client: Tetra Tech, Inc. TestAmerica Job ID: 160-29881-1
Project/Site: Former Carnotite Site - Non-Rad Analysis

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
G	The Sample MDC is greater than the requested RL.
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Former Carnotite Site - Non-Rad Analysis

Report Number: 160-29881-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 07/31/2018; the samples arrived in good condition, and properly preserved. The temperatures of the 2 coolers at receipt time were 18.2º C and 18.2º C.

PERCENT SOLIDS

Samples CRC-B9-0406 (160-29881-1), CRC-B6-0204 (160-29881-2), CRC-B1-0406 (160-29881-3), CRC-B7-0204 (160-29881-4), CRC-B22-0506 (160-29881-5), CRC-B7-0406 (160-29881-6), CRC-B4-0608 (160-29881-7), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9), CRC-B5-0204 (160-29881-10), CRC-B5-0608 (160-29881-11), CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17), CRC-BK1-0203 (160-29881-18), CRC-BK2-0102 (160-29881-19), CRC-BK2-0304 (160-29881-20), CRC-BK4-0102 (160-29881-21), CRC-BK6-0002 (160-29881-22), CRC-BK6-0406 (160-29881-23), CRC-BK7-0405 (160-29881-24), CRC-BK9-0506 (160-29881-25), CRC-BK8-0102 (160-29881-26), CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0406 (160-29881-32), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41) and CRC-B11-2628 (160-29881-42) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 07/31/2018.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples CRC-B9-0406 (160-29881-1), CRC-B7-0204 (160-29881-4), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9),

CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17), CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0406 (160-29881-32), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41) and CRC-B11-2628 (160-29881-42) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA 901.1. The samples were dried on 08/01/2018, prepared on 08/02/2018 and analyzed on 08/23/2018.

Prep Batch: 160-379951
The following sample, analyzed by gamma spectroscopy, did not meet the detection goal due to high concentrations of the analyte. The data have been reported with this narrative. CRC-B7-0204 (160-29881-4)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)
Samples CRC-B9-0406 (160-29881-1), CRC-B6-0204 (160-29881-2), CRC-B1-0406 (160-29881-3), CRC-B7-0204 (160-29881-4), CRC-B22-0506 (160-29881-5), CRC-B7-0406 (160-29881-6), CRC-B4-0608 (160-29881-7), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9), CRC-B5-0204 (160-29881-10), CRC-B5-0608 (160-29881-11), CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17), CRC-BK1-0203 (160-29881-18), CRC-BK2-0102 (160-29881-19), CRC-BK2-0304 (160-29881-20), CRC-BK4-0102 (160-29881-21), CRC-BK6-0002 (160-29881-22), CRC-BK6-0406 (160-29881-23), CRC-BK7-0405 (160-29881-24), CRC-BK9-0506 (160-29881-25), CRC-BK8-0102 (160-29881-26), CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41) and CRC-B11-2628 (160-29881-42) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 08/01/2018, prepared on 08/06/2018 and 08/14/2018 and analyzed on 08/28/2018.

Prep Batch: 160-386101
The thorium-230 detection goal was not met for the following samples due to high activity: CRC-B17-0406 (160-29881-32) and (160-29881-A-32-G DU). Analytical results are reported with the detection limit achieved.

Prep Batch: 160-380642
The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-B9-0406 (160-29881-1), CRC-B6-0204 (160-29881-2), CRC-B1-0406 (160-29881-3), CRC-B7-0204 (160-29881-4), CRC-B22-0506 (160-29881-5), CRC-B7-0406 (160-29881-6), CRC-B4-0608 (160-29881-7), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9), CRC-B5-0204 (160-29881-10), CRC-B5-0608 (160-29881-11), CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17) and (160-29881-A-1-B DU). The samples contain rocks.

Prep Batch: 160-380676
The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0406 (160-29881-32), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41), CRC-B11-2628 (160-29881-42) and (160-29881-A-27-B DU). The samples contain rocks.

The following sample was re-digested/re-extracted due to high activity: CRC-B17-0406 (160-29881-32).

Prep Batch: 160-382139
The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-BK1-0203 (160-29881-18), CRC-BK2-0102 (160-29881-19), CRC-BK2-0304 (160-29881-20), CRC-BK4-0102 (160-29881-21), CRC-BK6-0002 (160-29881-22), CRC-BK6-0406 (160-29881-23), CRC-BK7-0405 (160-29881-24), CRC-BK9-0506 (160-29881-25), CRC-BK8-0102 (160-29881-26) and (160-29881-A-18-B DU). The samples contain rocks.

Prep Batch: 160-386101
The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-B17-0406 (160-29881-32) and (160-29881-A-32-B DU). The samples contain rocks.

Due to high activity from this site, a reduced sample size was used for the following samples: CRC-B17-0406 (160-29881-32) and (160-29881-A-32-B DU).

The thorium-230 detection goal was not met for the following samples due to high activity: CRC-B17-0406 (160-29881-32) and (160-29881-A-32-G DU). Analytical results are reported with the detection limit achieved.

The method blank (MB) has thorium-230 activity above the MDC and RL. The following associated samples exhibit concentrations greater than five (5) times the concentrations observed in the MB; therefore, re-analysis is not required. The data have been reported. CRC-B17-0406 (160-29881-32), (LCS 160-386101/2-A), (MB 160-386101/1-A) and (160-29881-A-32-G DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples CRC-B9-0406 (160-29881-1), CRC-B6-0204 (160-29881-2), CRC-B1-0406 (160-29881-3), CRC-B7-0204 (160-29881-4), CRC-B22-0506 (160-29881-5), CRC-B7-0406 (160-29881-6), CRC-B4-0608 (160-29881-7), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9), CRC-B5-0204 (160-29881-10), CRC-B5-0608 (160-29881-11), CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17), CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0406 (160-29881-32), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41) and CRC-B11-2628 (160-29881-42) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 08/01/2018, prepared on 08/06/2018 and analyzed on 08/28/2018.

Prep Batch: 160-380661

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-B9-0406 (160-29881-1), CRC-B6-0204 (160-29881-2), CRC-B1-0406 (160-29881-3), CRC-B7-0204 (160-29881-4), CRC-B22-0506 (160-29881-5), CRC-B7-0406 (160-29881-6), CRC-B4-0608 (160-29881-7), CRC-B14-0204 (160-29881-8), CRC-B17-0204 (160-29881-9), CRC-B5-0204 (160-29881-10), CRC-B5-0608 (160-29881-11), CRC-B11-0204 (160-29881-12), CRC-B4-1012 (160-29881-13), CRC-B4-1820 (160-29881-14), CRC-B12-0002 (160-29881-15), CRC-B12-0406 (160-29881-16), CRC-B12-1214 (160-29881-17) and (160-29881-A-1-B DU). The samples contain rocks.

Prep Batch: 160-380693

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: CRC-B4-2628 (160-29881-27), CRC-B14-0608 (160-29881-28), CRC-B14-1012 (160-29881-29), CRC-B14-1618 (160-29881-30), CRC-B14-2426 (160-29881-31), CRC-B17-0406 (160-29881-32), CRC-B17-0810 (160-29881-33), CRC-B17-1820 (160-29881-34), CRC-B17-2628 (160-29881-35), CRC-B5-1214 (160-29881-36), CRC-B5-1618 (160-29881-37), CRC-B5-2224 (160-29881-38), CRC-B5-2830 (160-29881-39), CRC-B11-1214 (160-29881-40), CRC-B11-2022 (160-29881-41), CRC-B11-2628 (160-29881-42) and (160-29881-A-27-B DU). The samples contain rocks.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: CRC-B9-0406 Lab Sample ID: 160-29881-1

Date Collected: 07/12/18 07:50 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.9		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	91.1		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.197	U	0.481	0.481		1.10	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Actinium-228	0.318	U	0.254	0.256		0.328	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Bismuth-212	0.302	U	0.809	0.809		1.42	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Bismuth-214	0.956		0.188	0.213		0.0956	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Lead-210	1.02	U	1.26	1.27		1.84	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Lead-212	0.472		0.111	0.126		0.117	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Lead-214	0.837		0.142	0.167		0.145	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Potassium-40	8.29		1.68	1.88		0.951	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Protactinium-231	-1.01	U	3.39	3.39		5.72	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Radium-226	0.956		0.188	0.213	1.00	0.0956	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Radium-228	0.318	U	0.254	0.256		0.328	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Thallium-208	0.141		0.0663	0.0679		0.0550	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Thorium-232	0.318	U	0.254	0.256		0.328	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Thorium-234	0.718	U	0.577	0.582		1.63	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Uranium-235	0.116	U	0.348	0.348		0.592	pCi/g	08/02/18 13:36	08/23/18 11:46	1
Uranium-238	0.718	U	0.577	0.582		1.63	pCi/g	08/02/18 13:36	08/23/18 11:46	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.00		0.208	0.225	1.00	0.135	pCi/g	08/06/18 10:00	08/28/18 19:55	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.3*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:55*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.523		0.136	0.143	1.00	0.0423	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0653		0.0533	0.0536	1.00	0.0327	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	0.565		0.141	0.149	1.00	0.0423	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.5*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B6-0204 Lab Sample ID: 160-29881-2

Date Collected: 07/11/18 16:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.1		0.1	0.1	%			07/31/18 22:47	1

Client Sample ID: CRC-B6-0204 — Lab Sample ID: 160-29881-2

Date Collected: 07/11/18 16:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	94.9		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	11.6		0.649	1.17	1.00	0.127	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.2*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	5.07		0.428	0.604	1.00	0.0438	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.214		0.0982	0.0998	1.00	0.0338	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	4.88		0.420	0.587	1.00	0.0437	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.7*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B1-0406 — Lab Sample ID: 160-29881-3

Date Collected: 07/10/18 10:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	3.7		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	96.3		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.11		0.206	0.227	1.00	0.120	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.4*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	3.05		0.338	0.424	1.00	0.0451	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0986		0.0700	0.0705	1.00	0.0649	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	3.09		0.339	0.427	1.00	0.0279	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.7*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B7-0204 — Lab Sample ID: 160-29881-4

Date Collected: 07/11/18 11:45 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**2.6**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**97.4**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.417	U	0.698	0.700		14.8	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Actinium-228	0.877	U	1.94	1.95		2.09	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-212	-1.99	U	22.8	22.8		9.68	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-214	**135**		2.19	14.2		1.02	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-210	**90.4**		8.83	13.8		12.7	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-212	0.426	U	1.38	1.38		2.28	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-214	**147**		1.83	15.4		1.30	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Potassium-40	**11.3**		4.98	5.11		5.05	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Protactinium-231	-7.27	U	33.7	33.7		55.6	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-226	**135**	**G**	2.19	14.2	1.00	1.02	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-228	0.877	U	1.94	1.95		2.09	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thallium-208	-0.323	U	0.497	0.499		0.630	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-232	0.877	U	1.94	1.95		2.09	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-234	**43.0**		8.21	9.36		12.9	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Uranium-235	**5.40**		3.02	3.07		3.18	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Uranium-238	**43.0**		8.21	9.36		12.9	pCi/g	08/02/18 13:36	08/23/18 06:28	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**165**		2.45	14.1	1.00	0.132	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.6*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**56.0**		1.77	5.03	1.00	0.0985	pCi/g	08/06/18 12:14	08/28/18 18:13	1
Uranium-235	**2.51**		0.418	0.469	1.00	0.0523	pCi/g	08/06/18 12:14	08/28/18 18:13	1
Uranium-238	**54.6**		1.75	4.91	1.00	0.0983	pCi/g	08/06/18 12:14	08/28/18 18:13	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*31.8*		*30 - 110*	*08/06/18 12:14*	*08/28/18 18:13*	*1*

Client Sample ID: CRC-B22-0506 — Lab Sample ID: 160-29881-5

Date Collected: 07/12/18 12:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**2.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample ID: CRC-B22-0506 — Lab Sample ID: 160-29881-5

Date Collected: 07/12/18 12:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	97.4		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.311		0.133	0.136	1.00	0.126	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.1*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.579		0.144	0.152	1.00	0.0549	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0635		0.0544	0.0547	1.00	0.0535	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	0.609		0.147	0.156	1.00	0.0429	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.2*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B7-0406 — Lab Sample ID: 160-29881-6

Date Collected: 07/11/18 15:25 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	1.4		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	98.6		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	2.65		0.324	0.393	1.00	0.128	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.1*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	7.39		0.531	0.817	1.00	0.0781	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.414		0.140	0.144	1.00	0.0355	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	7.50		0.534	0.826	1.00	0.0285	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.3*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B4-0608 — Lab Sample ID: 160-29881-7

Date Collected: 07/26/18 11:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	2.5		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	97.5		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.451		0.157	0.162	1.00	0.130	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.2*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.229		0.0889	0.0910	1.00	0.0414	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.000	U	0.00532	0.00532	1.00	0.0319	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	0.220		0.0871	0.0890	1.00	0.0413	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.4*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B14-0204 — Lab Sample ID: 160-29881-8

Date Collected: 07/27/18 12:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.8		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	95.2		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.246	U	0.636	0.637		1.36	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Actinium-228	0.921		0.238	0.256		0.440	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-212	-0.331	U	1.08	1.08		1.86	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-214	2.51		0.267	0.374		0.151	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-210	2.68		1.76	1.79		2.45	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-212	0.841		0.131	0.170		0.139	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-214	2.67		0.243	0.368		0.181	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Potassium-40	11.9		1.59	2.00		0.757	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Protactinium-231	-1.05	U	4.39	4.39		7.34	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-226	2.51		0.267	0.374	1.00	0.151	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-228	0.921		0.238	0.256		0.440	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thallium-208	-0.00489	U	0.00555	0.00557		0.182	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-232	0.921		0.238	0.256		0.440	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-234	1.70	U	1.71	1.72		2.34	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Uranium-235	0.116	U	0.467	0.467		0.872	pCi/g	08/02/18 13:36	08/23/18 06:28	1

Client Sample ID: CRC-B14-0204 — Lab Sample ID: 160-29881-8

Date Collected: 07/27/18 12:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-238	1.70	U	1.71	1.72		2.34	pCi/g	08/02/18 13:36	08/23/18 06:28	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**14.1**		0.747	1.40	1.00	0.137	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**1.75**		0.249	0.289	1.00	0.0265	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	**0.104**		0.0699	0.0705	1.00	0.0615	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**1.72**		0.247	0.286	1.00	0.0494	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*95.0*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B17-0204 — Lab Sample ID: 160-29881-9

Date Collected: 07/27/18 16:15 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**8.9**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**91.1**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-1.73	U	6.55	6.55		10.8	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Actinium-228	0.775	U	0.491	0.498		0.953	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-212	0.00168	U	2.67	2.67		4.57	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Bismuth-214	**24.7**		1.06	2.73		0.472	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-210	**22.2**		5.32	5.99		6.61	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-212	**0.881**		0.269	0.284		0.401	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Lead-214	**25.8**		1.07	2.82		0.630	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Potassium-40	**11.0**		3.02	3.22		2.61	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Protactinium-231	0.000	U	3.01	3.01		25.0	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-226	**24.7**		1.06	2.73	1.00	0.472	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Radium-228	0.775	U	0.491	0.498		0.953	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thallium-208	**0.369**		0.169	0.173		0.194	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-232	0.775	U	0.491	0.498		0.953	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Thorium-234	**18.9**		3.81	4.37		5.57	pCi/g	08/02/18 13:36	08/23/18 06:28	1

Client Sample ID: CRC-B17-0204 — Lab Sample ID: 160-29881-9

Date Collected: 07/27/18 16:15 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-235	0.0226	U	0.0401	0.0402		3.71	pCi/g	08/02/18 13:36	08/23/18 06:28	1
Uranium-238	**18.9**		3.81	4.37		5.57	pCi/g	08/02/18 13:36	08/23/18 06:28	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**89.3**		1.69	7.69	1.00	0.122	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.7*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**18.3**		1.01	1.84	1.00	0.0670	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	**0.874**		0.246	0.257	1.00	0.0833	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**18.2**		1.00	1.82	1.00	0.0414	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*56.2*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B5-0204 — Lab Sample ID: 160-29881-10

Date Collected: 07/30/18 11:35 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**13.7**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**86.3**		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**8.76**		0.552	0.920	1.00	0.128	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.8*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**1.72**		0.250	0.289	1.00	0.0439	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0536	U	0.0508	0.0510	1.00	0.0546	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**1.67**		0.246	0.283	1.00	0.0438	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Client Sample ID: CRC-B5-0204 — Lab Sample ID: 160-29881-10

Date Collected: 07/30/18 11:35 **Matrix: Solid**
Date Received: 07/31/18 09:10

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.5*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B5-0608 — Lab Sample ID: 160-29881-11

Date Collected: 07/30/18 11:40 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**3.7**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**96.3**		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.182**		0.117	0.118	1.00	0.127	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.4*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.244**		0.0941	0.0963	1.00	0.0272	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.00845	U	0.0232	0.0232	1.00	0.0545	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**0.187**		0.0829	0.0844	1.00	0.0437	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.1*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B11-0204 — Lab Sample ID: 160-29881-12

Date Collected: 07/30/18 14:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**6.2**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**93.8**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.581	U	2.11	2.11		3.52	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Actinium-228	**1.04**		0.412	0.425		0.598	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Bismuth-212	0.951	U	1.58	1.58		2.64	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Bismuth-214	**8.82**		0.565	1.08		0.237	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Lead-210	**7.99**		3.66	3.78		4.30	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Lead-212	**0.907**		0.172	0.208		0.215	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Lead-214	**10.1**		0.454	1.15		0.330	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Potassium-40	**13.0**		2.06	2.45		1.12	pCi/g	08/02/18 13:36	08/23/18 06:29	1

Client Sample ID: CRC-B11-0204 — Lab Sample ID: 160-29881-12

Date Collected: 07/30/18 14:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Protactinium-231	0.000	U	2.51	2.51		14.7	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Radium-226	**8.82**		0.565	1.08	1.00	0.237	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Radium-228	**1.04**		0.412	0.425		0.598	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Thallium-208	0.0523	U	0.164	0.164		0.197	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Thorium-232	**1.04**		0.412	0.425		0.598	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Thorium-234	-2.84	U	2.35	2.37		6.33	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Uranium-235	0.471	U	1.02	1.02		2.00	pCi/g	08/02/18 13:36	08/23/18 06:29	1
Uranium-238	-2.84	U	2.35	2.37		6.33	pCi/g	08/02/18 13:36	08/23/18 06:29	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**10.3**		0.578	1.04	1.00	0.118	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*103*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**1.58**		0.230	0.265	1.00	0.0514	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	**0.0621**		0.0507	0.0509	1.00	0.0310	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**1.39**		0.215	0.245	1.00	0.0249	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*106*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B4-1012 — Lab Sample ID: 160-29881-13

Date Collected: 07/26/18 11:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**11.0**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**89.0**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0618	U	0.612	0.612		1.05	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Actinium-228	**0.164**		0.130	0.131		0.154	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Bismuth-212	0.162	U	0.580	0.580		1.02	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Bismuth-214	**0.304**		0.0948	0.0999		0.0622	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Lead-210	-0.296	U	1.24	1.24		2.16	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Lead-212	**0.135**		0.0569	0.0595		0.0782	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Lead-214	**0.253**		0.0889	0.0927		0.0824	pCi/g	08/02/18 13:36	08/23/18 06:31	1

Client Sample ID: CRC-B4-1012 — Lab Sample ID: 160-29881-13

Date Collected: 07/26/18 11:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Potassium-40	**6.79**		1.30	1.47		0.806	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Protactinium-231	0.395	U	1.20	1.20		2.85	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Radium-226	**0.304**		0.0948	0.0999	1.00	0.0622	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Radium-228	**0.164**		0.130	0.131		0.154	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Thallium-208	**0.0906**		0.0624	0.0631		0.0632	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Thorium-232	**0.164**		0.130	0.131		0.154	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Thorium-234	-0.572	U	0.909	0.911		1.44	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Uranium-235	-0.0177	U	0.0340	0.0340		0.547	pCi/g	08/02/18 13:36	08/23/18 06:31	1
Uranium-238	-0.572	U	0.909	0.911		1.44	pCi/g	08/02/18 13:36	08/23/18 06:31	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.204**		0.118	0.120	1.00	0.126	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.9*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.265**		0.0976	0.100	1.00	0.0431	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0111	U	0.0221	0.0222	1.00	0.0332	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**0.115**		0.0640	0.0648	1.00	0.0266	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*99.3*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B4-1820 — Lab Sample ID: 160-29881-14

Date Collected: 07/26/18 11:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**19.8**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**80.2**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.228	U	0.723	0.723		1.05	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Actinium-228	**0.549**		0.167	0.176		0.153	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Bismuth-212	0.654	U	1.28	1.28		2.17	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Bismuth-214	**0.457**		0.175	0.181		0.164	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Lead-210	1.65	U	1.52	1.53		2.04	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Lead-212	**0.354**		0.102	0.112		0.115	pCi/g	08/02/18 13:36	08/23/18 06:32	1

Client Sample ID: CRC-B4-1820 — Lab Sample ID: 160-29881-14

Date Collected: 07/26/18 11:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-214	**0.536**		0.146	0.156		0.122	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Potassium-40	**11.9**		2.07	2.40		1.02	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Protactinium-231	0.000	U	0.709	0.709		5.80	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Radium-226	**0.457**		0.175	0.181	1.00	0.164	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Radium-228	**0.549**		0.167	0.176		0.153	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Thallium-208	0.0818	U	0.0969	0.0973		0.0927	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Thorium-232	**0.549**		0.167	0.176		0.153	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Thorium-234	0.781	U	1.21	1.21		2.01	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Uranium-235	-0.0129	U	0.373	0.373		0.703	pCi/g	08/02/18 13:36	08/23/18 06:32	1
Uranium-238	0.781	U	1.21	1.21		2.01	pCi/g	08/02/18 13:36	08/23/18 06:32	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.458**		0.148	0.153	1.00	0.122	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.1*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.417**		0.125	0.130	1.00	0.0571	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	**0.0459**		0.0459	0.0461	1.00	0.0344	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**0.493**		0.135	0.142	1.00	0.0516	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.8*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B12-0002 — Lab Sample ID: 160-29881-15

Date Collected: 07/26/18 12:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**5.9**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**94.1**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.575	U	1.56	1.56		2.62	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Actinium-228	**1.08**		0.249	0.273		0.207	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-212	0.000	U	0.871	0.871		1.85	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-214	**2.60**		0.335	0.427		0.176	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-210	**3.80**		2.27	2.32		3.10	pCi/g	08/02/18 13:36	08/23/18 07:09	1

Client Sample ID: CRC-B12-0002 Lab Sample ID: 160-29881-15

Date Collected: 07/26/18 12:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-212	0.785		0.150	0.171		0.163	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-214	2.66		0.271	0.382		0.254	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Potassium-40	12.1		1.83	2.20		0.509	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Protactinium-231	-1.36	U	5.56	5.56		9.31	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-226	2.60		0.335	0.427	1.00	0.176	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-228	1.08		0.249	0.273		0.207	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thallium-208	0.251		0.0885	0.0921		0.0839	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-232	1.08		0.249	0.273		0.207	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-234	1.12	U	0.845	0.854		2.47	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-235	0.0346	U	0.0996	0.0996		1.42	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-238	1.12	U	0.845	0.854		2.47	pCi/g	08/02/18 13:36	08/23/18 07:09	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	5.34		0.435	0.625	1.00	0.126	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.5*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	1.12		0.193	0.214	1.00	0.0400	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0591		0.0506	0.0508	1.00	0.0497	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	1.10		0.191	0.212	1.00	0.0550	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.2*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B12-0406 Lab Sample ID: 160-29881-16

Date Collected: 07/26/18 12:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.4		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	95.6		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.229	U	0.511	0.512		0.772	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Actinium-228	0.227		0.102	0.105		0.0844	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-212	0.220	U	0.539	0.539		0.936	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-214	0.295		0.0990	0.104		0.0924	pCi/g	08/02/18 13:36	08/23/18 07:09	1

Client Sample ID: CRC-B12-0406 — Lab Sample ID: 160-29881-16

Date Collected: 07/26/18 12:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-210	-0.200	U	1.08	1.08		1.65	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-212	**0.103**		0.0619	0.0633		0.0930	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-214	**0.281**		0.0753	0.0807		0.0898	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Potassium-40	**5.93**		1.07	1.23		0.537	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Protactinium-231	0.000	U	0.450	0.450		2.87	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-226	**0.295**		0.0990	0.104	1.00	0.0924	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-228	**0.227**		0.102	0.105		0.0844	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thallium-208	0.0409	U	0.0751	0.0752		0.0758	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-232	**0.227**		0.102	0.105		0.0844	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-234	0.596	U	0.685	0.688		0.959	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-235	-0.113	U	0.217	0.217		0.433	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-238	0.596	U	0.685	0.688		0.959	pCi/g	08/02/18 13:36	08/23/18 07:09	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.438**		0.157	0.161	1.00	0.133	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*73.7*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.170**		0.0782	0.0795	1.00	0.0488	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.0108	U	0.0217	0.0217	1.00	0.0325	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**0.311**		0.104	0.108	1.00	0.0421	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.0*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-B12-1214 — Lab Sample ID: 160-29881-17

Date Collected: 07/26/18 12:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**14.1**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**85.9**		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.246	U	0.791	0.791		1.34	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Actinium-228	0.177	U	0.217	0.218		0.291	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Bismuth-212	-0.0634	U	0.733	0.733		1.33	pCi/g	08/02/18 13:36	08/23/18 07:10	1

Client Sample ID: CRC-B12-1214 — Lab Sample ID: 160-29881-17

Date Collected: 07/26/18 12:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Bismuth-214	**0.301**		0.107	0.111		0.107	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-210	-0.191	U	1.65	1.65		2.87	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-212	**0.160**		0.0711	0.0741		0.0931	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-214	**0.258**		0.139	0.141		0.152	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Potassium-40	**12.8**		1.91	2.32		0.815	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Protactinium-231	0.000	U	0.725	0.725		5.78	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Radium-226	**0.301**		0.107	0.111	1.00	0.107	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Radium-228	0.177	U	0.217	0.218		0.291	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thallium-208	0.0232	U	0.0418	0.0418		0.109	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thorium-232	0.177	U	0.217	0.218		0.291	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thorium-234	-0.874	U	1.32	1.32		2.92	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Uranium-235	-0.0347	U	0.0534	0.0535		0.874	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Uranium-238	-0.874	U	1.32	1.32		2.92	pCi/g	08/02/18 13:36	08/23/18 07:10	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.129**		0.108	0.109	1.00	0.126	pCi/g	08/06/18 10:00	08/28/18 19:56	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.6*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:56*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.180**		0.0815	0.0829	1.00	0.0440	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.00849	U	0.0233	0.0234	1.00	0.0548	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	**0.225**		0.0909	0.0929	1.00	0.0440	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*80.4*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Client Sample ID: CRC-BK1-0203 — Lab Sample ID: 160-29881-18

Date Collected: 07/26/18 13:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**8.8**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**91.2**		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**1.03**		0.209	0.226	1.00	0.127	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Client Sample ID: CRC-BK1-0203 — Lab Sample ID: 160-29881-18

Date Collected: 07/26/18 13:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.4*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK2-0102 — Lab Sample ID: 160-29881-19

Date Collected: 07/26/18 13:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.3		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	87.7		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.05		0.215	0.232	1.00	0.130	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.0*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK2-0304 — Lab Sample ID: 160-29881-20

Date Collected: 07/26/18 13:35 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.1		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	84.9		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.509		0.162	0.167	1.00	0.132	pCi/g	08/14/18 13:41	08/28/18 19:45	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.5*		*30 - 110*	*08/14/18 13:41*	*08/28/18 19:45*	*1*

Client Sample ID: CRC-BK4-0102 — Lab Sample ID: 160-29881-21

Date Collected: 07/26/18 14:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.2		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	91.8		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.753		0.183	0.193	1.00	0.122	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Client Sample ID: CRC-BK4-0102 — Lab Sample ID: 160-29881-21

Date Collected: 07/26/18 14:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.0*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK6-0002 — Lab Sample ID: 160-29881-22

Date Collected: 07/26/18 14:35 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.9		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	86.1		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.22		0.220	0.243	1.00	0.127	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.6*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK6-0406 — Lab Sample ID: 160-29881-23

Date Collected: 07/26/18 14:40 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10.8		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	89.2		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.876		0.204	0.216	1.00	0.132	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.4*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK7-0405 — Lab Sample ID: 160-29881-24

Date Collected: 07/26/18 15:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10.2		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	89.8		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.654		0.168	0.177	1.00	0.119	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Client Sample ID: CRC-BK7-0405 — Lab Sample ID: 160-29881-24

Date Collected: 07/26/18 15:10 **Matrix: Solid**
Date Received: 07/31/18 09:10

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*99.2*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK9-0506 — Lab Sample ID: 160-29881-25

Date Collected: 07/26/18 15:45 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	3.3		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	96.7		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	0.397		0.154	0.157	1.00	0.137	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.5*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-BK8-0102 — Lab Sample ID: 160-29881-26

Date Collected: 07/26/18 16:00 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.6		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	91.4		0.1	0.1	%			07/31/18 22:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	1.09		0.220	0.238	1.00	0.140	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.7*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Client Sample ID: CRC-B4-2628 — Lab Sample ID: 160-29881-27

Date Collected: 07/27/18 09:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.4		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	79.6		0.1	0.1	%			07/31/18 22:47	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.180	U	0.790	0.790		1.15	pCi/g	08/02/18 13:36	08/23/18 07:11	1

Client Sample ID: CRC-B4-2628 — Lab Sample ID: 160-29881-27

Date Collected: 07/27/18 09:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-228	**0.495**		0.256	0.261		0.249	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Bismuth-212	-0.667	U	1.29	1.29		2.17	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Bismuth-214	**0.703**		0.177	0.192		0.146	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Lead-210	1.11	U	1.49	1.50		2.19	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Lead-212	**0.360**		0.0985	0.109		0.117	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Lead-214	**0.639**		0.141	0.156		0.159	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Potassium-40	**12.9**		1.78	2.22		0.873	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Protactinium-231	-0.000000253	U	2.96	2.96		5.06	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Radium-226	**0.703**		0.177	0.192	1.00	0.146	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Radium-228	**0.495**		0.256	0.261		0.249	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Thallium-208	**0.124**		0.0548	0.0563		0.0593	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Thorium-232	**0.495**		0.256	0.261		0.249	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Thorium-234	0.384	U	0.430	0.431		1.63	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Uranium-235	-0.240	U	0.327	0.328		0.794	pCi/g	08/02/18 13:36	08/23/18 07:11	1
Uranium-238	0.384	U	0.430	0.431		1.63	pCi/g	08/02/18 13:36	08/23/18 07:11	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.429**		0.148	0.152	1.00	0.123	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.8*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.389**		0.118	0.122	1.00	0.0694	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.0421**		0.0421	0.0423	1.00	0.0316	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.454**		0.124	0.130	1.00	0.0409	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*95.7*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B14-0608 — Lab Sample ID: 160-29881-28

Date Collected: 07/27/18 12:15 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**2.3**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**97.7**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B14-0608

Lab Sample ID: 160-29881-28

Date Collected: 07/27/18 12:15
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.331	U	0.737	0.738		1.24	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Actinium-228	0.146	U	0.187	0.188		0.302	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-212	-0.0460	U	0.606	0.607		1.23	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Bismuth-214	**0.195**		0.101	0.103		0.121	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-210	-1.45	U	1.81	1.82		3.24	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-212	**0.204**		0.0889	0.0914		0.104	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Lead-214	**0.233**		0.112	0.115		0.156	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Potassium-40	**10.3**		1.72	2.01		1.13	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Protactinium-231	0.000	U	0.503	0.503		5.92	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-226	**0.195**		0.101	0.103	1.00	0.121	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Radium-228	0.146	U	0.187	0.188		0.302	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thallium-208	**0.114**		0.0515	0.0528		0.0547	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-232	0.146	U	0.187	0.188		0.302	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Thorium-234	-1.39	U	1.34	1.35		2.66	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-235	0.131	U	0.467	0.467		0.787	pCi/g	08/02/18 13:36	08/23/18 07:09	1
Uranium-238	-1.39	U	1.34	1.35		2.66	pCi/g	08/02/18 13:36	08/23/18 07:09	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.149**		0.117	0.117	1.00	0.136	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*72.5*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.144**		0.0724	0.0734	1.00	0.0617	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.0102	U	0.0205	0.0205	1.00	0.0307	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.154**		0.0717	0.0728	1.00	0.0397	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.0*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B14-1012

Lab Sample ID: 160-29881-29

Date Collected: 07/27/18 12:20
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**15.6**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**84.4**		0.1	0.1	%			07/31/18 22:47	1

Client Sample ID: CRC-B14-1012 Lab Sample ID: 160-29881-29

Date Collected: 07/27/18 12:20 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.425	U	0.874	0.875		1.46	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Actinium-228	**0.282**		0.193	0.195		0.197	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Bismuth-212	0.253	U	0.553	0.554		0.965	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Bismuth-214	0.0312	U	0.166	0.166		0.286	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-210	-0.380	U	1.45	1.45		2.52	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-212	**0.202**		0.0753	0.0797		0.0962	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Lead-214	**0.295**		0.0979	0.103		0.101	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Potassium-40	**13.5**		1.87	2.33		0.741	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Protactinium-231	0.000	U	0.436	0.436		3.99	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Radium-226	0.0312	U	0.166	0.166	1.00	0.286	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Radium-228	**0.282**		0.193	0.195		0.197	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thallium-208	0.0780	U	0.0555	0.0560		0.0802	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thorium-232	**0.282**		0.193	0.195		0.197	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Thorium-234	-0.375	U	1.45	1.45		2.50	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Uranium-235	-0.00664	U	0.0412	0.0412		0.824	pCi/g	08/02/18 13:36	08/23/18 07:10	1
Uranium-238	-0.375	U	1.45	1.45		2.50	pCi/g	08/02/18 13:36	08/23/18 07:10	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.177**		0.117	0.118	1.00	0.131	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.2*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.205**		0.0850	0.0867	1.00	0.0524	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.00790	U	0.0217	0.0217	1.00	0.0510	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.167**		0.0757	0.0770	1.00	0.0409	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*103*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B14-1618 Lab Sample ID: 160-29881-30

Date Collected: 07/27/18 12:25 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**20.2**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**79.8**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B14-1618

Lab Sample ID: 160-29881-30

Date Collected: 07/27/18 12:25
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0807	U	0.296	0.296		1.16	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Actinium-228	**0.346**		0.194	0.197		0.182	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Bismuth-212	-0.458	U	0.880	0.881		1.49	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Bismuth-214	**0.463**		0.106	0.117		0.0449	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Lead-210	1.19	U	1.25	1.26		2.02	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Lead-212	**0.261**		0.0794	0.0863		0.102	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Lead-214	**0.462**		0.115	0.125		0.0937	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Potassium-40	**14.3**		1.84	2.35		0.622	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Protactinium-231	0.333	U	1.49	1.49		3.94	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Radium-226	**0.463**		0.106	0.117	1.00	0.0449	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Radium-228	**0.346**		0.194	0.197		0.182	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Thallium-208	**0.110**		0.0728	0.0737		0.0744	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Thorium-232	**0.346**		0.194	0.197		0.182	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Thorium-234	0.412	U	0.473	0.475		1.27	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Uranium-235	-0.0218	U	0.220	0.220		0.397	pCi/g	08/02/18 13:36	08/23/18 07:12	1
Uranium-238	0.412	U	0.473	0.475		1.27	pCi/g	08/02/18 13:36	08/23/18 07:12	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.315**		0.136	0.139	1.00	0.135	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.6*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.313**		0.107	0.110	1.00	0.0549	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.00552	U	0.0234	0.0234	1.00	0.0619	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.370**		0.115	0.119	1.00	0.0429	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*92.2*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B14-2426

Lab Sample ID: 160-29881-31

Date Collected: 07/27/18 12:30
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**18.7**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**81.3**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B14-2426

Lab Sample ID: 160-29881-31

Date Collected: 07/27/18 12:30
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0260	U	0.696	0.696		1.03	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Actinium-228	**0.493**		0.194	0.200		0.140	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Bismuth-212	-0.0101	U	0.749	0.749		1.39	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Bismuth-214	**0.519**		0.138	0.148		0.0937	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Lead-210	-0.120	U	1.55	1.55		2.36	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Lead-212	**0.376**		0.0951	0.107		0.0971	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Lead-214	**0.557**		0.136	0.147		0.119	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Potassium-40	**11.3**		1.92	2.24		0.932	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Protactinium-231	0.000	U	0.681	0.681		4.78	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Radium-226	**0.519**		0.138	0.148	1.00	0.0937	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Radium-228	**0.493**		0.194	0.200		0.140	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Thallium-208	**0.0894**		0.0880	0.0885		0.0845	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Thorium-232	**0.493**		0.194	0.200		0.140	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Thorium-234	0.776	U	0.396	0.404		1.47	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Uranium-235	0.169	U	0.318	0.318		0.571	pCi/g	08/02/18 13:36	08/23/18 07:14	1
Uranium-238	0.776	U	0.396	0.404		1.47	pCi/g	08/02/18 13:36	08/23/18 07:14	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.320**		0.133	0.136	1.00	0.128	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.2*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.281**		0.0965	0.0993	1.00	0.0456	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.0278	U	0.0354	0.0355	1.00	0.0490	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.331**		0.104	0.108	1.00	0.0393	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*107*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B17-0406

Lab Sample ID: 160-29881-32

Date Collected: 07/27/18 16:20
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**9.6**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**90.4**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B17-0406

Lab Sample ID: 160-29881-32

Date Collected: 07/27/18 16:20
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.876	U	1.33	1.34		4.53	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Actinium-228	**0.908**		0.307	0.321		0.347	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Bismuth-212	-1.25	U	1.87	1.87		3.09	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Bismuth-214	**19.0**		0.661	2.08		0.271	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-210	**13.7**		2.79	3.22		4.00	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-212	0.135	U	0.436	0.436		0.723	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-214	**21.3**		0.584	2.29		0.384	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Potassium-40	**11.0**		1.77	2.10		1.21	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Protactinium-231	0.000	U	1.01	1.01		16.6	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Radium-226	**19.0**		0.661	2.08	1.00	0.271	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Radium-228	**0.908**		0.307	0.321		0.347	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thallium-208	**0.276**		0.126	0.129		0.133	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thorium-232	**0.908**		0.307	0.321		0.347	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thorium-234	**7.14**		1.43	1.61		4.35	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Uranium-235	**2.04**		0.859	0.884		1.04	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Uranium-238	**7.14**		1.43	1.61		4.35	pCi/g	08/02/18 13:36	08/23/18 07:43	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**361**	**G**	29.3	42.2	1.00	4.11	pCi/g	08/29/18 11:36	08/31/18 02:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*97.2*		*30 - 110*	*08/29/18 11:36*	*08/31/18 02:42*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**13.1**		0.664	1.28	1.00	0.0599	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.807**		0.184	0.196	1.00	0.0314	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**12.8**		0.656	1.26	1.00	0.0471	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*93.2*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B17-0810

Lab Sample ID: 160-29881-33

Date Collected: 07/27/18 16:25
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**10.4**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**89.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B17-0810

Lab Sample ID: 160-29881-33
Date Collected: 07/27/18 16:25
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.272	U	1.22	1.22		2.06	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Actinium-228	**0.915**		0.242	0.259		0.219	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Bismuth-212	-0.739	U	1.25	1.25		2.09	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Bismuth-214	**1.19**		0.233	0.263		0.168	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Lead-210	2.34	U	2.02	2.04		2.73	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Lead-212	**0.791**		0.137	0.160		0.145	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Lead-214	**1.08**		0.179	0.210		0.130	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Potassium-40	**14.4**		1.84	2.35		0.434	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Protactinium-231	0.0526	U	3.94	3.94		6.67	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Radium-226	**1.19**		0.233	0.263	1.00	0.168	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Radium-228	**0.915**		0.242	0.259		0.219	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Thallium-208	**0.339**		0.100	0.106		0.0851	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Thorium-232	**0.915**		0.242	0.259		0.219	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Thorium-234	**4.25**		1.45	1.53		2.07	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Uranium-235	0.000	U	0.250	0.250		1.40	pCi/g	08/02/18 13:36	08/23/18 07:44	1
Uranium-238	**4.25**		1.45	1.53		2.07	pCi/g	08/02/18 13:36	08/23/18 07:44	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**1.56**		0.244	0.277	1.00	0.123	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.0*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**4.46**		0.410	0.555	1.00	0.0626	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.216**		0.102	0.104	1.00	0.0653	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**4.37**		0.405	0.546	1.00	0.0665	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.5*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B17-1820

Lab Sample ID: 160-29881-34
Date Collected: 07/27/18 16:30
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**18.4**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**81.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample ID: CRC-B17-1820 — Lab Sample ID: 160-29881-34

Date Collected: 07/27/18 16:30 **Matrix: Solid**
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.339	U	0.505	0.506		1.09	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Actinium-228	0.0725	U	0.212	0.212		0.469	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Bismuth-212	-0.409	U	0.682	0.683		1.75	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Bismuth-214	**0.377**		0.141	0.146		0.141	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-210	0.219	U	1.06	1.06		1.72	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-212	**0.292**		0.0856	0.0936		0.0997	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Lead-214	**0.542**		0.132	0.144		0.118	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Potassium-40	**16.9**		2.11	2.73		0.750	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Protactinium-231	-0.873	U	2.90	2.90		4.90	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Radium-226	**0.377**		0.141	0.146	1.00	0.141	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Radium-228	0.0725	U	0.212	0.212		0.469	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thallium-208	**0.143**		0.0677	0.0693		0.0737	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thorium-232	0.0725	U	0.212	0.212		0.469	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Thorium-234	0.0794	U	1.46	1.46		2.14	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Uranium-235	0.111	U	0.337	0.338		0.572	pCi/g	08/02/18 13:36	08/23/18 07:43	1
Uranium-238	0.0794	U	1.46	1.46		2.14	pCi/g	08/02/18 13:36	08/23/18 07:43	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.415**		0.141	0.145	1.00	0.119	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.2*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.440**		0.134	0.139	1.00	0.0566	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.0503**		0.0503	0.0505	1.00	0.0377	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.429**		0.132	0.137	1.00	0.0565	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.2*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B17-2628 — Lab Sample ID: 160-29881-35

Date Collected: 07/30/18 08:45 **Matrix: Solid**
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**25.3**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**74.7**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B17-2628

Lab Sample ID: 160-29881-35
Date Collected: 07/30/18 08:45
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.216	U	0.880	0.880		1.21	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Actinium-228	**0.575**		0.203	0.212		0.138	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Bismuth-212	-0.0813	U	0.838	0.838		1.93	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Bismuth-214	**0.684**		0.200	0.212		0.185	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Lead-210	-0.0871	U	2.13	2.13		3.67	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Lead-212	**0.479**		0.120	0.135		0.139	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Lead-214	**0.714**		0.150	0.168		0.145	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Potassium-40	**11.8**		1.96	2.30		0.917	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Protactinium-231	-0.585	U	3.50	3.50		5.93	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Radium-226	**0.684**		0.200	0.212	1.00	0.185	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Radium-228	**0.575**		0.203	0.212		0.138	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Thallium-208	**0.193**		0.0620	0.0651		0.0448	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Thorium-232	**0.575**		0.203	0.212		0.138	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Thorium-234	-1.14	U	1.68	1.68		3.23	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Uranium-235	0.0606	U	0.176	0.176		1.14	pCi/g	08/02/18 13:36	08/23/18 07:45	1
Uranium-238	-1.14	U	1.68	1.68		3.23	pCi/g	08/02/18 13:36	08/23/18 07:45	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.496**		0.152	0.157	1.00	0.123	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.1*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.462**		0.131	0.137	1.00	0.0673	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.0307	U	0.0391	0.0391	1.00	0.0540	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.403**		0.120	0.125	1.00	0.0269	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.1*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B5-1214

Lab Sample ID: 160-29881-36
Date Collected: 07/30/18 11:45
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**17.1**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**82.9**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-1214

Lab Sample ID: 160-29881-36

Date Collected: 07/30/18 11:45
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.330	U	0.732	0.733		1.04	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Actinium-228	**0.234**		0.148	0.150		0.163	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Bismuth-212	-0.264	U	0.823	0.824		1.42	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Bismuth-214	**0.294**		0.124	0.128		0.127	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Lead-210	0.659	U	1.26	1.26		1.85	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Lead-212	**0.190**		0.0726	0.0766		0.0948	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Lead-214	**0.437**		0.121	0.130		0.115	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Potassium-40	**12.3**		1.61	2.04		0.758	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Protactinium-231	0.0660	U	0.904	0.904		3.97	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Radium-226	**0.294**		0.124	0.128	1.00	0.127	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Radium-228	**0.234**		0.148	0.150		0.163	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Thallium-208	**0.103**		0.0486	0.0498		0.0489	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Thorium-232	**0.234**		0.148	0.150		0.163	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Thorium-234	0.990	U	1.11	1.12		1.52	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Uranium-235	-0.0215	U	0.136	0.136		0.593	pCi/g	08/02/18 13:36	08/23/18 07:47	1
Uranium-238	0.990	U	1.11	1.12		1.52	pCi/g	08/02/18 13:36	08/23/18 07:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.256**		0.125	0.127	1.00	0.125	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.0*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.277**		0.0988	0.101	1.00	0.0422	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	-0.00271	U	0.00543	0.00543	1.00	0.0525	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.215**		0.0872	0.0890	1.00	0.0421	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.7*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B5-1618

Lab Sample ID: 160-29881-37

Date Collected: 07/30/18 11:50
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**22.4**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**77.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-1618

Lab Sample ID: 160-29881-37
Date Collected: 07/30/18 11:50
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.381	U	0.579	0.581		0.799	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Actinium-228	0.181	U	0.330	0.330		0.377	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Bismuth-212	-0.0181	U	1.04	1.04		1.43	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Bismuth-214	**0.437**		0.151	0.157		0.150	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Lead-210	-1.26	U	2.26	2.27		3.99	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Lead-212	**0.446**		0.110	0.119		0.118	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Lead-214	**0.544**		0.159	0.168		0.144	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Potassium-40	**16.5**		2.24	2.79		1.13	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Protactinium-231	0.901	U	2.34	2.35		5.36	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Radium-226	**0.437**		0.151	0.157	1.00	0.150	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Radium-228	0.181	U	0.330	0.330		0.377	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Thallium-208	**0.172**		0.0697	0.0719		0.0696	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Thorium-232	0.181	U	0.330	0.330		0.377	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Thorium-234	-0.649	U	1.15	1.15		3.35	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Uranium-235	-0.260	U	0.804	0.804		1.34	pCi/g	08/02/18 14:22	08/23/18 18:46	1
Uranium-238	-0.649	U	1.15	1.15		3.35	pCi/g	08/02/18 14:22	08/23/18 18:46	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.545**		0.172	0.178	1.00	0.134	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*71.7*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.294**		0.0968	0.0999	1.00	0.0439	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.00975	U	0.0195	0.0195	1.00	0.0293	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.422**		0.115	0.120	1.00	0.0235	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*105*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B5-2224

Lab Sample ID: 160-29881-38
Date Collected: 07/30/18 11:55
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**19.0**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**81.0**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-2224

Lab Sample ID: 160-29881-38

Date Collected: 07/30/18 11:55
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.225	U	0.604	0.605		1.02	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Actinium-228	0.193	U	0.239	0.240		0.283	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Bismuth-212	-0.0252	U	0.595	0.595		1.08	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Bismuth-214	**0.344**		0.0853	0.0925		0.0390	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Lead-210	0.779	U	1.15	1.15		1.90	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Lead-212	**0.150**		0.0680	0.0707		0.0984	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Lead-214	**0.403**		0.0913	0.100		0.0745	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Potassium-40	**12.2**		1.59	2.02		0.541	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Protactinium-231	-0.641	U	2.21	2.21		3.72	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Radium-226	**0.344**		0.0853	0.0925	1.00	0.0390	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Radium-228	0.193	U	0.239	0.240		0.283	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Thallium-208	**0.0639**		0.0458	0.0463		0.0501	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Thorium-232	0.193	U	0.239	0.240		0.283	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Thorium-234	0.549	U	0.805	0.807		1.33	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Uranium-235	0.0986	U	0.154	0.155		0.406	pCi/g	08/02/18 14:22	08/23/18 07:52	1
Uranium-238	0.549	U	0.805	0.807		1.33	pCi/g	08/02/18 14:22	08/23/18 07:52	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.543**		0.165	0.172	1.00	0.127	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.7*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.310**		0.111	0.114	1.00	0.0473	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.0182	U	0.0355	0.0355	1.00	0.0681	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.261**		0.101	0.104	1.00	0.0472	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.5*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B5-2830

Lab Sample ID: 160-29881-39

Date Collected: 07/30/18 12:00
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**33.0**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**67.0**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-2830

Lab Sample ID: 160-29881-39

Date Collected: 07/30/18 12:00
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.315	U	1.11	1.11		1.89	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Actinium-228	**0.656**		0.262	0.271		0.212	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Bismuth-212	**1.66**		0.739	0.758		0.834	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Bismuth-214	**0.912**		0.219	0.238		0.159	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Lead-210	0.834	U	1.84	1.84		2.76	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Lead-212	**0.351**		0.122	0.128		0.167	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Lead-214	**0.749**		0.185	0.200		0.179	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Potassium-40	**13.6**		1.91	2.35		0.495	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Protactinium-231	0.000	U	0.753	0.753		6.69	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Radium-226	**0.912**		0.219	0.238	1.00	0.159	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Radium-228	**0.656**		0.262	0.271		0.212	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Thallium-208	**0.146**		0.0859	0.0872		0.0971	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Thorium-232	**0.656**		0.262	0.271		0.212	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Thorium-234	1.89	U	1.73	1.75		2.18	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Uranium-235	0.0525	U	0.0903	0.0904		1.15	pCi/g	08/02/18 14:22	08/23/18 08:47	1
Uranium-238	1.89	U	1.73	1.75		2.18	pCi/g	08/02/18 14:22	08/23/18 08:47	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.515**		0.159	0.165	1.00	0.128	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.2*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.489**		0.126	0.132	1.00	0.0494	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.0298**		0.0344	0.0345	1.00	0.0298	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.382**		0.110	0.115	1.00	0.0239	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*92.7*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B11-1214

Lab Sample ID: 160-29881-40

Date Collected: 07/30/18 14:20
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**17.4**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**82.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B11-1214

Lab Sample ID: 160-29881-40

Date Collected: 07/30/18 14:20
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.380	U	0.855	0.856		1.44	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Actinium-228	0.204	U	0.205	0.206		0.216	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Bismuth-212	0.574	U	1.23	1.23		2.08	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Bismuth-214	**0.435**		0.125	0.133		0.105	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-210	0.145	U	1.43	1.43		2.47	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-212	**0.182**		0.0784	0.0819		0.105	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-214	**0.409**		0.132	0.139		0.127	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Potassium-40	**13.6**		1.96	2.40		0.805	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Protactinium-231	0.000	U	0.812	0.812		4.70	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Radium-226	**0.435**		0.125	0.133	1.00	0.105	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Radium-228	0.204	U	0.205	0.206		0.216	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thallium-208	0.0663	U	0.102	0.102		0.114	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thorium-232	0.204	U	0.205	0.206		0.216	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thorium-234	0.277	U	0.505	0.506		1.49	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Uranium-235	0.191	U	0.441	0.441		1.02	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Uranium-238	0.277	U	0.505	0.506		1.49	pCi/g	08/02/18 14:22	08/23/18 08:41	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.297**		0.126	0.129	1.00	0.121	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*96.2*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.296**		0.105	0.108	1.00	0.0510	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.00850	U	0.0234	0.0234	1.00	0.0548	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.264**		0.0979	0.100	1.00	0.0273	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.1*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B11-2022

Lab Sample ID: 160-29881-41

Date Collected: 07/30/18 14:35
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**22.0**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**78.0**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B11-2022

Lab Sample ID: 160-29881-41

Date Collected: 07/30/18 14:35
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0246	U	0.775	0.775		1.14	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Actinium-228	**0.339**		0.263	0.265		0.284	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Bismuth-212	0.579	U	1.20	1.20		2.02	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Bismuth-214	**0.632**		0.157	0.170		0.132	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Lead-210	1.10	U	1.73	1.74		2.41	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Lead-212	**0.328**		0.0880	0.0977		0.0990	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Lead-214	**0.605**		0.139	0.153		0.123	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Potassium-40	**13.2**		1.76	2.22		0.838	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Protactinium-231	0.000	U	0.476	0.476		4.44	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Radium-226	**0.632**		0.157	0.170	1.00	0.132	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Radium-228	**0.339**		0.263	0.265		0.284	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Thallium-208	**0.131**		0.0632	0.0647		0.0684	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Thorium-232	**0.339**		0.263	0.265		0.284	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Thorium-234	0.660	U	0.647	0.651		1.70	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Uranium-235	0.286	U	0.266	0.268		0.347	pCi/g	08/02/18 14:22	08/23/18 08:44	1
Uranium-238	0.660	U	0.647	0.651		1.70	pCi/g	08/02/18 14:22	08/23/18 08:44	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.335**		0.137	0.139	1.00	0.127	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*94.0*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.351**		0.110	0.114	1.00	0.0473	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	**0.0736**		0.0556	0.0560	1.00	0.0315	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	**0.371**		0.112	0.116	1.00	0.0253	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*101*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Client Sample ID: CRC-B11-2628

Lab Sample ID: 160-29881-42

Date Collected: 07/30/18 14:50
Matrix: Solid
Date Received: 07/31/18 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**14.4**		0.1	0.1	%			07/31/18 22:47	1
Percent Solids	**85.6**		0.1	0.1	%			07/31/18 22:47	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B11-2628

Lab Sample ID: 160-29881-42

Date Collected: 07/30/18 14:50
Matrix: Solid
Date Received: 07/31/18 09:10

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.122	U	0.250	0.251		1.88	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Actinium-228	**0.562**		0.193	0.201		0.131	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Bismuth-212	0.348	U	1.34	1.35		2.32	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Bismuth-214	**0.501**		0.177	0.185		0.165	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-210	1.56	U	1.94	1.95		2.71	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-212	**0.420**		0.114	0.123		0.137	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Lead-214	**0.655**		0.160	0.174		0.171	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Potassium-40	**14.7**		2.10	2.57		1.10	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Protactinium-231	0.000	U	1.04	1.04		6.33	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Radium-226	**0.501**		0.177	0.185	1.00	0.165	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Radium-228	**0.562**		0.193	0.201		0.131	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thallium-208	**0.158**		0.0786	0.0802		0.0823	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thorium-232	**0.562**		0.193	0.201		0.131	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Thorium-234	-1.72	U	1.46	1.48		3.35	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Uranium-235	0.000	U	0.196	0.196		1.34	pCi/g	08/02/18 14:22	08/23/18 08:41	1
Uranium-238	-1.72	U	1.46	1.48		3.35	pCi/g	08/02/18 14:22	08/23/18 08:41	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	**0.455**		0.155	0.160	1.00	0.128	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*08/06/18 14:11*	*08/28/18 02:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**0.334**		0.110	0.114	1.00	0.0587	pCi/g	08/06/18 15:28	08/28/18 18:11	1
Uranium-235	0.00547	U	0.0232	0.0232	1.00	0.0613	pCi/g	08/06/18 15:28	08/28/18 18:11	1
Uranium-238	**0.270**		0.0998	0.102	1.00	0.0624	pCi/g	08/06/18 15:28	08/28/18 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*97.5*		*30 - 110*	*08/06/18 15:28*	*08/28/18 18:11*	*1*

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

General Chemistry

Analyte	RL	MDL	Units	Method
Percent Moisture	0.1	0.1	%	Moisture
Percent Solids	0.1	0.1	%	Moisture

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	Client Sample ID	horium-22 (30-110)							
160-29881-1	CRC-B9-0406	83.3							
160-29881-1 DU	CRC-B9-0406	94.1							
160-29881-2	CRC-B6-0204	74.2							
160-29881-3	CRC-B1-0406	81.4							
160-29881-4	CRC-B7-0204	76.6							
160-29881-5	CRC-B22-0506	80.1							
160-29881-6	CRC-B7-0406	77.1							
160-29881-7	CRC-B4-0608	80.2							
160-29881-8	CRC-B14-0204	84.0							
160-29881-9	CRC-B17-0204	95.7							
160-29881-10	CRC-B5-0204	95.8							
160-29881-11	CRC-B5-0608	80.4							
160-29881-12	CRC-B11-0204	103							
160-29881-13	CRC-B4-1012	79.9							
160-29881-14	CRC-B4-1820	81.1							
160-29881-15	CRC-B12-0002	80.5							
160-29881-16	CRC-B12-0406	73.7							
160-29881-17	CRC-B12-1214	77.6							
160-29881-18	CRC-BK1-0203	75.4							
160-29881-18 DU	CRC-BK1-0203	73.3							
160-29881-19	CRC-BK2-0102	77.0							
160-29881-20	CRC-BK2-0304	78.5							
160-29881-21	CRC-BK4-0102	80.0							
160-29881-22	CRC-BK6-0002	88.6							
160-29881-23	CRC-BK6-0406	80.4							
160-29881-24	CRC-BK7-0405	99.2							
160-29881-25	CRC-BK9-0506	83.5							
160-29881-26	CRC-BK8-0102	85.7							
160-29881-27	CRC-B4-2628	76.8							
160-29881-27 DU	CRC-B4-2628	81.3							
160-29881-28	CRC-B14-0608	72.5							
160-29881-29	CRC-B14-1012	89.2							
160-29881-30	CRC-B14-1618	95.6							
160-29881-31	CRC-B14-2426	89.2							
160-29881-32	CRC-B17-0406	97.2							
160-29881-32 DU	CRC-B17-0406	93.9							
160-29881-33	CRC-B17-0810	78.0							
160-29881-34	CRC-B17-1820	82.2							
160-29881-35	CRC-B17-2628	84.1							
160-29881-36	CRC-B5-1214	81.0							
160-29881-37	CRC-B5-1618	71.7							
160-29881-38	CRC-B5-2224	82.7							
160-29881-39	CRC-B5-2830	93.2							
160-29881-40	CRC-B11-1214	96.2							
160-29881-41	CRC-B11-2022	94.0							
160-29881-42	CRC-B11-2628	79.0							
LCS 160-380642/2-A	Lab Control Sample	97.7							
LCS 160-380676/2-A	Lab Control Sample	81.9							
LCS 160-382139/2-A	Lab Control Sample	84.9							

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	horium-22 (30-110)
LCS 160-386101/2-A	Lab Control Sample	89.5
MB 160-380642/1-A	Method Blank	86.8
MB 160-380676/1-A	Method Blank	90.2
MB 160-382139/1-A	Method Blank	98.2
MB 160-386101/1-A	Method Blank	92.1

Tracer/Carrier Legend

Thorium-229 = Thorium-229

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	ranium-23 (30-110)
160-29881-1	CRC-B9-0406	87.5
160-29881-1 DU	CRC-B9-0406	100
160-29881-2	CRC-B6-0204	90.7
160-29881-3	CRC-B1-0406	83.7
160-29881-4	CRC-B7-0204	31.8
160-29881-5	CRC-B22-0506	90.2
160-29881-6	CRC-B7-0406	81.3
160-29881-7	CRC-B4-0608	96.4
160-29881-8	CRC-B14-0204	95.0
160-29881-9	CRC-B17-0204	56.2
160-29881-10	CRC-B5-0204	81.5
160-29881-11	CRC-B5-0608	77.1
160-29881-12	CRC-B11-0204	106
160-29881-13	CRC-B4-1012	99.3
160-29881-14	CRC-B4-1820	83.8
160-29881-15	CRC-B12-0002	96.2
160-29881-16	CRC-B12-0406	90.0
160-29881-17	CRC-B12-1214	80.4
160-29881-27	CRC-B4-2628	95.7
160-29881-27 DU	CRC-B4-2628	84.6
160-29881-28	CRC-B14-0608	96.0
160-29881-29	CRC-B14-1012	103
160-29881-30	CRC-B14-1618	92.2
160-29881-31	CRC-B14-2426	107
160-29881-32	CRC-B17-0406	93.2
160-29881-33	CRC-B17-0810	91.5
160-29881-34	CRC-B17-1820	88.2
160-29881-35	CRC-B17-2628	96.1
160-29881-36	CRC-B5-1214	88.7
160-29881-37	CRC-B5-1618	105
160-29881-38	CRC-B5-2224	88.5
160-29881-39	CRC-B5-2830	92.7
160-29881-40	CRC-B11-1214	89.1
160-29881-41	CRC-B11-2022	101

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	**Client Sample ID**	**ranium-23 (30-110)**
160-29881-42	CRC-B11-2628	97.5
LCS 160-380661/2-A	Lab Control Sample	90.6
LCS 160-380693/2-A	Lab Control Sample	79.8
MB 160-380661/1-A	Method Blank	108
MB 160-380693/1-A	Method Blank	81.0

Tracer/Carrier Legend

Uranium-232 = Uranium-232

Method: Moisture - Percent Moisture

Lab Sample ID: 160-29881-1 DU — **Client Sample ID: CRC-B9-0406**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 379546

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	8.9		9.0		%		1	30
Percent Solids	91.1		91.0		%		0.1	30

Lab Sample ID: 160-29881-42 DU — **Client Sample ID: CRC-B11-2628**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 379546

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	14.4		14.5		%		1	30
Percent Solids	85.6		85.5		%		0.2	30

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-379951/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 384700 — **Prep Batch: 379951**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.02519	U	0.0663	0.0664		0.829	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Actinium-228	-0.01254	U	0.176	0.176		0.219	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Bismuth-212	-0.02701	U	0.429	0.429		0.808	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Bismuth-214	-0.1060	U	0.122	0.122		0.293	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Lead-210	-0.07831	U	0.164	0.164		1.69	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Lead-212	0.01037	U	0.0511	0.0511		0.0899	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Lead-214	-0.04028	U	0.0768	0.0769		0.146	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Potassium-40	0.1925	U	0.426	0.427		0.751	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Protactinium-231	0.1503	U	1.42	1.42		2.48	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Radium-226	-0.1060	U	0.122	0.122	1.00	0.293	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Radium-228	-0.01254	U	0.176	0.176		0.219	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Thallium-208	0.009027	U	0.0448	0.0448		0.0600	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Thorium-232	-0.01254	U	0.176	0.176		0.219	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Thorium-234	0.3218	U	0.742	0.743		1.27	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Uranium-235	0.05960	U	0.153	0.153		0.494	pCi/g	08/02/18 13:36	08/23/18 06:25	1
Uranium-238	0.3218	U	0.742	0.743		1.27	pCi/g	08/02/18 13:36	08/23/18 06:25	1

Lab Sample ID: LCS 160-379951/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 384701 — **Prep Batch: 379951**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.8	97.96		11.5		1.33	pCi/g	101	87 - 116
Cesium-137	28.2	30.72		3.22		0.228	pCi/g	109	87 - 120
Cobalt-60	12.8	13.61		1.42		0.174	pCi/g	106	87 - 115

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-29881-1 DU
Matrix: Solid
Analysis Batch: 384700

Client Sample ID: CRC-B9-0406
Prep Type: Total/NA
Prep Batch: 379951

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium-227	0.197	U		0.2648	U	0.416		1.11	pCi/g			0.08	1
Actinium-228	0.318	U		0.3837		0.132		0.0764	pCi/g			0.17	1
Bismuth-212	0.302	U		0.3731	U	0.627		1.05	pCi/g			0.05	1
Bismuth-214	0.956			0.6697		0.155		0.112	pCi/g			0.78	1
Lead-210	1.02	U		-0.3503	U	1.13		2.42	pCi/g			0.57	1
Lead-212	0.472			0.3481		0.0911		0.0907	pCi/g			0.57	1
Lead-214	0.837			0.6647		0.133		0.0907	pCi/g			0.57	1
Potassium-40	8.29			9.342		1.60		0.621	pCi/g			0.30	1
Protactinium-231	-1.01	U		0.2174	U	1.39		4.43	pCi/g			0.26	1
Radium-226	0.956			0.6697		0.155	1.00	0.112	pCi/g			0.78	1
Radium-228	0.318	U		0.3837		0.132		0.0764	pCi/g			0.17	1
Thallium-208	0.141			0.06668	U	0.0647		0.0735	pCi/g			0.56	1
Thorium-232	0.318	U		0.3837		0.132		0.0764	pCi/g			0.17	1
Thorium-234	0.718	U		-0.6327	U	1.36		2.26	pCi/g			0.70	1
Uranium-235	0.116	U		0.07127	U	0.178		0.831	pCi/g			0.08	1
Uranium-238	0.718	U		-0.6327	U	1.36		2.26	pCi/g			0.70	1

Lab Sample ID: MB 160-379959/1-A
Matrix: Solid
Analysis Batch: 384697

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 379959

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.1094	U	0.280	0.280		0.612	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Actinium-228	0.1989	U	0.124	0.126		0.299	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Bismuth-212	-0.4593	U	1.11	1.11		1.93	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Bismuth-214	0.01509	U	0.179	0.179		0.320	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Lead-210	-0.4517	U	1.30	1.30		2.14	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Lead-212	0.0007222	U	0.0912	0.0912		0.163	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Lead-214	0.01934	U	0.115	0.116		0.183	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Potassium-40	-0.5145	U	1.14	1.14		1.61	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Protactinium-231	0.5165	U	1.48	1.48		3.54	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Radium-226	0.01509	U	0.179	0.179	1.00	0.320	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Radium-228	0.1989	U	0.124	0.126		0.299	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Thallium-208	0.01106	U	0.0461	0.0461		0.0665	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Thorium-232	0.1989	U	0.124	0.126		0.299	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Thorium-234	-0.4934	U	0.677	0.679		1.24	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Uranium-235	0.01056	U	0.0839	0.0840		0.479	pCi/g	08/02/18 14:22	08/23/18 07:50	1
Uranium-238	-0.4934	U	0.677	0.679		1.24	pCi/g	08/02/18 14:22	08/23/18 07:50	1

Lab Sample ID: LCS 160-379959/2-A
Matrix: Solid
Analysis Batch: 384705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 379959

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			96.8	98.75		11.6		1.30	pCi/g	102	87 - 116		

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-379959/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 384705 — **Prep Batch: 379959**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Cesium-137			28.2	30.26		3.19		0.307	pCi/g	107	87 - 120		
Cobalt-60			12.8	13.74		1.45		0.190	pCi/g	107	87 - 115		

Lab Sample ID: 160-29881-37 DU — **Client Sample ID: CRC-B5-1618**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 384701 — **Prep Batch: 379959**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium-227	0.381	U		0.3186	U	0.644		0.837	pCi/g			0.05	1
Actinium-228	0.181	U		0.1778	U	0.228		0.364	pCi/g			0.01	1
Bismuth-212	-0.0181	U		0.1585	U	1.11		1.94	pCi/g			0.08	1
Bismuth-214	0.437			0.4858		0.142		0.0901	pCi/g			0.16	1
Lead-210	-1.26	U		0.3684	U	1.47		2.31	pCi/g			0.43	1
Lead-212	0.446			0.3106		0.0974		0.109	pCi/g			0.63	1
Lead-214	0.544			0.4844		0.147		0.154	pCi/g			0.19	1
Potassium-40	16.5			15.81		2.52		0.441	pCi/g			0.12	1
Protactinium-231	0.901	U		0.0000	U	0.335		5.12	pCi/g			0.34	1
Radium-226	0.437			0.4858		0.142	1.00	0.0901	pCi/g			0.16	1
Radium-228	0.181	U		0.1778	U	0.228		0.364	pCi/g			0.01	1
Thallium-208	0.172			0.08890		0.0569		0.0674	pCi/g			0.64	1
Thorium-232	0.181	U		0.1778	U	0.228		0.364	pCi/g			0.01	1
Thorium-234	-0.649	U		1.315	F	0.740		1.02	pCi/g			1.04	1
Uranium-235	-0.260	U		0.1145	U	0.243		1.18	pCi/g			0.36	1
Uranium-238	-0.649	U		1.315	F	0.740		1.02	pCi/g			1.04	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-380642/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385818 — **Prep Batch: 380642**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	-0.07154	U	0.0708	0.0710	1.00	0.133	pCi/g	08/06/18 10:00	08/28/18 19:55	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.8*		*30 - 110*	*08/06/18 10:00*	*08/28/18 19:55*	*1*

Lab Sample ID: LCS 160-380642/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385819 — **Prep Batch: 380642**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.20		2.49	1.00	0.225	pCi/g	103	81 - 118		

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-380642/2-A
Matrix: Solid
Analysis Batch: 385819

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380642

Tracer	LCS %Yield	LCS Qualifier	Limits
Thorium-229	97.7		30 - 110

Lab Sample ID: 160-29881-1 DU
Matrix: Solid
Analysis Batch: 385821

Client Sample ID: CRC-B9-0406
Prep Type: Total/NA
Prep Batch: 380642

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-230	1.00			0.9443		0.211	1.00	0.125	pCi/g			0.13	1

Tracer	DU %Yield	DU Qualifier	Limits
Thorium-229	94.1		30 - 110

Lab Sample ID: MB 160-380676/1-A
Matrix: Solid
Analysis Batch: 385810

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380676

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	-0.05776	U	0.0737	0.0739	1.00	0.133	pCi/g	08/06/18 14:11	08/28/18 02:46	1

Tracer	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	90.2		30 - 110	08/06/18 14:11	08/28/18 02:46	1

Lab Sample ID: LCS 160-380676/2-A
Matrix: Solid
Analysis Batch: 385813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380676

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	24.76		2.45	1.00	0.181	pCi/g	101	81 - 118		

Tracer	LCS %Yield	LCS Qualifier	Limits
Thorium-229	81.9		30 - 110

Lab Sample ID: 160-29881-27 DU
Matrix: Solid
Analysis Batch: 385816

Client Sample ID: CRC-B4-2628
Prep Type: Total/NA
Prep Batch: 380676

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-230	0.429			0.5453		0.165	1.00	0.119	pCi/g			0.37	1

Tracer	DU %Yield	DU Qualifier	Limits
Thorium-229	81.3		30 - 110

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-382139/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385835 — **Prep Batch: 382139**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	-0.02372	U	0.0762	0.0762	1.00	0.121	pCi/g	08/14/18 13:41	08/28/18 02:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*98.2*		*30 - 110*	*08/14/18 13:41*	*08/28/18 02:47*	*1*

Lab Sample ID: LCS 160-382139/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385836 — **Prep Batch: 382139**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.26		2.31	1.00	0.192	pCi/g	95	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*84.9*		*30 - 110*

Lab Sample ID: 160-29881-18 DU — **Client Sample ID: CRC-BK1-0203**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385838 — **Prep Batch: 382139**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-230	1.03			0.8286		0.210	1.00	0.134	pCi/g			0.45	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*73.3*		*30 - 110*

Lab Sample ID: MB 160-386101/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 386524 — **Prep Batch: 386101**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	7.603	G	4.68	4.72	1.00	4.94	pCi/g	08/29/18 11:36	08/31/18 02:42	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.1*		*30 - 110*	*08/29/18 11:36*	*08/31/18 02:42*	*1*

Lab Sample ID: LCS 160-386101/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 386568 — **Prep Batch: 386101**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	27.20		2.66	1.00	0.229	pCi/g	111	81 - 118		

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-386101/2-A
Matrix: Solid
Analysis Batch: 386568

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 386101

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*89.5*		*30 - 110*

Lab Sample ID: 160-29881-32 DU
Matrix: Solid
Analysis Batch: 386586

Client Sample ID: CRC-B17-0406
Prep Type: Total/NA
Prep Batch: 386101

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-230	361	G		373.6	G	43.6	1.00	4.46	pCi/g			0.15	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*93.9*		*30 - 110*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-380661/1-A
Matrix: Solid
Analysis Batch: 385895

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380661

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.01237	U	0.0240	0.0241	1.00	0.0462	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-235	0.01026	U	0.0205	0.0205	1.00	0.0308	pCi/g	08/06/18 12:14	08/28/18 03:26	1
Uranium-238	0.01440	U	0.0236	0.0237	1.00	0.0398	pCi/g	08/06/18 12:14	08/28/18 03:26	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*108*		*30 - 110*	*08/06/18 12:14*	*08/28/18 03:26*	*1*

Lab Sample ID: LCS 160-380661/2-A
Matrix: Solid
Analysis Batch: 385896

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380661

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-234			6.37	6.809		0.767	1.00	0.0594	pCi/g	107	84 - 120		
Uranium-238			6.51	6.472		0.737	1.00	0.0537	pCi/g	99	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*90.6*		*30 - 110*

Lab Sample ID: 160-29881-1 DU
Matrix: Solid
Analysis Batch: 385898

Client Sample ID: CRC-B9-0406
Prep Type: Total/NA
Prep Batch: 380661

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-234	0.523			0.5673		0.143	1.00	0.0388	pCi/g			0.16	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-29881-1 DU — **Client Sample ID: CRC-B9-0406**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385898 — **Prep Batch: 380661**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-235	0.0653			0.03243	U	0.0409	1.00	0.0617	pCi/g			0.35	1
Uranium-238	0.565			0.4761		0.130	1.00	0.0448	pCi/g			0.32	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*100*		*30 - 110*

Lab Sample ID: MB 160-380693/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385871 — **Prep Batch: 380693**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	-0.002202	U	0.0202	0.0202	1.00	0.0627	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-235	0.0000	U	0.00548	0.00548	1.00	0.0329	pCi/g	08/06/18 15:28	08/28/18 03:30	1
Uranium-238	0.03297	U	0.0354	0.0355	1.00	0.0425	pCi/g	08/06/18 15:28	08/28/18 03:30	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.0*		*30 - 110*	*08/06/18 15:28*	*08/28/18 03:30*	*1*

Lab Sample ID: LCS 160-380693/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385873 — **Prep Batch: 380693**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-234			6.37	6.822		0.766	1.00	0.0585	pCi/g	107	84 - 120		
Uranium-238			6.51	6.984		0.780	1.00	0.0457	pCi/g	107	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*79.8*		*30 - 110*

Lab Sample ID: 160-29881-27 DU — **Client Sample ID: CRC-B4-2628**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 385875 — **Prep Batch: 380693**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-234	0.389			0.3668		0.123	1.00	0.0534	pCi/g			0.09	1
Uranium-235	0.0421			0.03557	U	0.0412	1.00	0.0356	pCi/g			0.08	1
Uranium-238	0.454			0.5824		0.158	1.00	0.0588	pCi/g			0.45	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*84.6*		*30 - 110*

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

General Chemistry

Analysis Batch: 379546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-1	CRC-B9-0406	Total/NA	Solid	Moisture	
160-29881-2	CRC-B6-0204	Total/NA	Solid	Moisture	
160-29881-3	CRC-B1-0406	Total/NA	Solid	Moisture	
160-29881-4	CRC-B7-0204	Total/NA	Solid	Moisture	
160-29881-5	CRC-B22-0506	Total/NA	Solid	Moisture	
160-29881-6	CRC-B7-0406	Total/NA	Solid	Moisture	
160-29881-7	CRC-B4-0608	Total/NA	Solid	Moisture	
160-29881-8	CRC-B14-0204	Total/NA	Solid	Moisture	
160-29881-9	CRC-B17-0204	Total/NA	Solid	Moisture	
160-29881-10	CRC-B5-0204	Total/NA	Solid	Moisture	
160-29881-11	CRC-B5-0608	Total/NA	Solid	Moisture	
160-29881-12	CRC-B11-0204	Total/NA	Solid	Moisture	
160-29881-13	CRC-B4-1012	Total/NA	Solid	Moisture	
160-29881-14	CRC-B4-1820	Total/NA	Solid	Moisture	
160-29881-15	CRC-B12-0002	Total/NA	Solid	Moisture	
160-29881-16	CRC-B12-0406	Total/NA	Solid	Moisture	
160-29881-17	CRC-B12-1214	Total/NA	Solid	Moisture	
160-29881-18	CRC-BK1-0203	Total/NA	Solid	Moisture	
160-29881-19	CRC-BK2-0102	Total/NA	Solid	Moisture	
160-29881-20	CRC-BK2-0304	Total/NA	Solid	Moisture	
160-29881-21	CRC-BK4-0102	Total/NA	Solid	Moisture	
160-29881-22	CRC-BK6-0002	Total/NA	Solid	Moisture	
160-29881-23	CRC-BK6-0406	Total/NA	Solid	Moisture	
160-29881-24	CRC-BK7-0405	Total/NA	Solid	Moisture	
160-29881-25	CRC-BK9-0506	Total/NA	Solid	Moisture	
160-29881-26	CRC-BK8-0102	Total/NA	Solid	Moisture	
160-29881-27	CRC-B4-2628	Total/NA	Solid	Moisture	
160-29881-28	CRC-B14-0608	Total/NA	Solid	Moisture	
160-29881-29	CRC-B14-1012	Total/NA	Solid	Moisture	
160-29881-30	CRC-B14-1618	Total/NA	Solid	Moisture	
160-29881-31	CRC-B14-2426	Total/NA	Solid	Moisture	
160-29881-32	CRC-B17-0406	Total/NA	Solid	Moisture	
160-29881-33	CRC-B17-0810	Total/NA	Solid	Moisture	
160-29881-34	CRC-B17-1820	Total/NA	Solid	Moisture	
160-29881-35	CRC-B17-2628	Total/NA	Solid	Moisture	
160-29881-36	CRC-B5-1214	Total/NA	Solid	Moisture	
160-29881-37	CRC-B5-1618	Total/NA	Solid	Moisture	
160-29881-38	CRC-B5-2224	Total/NA	Solid	Moisture	
160-29881-39	CRC-B5-2830	Total/NA	Solid	Moisture	
160-29881-40	CRC-B11-1214	Total/NA	Solid	Moisture	
160-29881-41	CRC-B11-2022	Total/NA	Solid	Moisture	
160-29881-42	CRC-B11-2628	Total/NA	Solid	Moisture	
160-29881-1 DU	CRC-B9-0406	Total/NA	Solid	Moisture	
160-29881-42 DU	CRC-B11-2628	Total/NA	Solid	Moisture	

Rad

Leach Batch: 379577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-1	CRC-B9-0406	Total/NA	Solid	Dry and Grind	

Rad (Continued)

Leach Batch: 379577 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-2	CRC-B6-0204	Total/NA	Solid	Dry and Grind	
160-29881-3	CRC-B1-0406	Total/NA	Solid	Dry and Grind	
160-29881-4	CRC-B7-0204	Total/NA	Solid	Dry and Grind	
160-29881-5	CRC-B22-0506	Total/NA	Solid	Dry and Grind	
160-29881-6	CRC-B7-0406	Total/NA	Solid	Dry and Grind	
160-29881-7	CRC-B4-0608	Total/NA	Solid	Dry and Grind	
160-29881-8	CRC-B14-0204	Total/NA	Solid	Dry and Grind	
160-29881-9	CRC-B17-0204	Total/NA	Solid	Dry and Grind	
160-29881-10	CRC-B5-0204	Total/NA	Solid	Dry and Grind	
160-29881-11	CRC-B5-0608	Total/NA	Solid	Dry and Grind	
160-29881-12	CRC-B11-0204	Total/NA	Solid	Dry and Grind	
160-29881-13	CRC-B4-1012	Total/NA	Solid	Dry and Grind	
160-29881-14	CRC-B4-1820	Total/NA	Solid	Dry and Grind	
160-29881-15	CRC-B12-0002	Total/NA	Solid	Dry and Grind	
160-29881-16	CRC-B12-0406	Total/NA	Solid	Dry and Grind	
160-29881-17	CRC-B12-1214	Total/NA	Solid	Dry and Grind	
160-29881-18	CRC-BK1-0203	Total/NA	Solid	Dry and Grind	
160-29881-19	CRC-BK2-0102	Total/NA	Solid	Dry and Grind	
160-29881-20	CRC-BK2-0304	Total/NA	Solid	Dry and Grind	
160-29881-21	CRC-BK4-0102	Total/NA	Solid	Dry and Grind	
160-29881-22	CRC-BK6-0002	Total/NA	Solid	Dry and Grind	
160-29881-23	CRC-BK6-0406	Total/NA	Solid	Dry and Grind	
160-29881-24	CRC-BK7-0405	Total/NA	Solid	Dry and Grind	
160-29881-25	CRC-BK9-0506	Total/NA	Solid	Dry and Grind	
160-29881-26	CRC-BK8-0102	Total/NA	Solid	Dry and Grind	
160-29881-27	CRC-B4-2628	Total/NA	Solid	Dry and Grind	
160-29881-28	CRC-B14-0608	Total/NA	Solid	Dry and Grind	
160-29881-29	CRC-B14-1012	Total/NA	Solid	Dry and Grind	
160-29881-30	CRC-B14-1618	Total/NA	Solid	Dry and Grind	
160-29881-31	CRC-B14-2426	Total/NA	Solid	Dry and Grind	
160-29881-32	CRC-B17-0406	Total/NA	Solid	Dry and Grind	
160-29881-33	CRC-B17-0810	Total/NA	Solid	Dry and Grind	
160-29881-34	CRC-B17-1820	Total/NA	Solid	Dry and Grind	
160-29881-35	CRC-B17-2628	Total/NA	Solid	Dry and Grind	
160-29881-36	CRC-B5-1214	Total/NA	Solid	Dry and Grind	
160-29881-37	CRC-B5-1618	Total/NA	Solid	Dry and Grind	
160-29881-38	CRC-B5-2224	Total/NA	Solid	Dry and Grind	
160-29881-39	CRC-B5-2830	Total/NA	Solid	Dry and Grind	
160-29881-40	CRC-B11-1214	Total/NA	Solid	Dry and Grind	
160-29881-41	CRC-B11-2022	Total/NA	Solid	Dry and Grind	
160-29881-42	CRC-B11-2628	Total/NA	Solid	Dry and Grind	
160-29881-1 DU	CRC-B9-0406	Total/NA	Solid	Dry and Grind	
160-29881-18 DU	CRC-BK1-0203	Total/NA	Solid	Dry and Grind	
160-29881-27 DU	CRC-B4-2628	Total/NA	Solid	Dry and Grind	
160-29881-32 DU	CRC-B17-0406	Total/NA	Solid	Dry and Grind	
160-29881-37 DU	CRC-B5-1618	Total/NA	Solid	Dry and Grind	

Prep Batch: 379951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-1	CRC-B9-0406	Total/NA	Solid	Fill_Geo-21	379577
160-29881-4	CRC-B7-0204	Total/NA	Solid	Fill_Geo-21	379577

Rad (Continued)

Prep Batch: 379951 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-8	CRC-B14-0204	Total/NA	Solid	Fill_Geo-21	379577
160-29881-9	CRC-B17-0204	Total/NA	Solid	Fill_Geo-21	379577
160-29881-12	CRC-B11-0204	Total/NA	Solid	Fill_Geo-21	379577
160-29881-13	CRC-B4-1012	Total/NA	Solid	Fill_Geo-21	379577
160-29881-14	CRC-B4-1820	Total/NA	Solid	Fill_Geo-21	379577
160-29881-15	CRC-B12-0002	Total/NA	Solid	Fill_Geo-21	379577
160-29881-16	CRC-B12-0406	Total/NA	Solid	Fill_Geo-21	379577
160-29881-17	CRC-B12-1214	Total/NA	Solid	Fill_Geo-21	379577
160-29881-27	CRC-B4-2628	Total/NA	Solid	Fill_Geo-21	379577
160-29881-28	CRC-B14-0608	Total/NA	Solid	Fill_Geo-21	379577
160-29881-29	CRC-B14-1012	Total/NA	Solid	Fill_Geo-21	379577
160-29881-30	CRC-B14-1618	Total/NA	Solid	Fill_Geo-21	379577
160-29881-31	CRC-B14-2426	Total/NA	Solid	Fill_Geo-21	379577
160-29881-32	CRC-B17-0406	Total/NA	Solid	Fill_Geo-21	379577
160-29881-33	CRC-B17-0810	Total/NA	Solid	Fill_Geo-21	379577
160-29881-34	CRC-B17-1820	Total/NA	Solid	Fill_Geo-21	379577
160-29881-35	CRC-B17-2628	Total/NA	Solid	Fill_Geo-21	379577
160-29881-36	CRC-B5-1214	Total/NA	Solid	Fill_Geo-21	379577
MB 160-379951/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-379951/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-29881-1 DU	CRC-B9-0406	Total/NA	Solid	Fill_Geo-21	379577

Prep Batch: 379959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-37	CRC-B5-1618	Total/NA	Solid	Fill_Geo-21	379577
160-29881-38	CRC-B5-2224	Total/NA	Solid	Fill_Geo-21	379577
160-29881-39	CRC-B5-2830	Total/NA	Solid	Fill_Geo-21	379577
160-29881-40	CRC-B11-1214	Total/NA	Solid	Fill_Geo-21	379577
160-29881-41	CRC-B11-2022	Total/NA	Solid	Fill_Geo-21	379577
160-29881-42	CRC-B11-2628	Total/NA	Solid	Fill_Geo-21	379577
MB 160-379959/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-379959/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-29881-37 DU	CRC-B5-1618	Total/NA	Solid	Fill_Geo-21	379577

Prep Batch: 380642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-1	CRC-B9-0406	Total/NA	Solid	ExtChrom	379577
160-29881-2	CRC-B6-0204	Total/NA	Solid	ExtChrom	379577
160-29881-3	CRC-B1-0406	Total/NA	Solid	ExtChrom	379577
160-29881-4	CRC-B7-0204	Total/NA	Solid	ExtChrom	379577
160-29881-5	CRC-B22-0506	Total/NA	Solid	ExtChrom	379577
160-29881-6	CRC-B7-0406	Total/NA	Solid	ExtChrom	379577
160-29881-7	CRC-B4-0608	Total/NA	Solid	ExtChrom	379577
160-29881-8	CRC-B14-0204	Total/NA	Solid	ExtChrom	379577
160-29881-9	CRC-B17-0204	Total/NA	Solid	ExtChrom	379577
160-29881-10	CRC-B5-0204	Total/NA	Solid	ExtChrom	379577
160-29881-11	CRC-B5-0608	Total/NA	Solid	ExtChrom	379577
160-29881-12	CRC-B11-0204	Total/NA	Solid	ExtChrom	379577
160-29881-13	CRC-B4-1012	Total/NA	Solid	ExtChrom	379577
160-29881-14	CRC-B4-1820	Total/NA	Solid	ExtChrom	379577
160-29881-15	CRC-B12-0002	Total/NA	Solid	ExtChrom	379577

Rad (Continued)

Prep Batch: 380642 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-16	CRC-B12-0406	Total/NA	Solid	ExtChrom	379577
160-29881-17	CRC-B12-1214	Total/NA	Solid	ExtChrom	379577
MB 160-380642/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-380642/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-1 DU	CRC-B9-0406	Total/NA	Solid	ExtChrom	379577

Prep Batch: 380661

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-1	CRC-B9-0406	Total/NA	Solid	ExtChrom	379577
160-29881-2	CRC-B6-0204	Total/NA	Solid	ExtChrom	379577
160-29881-3	CRC-B1-0406	Total/NA	Solid	ExtChrom	379577
160-29881-4	CRC-B7-0204	Total/NA	Solid	ExtChrom	379577
160-29881-5	CRC-B22-0506	Total/NA	Solid	ExtChrom	379577
160-29881-6	CRC-B7-0406	Total/NA	Solid	ExtChrom	379577
160-29881-7	CRC-B4-0608	Total/NA	Solid	ExtChrom	379577
160-29881-8	CRC-B14-0204	Total/NA	Solid	ExtChrom	379577
160-29881-9	CRC-B17-0204	Total/NA	Solid	ExtChrom	379577
160-29881-10	CRC-B5-0204	Total/NA	Solid	ExtChrom	379577
160-29881-11	CRC-B5-0608	Total/NA	Solid	ExtChrom	379577
160-29881-12	CRC-B11-0204	Total/NA	Solid	ExtChrom	379577
160-29881-13	CRC-B4-1012	Total/NA	Solid	ExtChrom	379577
160-29881-14	CRC-B4-1820	Total/NA	Solid	ExtChrom	379577
160-29881-15	CRC-B12-0002	Total/NA	Solid	ExtChrom	379577
160-29881-16	CRC-B12-0406	Total/NA	Solid	ExtChrom	379577
160-29881-17	CRC-B12-1214	Total/NA	Solid	ExtChrom	379577
MB 160-380661/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-380661/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-1 DU	CRC-B9-0406	Total/NA	Solid	ExtChrom	379577

Prep Batch: 380676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-27	CRC-B4-2628	Total/NA	Solid	ExtChrom	379577
160-29881-28	CRC-B14-0608	Total/NA	Solid	ExtChrom	379577
160-29881-29	CRC-B14-1012	Total/NA	Solid	ExtChrom	379577
160-29881-30	CRC-B14-1618	Total/NA	Solid	ExtChrom	379577
160-29881-31	CRC-B14-2426	Total/NA	Solid	ExtChrom	379577
160-29881-33	CRC-B17-0810	Total/NA	Solid	ExtChrom	379577
160-29881-34	CRC-B17-1820	Total/NA	Solid	ExtChrom	379577
160-29881-35	CRC-B17-2628	Total/NA	Solid	ExtChrom	379577
160-29881-36	CRC-B5-1214	Total/NA	Solid	ExtChrom	379577
160-29881-37	CRC-B5-1618	Total/NA	Solid	ExtChrom	379577
160-29881-38	CRC-B5-2224	Total/NA	Solid	ExtChrom	379577
160-29881-39	CRC-B5-2830	Total/NA	Solid	ExtChrom	379577
160-29881-40	CRC-B11-1214	Total/NA	Solid	ExtChrom	379577
160-29881-41	CRC-B11-2022	Total/NA	Solid	ExtChrom	379577
160-29881-42	CRC-B11-2628	Total/NA	Solid	ExtChrom	379577
MB 160-380676/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-380676/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-27 DU	CRC-B4-2628	Total/NA	Solid	ExtChrom	379577

Rad (Continued)

Prep Batch: 380693

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-27	CRC-B4-2628	Total/NA	Solid	ExtChrom	379577
160-29881-28	CRC-B14-0608	Total/NA	Solid	ExtChrom	379577
160-29881-29	CRC-B14-1012	Total/NA	Solid	ExtChrom	379577
160-29881-30	CRC-B14-1618	Total/NA	Solid	ExtChrom	379577
160-29881-31	CRC-B14-2426	Total/NA	Solid	ExtChrom	379577
160-29881-32	CRC-B17-0406	Total/NA	Solid	ExtChrom	379577
160-29881-33	CRC-B17-0810	Total/NA	Solid	ExtChrom	379577
160-29881-34	CRC-B17-1820	Total/NA	Solid	ExtChrom	379577
160-29881-35	CRC-B17-2628	Total/NA	Solid	ExtChrom	379577
160-29881-36	CRC-B5-1214	Total/NA	Solid	ExtChrom	379577
160-29881-37	CRC-B5-1618	Total/NA	Solid	ExtChrom	379577
160-29881-38	CRC-B5-2224	Total/NA	Solid	ExtChrom	379577
160-29881-39	CRC-B5-2830	Total/NA	Solid	ExtChrom	379577
160-29881-40	CRC-B11-1214	Total/NA	Solid	ExtChrom	379577
160-29881-41	CRC-B11-2022	Total/NA	Solid	ExtChrom	379577
160-29881-42	CRC-B11-2628	Total/NA	Solid	ExtChrom	379577
MB 160-380693/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-380693/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-27 DU	CRC-B4-2628	Total/NA	Solid	ExtChrom	379577

Prep Batch: 382139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-18	CRC-BK1-0203	Total/NA	Solid	ExtChrom	379577
160-29881-19	CRC-BK2-0102	Total/NA	Solid	ExtChrom	379577
160-29881-20	CRC-BK2-0304	Total/NA	Solid	ExtChrom	379577
160-29881-21	CRC-BK4-0102	Total/NA	Solid	ExtChrom	379577
160-29881-22	CRC-BK6-0002	Total/NA	Solid	ExtChrom	379577
160-29881-23	CRC-BK6-0406	Total/NA	Solid	ExtChrom	379577
160-29881-24	CRC-BK7-0405	Total/NA	Solid	ExtChrom	379577
160-29881-25	CRC-BK9-0506	Total/NA	Solid	ExtChrom	379577
160-29881-26	CRC-BK8-0102	Total/NA	Solid	ExtChrom	379577
MB 160-382139/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-382139/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-18 DU	CRC-BK1-0203	Total/NA	Solid	ExtChrom	379577

Prep Batch: 386101

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-29881-32	CRC-B17-0406	Total/NA	Solid	ExtChrom	379577
MB 160-386101/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-386101/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
160-29881-32 DU	CRC-B17-0406	Total/NA	Solid	ExtChrom	379577

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B9-0406 — Lab Sample ID: 160-29881-1

Date Collected: 07/12/18 07:50
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384697	08/23/18 11:46	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385897	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385820	08/28/18 19:55	ALS	TAL SL

Client Sample ID: CRC-B6-0204 — Lab Sample ID: 160-29881-2

Date Collected: 07/11/18 16:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385899	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385822	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B1-0406 — Lab Sample ID: 160-29881-3

Date Collected: 07/10/18 10:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385900	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385824	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B7-0204 — Lab Sample ID: 160-29881-4

Date Collected: 07/11/18 11:45
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL

Client Sample ID: CRC-B7-0204 — Lab Sample ID: 160-29881-4

Date Collected: 07/11/18 11:45 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384704	08/23/18 06:28	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385885	08/28/18 18:13	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385825	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B22-0506 — Lab Sample ID: 160-29881-5

Date Collected: 07/12/18 12:00 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385908	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385826	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B7-0406 — Lab Sample ID: 160-29881-6

Date Collected: 07/11/18 15:25 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385910	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385828	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B4-0608 — Lab Sample ID: 160-29881-7

Date Collected: 07/26/18 11:00 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL

Client Sample ID: CRC-B4-0608 — Lab Sample ID: 160-29881-7

Date Collected: 07/26/18 11:00 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	A-01-R		1	385912	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385830	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B14-0204 — Lab Sample ID: 160-29881-8

Date Collected: 07/27/18 12:10 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384702	08/23/18 06:28	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385913	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385831	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B17-0204 — Lab Sample ID: 160-29881-9

Date Collected: 07/27/18 16:15 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384705	08/23/18 06:28	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385914	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385832	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B5-0204 — Lab Sample ID: 160-29881-10

Date Collected: 07/30/18 11:35 — **Matrix: Solid**
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-0204
Lab Sample ID: 160-29881-10
Date Collected: 07/30/18 11:35
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385915	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385833	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B5-0608
Lab Sample ID: 160-29881-11
Date Collected: 07/30/18 11:40
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385916	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385834	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B11-0204
Lab Sample ID: 160-29881-12
Date Collected: 07/30/18 14:10
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384699	08/23/18 06:29	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385917	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385835	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B4-1012
Lab Sample ID: 160-29881-13
Date Collected: 07/26/18 11:10
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B4-1012

Lab Sample ID: 160-29881-13
Date Collected: 07/26/18 11:10
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	901.1		1	384698	08/23/18 06:31	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385918	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385836	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B4-1820

Lab Sample ID: 160-29881-14
Date Collected: 07/26/18 11:20
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384697	08/23/18 06:32	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385919	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385837	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B12-0002

Lab Sample ID: 160-29881-15
Date Collected: 07/26/18 12:10
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384701	08/23/18 07:09	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385920	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385838	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B12-0406 — Lab Sample ID: 160-29881-16

Date Collected: 07/26/18 12:20
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384703	08/23/18 07:09	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385922	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385840	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-B12-1214 — Lab Sample ID: 160-29881-17

Date Collected: 07/26/18 12:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384704	08/23/18 07:10	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380661	08/06/18 12:14	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385923	08/28/18 03:26	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380642	08/06/18 10:00	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385841	08/28/18 19:56	ALS	TAL SL

Client Sample ID: CRC-BK1-0203 — Lab Sample ID: 160-29881-18

Date Collected: 07/26/18 13:10
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385837	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK2-0102 — Lab Sample ID: 160-29881-19

Date Collected: 07/26/18 13:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL

Client Sample ID: CRC-BK2-0102 — Lab Sample ID: 160-29881-19

Date Collected: 07/26/18 13:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385840	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK2-0304 — Lab Sample ID: 160-29881-20

Date Collected: 07/26/18 13:35
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385839	08/28/18 19:45	ALS	TAL SL

Client Sample ID: CRC-BK4-0102 — Lab Sample ID: 160-29881-21

Date Collected: 07/26/18 14:00
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385842	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK6-0002 — Lab Sample ID: 160-29881-22

Date Collected: 07/26/18 14:35
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385843	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK6-0406 — Lab Sample ID: 160-29881-23

Date Collected: 07/26/18 14:40
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385845	08/28/18 02:47	ALS	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-BK7-0405 — Lab Sample ID: 160-29881-24

Date Collected: 07/26/18 15:10
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385846	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK9-0506 — Lab Sample ID: 160-29881-25

Date Collected: 07/26/18 15:45
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385847	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-BK8-0102 — Lab Sample ID: 160-29881-26

Date Collected: 07/26/18 16:00
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			382139	08/14/18 13:41	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385850	08/28/18 02:47	ALS	TAL SL

Client Sample ID: CRC-B4-2628 — Lab Sample ID: 160-29881-27

Date Collected: 07/27/18 09:20
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384702	08/23/18 07:11	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385814	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385874	08/28/18 03:30	ALS	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B14-0608

Lab Sample ID: 160-29881-28
Date Collected: 07/27/18 12:15
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384705	08/23/18 07:09	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385817	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385876	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B14-1012

Lab Sample ID: 160-29881-29
Date Collected: 07/27/18 12:20
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384699	08/23/18 07:10	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385818	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385877	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B14-1618

Lab Sample ID: 160-29881-30
Date Collected: 07/27/18 12:25
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384698	08/23/18 07:12	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385819	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385879	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B14-2426 — Lab Sample ID: 160-29881-31

Date Collected: 07/27/18 12:30
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384697	08/23/18 07:14	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385820	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385880	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B17-0406 — Lab Sample ID: 160-29881-32

Date Collected: 07/27/18 16:20
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384700	08/23/18 07:43	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385881	08/28/18 03:30	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			386101	08/29/18 11:36	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	386569	08/31/18 02:42	ALS	TAL SL

Client Sample ID: CRC-B17-0810 — Lab Sample ID: 160-29881-33

Date Collected: 07/27/18 16:25
Date Received: 07/31/18 09:10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384701	08/23/18 07:44	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385822	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385882	08/28/18 03:30	ALS	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B17-1820

Lab Sample ID: 160-29881-34
Date Collected: 07/27/18 16:30
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384703	08/23/18 07:43	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385824	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385885	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B17-2628

Lab Sample ID: 160-29881-35
Date Collected: 07/30/18 08:45
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384704	08/23/18 07:45	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385825	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385886	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B5-1214

Lab Sample ID: 160-29881-36
Date Collected: 07/30/18 11:45
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379951	08/02/18 13:36	EAW	TAL SL
Total/NA	Analysis	901.1		1	384702	08/23/18 07:47	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385826	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385887	08/28/18 03:30	ALS	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B5-1618

Lab Sample ID: 160-29881-37
Date Collected: 07/30/18 11:50
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384705	08/23/18 18:46	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385828	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385888	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B5-2224

Lab Sample ID: 160-29881-38
Date Collected: 07/30/18 11:55
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384698	08/23/18 07:52	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385830	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385890	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B5-2830

Lab Sample ID: 160-29881-39
Date Collected: 07/30/18 12:00
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384701	08/23/18 08:47	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385831	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385891	08/28/18 03:30	ALS	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Client Sample ID: CRC-B11-1214

Lab Sample ID: 160-29881-40
Date Collected: 07/30/18 14:20
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384704	08/23/18 08:41	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385832	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385892	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B11-2022

Lab Sample ID: 160-29881-41
Date Collected: 07/30/18 14:35
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384702	08/23/18 08:44	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385833	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385893	08/28/18 03:30	ALS	TAL SL

Client Sample ID: CRC-B11-2628

Lab Sample ID: 160-29881-42
Date Collected: 07/30/18 14:50
Matrix: Solid
Date Received: 07/31/18 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	379546	07/31/18 22:47	SDB	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			379959	08/02/18 14:22	EAW	TAL SL
Total/NA	Analysis	901.1		1	384705	08/23/18 08:41	KLS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380676	08/06/18 14:11	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385834	08/28/18 02:46	ALS	TAL SL
Total/NA	Leach	Dry and Grind			379577	08/01/18 10:33	DRO	TAL SL
Total/NA	Prep	ExtChrom			380693	08/06/18 15:28	TAT	TAL SL
Total/NA	Analysis	A-01-R		1	385882	08/28/18 18:11	ALS	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 160-29881-1
Project/Site: Former Carnotite Site - Non-Rad Analysis

Laboratory: TestAmerica St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Louisiana	NELAP	6	04080	06-30-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
901.1	Fill_Geo-21	Solid	Actinium-227
901.1	Fill_Geo-21	Solid	Actinium-228
901.1	Fill_Geo-21	Solid	Bismuth-212
901.1	Fill_Geo-21	Solid	Bismuth-214
901.1	Fill_Geo-21	Solid	Lead-210
901.1	Fill_Geo-21	Solid	Lead-212
901.1	Fill_Geo-21	Solid	Lead-214
901.1	Fill_Geo-21	Solid	Potassium-40
901.1	Fill_Geo-21	Solid	Protactinium-231
901.1	Fill_Geo-21	Solid	Radium-226
901.1	Fill_Geo-21	Solid	Radium-228
901.1	Fill_Geo-21	Solid	Thallium-208
901.1	Fill_Geo-21	Solid	Thorium-232
901.1	Fill_Geo-21	Solid	Thorium-234
901.1	Fill_Geo-21	Solid	Uranium-235
901.1	Fill_Geo-21	Solid	Uranium-238
A-01-R	ExtChrom	Solid	Uranium-235
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Method	Method Description	Protocol	Laboratory
Moisture	Percent Moisture	EPA	TAL SL
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Former Carnotite Site - Non-Rad Analysis

TestAmerica Job ID: 160-29881-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-29881-1	CRC-B9-0406	Solid	07/12/18 07:50	07/31/18 09:10
160-29881-2	CRC-B6-0204	Solid	07/11/18 16:30	07/31/18 09:10
160-29881-3	CRC-B1-0406	Solid	07/10/18 10:30	07/31/18 09:10
160-29881-4	CRC-B7-0204	Solid	07/11/18 11:45	07/31/18 09:10
160-29881-5	CRC-B22-0506	Solid	07/12/18 12:00	07/31/18 09:10
160-29881-6	CRC-B7-0406	Solid	07/11/18 15:25	07/31/18 09:10
160-29881-7	CRC-B4-0608	Solid	07/26/18 11:00	07/31/18 09:10
160-29881-8	CRC-B14-0204	Solid	07/27/18 12:10	07/31/18 09:10
160-29881-9	CRC-B17-0204	Solid	07/27/18 16:15	07/31/18 09:10
160-29881-10	CRC-B5-0204	Solid	07/30/18 11:35	07/31/18 09:10
160-29881-11	CRC-B5-0608	Solid	07/30/18 11:40	07/31/18 09:10
160-29881-12	CRC-B11-0204	Solid	07/30/18 14:10	07/31/18 09:10
160-29881-13	CRC-B4-1012	Solid	07/26/18 11:10	07/31/18 09:10
160-29881-14	CRC-B4-1820	Solid	07/26/18 11:20	07/31/18 09:10
160-29881-15	CRC-B12-0002	Solid	07/26/18 12:10	07/31/18 09:10
160-29881-16	CRC-B12-0406	Solid	07/26/18 12:20	07/31/18 09:10
160-29881-17	CRC-B12-1214	Solid	07/26/18 12:30	07/31/18 09:10
160-29881-18	CRC-BK1-0203	Solid	07/26/18 13:10	07/31/18 09:10
160-29881-19	CRC-BK2-0102	Solid	07/26/18 13:30	07/31/18 09:10
160-29881-20	CRC-BK2-0304	Solid	07/26/18 13:35	07/31/18 09:10
160-29881-21	CRC-BK4-0102	Solid	07/26/18 14:00	07/31/18 09:10
160-29881-22	CRC-BK6-0002	Solid	07/26/18 14:35	07/31/18 09:10
160-29881-23	CRC-BK6-0406	Solid	07/26/18 14:40	07/31/18 09:10
160-29881-24	CRC-BK7-0405	Solid	07/26/18 15:10	07/31/18 09:10
160-29881-25	CRC-BK9-0506	Solid	07/26/18 15:45	07/31/18 09:10
160-29881-26	CRC-BK8-0102	Solid	07/26/18 16:00	07/31/18 09:10
160-29881-27	CRC-B4-2628	Solid	07/27/18 09:20	07/31/18 09:10
160-29881-28	CRC-B14-0608	Solid	07/27/18 12:15	07/31/18 09:10
160-29881-29	CRC-B14-1012	Solid	07/27/18 12:20	07/31/18 09:10
160-29881-30	CRC-B14-1618	Solid	07/27/18 12:25	07/31/18 09:10
160-29881-31	CRC-B14-2426	Solid	07/27/18 12:30	07/31/18 09:10
160-29881-32	CRC-B17-0406	Solid	07/27/18 16:20	07/31/18 09:10
160-29881-33	CRC-B17-0810	Solid	07/27/18 16:25	07/31/18 09:10
160-29881-34	CRC-B17-1820	Solid	07/27/18 16:30	07/31/18 09:10
160-29881-35	CRC-B17-2628	Solid	07/30/18 08:45	07/31/18 09:10
160-29881-36	CRC-B5-1214	Solid	07/30/18 11:45	07/31/18 09:10
160-29881-37	CRC-B5-1618	Solid	07/30/18 11:50	07/31/18 09:10
160-29881-38	CRC-B5-2224	Solid	07/30/18 11:55	07/31/18 09:10
160-29881-39	CRC-B5-2830	Solid	07/30/18 12:00	07/31/18 09:10
160-29881-40	CRC-B11-1214	Solid	07/30/18 14:20	07/31/18 09:10
160-29881-41	CRC-B11-2022	Solid	07/30/18 14:35	07/31/18 09:10
160-29881-42	CRC-B11-2628	Solid	07/30/18 14:50	07/31/18 09:10

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
108001_00001	12/06/67	Eckert and Ziegler, Lot 108001			(Purchased Reagent)		Americium-241	7.286 Bq
							Pu-239	6.646 Bq
							Thorium-230	6.01 Bq
108002_00001	12/07/67	Eckert and Ziegler, Lot 108002			(Purchased Reagent)		Americium-241	8.089 Bq
							Pu-239	8.515 Bq
							Thorium-230	9.349 Bq
108345_00001	01/22/68	Eckert & Ziegler, Lot 108345			(Purchased Reagent)		Americium-241	7.916 Bq
							Pu-239	7.695 Bq
							Thorium-230	7.314 Bq
108346_00001	01/22/68	Eckert & Ziegler, Lot 108346			(Purchased Reagent)		Americium-241	8.008 Bq
							Pu-239	7.835 Bq
							Thorium-230	7.57 Bq
108347_00001	01/23/68	Eckert & Ziegler, Lot 108347			(Purchased Reagent)		Americium-241	8.643 Bq
							Pu-239	8.035 Bq
							Thorium-230	8.101 Bq
108348_00001	01/23/68	Eckert & Ziegler, Lot 108348			(Purchased Reagent)		Americium-241	7.497 Bq
							Pu-239	7.067 Bq
							Thorium-230	6.956 Bq
82232-334_00001	06/03/60	Eckert & Ziegler, Lot 82232-334			(Purchased Reagent)		Americium-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60	Eckert & Zigler, Lot 82233-334			(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60	Eckert & Zigler, Lot 82234-334			(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60	Eckert & Ziegler, Lot 82235-334			(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60	Eckert & Ziegler, Lot 82237-334			(Purchased Reagent)		Americium-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82238-334_00001	06/01/60	Eckert & Ziegler, Lot 82238-334			(Purchased Reagent)		Americium-241	5.932 Bq
							Pu-239	6.753 Bq
							Thorium-230	7.099 Bq
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Americium-241	6.638 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60	Eckert & Ziegler, Lot 82242-334			(Purchased Reagent)		Americium-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60	Eckert & Ziegler, Lot 82243-334			(Purchased Reagent)		Americium-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60	Eckert & Zigler, Lot 82244-334			(Purchased Reagent)		Americium-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60	Eckert & Ziegler, Lot 82245-334			(Purchased Reagent)		Americium-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60	Eckert & Ziegler, Lot 82246-334			(Purchased Reagent)		Americium-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Marn Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Lead-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Lead-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
Source A_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9986 Source	Gamma Ampuole_00001	0.9986 g	Americium-241	9.4429 Bq
							Cd-109	132.909 Bq
							Ce-139	4.4538 Bq
							Cesium-137	3.7296 Bq
							Co-57	2.9513 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cobalt-60	6.2002 Bq
							Hg-203	9.6996 Bq
							Sn-113	7.6266 Bq
							Y-88	12.712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Y-88	2681.34 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Th-229_00023	12/20/18	12/15/17	0.1M HNO3, Lot n/a	500 mL	Th-229_00017	15 mL	At-217	67.2296 dpm/mL
							Thorium-229	67.2296 dpm/mL
.Th-229_00017	12/20/18	08/20/14	0.1M HNO3, Lot n/a	100 mL	Th-229_00016	5.0464 g	At-217	2240.99 dpm/mL
							Thorium-229	2240.99 dpm/mL
..Th-229_00016	08/06/64		Analytics, Lot 97790		(Purchased Reagent)		At-217	740.127 Bq/g
							Thorium-229	740.127 Bq/g
Th-229_00024	12/20/18	08/01/18	0.1M HNO3, Lot n/a	250 mL	Th-229_00017	7.5 mL	At-217	67.2296 dpm/mL
							Thorium-229	67.2296 dpm/mL
.Th-229_00017	12/20/18	08/20/14	0.1M HNO3, Lot n/a	100 mL	Th-229_00016	5.0464 g	At-217	2240.99 dpm/mL
							Thorium-229	2240.99 dpm/mL
..Th-229_00016	08/06/64		Analytics, Lot 97790		(Purchased Reagent)		At-217	740.127 Bq/g
							Thorium-229	740.127 Bq/g
TRM-2_00002	03/20/50		DOE, Lot TRM-2		(Purchased Reagent)		Lead-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							Uranium-234	6.2 pCi/g
							Uranium-238	6 pCi/g
Tuna Can LCS_00006	09/29/17		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00007	09/21/18		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15		Eckert & Ziegler, Lot 81427-334		(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq
							Cobalt-60	742 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Hg-203	1208 Bq
							Lead-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Lead-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Lead-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq
U-232_00040	12/20/18	12/18/17	DI Water, Lot n/a	500 mL	U-232_00009	4 mL	Uranium-232	82.2457 dpm/mL
.U-232_00009	12/20/18	08/29/11	1M HNO3, Lot 0	100 mL	U-232_00003	5.1609 g	Uranium-232	10280.7 dpm/mL
..U-232_00003	08/25/61	Eckert & Ziegler, Lot 85539-334			(Purchased Reagent)		Uranium-232	3320.07 Bq/g
UNAT_00014	11/28/18	12/21/17	1M HNO3, Lot n/a	200 mL	UNAT Parent_00001	20 mL	Uranium-234	70.6912 dpm/mL
							Uranium-235	3.37064 dpm/mL
							Uranium-238	72.265 dpm/mL
.UNAT Parent_00001	11/28/18	05/03/13	1M HNO3, Lot n/a	200 mL	UNAT Ampoule_00001	19.2509 g	Uranium-234	706.912 dpm/mL
							Uranium-235	33.7064 dpm/mL
							Uranium-238	722.65 dpm/mL
..UNAT Ampoule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		Uranium-234	7344.2 dpm/g
							Uranium-235	350.18 dpm/g
							Uranium-238	7507.7 dpm/g

Reagent

108001_00001

Eckert & Ziegler
Analytics

1368446
ID: 108001_00001
Exp:12/06/67 Prpd:JLW Opn:01/29/18
Alpha Calibration source

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108001
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2698841, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 06-December-2017 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	6.646E+00	4950-5240	8.806E+06	1.2	1.5	3.9
Am-241	7.286E+00	5280-5600	1.580E+05	1.1	1.5	3.8
Th-230	6.010E+00	4470-4760	2.753E+07	1.2	1.5	3.9
Total Activity	1.997E+01	3000-8000		0.7	1.5	3.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

SRS Number: 108001

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 19-DEC-17

J. Lahr, Spectroscopist

Reagent

108002_00001

Eckert & Ziegler
Analytics

1368447
ID: 108002_00001
Exp:12/07/67 Prpd:JLW Opn:01/29/18
Alpha Calibration source

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108002
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2698841, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 07-December-2017 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	8.515E+00	4950-5240	8.806E+06	1.0	1.5	3.7
Am-241	8.089E+00	5280-5600	1.580E+05	1.0	1.5	3.7
Th-230	9.349E+00	4470-4760	2.753E+07	1.0	1.5	3.6
Total Activity	2.599E+01	3000-8000		0.6	1.5	3.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

SRS Number: 108002

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 19-DEC-17

J. Lahr, Spectroscopist

Reagent

108345_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108345
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2695542, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 22-January-2018 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	7.695E+00	4950-5240	8.806E+06	1.1	1.5	3.7
Am-241	7.916E+00	5280-5600	1.580E+05	1.1	1.5	3.7
Th-230	7.314E+00	4470-4760	2.753E+07	1.1	1.5	3.7
Total Activity	2.294E+01	3000-8000		0.7	1.5	3.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

SRS Number: 108345

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 29-JAN-18

J. Lahr, Spectroscopist

Reagent

108346_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108346
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2695542, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 22-January-2018 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	7.835E+00	4950-5240	8.806E+06	1.2	1.5	3.8
Am-241	8.008E+00	5280-5600	1.580E+05	1.2	1.5	3.8
Th-230	7.570E+00	4470-4760	2.753E+07	1.2	1.5	3.8
Total Activity	2.343E+01	3000-8000		0.9	1.5	3.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

SRS Number: 108346

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 29-JAN-18

J. Kahr, Spectroscopist

Reagent

108347_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108347
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2702184, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 23-January-2018 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	8.035E+00	4950-5240	8.806E+06	1.0	1.5	3.6
Am-241	8.643E+00	5280-5600	1.580E+05	1.0	1.5	3.6
Th-230	8.101E+00	4470-4760	2.753E+07	1.0	1.5	3.6
Total Activity	2.480E+01	3000-8000		0.5	1.5	3.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

SRS Number: 108347

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 29-JAN-18

J. Lahr, Spectroscopist

Reagent

108348_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 108348
Source Description: 24.1 mm Diameter x 0.77 mm Thick Stainless Steel Disk
Product Code: MIX-EAB-FOIL
Customer: TestAmerica Laboratories - St. Louis
P.O. Number: 2702184, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities (if detected) were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectrometry. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 23-January-2018 12:00 PM EST

Isotope	Activity, Bq	Energy Range, keV	Half-Life, d	Uncertainty u_A, %	u_B, %	U, %*
Pu-239	7.067E+00	4950-5240	8.806E+06	1.1	1.5	3.7
Am-241	7.497E+00	5280-5600	1.580E+05	1.1	1.5	3.7
Th-230	6.956E+00	4470-4760	2.753E+07	1.1	1.5	3.7
Total Activity	2.154E+01	3000-8000		0.7	1.5	3.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

SRS Number: 108348

Comments:

Diameter of active area: 19 mm

Mounted on customer supplied 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION:

Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Calibrated by: _____

A. Chen, Spectroscopist

QC Approved by: _____ Date: 29-JAN-18

J. Lahr, Spectroscopist

Reagent

82232-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82238-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82238-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.099E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.753E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.932E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.983E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Reagent

82241-334_00001

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Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06·24·2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

ANA Form005 Rev. —

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Marn Soil_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

MarnSolid_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty*, % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Source A_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source C_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Source H_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

83725-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 μg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MITaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13/JAN/11
J. D. McCorvey, QA Manager Alternate

Reagent

Th-229_00016

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

97790

Th-229 5 mL Liquid in Flame Sealed Vial

430569
ID: Th-229_00016
Exp:08/06/64 Prpd:SCB Opn:08/20/14
Th-229 Ampoule

Customer: TestAmerica - St. Louis
P.O. No.: 2573570, Item 1 Product Code: 8229

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.761E+03	0.5	1.5	3.1	08/06/2014

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities: Th-228 2.83E-01 Bq, Th-230 2.33E+01 Bq, Th-232 1.51E0 Bq; γ-impurities (other than decay products)<0.1%.
5.08156 g 0.5M HNO3 solution. Carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QC Approved: _____ Date: 06 AUG 14
A. Chen, Spectroscopist

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

ANA Form005 Rev. —

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

U.S. DEPARTMENT OF COMMERCE
National Institute of Standards & Technology
Gaithersburg, MD 20899

Certificate of Participation

Eckert & Ziegler Analytics
Atlanta, Georgia

is a participant for the period January 1, 2014, through December 31, 2014, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with NRMAP Incorporated. Continued participation is evidenced by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value from that measured by the National Institute of Standards and Technology. The significance of these Reports is addressed below.*

For the Director,

Michael P. Unterweger, Leader
Radioactivity Group
Physical Measurement Laboratory

*As guidance for the proper use of Reports of Traceability, it should be emphasized that the National Institute of Standards and Technology is concerned only with fostering good measurements capability and consistency with the national measurements system. The assurance of the proper application of that capability to the ultimate consumer products is the responsibility of each manufacturer of these products and of the Federal regulatory agencies.

A continuing traceability program in radioactivity demonstrates, to the degree established by the periodic assays of calibrated radioactivity samples, a continuing competence to maintain the methods and standards necessary for accurate measurement. Such a program cannot, however, endorse each and every measurement nor the final product, any more than a spot check can vouch for every unchecked item. Care should be taken, therefore, not to imply such endorsement. The proper use of this Report is governed by section 200.114 of Title 15 of the Code of Federal Regulations. These regulations may be met if Reports are quoted only in their entirety. Excerpts out of context may be misleading.

1380 Seaboard Industrial Boulevard
Atlanta, Georgia 30318 USA
Phone (404) 352-8677 • Fax (404) 352-2837
Email: analytics@ezag.com (Tax EIN: 58-1406082)

Eckert & Ziegler
Analytics

Recommended Procedure for Opening the Flame Sealed Vial

1) If the solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the standard.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood.

3) Shake the vial to wet the entire inside surface of the vial. Return the vial to the upright position.

4) Check that all of the liquid has drained out of the neck of the vial. If necessary, gently tap the neck to speed the process.

5) The Wheaton vials we use are pre-scored.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the vial upright and wrap with soft tissue, such as Chem Wipes, around the tip of the vial and secure with tape (see picture). Snap off the top of the vial by pressing the pre-scored part of the neck away towards you while pulling the tip of the vial away from you.

8) Transfer the solution from the vial using a pycnometer or pipet with a dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused solution in a flame sealed glass vial, if possible, to minimize the evaporation loss.

Reagent

Th-229_00023

Standard ID Number: Th-229_00023 (Coppt)
True Value = 67.21 dpm/mL
Date Analyzed: 12/20/2017

Radionuclide: Th-229

	Replicates	
#1	69.18	dpm/mL
#2	67.64	dpm/mL
#3	64.07	dpm/mL

Mean = 66.9633333

1 sigma = 2.6213419

1.96 sigma = 5.13783

True Value minus 5% = 63.8495 (True Value - 5%)
True Value plus 5% = 70.5705 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: ALD 12/21/17

2nd Reviewed By/Date: RM 12·21·17

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	8/6/2014 0:00		
Decayto Date/Time (t):	12/20/17 0:00		
Initial Activity (A_0):	67.23 dpm		
Initial Aliquot:	1 mL		
Initial Conc:	67.22958 dpm/mL		
***Soln. Density:**	1 g/mL		
Nuclide:	Th-229		
Half-Life (days):	2897163	decay days	fraction
****Decay Factor:**	0.9997	1232.00	0.00043
Decay Corr Activity:	6.7210E+01 dpm		
Decay Corr Conc:	6.7210E+01 dpm/mL		

Conversion/Calculations

Final Activity Unit:	dpm
Activity Unit Factor:	1.00000
Final Volume Unit:	mL
Volume Unit Factor:	1.000
Final Concentration:	6.7210E+01 dpm/mL
Aliquot Volume:	1.0000E+00 mL
Final Activity (A):	6.7210E+01 dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:43:30AM 12/21/2017

Sample

Sample Name: Ver1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th 229 tracer
AnalysisResultsID: 206417
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

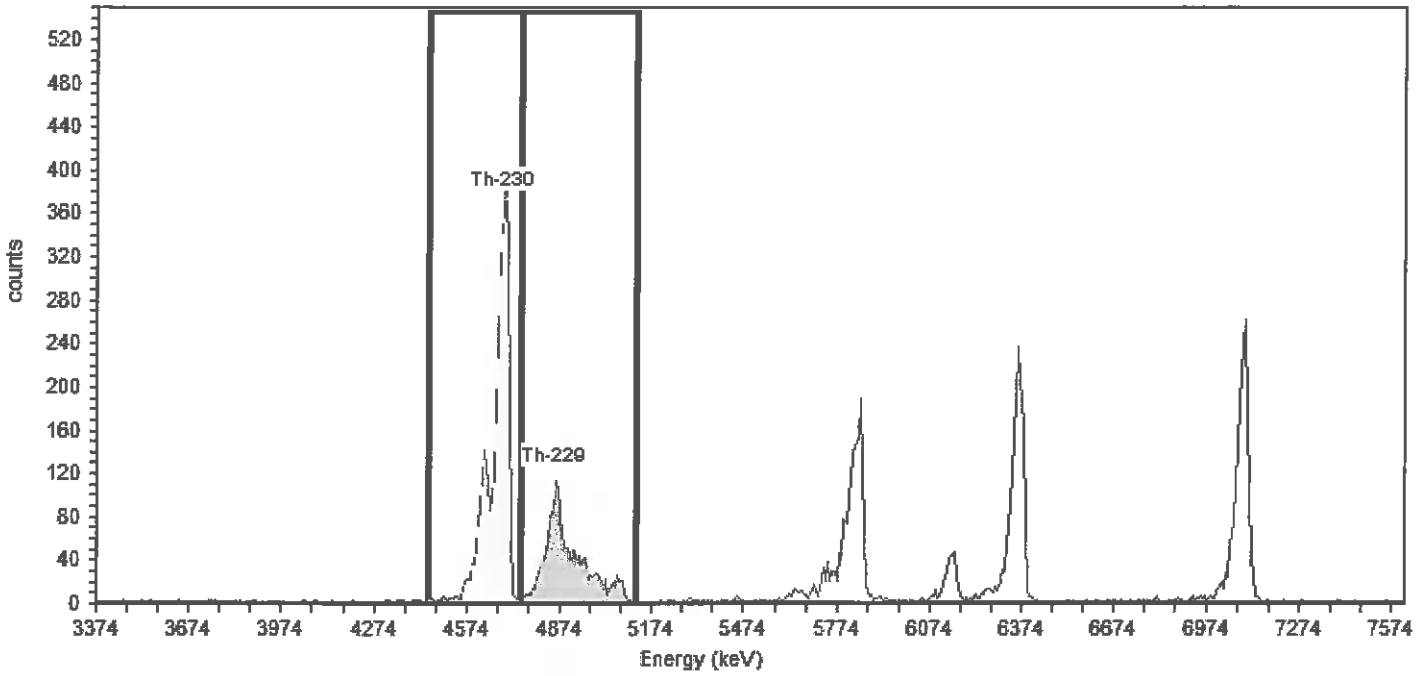
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:41:20AM

Tracer Nuclide: Th-230
Tracer Recovery: 92.23%

Acquisition

Detector: AV210 SN: 50-119AA1
Acquisition Start Date: 12/20/2017 7:15:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 11/17/2017 3:28:10PM
Bkgd Info: Sample: ICB;AV210; Det: AV210; Spectrum #1; 11/17/2017 3:28:10 PM

Energy Calibration: IC-9795;AV210-20171114
Efficiency Calibration:IC-9795;AV210-20171114
Calibration Date: 11/14/2017 12:00:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.40% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:12/20/2017 7:14:50PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	50.8	99.7	3004	6.0000	2998.00	1.233E+002	DPM/mL
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	69.5	99.8	1554	1.0000	1553.00	6.918E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:44:04AM 12/21/2017

Sample

Sample Name: Ver2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th 229 tracer
AnalysisResultsID: 206418
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

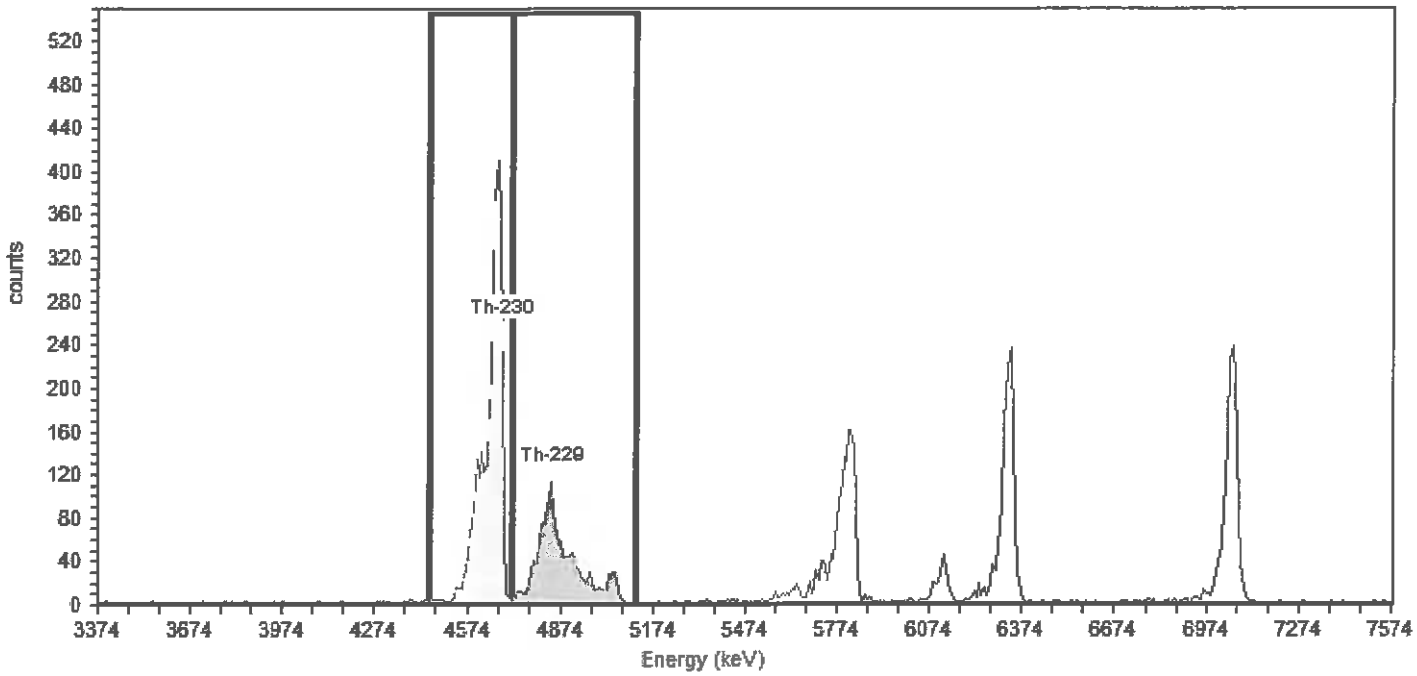
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:41:20AM

Tracer Nuclide: Th-230
Tracer Recovery: 108.60%

Acquisition

Detector: AV211 SN: 50-117Z4
Acquisition Start Date: 12/20/2017 7:15:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 11/17/2017 3:28:10PM
Bkgd Info: Sample: ICB;AV211; Det: AV211; Spectrum #1; 11/17/2017 3:28:10 PM

Energy Calibration: IC-9817;AV211-20171114a
Efficiency Calibration:IC-9817;AV211-20171114a
Calibration Date: 11/14/2017 12:01:51PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th229_ROI_2010
Decay Correction:12/20/2017 7:14:50PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.9	99.7	3182	13.0310	3169.46	1.452E+002	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.0	99.8	1615	10.0310	1605.15	6.764E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:45:14AM 12/21/2017

Sample

Sample Name: Ver3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th 229 tracer
AnalysisResultsID: 206420
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

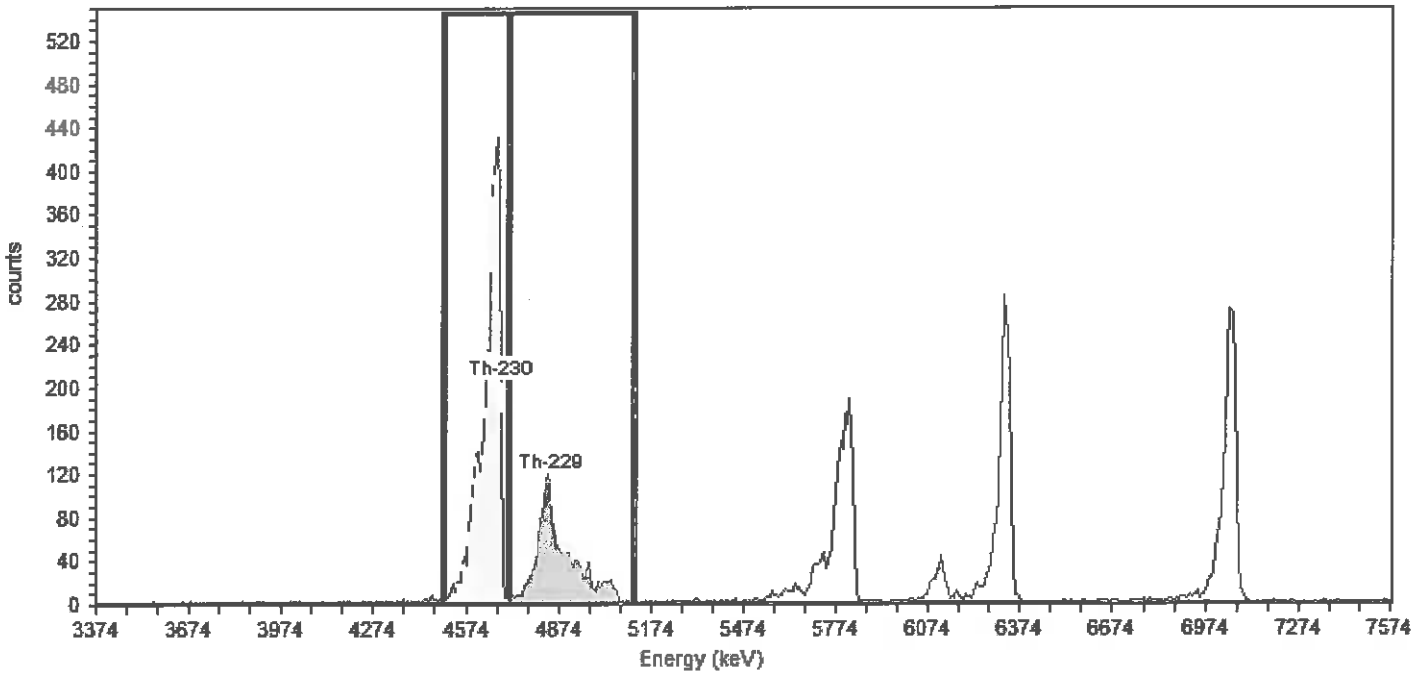
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM / mL x (Vol.) 0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 11:41:20AM

Tracer Nuclide: Th-230
Tracer Recovery: 121.11%

Acquisition

Detector: AV212 SN: 49-155m5
Acquisition Start Date: 12/20/2017 7:15:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 11/17/2017 3:28:10PM
Bkgd Info: Sample: ICB;AV212; Det: AV212; Spectrum #1; 11/17/2017 3:28:10 PM

Energy Calibration: IC-9884;AV212-20171114
Efficiency Calibration:IC-9884;AV212-20171114
Calibration Date: 11/14/2017 12:01:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.41% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute Interactive ROI Analysis
Decay Correction:12/20/2017 7:14:50PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-230	4688.0	4,687.5	0.5	4500.5	4709.3	42.7	99.7	3475	2.0000	3473.00	1.619E+002	DPM/mL
Th-229	4848.0	4,845.3	2.7	4709.3	5119.5	67.0	99.8	1667	1.0000	1666.00	6.407E+001	DPM/mL

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Th-229 Tracer Verification (coppt.)

Standard Verification

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	VER. 1	0.1	210	
2	2	1	211	
3	3	1	212	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230-00036

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 44.5646

Act Ref Date : 08-08-13

Samples Spiked and Traced By: SUB 12/19/17 (Initials / Date)

Verification Signature & Date: RM 12/19/17 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229.00023

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.22958

Act Ref Date : 08-06-14

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☐	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☐	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Th-229 Tracer ONLY VER.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Standard Verification

(Coppt).

Batch No. : _____

Balance ID : _____

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	VER. 1 RC² = 150	0.1	205	RC: 147
2	1 2 = 164	96	207	RC: 149
3	1 3 = 156	94	209	RC: 152
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n No. : Th-229.00023

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.22958

Act Ref Date : 08-06-14

Samples Spiked and Traced By: SUB 12/19/17 (Initials / Date)

Verification Signature & Date: PDM 12/19/17 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : I

Std Sol'n ID. :

Vol (mL) :

Ref Activity (dpm/mL) :

Act Ref Date :

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☐	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☐	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:20AM 1/15/2018

Sample

Sample Name: Ver. 1
SampleType: Sample

Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229 Tracer Only
AnalysisID: 719841

Analyst: 60040

Tracer

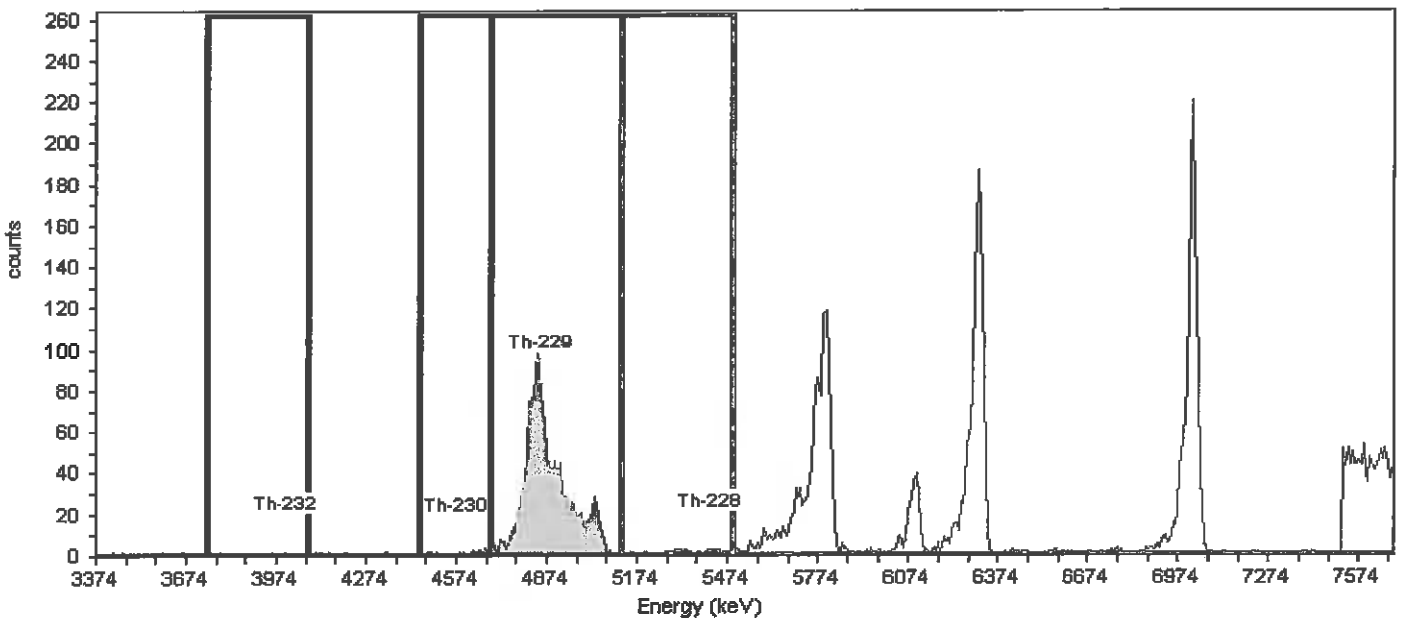
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV97
Serial Number: 76-03393
Acquisition Start Date: 1/12/2018 5:11:28PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 12/19/2017 12:16:50PM
Background Info: Sample: ICB;AV97; Det: AV97; Spectrum #1; Dec-19-2017 12:16

Calibration Name: IC-9886;AV97-20170802
Calibration Date: 8/2/2017 11:02:54AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.33% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/12/2018 5:08:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	11.9	100.2	3	1.0000	2.43	0.113	DPM/mL
Th-230	4567.6	4,687.5	-119.9	4448.3	4686.9	29.6	99.7	18	0.0000	18.00	0.842	DPM/mL
Th-229	4848.0	4,845.3	2.7	4686.9	5119.5	82.2	99.8	1538	1.0000	1537.00	71.851	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	140.5	99.8	37	17.9134	19.17	0.897	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:01:54AM 1/15/2018

Sample

Sample Name: Ver 2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229 Tracer Only
AnalysisID: 719839

Analyst: 60040

Tracer

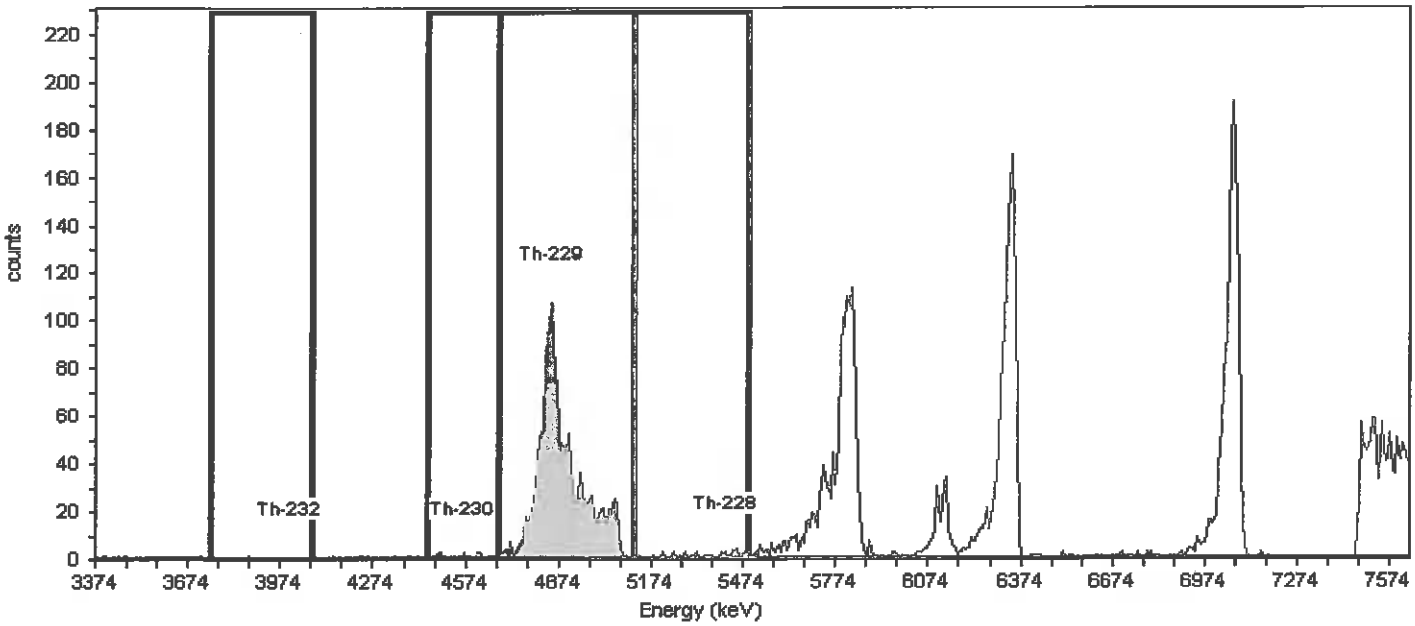
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV96
Serial Number: 46-033P1
Acquisition Start Date: 1/12/2018 5:11:26PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 12/19/2017 12:16:48PM
Background Info: Sample: ICB;AV96; Det: AV96; Spectrum #1; Dec-19-2017 12:16

Calibration Name: IC-9885;AV96-20170802
Calibration Date: 8/2/2017 11:02:35AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/12/2018 5:08:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	1.0000	0.00	0.000	DPM/mL
Th-230	4563.9	4,687.5	-123.6	4448.3	4679.5	196.1	99.7	23	0.0000	23.00	0.992	DPM/mL
Th-229	4848.0	4,845.3	2.7	4679.5	5119.5	76.5	99.8	1561	2.0000	1559.00	67.142	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.1	99.8	39	14.0000	25.00	1.077	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:07AM 1/15/2018

Sample

Sample Name: Ver 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229 Tracer Only
AnalysisID: 719837

Analyst: 60040

Tracer

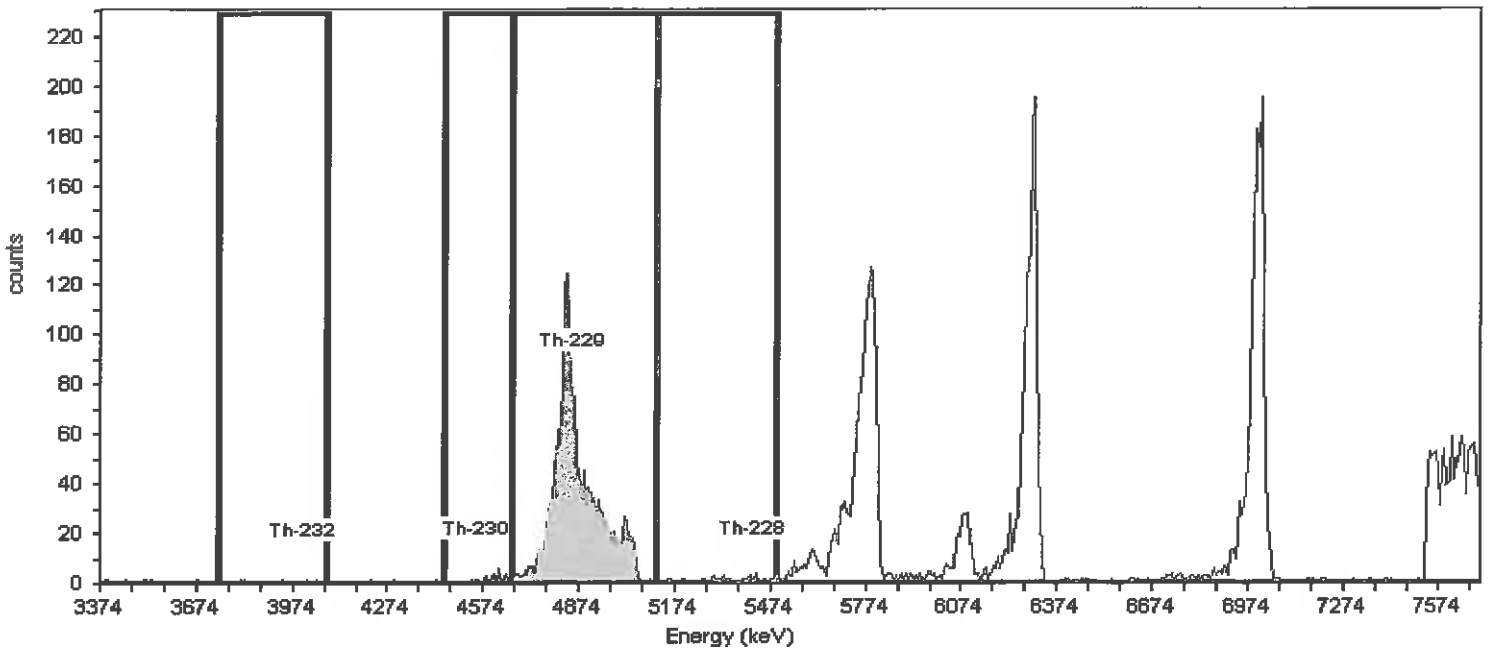
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: AV94
Serial Number: 49-203ff5
Acquisition Start Date: 1/12/2018 5:11:25PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 12/20/2017 2:53:21PM
Background Info: Sample: ICB;AV94; Det: AV94; Spectrum #1; Dec-20-2017 14:53

Calibration Name: IC-9817;AV94-20170802
Calibration Date: 8/2/2017 11:02:05AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.29% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/12/2018 5:08:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.8	100.2	6	1.0000	4.57	0.204	DPM/mL
Th-230	4556.4	4,687.5	-131.1	4448.3	4664.6	52.6	99.7	22	0.0000	22.00	0.987	DPM/mL
Th-229	4848.0	4,845.3	2.7	4664.6	5119.5	68.6	99.8	1596	3.0000	1593.00	71.396	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	181.0	99.8	27	14.0000	12.91	0.579	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 229 _ 00023

Reagent ID: Th-229_00023

		Expiration Date:	12/20/2018
Description:	Th-229 Tracer	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	0.1M HNO3
Reagent Volume:	500.000 mL	Solvent Lot:	n/a
Creation Date:	12/15/2017		
Open Date:			
Container(s):	1347365		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
At-217	Th-229_00017	03/26/2018	2240.98600	dpm/mL	67.22958	dpm/mL
Th-229	Th-229_00017	03/26/2018	2240.98600	dpm/mL	67.22958	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00017	Th-229 Parent		03/26/18				15.00000	mL

Reagent

Th-229_00024

ExtChrom_Actin Prep Worksheet

(Used for Collecting Prep Info)

Batch Number: 160-381464 | Analyst: Mazariegos, Chelsea M | Batch Open: 8/9/2018 5:47:00PM

Batch End: 8/16/2018 3:52:00PM

Preparation, Extraction Chromatography Resin Actinide Separation

	Input Sample Lab ID 8/23/18	Input Sample Lab ID (Analytical Method)	SDG	Matrix	Initial Amount	Final Amount	Due Date	Analytical TAT	Div Rank	Comments
1	160-29904-A-1 96	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Contamination Check
2	160-29904-A-1 97	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Contamination Check
3	160-29904-A-1 98	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Contamination Check

Batch Notes

Balance ID	n/a
Analyst ID - Reagent Drop	CMM
Analyst ID - Reagent Drop Witness	KNF per CMM
Pipette ID	RAD116
Analyst ID - Column	N/A
Column Date	N/A
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/09/2018
SOP Number	ST-RC-0100
Batch Comment	Th-229_00024 Contamination Check

Rad Worksheet

Batch Number: 160-381464
Method: ExtChrom
Analyst: Mazariegos, Chelsea M

Date Open: Aug 09 2018 5:47PM
Batch End: Aug 16 2018 3:52PM

Lab ID	Client ID	Method Chain	Basis	Initial weight/volume of sample	Th-229_00024
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL

Balance ID:	n/a
Analyst ID - Reagent Drop:	CMM
Analyst ID - Reagent Drop Witness:	KNF per CMM
Pipette ID:	RAD116
Analyst ID - Column:	N/A
Column Date:	N/A
Analyst ID - CoPrecipitation:	CMM
CoPrecipitation Date:	08/09/2018
SOP Number:	ST-RC-0100

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:50:51PM 8/24/2018

Sample

Sample Name: 160-29904-A-1-G
SampleType: Sample
: 160-29904-A-1-G
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #4 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 381464
AnalysisID: 738715

Analyst: 60040

Tracer

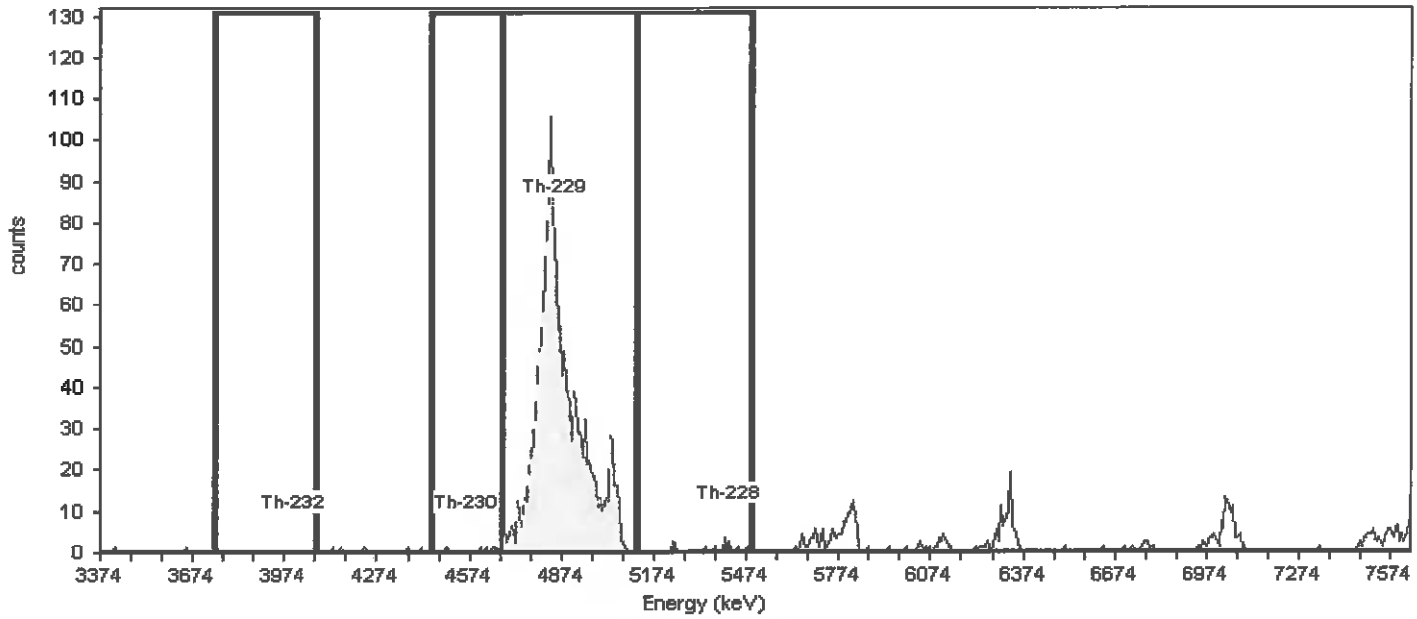
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 11:00:28AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.31%

Acquisition

Detector: AV96
Serial Number: 46-033P1
Acquisition Start Date: 8/23/2018 12:36:16PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 8/11/2018 5:18:07PM
Background Info: Sample: ICB;AV96; Det: AV96; Spectrum #1; Aug-11-2018 17:18

Calibration Name: IC-1370619;AV96-05162018
Calibration Date: 5/17/2018 6:13:25AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.15% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/10/2018 6:48:54PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 8/24/2018

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	0.0000	0.00	0.000	pCi/L
Th-230	4563.9	4,687.5	-123.6	4448.3	4679.5	28.7	99.7	6	2.0000	4.00	79.427	pCi/L
Th-229	4848.0	4,845.3	2.7	4679.5	5119.5	82.5	99.8	1527	1.0000	1526.00	26,440.990	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	96.7	99.8	12	18.0000	-6.00	-120.584	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:51:31PM 8/24/2018

Sample

Sample Name: 160-29904-A-1-H
SampleType: Sample
: 160-29904-A-1-H
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #4 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 381464
AnalysisID: 738716

Analyst: 60040

Tracer

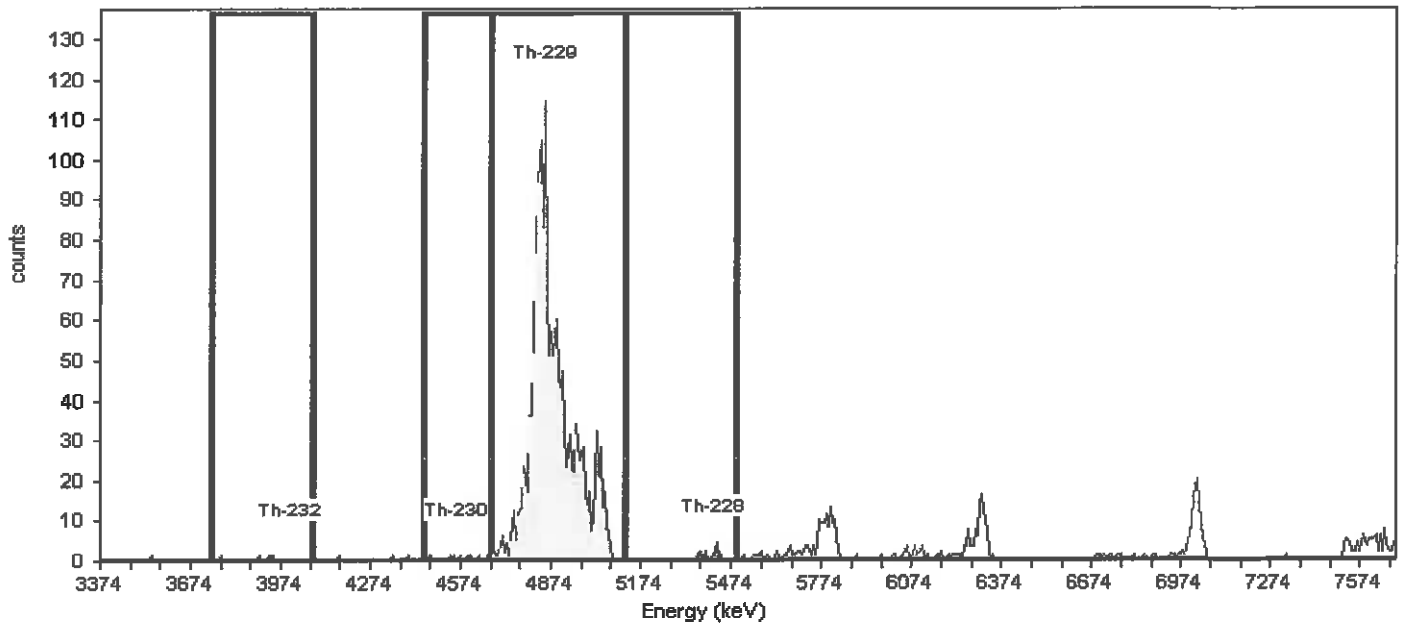
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 11:00:28AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.67%

Acquisition

Detector: AV97
Serial Number: 76-03393
Acquisition Start Date: 8/23/2018 12:36:17PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 8/11/2018 5:18:09PM
Background Info: Sample: ICB;AV97; Det: AV97; Spectrum #1; Aug-11-2018 17:18

Calibration Name: IC-1370620;AV97-05162018
Calibration Date: 5/17/2018 6:13:36AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.84% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/10/2018 6:48:54PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 8/24/2018

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	200.9	100.2	4	2.0000	2.00	38.482	pCi/L
Th-230	4560.2	4,687.5	-127.3	4448.3	4672.0	10.1	99.7	9	1.0000	8.00	154.698	pCi/L
Th-229	4848.0	4,845.3	2.7	4672.0	5119.5	91.7	99.8	1573	6.0000	1567.00	27,458.880	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	90.0	99.8	13	15.0866	-2.26	-44.228	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:52:52PM 8/24/2018

Sample

Sample Name: 160-29904-A-1-I
SampleType: Sample
: 160-29904-A-1-I
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #4 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 381464
AnalysisID: 738717

Analyst: 60040

Tracer

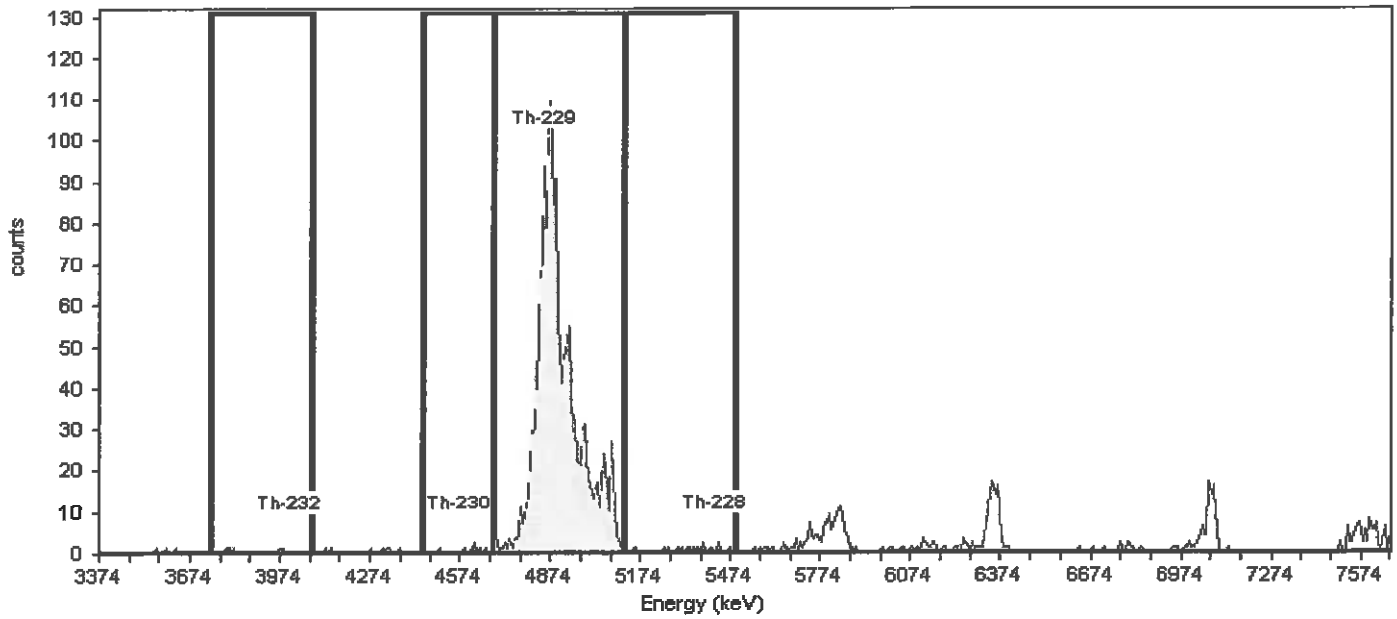
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.10 mL = 6.72 DPM
Tracer Ref. Date: 8/6/2014 11:00:28AM

Tracer Nuclide: Th-229
Tracer Recovery: 99.79%

Acquisition

Detector: AV98
Serial Number: 46-033Q3
Acquisition Start Date: 8/23/2018 12:36:19PM
Live Time: 960.01 min.
Real Time: 960.02 min.
Background Date: 8/13/2018 2:36:17PM
Background Info: Sample: ICB;AV98; Det: AV98; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-7107;AV98-05172018
Calibration Date: 5/17/2018 8:54:10AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.14% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/10/2018 6:48:54PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 8/24/2018

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	41.9	100.2	5	6.0336	-1.03	-19.296	pCi/L
Th-230	4567.6	4,687.5	-119.9	4448.3	4686.9	54.7	99.7	7	3.0000	4.00	75.050	pCi/L
Th-229	4848.0	4,845.3	2.7	4686.9	5119.5	84.9	99.8	1620	5.0000	1615.00	30,220.390	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	10.1	99.8	17	17.0867	-0.17	-3.292	pCi/L

Standard ID Number: Th-229_00024
True Value = 30273 pCi/L
Date Analyzed: 8/4/2018

Radionuclide: Th-229

	Replicates	
#1	30310.44	pCi/L
#2	30956.57	pCi/L
#3	30944.9	pCi/L

Mean = 30737.3033

1 sigma = 369.720538

1.96 sigma = 724.6523

True Value minus 5% = 28759.35 (True Value - 5%)
True Value plus 5% = 31786.65 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: lm 8·6·18

2nd Reviewed By/Date: AB 8/24/18

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	8/6/2014 0:00			
Decayto Date/Time (t):	8/4/18 0:00			
Initial Activity (A_0):	67.23	dpm		
Initial Aliquot:	1	mL		
Initial Conc:	67.22958	dpm/mL		
***Soln. Density:**	1	g/mL		
Nuclide:	Th-229			
Half-Life (days):	2897163		decay days	fraction
****Decay Factor:**	0.9997		1459.00	0.00050
Decay Corr Activity:	6.7206E+01	dpm		
Decay Corr Conc:	6.7206E+01	dpm/mL		

Conversion/Calculations

Final Activity Unit:	pCi	
Activity Unit Factor:	0.45045	
Final Volume Unit:	L	
Volume Unit Factor:	0.001	
Final Concentration:	3.0273E+04	pCi/L
Aliquot Volume:	1.0000E+00	L
Final Activity (A):	3.0273E+04	pCi

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

Ref. 08·06·14

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 229 _ 00024

Reagent ID: Th-229_00024

Description:	Th-229 Tracer	Expiration Date:	12/20/2018
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bernsen, Sarah C
Reagent Volume:	250.000 mL	Solvent:	0.1M HNO3
Creation Date:	08/01/2018	Solvent Lot:	n/a
Open Date:			
Container(s):	1529235		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
At-217	Th-229_00017	12/20/2018	2240.98600	dpm/mL	67.22958	dpm/mL
Th-229	Th-229_00017	12/20/2018	2240.98600	dpm/mL	67.22958	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00017	Th-229 Parent		12/20/18				7.50000	mL

ExtChrom_Actin Prep Worksheet

(Used for Collecting Prep Info)

Batch Number: 160-380161 | Analyst: Bernsen, Sarah C | Batch Open: 8/3/2018 12:14:00PM

Batch End: 8/3/2018 8:20:00PM

Preparation, Extraction Chromatography Resin Actinide Separation

	Input Sample Lab ID	Input Sample Lab ID (Analytical Method)	SDG	Matrix	Initial Amount	Final Amount	Due Date	Analytical TAT	Div Rank	Comments
1	160-29904-A-1 80	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Verification
2	160-29904-A-1 81	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Verification
3	160-29904-A-1 82	160-29904-A-1 (A01R_Th)	N/A	Water	0.1 mL		8/27/18	18_Days	N/A	Th-229_00024 Verification

Batch Notes

Balance ID	n/a
Analyst ID - Reagent Drop	CMM
Analyst ID - Reagent Drop Witness	CMA per CMM
Pipette ID	RAD104
Analyst ID - Column	N/A
Column Date	N/A
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/03/2018
SOP Number	ST-RC-0100
Batch Comment	Th-229_00024 Verification

Rad Worksheet

Batch Number: 160-380161
Method: ExtChrom
Analyst: Bernsen, Sarah C

Date Open: Aug 03 2018 12:14PM
Batch End: Aug 03 2018 8:20PM

Lab ID	Client ID	Method Chain	Basis	Initial weight/volume of sample	Th-229_00024	Th-230_00036
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL	0.3 mL
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL	0.3 mL
160-29904-A-1	Th-229 Verify	ExtChrom_Actin, A01R_Th	T	0.1 mL	0.1 mL	0.3 mL

Balance ID:	n/a
Analyst ID - Reagent Drop:	CMM
Analyst ID - Reagent Drop Witness:	CMA per CMM
Pipette ID:	RAD104
Analyst ID - Column:	N/A
Column Date:	N/A
Analyst ID - CoPrecipitation:	CMM
CoPrecipitation Date:	08/03/2018
SOP Number:	ST-RC-0100

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Alpha Spectroscopy

Batch: 380161 **Operator:**

Blank Pop. Correct. ✓

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
160-29904-A-1-A	160-29904-A-1-A	0.1000 mL	1.00	1.00	AV80	8 / 4 / 18 15:26	960.00	Th-230_00036	Th-230	2.007E+004	90.94%

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC	
Th-228	3.28997E+002	pCi/L	1.482E+002	1.488E+002	4.685E+002	2.048E+002	148.8464
Th-229	3.03104E+004	pCi/L	7.742E+002	1.490E+003	2.646E+002	1.028E+002	1,489.9544
Th-230	5.47644E+004	pCi/L	9.899E+002	2.504E+003	1.370E+002	4.170E+001	2,504.0855
Th-232	5.80342E+001	pCi/L	7.855E+001	7.858E+001	2.921E+002	1.167E+002	78.5839

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
160-29904-A-1-B	160-29904-A-1-B	0.1000 mL	1.00	1.00	AV81	8 / 4 / 18 15:26	960.00	Th-230_00036	Th-230	2.007E+004	89.63%

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC	
Th-228	2.32281E+002	pCi/L	1.188E+002	1.192E+002	3.809E+002	1.615E+002	119.2230
Th-229	3.09566E+004	pCi/L	7.725E+002	1.512E+003	1.473E+002	4.479E+001	1,512.3371
Th-230	5.39766E+004	pCi/L	9.659E+002	2.464E+003	1.324E+002	4.028E+001	2,464.2002
Th-232	1.12808E+002	pCi/L	6.028E+001	6.047E+001	1.837E+002	6.309E+001	60.4670

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
160-29904-A-1-C	160-29904-A-1-C	0.1000 mL	1.00	1.00	AV82	8 / 4 / 18 15:26	960.00	Th-230_00036	Th-230	2.007E+004	94.40%

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC	
Th-228	4.88205E+002	pCi/L	1.216E+002	1.233E+002	3.028E+002	1.232E+002	123.3120
Th-229	3.09449E+004	pCi/L	7.639E+002	1.508E+003	2.078E+002	7.571E+001	1,507.5527
Th-230	5.68489E+004	pCi/L	1.006E+003	2.591E+003	2.186E+002	8.266E+001	2,590.8948
Th-232	5.61337E+001	pCi/L	5.614E+001	5.619E+001	2.069E+002	7.540E+001	56.1897

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity	StdAdded	Recovery	LCL	UCL	ZFactor

Sample Duplicate Information

Sample ID	Analyte	Sample Activity	Dup Sample ID	Dup Activity	RPD	RER	DER	Qualifier	ZFactor

Matrix Spike Information

SampID	SampMSID	Analyte	Sample Activity	MS Activity	StdAdded	MSRecovery

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

Batch Reagent/Chemical IDs

Printed: 8/6/2018 3:05 PM
Form: QA-0093 Th (Rev 01-05-17)

Batch number: 380161 Th

Date: 8/6/18

Analyst: cmm

Reagent IDs used:

01	~~calcium nitrate~~
02	ammonium phosphate dibasic
03	bromocresol purple
04	NH4OH
05	HNO3
06	HCl
07	HF
08	3M HNO3/0.25M Boric
09	Load
10	3M HNO3
11	~~9M HCl~~ cmm 8/6/18
12	1M HCl 1532683
13	H2O2 1480569
14	Neodymium Carrier 1394461
15	Ethanol 1479964
16	~~pH strip lot~~ cmm 8/6/18
17	~~syringe filter lot~~ cmm 8/6/18
18	HF 1523711
19	
20	
21	
22	cmm 8/6/18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:26:42PM 8/6/2018

Sample

Sample Name: 160-29904-A-1-A
SampleType: Sample
: 160-29904-A-1-A
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380161
AnalysisID: 736070

Analyst: 60040

Tracer

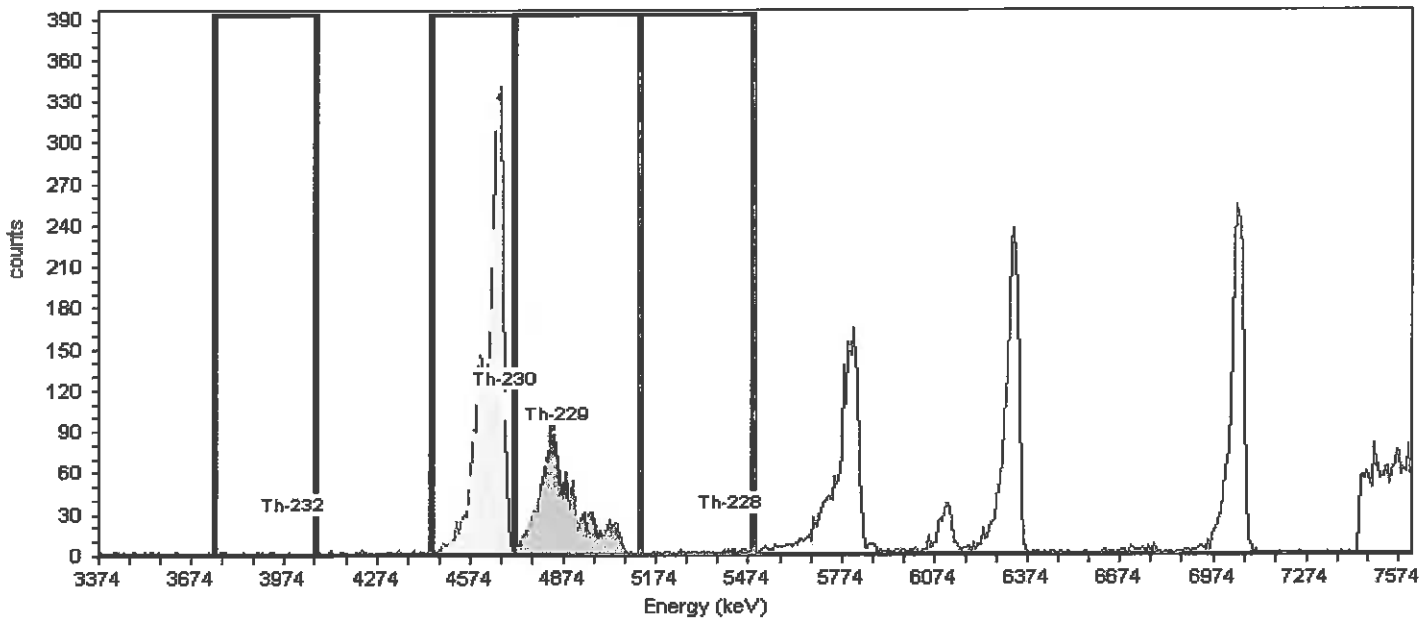
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:23PM

Tracer Nuclide: Th-230
Tracer Recovery: 90.94%

Acquisition

Detector: AV80
Serial Number: 46-03305
Acquisition Start Date: 8/4/2018 3:26:41PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Background Date: 7/13/2018 12:11:37PM
Background Info: Sample: ICB;AV80; Det: AV80; Spectrum #2; Jul-13-2018 12:11

Calibration Name: IC-1370622;AV80-05152018
Calibration Date: 5/15/2018 6:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.32% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/4/2018 3:25:30PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	35.6	100.2	10	6.5750	2.97	58.040	pCi/L
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.7	99.7	3064	1.0000	3062.53	54,767.130	pCi/L
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	96.4	99.8	1548	5.0639	1542.96	30,310.470	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	18.0	99.8	37	20.0639	16.74	329.053	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:27:57PM 8/6/2018

Sample

Sample Name: 160-29904-A-1-B
SampleType: Sample
: 160-29904-A-1-B
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380161
AnalysisID: 736073

Analyst: 60040

Tracer

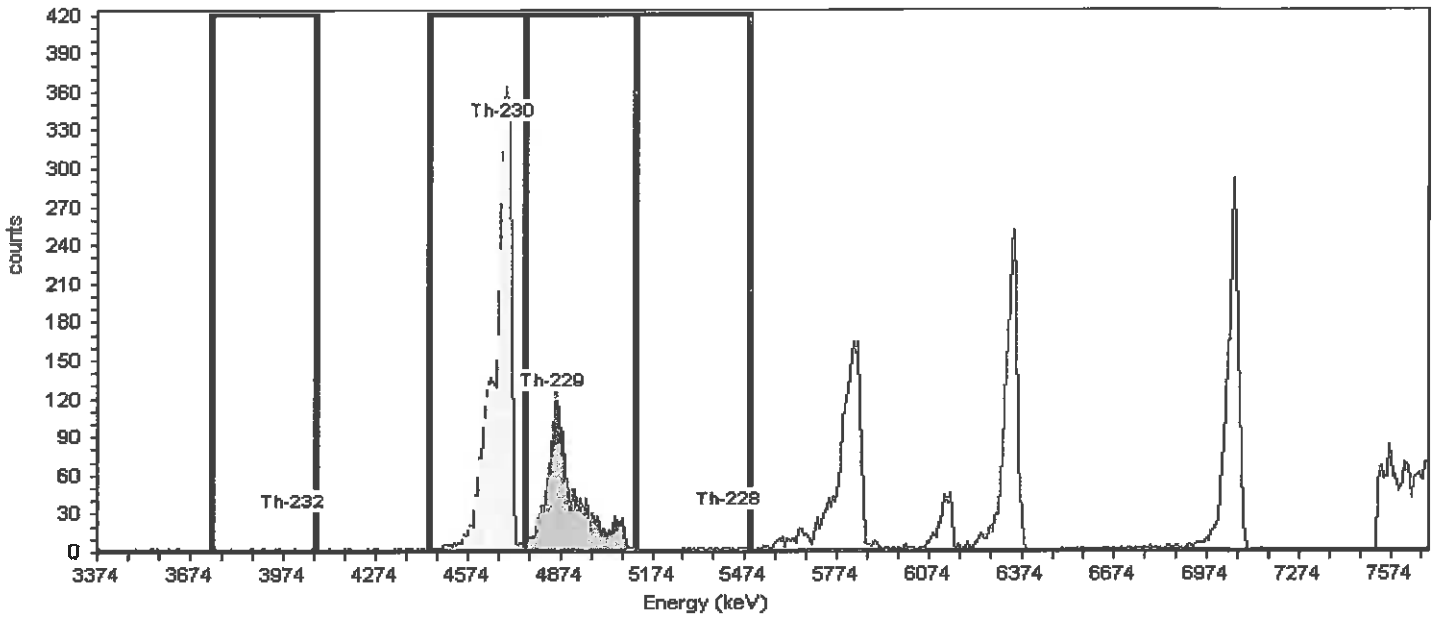
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:23PM

Tracer Nuclide: Th-230
Tracer Recovery: 89.63%

Acquisition

Detector: AV81
Serial Number: 52-104X5
Acquisition Start Date: 8/4/2018 3:26:41PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Background Date: 7/12/2018 1:40:45PM
Background Info: Sample: ICB;AV81; Det: AV81; Spectrum #1; Jul-12-2018 13:40

Calibration Name: IC-1370619;AV81-05152018
Calibration Date: 5/15/2018 6:38:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.25% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/4/2018 3:25:31PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 8/6/2018

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.3	100.2	8	2.0000	5.88	112.814	pCi/L
Th-230	4688.0	4,687.5	0.5	4448.3	4761.5	60.3	99.7	3126	1.0000	3125.00	53,979.240	pCi/L
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	68.2	99.8	1609	1.0000	1608.00	30,956.610	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	29.9	99.8	25	13.0000	12.06	232.336	pCi/L

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:28:47PM 8/6/2018

Sample

Sample Name: 160-29904-A-1-C
SampleType: Sample
: 160-29904-A-1-C
Sample Collection Date: 8/1/2018 12:00:00PM

Spectrum #1 Analysis #1
Sample Volume : 0.0001L
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380161
AnalysisID: 736074

Analyst: 60040

Tracer

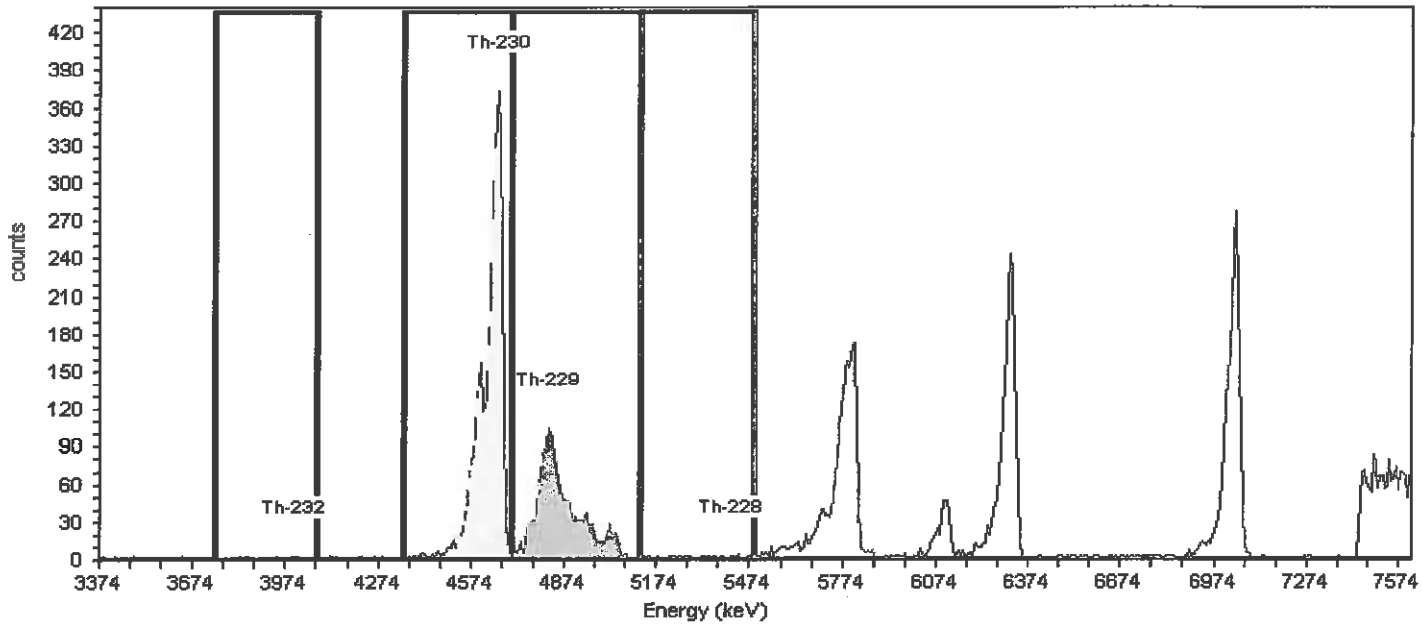
Tracer Name: Th-230_00036
Tracer Activity: 44.56 DPM/mL x (Vol.)0.30 mL = 13.37 DPM
Tracer Ref. Date: 8/8/2013 12:00:23PM

Tracer Nuclide: Th-230
Tracer Recovery: 94.40%

Acquisition

Detector: AV82
Serial Number: 46-032EE5
Acquisition Start Date: 8/4/2018 3:26:43PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Background Date: 7/12/2018 1:40:46PM
Background Info: Sample: ICB;AV82; Det: AV82; Spectrum #1; Jul-12-2018 13:40

Calibration Name: IC-1370620;AV82-05152018
Calibration Date: 5/15/2018 6:38:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.51% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 8/4/2018 3:25:31PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual Integration for tailing
RTM 8/6/2018

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	202.0	100.2	6	3.0000	3.00	56.139	pCi/L
Th-230	4657.1	4,687.5	-30.4	4351.3	4701.9	30.7	99.7	3206	4.0000	3202.00	56,851.720	pCi/L
Th-229	4821.2	4,845.3	-24.1	4701.9	5119.5	80.7	99.8	1650	3.0000	1647.00	30,944.940	pCi/L
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	259.1	99.8	34	7.9361	25.98	488.261	pCi/L

Reagent

TRM-2_00002

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

Reagent

Tuna Can LCS_00006

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: [signature], for
D. M. Montgomery, QA Manager

Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (1012459)
True Value = 97.08 pCi/g
Date Analyzed: 9/29/2016

Radionuclide: Gamma LCS Am-241

	Replicates	
#1	96.82	pCi/g
#2	96.69	pCi/g
#3	97.75	pCi/g

Mean = 97.08667

1 sigma = 0.578129

1.96 sigma = 1.133133

True Value minus 5% = 92.226 (True Value - 5%)
True Value plus 5% = 101.934 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/03/16

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (112459)
True Value = 29.45 pCi/g
Date Analyzed: 9/29/2016

Radionuclide: Gamma LCS Cs-137

	Replicates	
#1	28.26	pCi/g
#2	28.64	pCi/g
#3	28.37	pCi/g

Mean = 28.42333

1 sigma = 0.195533

1.96 sigma = 0.383246

True Value minus 5% = 27.9775 (True Value - 5%)
True Value plus 5% = 30.9225 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/03/16

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00006 (1012459)
True Value = 16.46 pCi/g
Date Analyzed: 9/29/116

Radionuclide: Gamma LCS Co-60

	Replicates	
#1	16.04	pCi/g
#2	15.77	pCi/g
#3	16.14	pCi/g

Mean = 15.98333

1 sigma = 0.191398

1.96 sigma = 0.375141

True Value minus 5% = 15.637 (True Value - 5%)
True Value plus 5% = 17.283 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 10/3/16

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV15	9 / 29 / 16 13:06	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	-2.044E-001pCi/g	5.500E-001	5.499E-001	1.436E+000	6.946E-001	-0.14	0.5500
AG-108M	10982	-1.018E-001pCi/g	9.743E-002	9.729E-002	3.075E-001	1.497E-001	-0.33	0.0974
AG-110M	10973	5.076E-002pCi/g	4.575E-002	4.567E-002	7.684E-001	3.751E-001	0.07	0.0457
AM-241	10818	9.682E+001pCi/g	5.100E+000	8.709E-001	1.290E+000	6.388E-001	75.07	5.0999
BA-133	10469	-1.624E-001pCi/g	1.661E-001	1.659E-001	5.506E-001	2.703E-001	-0.29	0.1661
BA-140	10463	-1.425E-001pCi/g	1.058E-001	1.055E-001	1.079E+000	5.219E-001	-0.13	0.1058
BE-7	10435	1.275E-001pCi/g	1.233E+000	1.233E+000	4.134E+000	2.030E+000	0.03	1.2334
BI-207	10195	1.058E-001pCi/g	7.194E-002	7.173E-002	2.372E-001	1.139E-001	0.45	0.0719
BI-210M	10173	8.477E-002pCi/g	9.587E-002	9.574E-002	4.994E-001	2.447E-001	0.17	0.0959
BI-212	10160	1.553E+000pCi/g	1.216E+000	1.214E+000	4.030E+000	1.941E+000	0.39	1.2163
BI-214	10154	8.681E-002pCi/g	3.647E-002	3.619E-002	1.088E+000	5.336E-001	0.08	0.0365
CD-109	9254	0.000E+000pCi/g	3.288E+000	3.288E+000	1.089E+001	5.402E+000	0.00	3.2880
CD-113M	17462	-1.456E+003pCi/g	1.073E+003	1.069E+003	3.536E+003	1.727E+003	-0.41	1,072.9969
CE-139	9241	7.398E-002pCi/g	7.038E-002	7.003E-002	2.323E-001	1.140E-001	0.32	0.0704
CE-141	9235	1.679E-002pCi/g	1.287E-001	1.287E-001	3.270E-001	1.601E-001	0.05	0.1287
CE-144	9221	-5.823E-001pCi/g	1.611E+000	1.610E+000	2.809E+000	1.390E+000	-0.21	1.6107
CF-249	9215	-3.279E-002pCi/g	1.794E-001	1.794E-001	6.001E-001	2.950E-001	-0.05	0.1794
CF-251	13690	-4.067E-001pCi/g	3.994E-001	3.978E-001	1.002E+000	4.903E-001	-0.41	0.3994
CO-56	8704	1.139E-001pCi/g	1.826E-001	1.825E-001	3.036E-001	1.454E-001	0.38	0.1826
CO-57	13694	4.528E-001pCi/g	4.266E-001	4.260E-001	1.102E+000	5.361E-001	0.41	0.4266
CO-58	8698	-1.658E-001pCi/g	1.376E-001	1.373E-001	4.558E-001	2.217E-001	-0.36	0.1376
CO-60	8692	1.604E+001pCi/g	8.400E-001	2.396E-001	9.914E-002	4.016E-002	161.75	0.8400
CR-51	8604	-9.651E-001pCi/g	1.169E+000	1.168E+000	3.438E+000	1.690E+000	-0.28	1.1689
CS-134	8553	6.593E-002pCi/g	8.889E-002	8.882E-002	5.089E-001	2.495E-001	0.13	0.0889
CS-136	8546	1.258E-001pCi/g	1.227E-001	1.225E-001	4.083E-001	1.980E-001	0.31	0.1227
CS-137	8539	2.826E+001pCi/g	1.520E+000	3.844E-001	2.878E-001	1.379E-001	98.20	1.5198
EU-152	7145	5.245E-001pCi/g	5.014E-001	5.007E-001	1.782E+000	8.797E-001	0.29	0.5014
EU-154	7138	4.532E-001pCi/g	3.576E-001	3.568E-001	3.623E+000	1.758E+000	0.13	0.3576
EU-155	7131	3.186E-001pCi/g	4.804E-001	4.800E-001	1.590E+000	7.880E-001	0.20	0.4804
FE-59	7073	-4.662E-001pCi/g	2.724E-001	2.714E-001	8.335E-001	4.027E-001	-0.56	0.2724
GA-68	18005	-2.864E+000pCi/g	6.167E+000	6.165E+000	1.352E+001	6.483E+000	-0.21	6.1671
GD-153	6824	-2.389E-001pCi/g	3.642E-001	3.639E-001	1.205E+000	5.975E-001	-0.20	0.3642
HF-181	6495	2.232E-002pCi/g	9.381E-002	9.380E-002	5.455E-001	2.678E-001	0.04	0.0938
HG-203	6466	-1.176E-001pCi/g	9.784E-002	9.761E-002	3.233E-001	1.585E-001	-0.36	0.0978
I-131	6380	1.345E-001pCi/g	1.325E-001	1.323E-001	2.783E-001	1.352E-001	0.48	0.1325
IR-192	6303	1.051E-001pCi/g	1.544E-001	1.543E-001	5.121E-001	2.528E-001	0.21	0.1544
K-40	6148	-3.414E-001pCi/g	3.403E+000	3.403E+000	1.694E+000	7.511E-001	-0.20	3.4027
LA-140	6096	6.964E-002pCi/g	2.842E-002	2.818E-002	6.304E-002	1.993E-002	1.10	0.0284
MN-54	5382	9.032E-003pCi/g	1.343E-001	1.343E-001	3.074E-001	1.474E-001	0.03	0.1343
NA-22	5201	7.656E-002pCi/g	4.569E-002	4.553E-002	1.483E-001	6.510E-002	0.52	0.0457
NB-94	5160	-6.911E-003pCi/g	8.527E-002	8.527E-002	2.509E-001	1.199E-001	-0.03	0.0853
NB-95	5154	-1.314E-001pCi/g	1.080E-001	1.078E-001	3.580E-001	1.732E-001	-0.37	0.1080
ND-147	5083	2.116E-001pCi/g	7.933E-001	7.932E-001	1.870E+000	9.017E-001	0.11	0.7933
NP-237	4757	-5.339E-001pCi/g	9.394E-001	9.389E-001	3.110E+000	1.543E+000	-0.17	0.9394
NP-239	4751	2.951E-001pCi/g	4.471E-001	4.467E-001	1.480E+000	7.333E-001	0.20	0.4471
PA-231	4541	0.000E+000pCi/g	1.548E+000	1.548E+000	1.296E+001	6.385E+000	0.00	1.5484
PA-233	4535	2.505E-001pCi/g	3.660E-001	3.657E-001	1.214E+000	5.993E-001	0.21	0.3660
PA-234	4528	9.127E-002pCi/g	1.542E-001	1.541E-001	1.714E+000	8.480E-001	0.05	0.1542
PA-234M	19453	2.654E+001pCi/g	1.513E+001	1.507E+001	5.612E+001	2.718E+001	0.47	15.1341
PB-210	4467	8.473E+002pCi/g	5.040E+001	8.041E+000	1.484E+001	7.350E+000	57.08	50.3970

PB-212	4454	5.507E-001pCi/g	1.742E-001	1.705E-001	3.941E-001	1.917E-001	1.40	0.1742
PB-214	4448	4.656E-001pCi/g	1.811E-001	1.795E-001	4.906E-001	2.371E-001	0.95	0.1811
PM-144	19585	-9.279E-002pCi/g	8.379E-002	8.365E-002	2.603E-001	1.247E-001	-0.36	0.0838
PM-146	2464	3.553E-001pCi/g	2.541E-001	2.534E-001	6.570E-001	3.117E-001	0.54	0.2541
RH-106	1882	0.000E+000pCi/g	4.336E-001	4.336E-001	5.120E+000	2.511E+000	0.00	0.4336
RU-103	1828	-1.980E-002pCi/g	1.475E-001	1.475E-001	2.961E-001	1.436E-001	-0.07	0.1475
SB-124	1784	1.062E-001pCi/g	8.303E-002	8.285E-002	5.042E-001	2.473E-001	0.21	0.0830
SB-125	1777	4.580E-001pCi/g	3.330E-001	3.322E-001	8.845E-001	4.300E-001	0.52	0.3330
SC-46	1739	-2.124E-001pCi/g	1.825E-001	1.822E-001	6.042E-001	2.955E-001	-0.35	0.1825
SN-113	1570	1.126E-001pCi/g	1.827E-001	1.826E-001	6.081E-001	2.988E-001	0.19	0.1827
SN-126	17459	-1.643E+000pCi/g	3.686E+000	3.685E+000	1.217E+001	6.066E+000	-0.13	3.6865
TA-182	1301	4.928E-001pCi/g	2.524E-001	2.512E-001	1.407E+000	6.803E-001	0.35	0.2524
TC-99M	17412	-2.091E-002pCi/g	1.038E-001	1.038E-001	3.452E-001	1.707E-001	-0.06	0.1038
TH-227	1058	5.331E+000pCi/g	2.061E+000	2.040E+000	6.682E+000	3.307E+000	0.80	2.0609
TH-229	1046	-1.252E+000pCi/g	1.725E+000	1.722E+000	4.349E+000	2.130E+000	-0.29	1.7249
TH-234	1027	-4.940E+000pCi/g	6.015E+000	6.009E+000	3.121E+001	1.555E+001	-0.16	6.0150
TL-208	929	4.162E-001pCi/g	1.180E-001	1.160E-001	2.299E-001	1.095E-001	1.81	0.1180
U-235	281	4.038E-001pCi/g	3.951E-001	3.946E-001	2.769E+000	1.369E+000	0.15	0.3951
Y-88	74	5.514E-002pCi/g	1.992E-002	1.971E-002	3.695E-001	1.776E-001	0.15	0.0199
ZN-65	31	0.000E+000pCi/g	1.231E-001	1.231E-001	1.061E+000	5.145E-001	0.00	0.1231
ZR-95	7	7.816E-003pCi/g	2.150E-001	2.150E-001	4.933E-001	2.360E-001	0.02	0.2150

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.826E+001	pCi/g	2.945E+001	95.99%	-0.5385
		CO-60	1.604E+001	pCi/g	1.646E+001	97.45%	-0.3492
		AM-241	9.682E+001	pCi/g	9.708E+001	99.74%	-0.0356

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV05	9 / 29 / 16 19:17	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	6.948E-001pCi/g	4.428E-001	4.413E-001	1.386E+000	6.661E-001	0.50	0.4428
AG-108M	10982	-4.815E-002pCi/g	1.360E-001	1.359E-001	3.314E-001	1.611E-001	-0.15	0.1360
AG-110M	10973	-6.551E-002pCi/g	5.828E-002	5.819E-002	7.502E-001	3.646E-001	-0.09	0.0583
AM-241	10818	9.669E+001pCi/g	5.084E+000	8.185E-001	1.163E+000	5.751E-001	83.11	5.0845
BA-133	10469	-1.677E-001pCi/g	1.639E-001	1.637E-001	5.438E-001	2.661E-001	-0.31	0.1639
BA-140	10463	7.654E-001pCi/g	4.133E-001	4.114E-001	9.742E-001	4.664E-001	0.79	0.4133
BE-7	10435	-5.190E-001pCi/g	1.221E+000	1.221E+000	3.698E+000	1.806E+000	-0.14	1.2210
BI-207	10195	1.327E-001pCi/g	2.286E-001	2.285E-001	5.028E-001	2.394E-001	0.26	0.2286
BI-210M	10173	1.105E-001pCi/g	1.761E-001	1.760E-001	4.963E-001	2.426E-001	0.22	0.1761
BI-212	10160	-8.056E-001pCi/g	1.326E+000	1.326E+000	4.824E+000	2.326E+000	-0.17	1.3264
BI-214	10154	-3.129E-001pCi/g	1.874E-001	1.867E-001	1.276E+000	6.260E-001	-0.25	0.1874
CD-109	9254	1.605E+000pCi/g	2.280E+000	2.278E+000	7.558E+000	3.734E+000	0.21	2.2797
CD-113M	17462	-1.293E+003pCi/g	1.131E+003	1.128E+003	3.745E+003	1.826E+003	-0.35	1,131.1129
CE-139	9241	-6.545E-002pCi/g	8.083E-002	8.059E-002	2.679E-001	1.316E-001	-0.24	0.0808
CE-141	9235	7.536E-003pCi/g	1.415E-001	1.415E-001	4.733E-001	2.330E-001	0.02	0.1415
CE-144	9221	1.609E-001pCi/g	5.660E-001	5.659E-001	1.890E+000	9.298E-001	0.09	0.5660
CF-249	9215	-5.097E-002pCi/g	4.175E-002	4.166E-002	6.544E-001	3.214E-001	-0.08	0.0417
CF-251	13690	2.258E-001pCi/g	3.420E-001	3.414E-001	9.101E-001	4.433E-001	0.25	0.3420
CO-56	8704	-2.777E-003pCi/g	1.256E-001	1.256E-001	3.392E-001	1.622E-001	-0.01	0.1256
CO-57	13694	0.000E+000pCi/g	3.371E-002	3.371E-002	2.220E-001	1.091E-001	0.00	0.0337
CO-58	8698	1.419E-001pCi/g	1.238E-001	1.236E-001	4.114E-001	1.985E-001	0.34	0.1238
CO-60	8692	1.577E+001pCi/g	8.296E-001	2.480E-001	5.871E-002	1.856E-002	268.60	0.8296
CR-51	8604	8.429E-001pCi/g	8.344E-001	8.332E-001	2.771E+000	1.352E+000	0.30	0.8344
CS-134	8553	-1.864E-002pCi/g	1.769E-002	1.766E-002	5.873E-001	2.880E-001	-0.03	0.0177
CS-136	8546	1.666E-002pCi/g	1.960E-002	1.958E-002	4.831E-001	2.344E-001	0.03	0.0196
CS-137	8539	2.864E+001pCi/g	1.546E+000	4.128E-001	3.089E-001	1.474E-001	92.72	1.5462
EU-152	7145	2.755E-001pCi/g	3.412E-001	3.409E-001	1.401E+000	6.875E-001	0.20	0.3412
EU-154	7138	1.747E-001pCi/g	1.106E-001	1.102E-001	3.597E+000	1.737E+000	0.05	0.1106
EU-155	7131	2.480E-001pCi/g	3.696E-001	3.694E-001	1.226E+000	6.054E-001	0.20	0.3696
FE-59	7073	1.492E-001pCi/g	1.439E-001	1.437E-001	7.280E-001	3.478E-001	0.20	0.1439
GA-68	18005	-6.353E+000pCi/g	7.244E+000	7.235E+000	1.575E+001	7.557E+000	-0.40	7.2435
GD-153	6824	5.593E-002pCi/g	1.741E-001	1.741E-001	5.826E-001	2.858E-001	0.10	0.1741
HF-181	6495	1.366E-001pCi/g	1.060E-001	1.057E-001	4.948E-001	2.417E-001	0.28	0.1060
HG-203	6466	2.250E-002pCi/g	1.022E-001	1.022E-001	2.611E-001	1.269E-001	0.09	0.1022
I-131	6380	2.210E-002pCi/g	1.184E-002	1.179E-002	2.971E-001	1.441E-001	0.07	0.0118
IR-192	6303	8.284E-002pCi/g	7.520E-002	7.504E-002	3.258E-001	1.592E-001	0.25	0.0752
K-40	6148	7.507E-001pCi/g	5.361E-001	5.347E-001	1.327E+000	5.540E-001	0.57	0.5361
LA-140	6096	8.699E-002pCi/g	7.949E-002	7.936E-002	1.364E-001	5.501E-002	0.64	0.0795
MN-54	5382	-1.165E-001pCi/g	1.521E-001	1.520E-001	3.439E-001	1.646E-001	-0.34	0.1521
NA-22	5201	-2.814E-002pCi/g	5.797E-002	5.795E-002	2.055E-001	9.236E-002	-0.14	0.0580
NB-94	5160	6.783E-002pCi/g	6.927E-002	6.918E-002	2.389E-001	1.130E-001	0.28	0.0693
NB-95	5154	-1.620E-001pCi/g	1.191E-001	1.188E-001	3.935E-001	1.900E-001	-0.41	0.1191
ND-147	5083	-6.514E-001pCi/g	8.776E-001	8.768E-001	2.138E+000	1.031E+000	-0.30	0.8776
NP-237	4757	-4.627E-001pCi/g	7.177E-001	7.172E-001	2.379E+000	1.176E+000	-0.19	0.7177
NP-239	4751	2.276E-001pCi/g	3.340E-001	3.337E-001	1.108E+000	5.467E-001	0.21	0.3340
PA-231	4541	0.000E+000pCi/g	1.373E+000	1.373E+000	1.362E+001	6.701E+000	0.00	1.3729
PA-233	4535	2.236E-001pCi/g	3.060E-001	3.057E-001	1.017E+000	4.997E-001	0.22	0.3060
PA-234	4528	2.928E-001pCi/g	4.437E-001	4.434E-001	1.312E+000	6.465E-001	0.22	0.4437
PA-234M	19453	2.108E+001pCi/g	1.857E+001	1.854E+001	6.416E+001	3.107E+001	0.33	18.5748
PB-210	4467	8.671E+002pCi/g	5.159E+001	8.329E+000	1.461E+001	7.229E+000	59.34	51.5925

PB-212	4454	7.463E-001pCi/g	1.602E-001	1.528E-001	3.656E-001	1.769E-001	2.04	0.1602
PB-214	4448	2.370E-001pCi/g	2.355E-001	2.351E-001	7.474E-001	3.643E-001	0.32	0.2355
PM-144	19585	7.285E-002pCi/g	5.436E-002	5.422E-002	2.571E-001	1.222E-001	0.28	0.0544
PM-146	2464	1.040E-001pCi/g	3.321E-001	3.321E-001	7.921E-001	3.765E-001	0.13	0.3321
RA-226	1950	-4.839E-001pCi/g	3.042E+000	3.042E+000	5.837E+000	2.855E+000	-0.08	3.0419
RH-106	1882	-3.016E-001pCi/g	9.937E-001	9.936E-001	3.367E+000	1.626E+000	-0.09	0.9937
RU-103	1828	-6.222E-002pCi/g	1.352E-001	1.352E-001	3.240E-001	1.568E-001	-0.19	0.1352
SB-124	1784	-4.848E-002pCi/g	4.616E-002	4.609E-002	5.906E-001	2.896E-001	-0.08	0.0462
SB-125	1777	3.726E-001pCi/g	5.015E-001	5.012E-001	9.624E-001	4.671E-001	0.39	0.5015
SC-46	1739	-1.934E-001pCi/g	1.709E-001	1.706E-001	5.668E-001	2.757E-001	-0.34	0.1709
SN-113	1570	-1.832E-001pCi/g	6.511E-002	6.443E-002	6.636E-001	3.257E-001	-0.28	0.0651
SN-126	17459	-3.558E-001pCi/g	8.245E-001	8.243E-001	2.749E+000	1.352E+000	-0.13	0.8245
TA-182	1301	6.142E-001pCi/g	5.525E-001	5.517E-001	1.835E+000	8.906E-001	0.33	0.5525
TC-99M	17412	-6.331E-002pCi/g	7.898E-002	7.890E-002	2.620E-001	1.290E-001	-0.24	0.0790
TH-227	1058	1.965E+000pCi/g	1.983E+000	1.980E+000	6.552E+000	3.239E+000	0.30	1.9825
TH-229	1046	3.332E-001pCi/g	3.014E-001	3.002E-001	4.053E+000	1.977E+000	0.08	0.3014
TH-234	1027	5.142E-001pCi/g	1.278E+000	1.278E+000	6.351E+000	3.118E+000	0.08	1.2779
TL-208	929	3.882E-001pCi/g	9.932E-002	9.725E-002	2.123E-001	9.976E-002	1.83	0.0993
U-235	281	-5.267E-001pCi/g	7.677E-001	7.672E-001	2.130E+000	1.049E+000	-0.25	0.7677
Y-88	74	1.200E-001pCi/g	1.531E-001	1.529E-001	3.472E-001	1.653E-001	0.35	0.1531
ZN-65	31	-4.722E-001pCi/g	4.068E-001	4.061E-001	1.349E+000	6.559E-001	-0.35	0.4068
ZR-95	7	4.516E-001pCi/g	1.936E-001	1.922E-001	4.383E-001	2.068E-001	1.03	0.1936

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.864E+001	pCi/g	2.944E+001	97.28%	-0.3615
		CO-60	1.577E+001	pCi/g	1.646E+001	95.82%	-0.5732
		AM-241	9.669E+001	pCi/g	9.708E+001	99.60%	-0.0539

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 272277 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-272277~2-	LCS	341.90g	1.00	GammaVision	GV10	9 / 30 / 16 19:13	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	5.161E-001pCi/g	4.930E-001	4.923E-001	1.066E+000	5.139E-001	0.48	0.4930
AG-108M	10982	-1.283E-001pCi/g	3.696E-002	3.637E-002	2.872E-001	1.401E-001	-0.45	0.0370
AG-110M	10973	-2.436E-001pCi/g	2.130E-001	2.126E-001	7.050E-001	3.451E-001	-0.35	0.2130
AM-241	10818	9.775E+001pCi/g	5.141E+000	8.314E-001	1.213E+000	6.008E-001	80.58	5.1409
BA-133	10469	7.040E-002pCi/g	1.351E-001	1.350E-001	4.510E-001	2.211E-001	0.16	0.1351
BA-140	10463	1.818E-001pCi/g	1.964E-001	1.962E-001	8.653E-001	4.175E-001	0.21	0.1964
BE-7	10435	-6.992E-001pCi/g	1.118E+000	1.117E+000	3.720E+000	1.828E+000	-0.19	1.1175
BI-207	10195	8.667E-002pCi/g	7.816E-002	7.803E-002	2.212E-001	1.066E-001	0.39	0.0782
BI-210M	10173	6.373E-002pCi/g	1.358E-001	1.357E-001	3.452E-001	1.681E-001	0.18	0.1358
BI-212	10160	1.530E+000pCi/g	1.367E+000	1.365E+000	4.535E+000	2.206E+000	0.34	1.3671
BI-214	10154	5.778E-001pCi/g	1.375E-001	1.341E-001	3.590E-001	1.707E-001	1.61	0.1375
CD-109	9254	1.642E+000pCi/g	2.301E+000	2.299E+000	7.619E+000	3.770E+000	0.22	2.3006
CD-113M	17462	9.148E+000pCi/g	9.992E+002	9.992E+002	3.367E+003	1.646E+003	0.00	999.2489
CE-139	9241	-2.055E-002pCi/g	6.937E-002	6.934E-002	2.318E-001	1.139E-001	-0.09	0.0694
CE-141	9235	1.025E-001pCi/g	7.847E-002	7.830E-002	2.128E-001	1.033E-001	0.48	0.0785
CE-144	9221	-4.688E-001pCi/g	5.253E-001	5.247E-001	1.741E+000	8.573E-001	-0.27	0.5253
CF-249	9215	1.362E-001pCi/g	1.495E-001	1.494E-001	4.985E-001	2.448E-001	0.27	0.1495
CF-251	13690	-3.095E-001pCi/g	3.513E-001	3.502E-001	9.286E-001	4.543E-001	-0.33	0.3513
CO-56	8704	1.879E-002pCi/g	1.572E-002	1.569E-002	2.803E-001	1.350E-001	0.07	0.0157
CO-57	13694	9.703E-002pCi/g	5.787E-002	5.764E-002	1.624E-001	7.956E-002	0.60	0.0579
CO-58	8698	2.483E-003pCi/g	9.680E-002	9.680E-002	3.289E-001	1.594E-001	0.01	0.0968
CO-60	8692	1.614E+001pCi/g	8.382E-001	2.145E-001	1.235E-001	5.442E-002	130.66	0.8382
CR-51	8604	-3.859E-001pCi/g	8.135E-001	8.132E-001	2.716E+000	1.332E+000	-0.14	0.8135
CS-134	8553	1.234E-001pCi/g	1.022E-001	1.020E-001	4.481E-001	2.199E-001	0.28	0.1022
CS-136	8546	1.085E-001pCi/g	7.572E-002	7.546E-002	2.841E-001	1.370E-001	0.38	0.0757
CS-137	8539	2.837E+001pCi/g	1.515E+000	3.427E-001	2.201E-001	1.050E-001	128.88	1.5151
EU-152	7145	4.455E-001pCi/g	3.696E-001	3.689E-001	1.216E+000	5.980E-001	0.37	0.3696
EU-154	7138	-8.727E-001pCi/g	8.178E-001	8.165E-001	2.720E+000	1.317E+000	-0.32	0.8178
EU-155	7131	2.450E-001pCi/g	3.372E-001	3.369E-001	1.118E+000	5.521E-001	0.22	0.3372
FE-59	7073	2.567E-001pCi/g	2.385E-001	2.382E-001	5.017E-001	2.396E-001	0.51	0.2385
GA-68	18005	-3.762E+000pCi/g	5.213E+000	5.209E+000	1.136E+001	5.457E+000	-0.33	5.2128
GD-153	6824	-1.804E-001pCi/g	2.541E-001	2.539E-001	8.419E-001	4.162E-001	-0.21	0.2541
HF-181	6495	9.232E-002pCi/g	1.044E-001	1.043E-001	4.959E-001	2.437E-001	0.19	0.1044
HG-203	6466	9.088E-002pCi/g	8.062E-002	8.045E-002	2.668E-001	1.306E-001	0.34	0.0806
I-131	6380	1.416E-002pCi/g	1.182E-002	1.180E-002	2.746E-001	1.339E-001	0.05	0.0118
IR-192	6303	-3.206E-003pCi/g	3.257E-003	3.251E-003	5.126E-001	2.534E-001	-0.01	0.0033
K-40	6148	-6.666E-002pCi/g	7.052E-001	7.052E-001	1.635E+000	7.434E-001	-0.04	0.7052
LA-140	6096	2.337E-002pCi/g	2.000E-002	1.996E-002	2.006E-001	9.142E-002	0.12	0.0200
MN-54	5382	1.200E-001pCi/g	1.052E-001	1.050E-001	2.364E-001	1.131E-001	0.51	0.1052
NA-22	5201	4.984E-002pCi/g	3.571E-002	3.562E-002	1.182E-001	5.202E-002	0.42	0.0357
NB-94	5160	3.947E-002pCi/g	6.204E-002	6.201E-002	2.207E-001	1.058E-001	0.18	0.0620
NB-95	5154	-1.353E-001pCi/g	9.204E-002	9.177E-002	3.033E-001	1.468E-001	-0.45	0.0920
ND-147	5083	-8.055E-001pCi/g	7.738E-001	7.724E-001	1.795E+000	8.692E-001	-0.45	0.7738
NP-237	4757	-4.782E-001pCi/g	6.851E-001	6.846E-001	2.269E+000	1.123E+000	-0.21	0.6851
NP-239	4751	-2.392E-001pCi/g	3.314E-001	3.311E-001	1.098E+000	5.427E-001	-0.22	0.3314
PA-231	4541	-2.858E+000pCi/g	4.644E+000	4.642E+000	1.540E+001	7.616E+000	-0.19	4.6444
PA-233	4535	-3.087E-003pCi/g	1.223E-001	1.223E-001	1.280E+000	6.331E-001	0.00	0.1223
PA-234	4528	6.645E-001pCi/g	3.995E-001	3.981E-001	5.016E-001	2.427E-001	1.32	0.3995
PA-234M	19453	1.019E+001pCi/g	7.871E+000	7.854E+000	5.194E+001	2.527E+001	0.20	7.8710
PB-210	4467	8.424E+002pCi/g	5.010E+001	7.962E+000	1.486E+001	7.359E+000	56.69	50.1004

PB-212	4454	7.213E-001pCi/g	1.549E-001	1.477E-001	3.494E-001	1.699E-001	2.06	0.1549
PB-214	4448	3.560E-001pCi/g	1.635E-001	1.624E-001	4.269E-001	2.062E-001	0.83	0.1635
PM-144	19585	4.197E-002pCi/g	5.362E-002	5.358E-002	2.115E-001	1.012E-001	0.20	0.0536
PM-146	2464	1.534E-001pCi/g	1.432E-001	1.429E-001	6.480E-001	3.101E-001	0.24	0.1432
RA-226	1950	4.820E-001pCi/g	1.940E+000	1.940E+000	5.198E+000	2.545E+000	0.09	1.9401
RH-106	1882	-1.076E+000pCi/g	8.905E-001	8.888E-001	2.950E+000	1.433E+000	-0.36	0.8905
RU-103	1828	5.218E-002pCi/g	9.724E-002	9.721E-002	2.375E-001	1.149E-001	0.22	0.0972
SB-124	1784	6.289E-002pCi/g	1.316E-001	1.316E-001	4.394E-001	2.156E-001	0.14	0.1316
SB-125	1777	-4.060E-001pCi/g	2.384E-001	2.375E-001	9.120E-001	4.454E-001	-0.45	0.2384
SC-46	1739	-1.325E-001pCi/g	1.242E-001	1.241E-001	5.329E-001	2.611E-001	-0.25	0.1242
SN-113	1570	1.363E-001pCi/g	1.516E-001	1.514E-001	5.030E-001	2.469E-001	0.27	0.1516
SN-126	17459	7.980E-001pCi/g	7.805E-001	7.794E-001	2.583E+000	1.272E+000	0.31	0.7805
TA-182	1301	3.939E-001pCi/g	3.736E-001	3.730E-001	1.242E+000	6.027E-001	0.32	0.3736
TC-99M	17412	-6.172E-002pCi/g	7.271E-002	7.262E-002	2.410E-001	1.188E-001	-0.26	0.0727
TH-227	1058	1.284E+000pCi/g	1.960E+000	1.958E+000	6.493E+000	3.214E+000	0.20	1.9597
TH-229	1046	1.458E+000pCi/g	1.568E+000	1.564E+000	3.942E+000	1.930E+000	0.37	1.5684
TH-234	1027	-1.796E+000pCi/g	5.751E+000	5.750E+000	6.531E+000	3.215E+000	-0.27	5.7506
TL-208	929	1.957E-001pCi/g	1.575E-001	1.572E-001	2.636E-001	1.271E-001	0.74	0.1575
U-235	281	2.796E-001pCi/g	5.431E-001	5.429E-001	1.808E+000	8.902E-001	0.15	0.5431
Y-88	74	-2.025E-001pCi/g	1.338E-001	1.334E-001	3.814E-001	1.849E-001	-0.53	0.1338
ZN-65	31	2.825E-001pCi/g	2.450E-001	2.446E-001	8.132E-001	3.940E-001	0.35	0.2450
ZR-95	7	-1.550E-001pCi/g	1.946E-001	1.944E-001	4.389E-001	2.107E-001	-0.35	0.1946

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-272277~2-A	LCS 160-272277~2-A	CS-137	2.837E+001	pCi/g	2.944E+001	96.35%	-0.4918
		CO-60	1.614E+001	pCi/g	1.645E+001	98.11%	-0.2592
		AM-241	9.775E+001	pCi/g	9.708E+001	100.69%	0.0929

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Blanks Information

SampID	WRKNO	Analyte	Activity	UncTotal	ZFactor

Reagent

Tuna Can LCS_00007

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

74139-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST Grams of Master Source: 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.5	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

St. Louis Radiological Standard Verification

Printed: 9/26/2017 1:46 PM

Standard ID Number: Tuna Can LCS_00007 (1282974)
True Value = 28.79 pCi/g
Date Analyzed: 9/21/2017

Radionuclide: Cs-137

	Replicates	
#1	28.31	pCi/g
#2	28.6	pCi/g
#3	28.53	pCi/g

Mean = 28.48

1 sigma = 0.15132746

1.96 sigma = 0.296602

True Value minus 5% = 27.3505 (True Value - 5%)
True Value plus 5% = 30.2295 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: JW 9/26/17

2nd Reviewed By/Date: RM 9-27-17

Standard ID Number: Tuna Can LCS_00007 (1282974)
True Value = 14.47 pCi/g
Date Analyzed: 9/21/2017

Radionuclide: Co-60

	Replicates	
#1	14.46	pCi/g
#2	14.27	pCi/g
#3	14.39	pCi/g

Mean = 14.3733333

1 sigma = 0.09609024

1.96 sigma = 0.188337

True Value minus 5% = 13.7465 (True Value - 5%)
True Value plus 5% = 15.1935 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: JW 9/26/17

2nd Reviewed By/Date: km 9·27·17

St. Louis Radiological Standard Verification

Printed: 9/26/2017 1:46 PM

Standard ID Number: Tuna Can LCS_00007 (1282974)
True Value = 96.93 pCi/g
Date Analyzed: 9/21/2017

Radionuclide: Am-241

	Replicates	
#1	93.28	pCi/g
#2	93.97	pCi/g
#3	92.89	pCi/g

Mean = 93.38

1 sigma = 0.54690036

1.96 sigma = 1.071925

True Value minus 5% = 92.0835 (True Value - 5%)
True Value plus 5% = 101.7765 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: JW 9/26/17

2nd Reviewed By/Date: RM 9·27·17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Tuna Can LCS_00007

Reagent ID: Tuna Can LCS_00007

Type:	ASTD	Expiration Date:	09/21/2018
Description:	Mixed Gamma Tuna Can LCS	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Watson, Jody L
Storage Location:	Gamma Closet	Vendor:	Analytics
Reagent Volume:	341.900 g	Vendor Lot #:	74139-334
Creation Date:	10/01/2006	Vendor Cat #:	
Open Date:			
Container(s):	1282974		
Comment:			

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Am-241					219.00000	dpm/g
Co-60					136.00000	dpm/g
Cs-137					82.30000	dpm/g

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 325347 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-325347~2-	LCS	341.90g	1.00	GammaVision	GV16	9 / 21 / 17 3:43	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	9.048E-001pCi/g	2.661E-001	2.621E-001	6.631E-001	3.146E-001	1.36	0.2661
AG-108M	10982	3.668E-002pCi/g	1.157E-001	1.157E-001	2.696E-001	1.317E-001	0.14	0.1157
AG-110M	10973	-2.316E-001pCi/g	1.957E-001	1.953E-001	6.472E-001	3.170E-001	-0.36	0.1957
AM-241	10818	9.328E+001pCi/g	4.901E+000	7.673E-001	1.120E+000	5.552E-001	83.26	4.9013
BA-133	10469	-1.453E-001pCi/g	1.365E-001	1.363E-001	4.518E-001	2.219E-001	-0.32	0.1365
BA-140	10463	6.864E-001pCi/g	3.618E-001	3.600E-001	7.634E-001	3.681E-001	0.90	0.3618
BE-7	10435	-1.077E+000pCi/g	1.079E+000	1.078E+000	3.575E+000	1.759E+000	-0.30	1.0795
BI-207	10195	8.400E-002pCi/g	7.160E-002	7.147E-002	2.093E-001	1.011E-001	0.40	0.0716
BI-210M	10173	1.437E-001pCi/g	1.414E-001	1.411E-001	3.403E-001	1.661E-001	0.42	0.1414
BI-212	10160	1.463E+000pCi/g	1.237E+000	1.234E+000	4.096E+000	1.993E+000	0.36	1.2367
BI-214	10154	5.551E-001pCi/g	1.698E-001	1.673E-001	3.340E-001	1.591E-001	1.66	0.1698
CD-109	9254	0.000E+000pCi/g	1.206E+000	1.206E+000	8.996E+000	4.463E+000	0.00	1.2058
CD-113M	17462	-2.036E+001pCi/g	1.066E+003	1.066E+003	3.577E+003	1.755E+003	-0.01	1,065.6537
CE-139	9241	-2.403E-002pCi/g	6.710E-002	6.706E-002	2.238E-001	1.101E-001	-0.11	0.0671
CE-141	9235	-2.619E-002pCi/g	1.673E-001	1.673E-001	5.562E-001	2.753E-001	-0.05	0.1673
CE-144	9221	4.653E-001pCi/g	6.901E-001	6.897E-001	2.286E+000	1.132E+000	0.20	0.6901
CF-249	9215	4.298E-002pCi/g	1.363E-001	1.363E-001	4.555E-001	2.238E-001	0.09	0.1363
CF-251	13690	6.063E-002pCi/g	3.338E-001	3.338E-001	8.475E-001	4.149E-001	0.07	0.3338
CO-56	8704	1.207E-001pCi/g	1.049E-001	1.047E-001	2.271E-001	1.089E-001	0.53	0.1049
CO-57	13694	4.884E-001pCi/g	7.303E-001	7.299E-001	2.419E+000	1.198E+000	0.20	0.7303
CO-58	8698	9.260E-002pCi/g	9.393E-002	9.381E-002	3.126E-001	1.518E-001	0.30	0.0939
CO-60	8692	1.446E+001pCi/g	7.501E-001	1.891E-001	7.878E-002	3.285E-002	183.54	0.7501
CR-51	8604	1.380E+000pCi/g	6.647E-001	6.606E-001	1.513E+000	7.337E-001	0.91	0.6647
CS-134	8553	1.602E-001pCi/g	1.266E-001	1.263E-001	4.088E-001	2.007E-001	0.39	0.1266
CS-136	8546	-4.685E-002pCi/g	1.111E-001	1.111E-001	2.430E-001	1.170E-001	-0.19	0.1111
CS-137	8539	2.831E+001pCi/g	1.508E+000	3.231E-001	2.024E-001	9.666E-002	139.88	1.5079
EU-152	7145	1.876E-001pCi/g	1.741E-001	1.738E-001	1.466E+000	7.240E-001	0.13	0.1741
EU-154	7138	4.033E-001pCi/g	4.069E-001	4.064E-001	2.449E+000	1.185E+000	0.16	0.4069
EU-155	7131	2.237E-001pCi/g	2.684E-001	2.681E-001	1.489E+000	7.387E-001	0.15	0.2684
FE-59	7073	3.201E-002pCi/g	2.488E-001	2.488E-001	5.291E-001	2.545E-001	0.06	0.2488
GA-68	18005	-4.863E-002pCi/g	4.659E+000	4.659E+000	9.945E+000	4.775E+000	0.00	4.6590
GD-153	6824	-9.950E-003pCi/g	1.058E-002	1.057E-002	9.331E-001	4.623E-001	-0.01	0.0106
HF-181	6495	1.083E-001pCi/g	1.229E-001	1.228E-001	4.796E-001	2.360E-001	0.23	0.1229
HG-203	6466	-3.624E-002pCi/g	7.772E-002	7.769E-002	2.596E-001	1.273E-001	-0.14	0.0777
I-131	6380	1.408E-002pCi/g	2.242E-002	2.240E-002	2.512E-001	1.225E-001	0.06	0.0224
IR-192	6303	1.702E-002pCi/g	1.564E-002	1.560E-002	2.984E-001	1.466E-001	0.06	0.0156
K-40	6148	6.025E-001pCi/g	4.185E-001	4.174E-001	1.106E+000	4.874E-001	0.54	0.4185
LA-140	6096	-8.046E-002pCi/g	5.037E-002	5.019E-002	1.685E-001	7.637E-002	-0.48	0.0504
MN-54	5382	6.604E-004pCi/g	1.070E-001	1.070E-001	2.363E-001	1.135E-001	0.00	0.1070
NA-22	5201	-1.279E-001pCi/g	6.593E-002	6.562E-002	2.133E-001	1.003E-001	-0.60	0.0659
NB-94	5160	-5.086E-002pCi/g	8.124E-002	8.120E-002	2.727E-001	1.322E-001	-0.19	0.0812
NB-95	5154	0.000E+000pCi/g	3.061E-002	3.061E-002	2.565E-001	1.239E-001	0.00	0.0306
ND-147	5083	1.060E-001pCi/g	6.941E-001	6.941E-001	1.632E+000	7.906E-001	0.06	0.6941
NP-237	4757	3.913E-001pCi/g	7.714E-001	7.711E-001	2.554E+000	1.267E+000	0.15	0.7714
NP-239	4751	-9.779E-002pCi/g	4.296E-001	4.296E-001	1.425E+000	7.070E-001	-0.07	0.4296
PA-231	4541	0.000E+000pCi/g	1.002E+000	1.002E+000	1.318E+001	6.513E+000	0.00	1.0016
PA-233	4535	-3.806E-003pCi/g	3.221E-001	3.221E-001	1.179E+000	5.834E-001	0.00	0.3221
PA-234	4528	1.113E+000pCi/g	4.538E-001	4.501E-001	1.387E+000	6.863E-001	0.80	0.4538
PA-234M	19453	6.869E+000pCi/g	6.140E+000	6.130E+000	4.528E+001	2.201E+001	0.15	6.1399
PB-210	4467	7.675E+002pCi/g	4.562E+001	7.069E+000	1.340E+001	6.641E+000	57.27	45.6164

PB-212	4454	**1.236E-001**pCi/g	1.686E-001	1.684E-001	5.593E-001	2.754E-001	0.22	0.1686
PB-214	4448	**7.401E-001**pCi/g	1.726E-001	1.683E-001	4.225E-001	2.048E-001	1.75	0.1726
PM-144	19585	**-2.998E-002**pCi/g	6.878E-002	6.877E-002	2.326E-001	1.122E-001	-0.13	0.0688
PM-146	2464	**7.664E-002**pCi/g	2.679E-001	2.679E-001	6.105E-001	2.928E-001	0.13	0.2679
RH-106	1882	**-1.029E+000**pCi/g	1.345E+000	1.344E+000	4.469E+000	2.197E+000	-0.23	1.3453
RU-103	1828	**1.035E-001**pCi/g	9.723E-002	9.709E-002	2.256E-001	1.094E-001	0.46	0.0972
SB-124	1784	**6.493E-002**pCi/g	8.596E-002	8.589E-002	3.647E-001	1.787E-001	0.18	0.0860
SB-125	1777	**1.207E-001**pCi/g	7.017E-002	6.990E-002	8.276E-001	4.043E-001	0.15	0.0702
SC-46	1739	**1.233E-001**pCi/g	9.496E-002	9.475E-002	4.767E-001	2.335E-001	0.26	0.0950
SN-113	1570	**1.378E-001**pCi/g	1.461E-001	1.459E-001	4.842E-001	2.380E-001	0.28	0.1461
SN-126	17459	**-1.547E+000**pCi/g	3.304E+000	3.303E+000	1.091E+001	5.436E+000	-0.14	3.3036
TA-182	1301	**1.291E-001**pCi/g	2.200E-001	2.200E-001	1.126E+000	5.468E-001	0.11	0.2200
TC-99M	17412	**-6.321E-002**pCi/g	9.084E-002	9.077E-002	3.009E-001	1.489E-001	-0.21	0.0908
TH-227	1058	**3.015E+000**pCi/g	5.085E+000	5.082E+000	1.678E+001	8.363E+000	0.18	5.0847
TH-229	1046	**-1.547E+000**pCi/g	1.476E+000	1.471E+000	3.702E+000	1.815E+000	-0.42	1.4764
TH-234	1027	**-4.867E+000**pCi/g	6.764E+000	6.759E+000	2.817E+001	1.404E+001	-0.17	6.7638
TL-208	929	**8.356E-002**pCi/g	9.786E-002	9.777E-002	2.303E-001	1.110E-001	0.36	0.0979
U-235	281	**-2.825E-002**pCi/g	3.082E-002	3.079E-002	2.375E+000	1.175E+000	-0.01	0.0308
Y-88	74	**-8.803E-002**pCi/g	1.370E-001	1.369E-001	2.980E-001	1.438E-001	-0.30	0.1370
ZN-65	31	**2.702E-001**pCi/g	2.035E-001	2.031E-001	6.732E-001	3.253E-001	0.40	0.2035
ZR-95	7	**1.762E-001**pCi/g	1.492E-001	1.490E-001	3.353E-001	1.598E-001	0.53	0.1492

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-325347~2-A	LCS 160-325347~2-A	**CS-137**	2.831E+001	pCi/g	2.879E+001	98.34%	-0.2223
		CO-60	1.446E+001	pCi/g	1.447E+001	99.89%	-0.0145
		AM-241	9.328E+001	pCi/g	9.693E+001	96.23%	-0.5168

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 327342 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-327342~2-	LCS	341.90g	1.00	GammaVision	GV16	9 / 21 / 17 4:42	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	8.500E-001pCi/g	4.315E-001	4.293E-001	9.173E-001	4.417E-001	0.93	0.4315
AG-108M	10982	9.481E-002pCi/g	4.196E-002	4.168E-002	1.710E-001	8.234E-002	0.55	0.0420
AG-110M	10973	2.660E-001pCi/g	1.258E-001	1.250E-001	5.898E-001	2.883E-001	0.45	0.1258
AM-241	10818	9.397E+001pCi/g	4.945E+000	8.199E-001	1.222E+000	6.061E-001	76.89	4.9452
BA-133	10469	-1.453E-001pCi/g	1.318E-001	1.315E-001	4.360E-001	2.140E-001	-0.33	0.1318
BA-140	10463	5.361E-002pCi/g	3.530E-001	3.530E-001	8.313E-001	4.020E-001	0.06	0.3530
BE-7	10435	-1.086E+000pCi/g	1.072E+000	1.071E+000	3.550E+000	1.746E+000	-0.31	1.0722
BI-207	10195	2.619E-002pCi/g	6.426E-002	6.425E-002	2.170E-001	1.050E-001	0.12	0.0643
BI-210M	10173	1.103E-001pCi/g	1.431E-001	1.430E-001	4.310E-001	2.115E-001	0.26	0.1431
BI-212	10160	1.101E+000pCi/g	8.695E-001	8.676E-001	2.882E+000	1.386E+000	0.38	0.8695
BI-214	10154	5.139E-001pCi/g	1.198E-001	1.168E-001	3.497E-001	1.670E-001	1.47	0.1198
CD-109	9254	6.280E-001pCi/g	2.773E+000	2.773E+000	9.198E+000	4.564E+000	0.07	2.7735
CD-113M	17462	-1.256E+003pCi/g	1.086E+003	1.083E+003	3.587E+003	1.760E+003	-0.35	1,085.7017
CE-139	9241	6.951E-002pCi/g	6.700E-002	6.668E-002	2.210E-001	1.087E-001	0.31	0.0670
CE-141	9235	9.782E-002pCi/g	1.627E-001	1.627E-001	5.395E-001	2.670E-001	0.18	0.1627
CE-144	9221	4.705E-001pCi/g	6.877E-001	6.873E-001	2.278E+000	1.128E+000	0.21	0.6877
CF-249	9215	1.320E-001pCi/g	1.307E-001	1.305E-001	4.332E-001	2.126E-001	0.30	0.1307
CF-251	13690	-3.563E-001pCi/g	3.086E-001	3.070E-001	1.017E+000	4.995E-001	-0.35	0.3086
CO-56	8704	1.030E-001pCi/g	4.239E-002	4.206E-002	2.271E-001	1.089E-001	0.45	0.0424
CO-57	13694	5.054E-002pCi/g	5.763E-002	5.757E-002	1.911E-001	9.406E-002	0.26	0.0576
CO-58	8698	-1.279E-001pCi/g	7.199E-002	7.168E-002	3.394E-001	1.652E-001	-0.38	0.0720
CO-60	8692	1.427E+001pCi/g	7.415E-001	1.906E-001	7.412E-002	3.052E-002	192.59	0.7415
CR-51	8604	-8.335E-001pCi/g	4.560E-001	4.538E-001	4.338E+000	2.146E+000	-0.19	0.4560
CS-134	8553	1.485E-001pCi/g	1.204E-001	1.201E-001	4.276E-001	2.101E-001	0.35	0.1204
CS-136	8546	9.370E-002pCi/g	2.502E-002	2.443E-002	2.556E-001	1.233E-001	0.37	0.0250
CS-137	8539	2.860E+001pCi/g	1.523E+000	3.276E-001	2.249E-001	1.079E-001	127.17	1.5234
EU-152	7145	-3.312E-001pCi/g	1.998E-001	1.991E-001	1.602E+000	7.919E-001	-0.21	0.1998
EU-154	7138	5.882E-001pCi/g	3.374E-001	3.360E-001	2.309E+000	1.116E+000	0.25	0.3374
EU-155	7131	9.622E-002pCi/g	4.703E-001	4.703E-001	1.560E+000	7.741E-001	0.06	0.4703
FE-59	7073	-2.265E-001pCi/g	2.692E-001	2.690E-001	5.651E-001	2.725E-001	-0.40	0.2692
GA-68	18005	1.605E+000pCi/g	4.810E+000	4.809E+000	1.020E+001	4.904E+000	0.16	4.8096
GD-153	6824	-9.427E-002pCi/g	2.781E-001	2.780E-001	9.227E-001	4.571E-001	-0.10	0.2781
HF-181	6495	-1.433E-001pCi/g	1.439E-001	1.437E-001	4.765E-001	2.344E-001	-0.30	0.1439
HG-203	6466	8.908E-002pCi/g	7.501E-002	7.484E-002	2.480E-001	1.214E-001	0.36	0.0750
I-131	6380	7.504E-002pCi/g	7.274E-002	7.264E-002	2.476E-001	1.207E-001	0.30	0.0727
IR-192	6303	6.064E-002pCi/g	1.383E-001	1.382E-001	4.593E-001	2.271E-001	0.13	0.1383
K-40	6148	2.839E-002pCi/g	5.578E-001	5.578E-001	1.382E+000	6.252E-001	0.02	0.5578
LA-140	6096	-1.272E-002pCi/g	6.694E-002	6.694E-002	1.343E-001	5.927E-002	-0.09	0.0669
MN-54	5382	-1.293E-002pCi/g	7.314E-002	7.314E-002	2.220E-001	1.064E-001	-0.06	0.0731
NA-22	5201	-9.911E-002pCi/g	5.513E-002	5.491E-002	1.791E-001	8.323E-002	-0.55	0.0551
NB-94	5160	7.171E-002pCi/g	8.219E-002	8.210E-002	2.744E-001	1.331E-001	0.26	0.0822
NB-95	5154	6.785E-002pCi/g	6.382E-002	6.373E-002	2.130E-001	1.022E-001	0.32	0.0638
ND-147	5083	-3.054E-001pCi/g	7.104E-001	7.102E-001	1.663E+000	8.061E-001	-0.18	0.7104
NP-237	4757	-5.319E-001pCi/g	1.657E+000	1.657E+000	2.693E+000	1.337E+000	-0.20	1.6574
NP-239	4751	2.641E-001pCi/g	4.419E-001	4.416E-001	1.462E+000	7.256E-001	0.18	0.4419
PA-231	4541	-9.132E-002pCi/g	9.741E-002	9.729E-002	1.310E+001	6.472E+000	-0.01	0.0974
PA-233	4535	3.446E-001pCi/g	3.778E-001	3.774E-001	1.090E+000	5.386E-001	0.32	0.3778
PA-234	4528	2.876E-001pCi/g	4.140E-001	4.137E-001	1.371E+000	6.786E-001	0.21	0.4140
PA-234M	19453	-2.098E+001pCi/g	1.502E+001	1.498E+001	5.286E+001	2.580E+001	-0.40	15.0219
PB-210	4467	8.153E+002pCi/g	4.866E+001	8.716E+000	1.491E+001	7.395E+000	54.69	48.6615

PB-212	4454	**5.258E-001**pCi/g	1.077E-001	1.021E-001	3.165E-001	1.540E-001	1.66	0.1077
PB-214	4448	**6.432E-001**pCi/g	1.307E-001	1.263E-001	3.806E-001	1.838E-001	1.69	0.1307
PM-144	19585	**-6.996E-002**pCi/g	8.109E-002	8.101E-002	2.708E-001	1.313E-001	-0.26	0.0811
PM-146	2464	**2.538E-001**pCi/g	2.166E-001	2.162E-001	4.878E-001	2.315E-001	0.52	0.2166
RH-106	1882	**9.992E-001**pCi/g	1.049E+000	1.048E+000	3.485E+000	1.705E+000	0.29	1.0495
RU-103	1828	**-1.026E-002**pCi/g	7.167E-002	7.167E-002	2.444E-001	1.187E-001	-0.04	0.0717
SB-124	1784	**-1.032E-001**pCi/g	1.298E-001	1.297E-001	4.310E-001	2.118E-001	-0.24	0.1298
SB-125	1777	**-1.763E-001**pCi/g	1.830E-001	1.828E-001	8.131E-001	3.971E-001	-0.22	0.1830
SC-46	1739	**1.436E-001**pCi/g	1.225E-001	1.223E-001	4.056E-001	1.980E-001	0.35	0.1225
SN-113	1570	**-9.433E-002**pCi/g	7.930E-002	7.915E-002	5.086E-001	2.502E-001	-0.19	0.0793
SN-126	17459	**-1.523E+000**pCi/g	3.319E+000	3.318E+000	1.096E+001	5.462E+000	-0.14	3.3190
TA-182	1301	**2.064E-001**pCi/g	3.682E-001	3.680E-001	1.234E+000	6.007E-001	0.17	0.3682
TC-99M	17412	**0.000E+000**pCi/g	3.379E-002	3.379E-002	3.005E-001	1.487E-001	0.00	0.0338
TH-227	1058	**-3.064E+000**pCi/g	5.199E+000	5.196E+000	1.716E+001	8.551E+000	-0.18	5.1990
TH-229	1046	**-1.641E+000**pCi/g	1.217E+000	1.210E+000	3.998E+000	1.963E+000	-0.41	1.2168
TH-234	1027	**-4.774E+000**pCi/g	7.226E+000	7.222E+000	2.799E+001	1.395E+001	-0.17	7.2259
TL-208	929	**2.380E-001**pCi/g	9.205E-002	9.122E-002	2.092E-001	1.004E-001	1.14	0.0920
U-235	281	**0.000E+000**pCi/g	2.223E-001	2.223E-001	2.402E+000	1.189E+000	0.00	0.2223
Y-88	74	**-1.225E-001**pCi/g	1.401E-001	1.399E-001	3.034E-001	1.465E-001	-0.40	0.1401
ZN-65	31	**-1.401E-001**pCi/g	2.510E-001	2.509E-001	8.418E-001	4.096E-001	-0.17	0.2510
ZR-95	7	**-4.541E-003**pCi/g	4.520E-003	4.514E-003	4.071E-001	1.957E-001	-0.01	0.0045

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-327342~2-A	LCS 160-327342~2-A	**CS-137**	2.860E+001	pCi/g	2.879E+001	99.33%	-0.0887
		CO-60	1.427E+001	pCi/g	1.447E+001	98.62%	-0.1892
		AM-241	9.397E+001	pCi/g	9.693E+001	96.95%	-0.4168

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Analysis Report for Gamma Spectroscopy

Batch: 327322 **Operator:**

SampID	WRKNO	Aliquot	Sigma	Instrument	Detector	CountDateTime	CountDuration
LCS 160-327322~2-	LCS	341.90g	1.00	GammaVision	GV16	9 / 21 / 17 3:01	30

Analyte	Cmpnd#	Activity	TotalUnc	CountUnc	MDA	MLCC	Act/MDA	
AC-228	11136	8.750E-002pCi/g	4.692E-001	4.692E-001	1.026E+000	4.960E-001	0.09	0.4692
AG-108M	10982	3.131E-002pCi/g	4.204E-002	4.201E-002	2.628E-001	1.283E-001	0.12	0.0420
AG-110M	10973	1.045E-001pCi/g	8.401E-002	8.384E-002	5.938E-001	2.903E-001	0.18	0.0840
AM-241	10818	9.289E+001pCi/g	4.865E+000	6.537E-001	9.745E-001	4.823E-001	95.32	4.8649
BA-133	10469	1.368E-001pCi/g	1.303E-001	1.301E-001	4.317E-001	2.119E-001	0.32	0.1303
BA-140	10463	2.647E-001pCi/g	3.485E-001	3.482E-001	8.135E-001	3.931E-001	0.33	0.3485
BE-7	10435	-1.104E+000pCi/g	1.063E+000	1.061E+000	3.519E+000	1.730E+000	-0.31	1.0630
BI-207	10195	1.758E-002pCi/g	2.874E-002	2.873E-002	2.146E-001	1.038E-001	0.08	0.0287
BI-210M	10173	-6.782E-002pCi/g	1.268E-001	1.267E-001	4.230E-001	2.075E-001	-0.16	0.1268
BI-212	10160	-9.206E-001pCi/g	1.301E+000	1.300E+000	3.534E+000	1.712E+000	-0.26	1.3012
BI-214	10154	6.724E-001pCi/g	2.010E-001	1.979E-001	3.908E-001	1.875E-001	1.72	0.2010
CD-109	9254	5.730E+000pCi/g	1.460E+000	1.425E+000	3.488E+000	1.709E+000	1.64	1.4600
CD-113M	17462	-2.443E+002pCi/g	1.040E+003	1.040E+003	3.484E+003	1.709E+003	-0.07	1,040.1179
CE-139	9241	-5.180E-002pCi/g	7.253E-002	7.237E-002	2.405E-001	1.184E-001	-0.22	0.0725
CE-141	9235	-1.095E-001pCi/g	1.695E-001	1.694E-001	5.616E-001	2.780E-001	-0.19	0.1695
CE-144	9221	-4.716E-001pCi/g	7.236E-001	7.231E-001	2.397E+000	1.187E+000	-0.20	0.7236
CF-249	9215	1.332E-001pCi/g	1.321E-001	1.319E-001	4.376E-001	2.149E-001	0.30	0.1321
CF-251	13690	2.555E-001pCi/g	3.216E-001	3.208E-001	8.102E-001	3.963E-001	0.32	0.3216
CO-56	8704	7.595E-002pCi/g	4.158E-002	4.139E-002	2.386E-001	1.146E-001	0.32	0.0416
CO-57	13694	6.304E-002pCi/g	5.399E-002	5.389E-002	1.784E-001	8.773E-002	0.35	0.0540
CO-58	8698	4.917E-002pCi/g	9.888E-002	9.885E-002	3.320E-001	1.615E-001	0.15	0.0989
CO-60	8692	1.439E+001pCi/g	7.463E-001	1.867E-001	7.056E-002	2.874E-002	203.99	0.7463
CR-51	8604	-1.736E-002pCi/g	5.160E-001	5.160E-001	2.376E+000	1.165E+000	-0.01	0.5160
CS-134	8553	2.089E-001pCi/g	1.678E-001	1.674E-001	4.023E-001	1.974E-001	0.52	0.1678
CS-136	8546	8.617E-002pCi/g	5.071E-002	5.047E-002	2.414E-001	1.162E-001	0.36	0.0507
CS-137	8539	2.853E+001pCi/g	1.519E+000	3.225E-001	1.931E-001	9.202E-002	147.72	1.5188
EU-152	7145	6.155E-001pCi/g	3.994E-001	3.981E-001	1.428E+000	7.051E-001	0.43	0.3994
EU-154	7138	7.701E-001pCi/g	4.669E-001	4.652E-001	2.363E+000	1.142E+000	0.33	0.4669
EU-155	7131	2.663E-001pCi/g	4.397E-001	4.395E-001	1.455E+000	7.218E-001	0.18	0.4397
FE-59	7073	-4.433E-002pCi/g	2.429E-001	2.429E-001	5.165E-001	2.483E-001	-0.09	0.2429
GA-68	18005	-2.186E+000pCi/g	5.044E+000	5.043E+000	1.068E+001	5.136E+000	-0.20	5.0442
GD-153	6824	7.494E-002pCi/g	3.280E-001	3.280E-001	1.088E+000	5.398E-001	0.07	0.3280
HF-181	6495	1.034E-001pCi/g	1.372E-001	1.371E-001	4.695E-001	2.310E-001	0.22	0.1372
HG-203	6466	-1.999E-002pCi/g	7.720E-002	7.719E-002	2.586E-001	1.268E-001	-0.08	0.0772
I-131	6380	1.331E-002pCi/g	1.020E-001	1.020E-001	2.485E-001	1.212E-001	0.05	0.1020
IR-192	6303	2.431E-002pCi/g	1.338E-001	1.338E-001	4.456E-001	2.202E-001	0.05	0.1338
K-40	6148	-8.047E-001pCi/g	2.674E+000	2.674E+000	1.708E+000	7.880E-001	-0.47	2.6744
LA-140	6096	8.073E-002pCi/g	7.575E-002	7.563E-002	1.128E-001	4.852E-002	0.72	0.0757
MN-54	5382	1.764E-002pCi/g	1.033E-001	1.033E-001	2.279E-001	1.093E-001	0.08	0.1033
NA-22	5201	3.114E-002pCi/g	4.610E-002	4.608E-002	1.592E-001	7.327E-002	0.20	0.0461
NB-94	5160	9.861E-002pCi/g	7.976E-002	7.960E-002	2.642E-001	1.280E-001	0.37	0.0798
NB-95	5154	0.000E+000pCi/g	4.536E-002	4.536E-002	2.484E-001	1.199E-001	0.00	0.0454
ND-147	5083	1.353E+000pCi/g	6.646E-001	6.601E-001	1.513E+000	7.312E-001	0.89	0.6646
NP-237	4757	-5.262E-001pCi/g	3.908E-001	3.897E-001	2.736E+000	1.358E+000	-0.19	0.3908
NP-239	4751	-2.565E-001pCi/g	4.286E-001	4.284E-001	1.418E+000	7.037E-001	-0.18	0.4286
PA-231	4541	-5.356E-008pCi/g	3.922E+000	3.922E+000	1.307E+001	6.461E+000	0.00	3.9218
PA-233	4535	-3.806E-003pCi/g	1.397E-001	1.397E-001	1.069E+000	5.284E-001	0.00	0.1397
PA-234	4528	3.080E-001pCi/g	2.599E-001	2.594E-001	5.782E-001	2.820E-001	0.53	0.2599
PA-234M	19453	1.595E+001pCi/g	1.353E+001	1.350E+001	4.482E+001	2.178E+001	0.36	13.5253
PB-210	4467	7.622E+002pCi/g	4.531E+001	7.090E+000	1.361E+001	6.748E+000	55.98	45.3109

PB-212	4454	7.513E-001pCi/g	1.780E-001	1.712E-001	3.711E-001	1.813E-001	2.02	0.1780
PB-214	4448	5.325E-001pCi/g	1.616E-001	1.592E-001	4.404E-001	2.137E-001	1.21	0.1616
PM-144	19585	3.767E-002pCi/g	5.127E-002	5.124E-002	2.457E-001	1.188E-001	0.15	0.0513
PM-146	2464	-3.219E-001pCi/g	2.884E-001	2.879E-001	6.460E-001	3.105E-001	-0.50	0.2884
RH-106	1882	1.934E+000pCi/g	1.280E+000	1.276E+000	4.067E+000	1.996E+000	0.48	1.2804
RU-103	1828	1.121E-001pCi/g	5.519E-002	5.488E-002	1.474E-001	7.024E-002	0.76	0.0552
SB-124	1784	1.132E-001pCi/g	1.399E-001	1.398E-001	3.919E-001	1.923E-001	0.29	0.1399
SB-125	1777	1.076E-001pCi/g	8.679E-002	8.662E-002	8.612E-001	4.211E-001	0.12	0.0868
SC-46	1739	0.000E+000pCi/g	6.229E-002	6.229E-002	4.333E-001	2.118E-001	0.00	0.0623
SN-113	1570	5.394E-002pCi/g	1.424E-001	1.424E-001	4.754E-001	2.336E-001	0.11	0.1424
SN-126	17459	-1.519E+000pCi/g	3.303E+000	3.302E+000	1.090E+001	5.435E+000	-0.14	3.3026
TA-182	1301	-4.896E-001pCi/g	3.452E-001	3.444E-001	1.139E+000	5.530E-001	-0.43	0.3452
TC-99M	17412	0.000E+000pCi/g	1.694E-002	1.694E-002	3.153E-001	1.561E-001	0.00	0.0169
TH-227	1058	7.587E-001pCi/g	1.843E+000	1.843E+000	6.115E+000	3.029E+000	0.12	1.8434
TH-229	1046	-1.629E+000pCi/g	1.554E+000	1.548E+000	3.893E+000	1.910E+000	-0.42	1.5535
TH-234	1027	-4.783E+000pCi/g	1.167E+000	1.140E+000	2.788E+001	1.390E+001	-0.17	1.1667
TL-208	929	3.622E-001pCi/g	9.634E-002	9.449E-002	1.952E-001	9.343E-002	1.86	0.0963
U-235	281	3.472E-001pCi/g	7.050E-001	7.048E-001	2.523E+000	1.250E+000	0.14	0.7050
Y-88	74	-9.672E-003pCi/g	1.010E-002	1.009E-002	2.867E-001	1.382E-001	-0.03	0.0101
ZN-65	31	0.000E+000pCi/g	1.100E-001	1.100E-001	7.843E-001	3.808E-001	0.00	0.1100
ZR-95	7	-5.796E-002pCi/g	1.604E-001	1.604E-001	3.658E-001	1.750E-001	-0.16	0.1604

Laboratory Control Sample Information

Sample ID	WRKNO	Analyte	Activity		StdAdded	Recovery	ZFactor
LCS 160-327322~2-A	LCS 160-327322~2-A	CS-137	2.853E+001	pCi/g	2.879E+001	99.09%	-0.1216
		CO-60	1.439E+001	pCi/g	1.447E+001	99.44%	-0.0771
		AM-241	9.289E+001	pCi/g	9.693E+001	95.83%	-0.5747

Sample Duplicate Information

Sample ID	Dup Sample ID	Analyte	Samp Activity	Dup Activity	RPD	RER	DER	Flag	ZFactor

Reagent

Tuna Can_00002

Rc'd 2/3/10

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

Customer: TestAmerica/St. Louis, MO
P.O. No.: 2339090, Item 1
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.017570

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.141E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.034E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	2.822E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.471E+04	1.488E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	2.124E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	4.790E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	2.938E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	1.926E+03	0.6	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.077E+05	7.163E+03	0.4	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	3.611E+03	0.5	1.9	3.9	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	3.612E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	7.569E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Comments:
1550 grams of sand.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/1/10
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty*, % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

U-232_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

85539-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2434448, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-232	2.517E+04	1.725E+04	0.5	2.4	4.9	08/25/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 daughters, γ-impurities (other than decay products) < 0.1 %.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 8/25/11
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

U-232_00040

St. Louis Radiological Standard Verification

Printed: 12/21/2017 12:45 PM

Standard ID Number: U-232_00040 (Clean)
True Value = 77.177 dpm/mL
Date Analyzed: 12/20/2017

Radionuclide: U-232

	Replicates	
#1	83.23	dpm/mL
#2	76.85	dpm/mL
#3	78.14	dpm/mL

Mean = 79.4066667

1 sigma = 3.37334157

1.96 sigma = 6.611749

True Value minus 5% = 73.31815 (True Value - 5%)
True Value plus 5% = 81.03585 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: ALD 12/21/17

2nd Reviewed By/Date: Rm 12·21·17

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	8/25/2011 0:00		
Decayto Date/Time (t):	12/20/17 0:00		
Initial Activity (A_0):	82.25	dpm	
Initial Aliquot:	1	mL	
Initial Conc:	82.245	dpm/mL	
***Soln. Density:**	1	g/mL	
Nuclide:	U-232		
Half-Life (days):	25165.725	decay days	fraction
****Decay Factor:**	0.9384	2309.00	0.09175
Decay Corr Activity:	7.7177E+01	dpm	
Decay Corr Conc:	7.7177E+01	dpm/mL	

Conversion/Calculations

Final Activity Unit:	dpm	
Activity Unit Factor:	1.00000	
Final Volume Unit:	mL	
Volume Unit Factor:	1.000	
Final Concentration:	7.7177E+01	dpm/mL
Aliquot Volume:	1.0000E+00	mL
Final Activity (A):	7.7177E+01	dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:50:32AM 12/21/2017

Sample

Sample Name: Ver1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U232 Clean
AnalysisResultsID: 206424
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

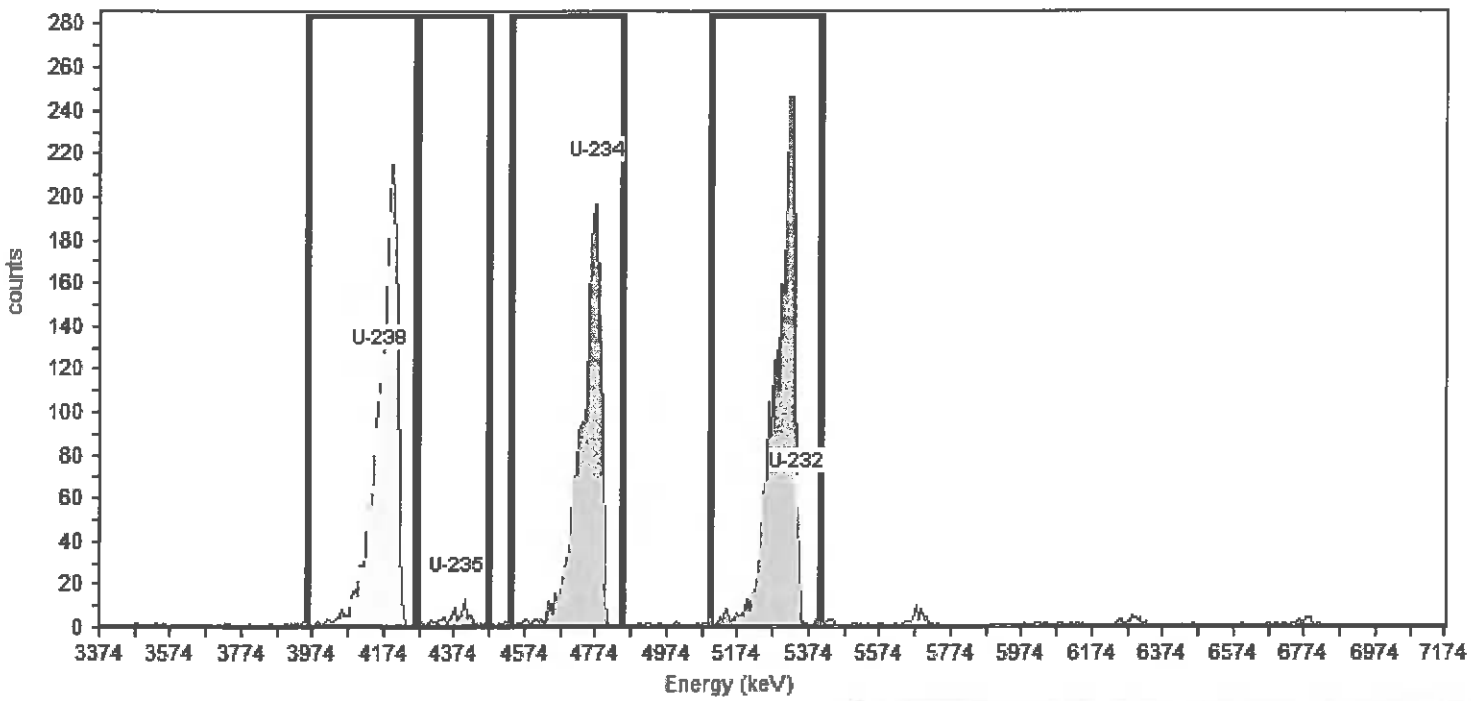
Tracer Name: UNAT_00013
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 11:48:31AM

Tracer Nuclide: U-238
Tracer Recovery: 114.55%

Acquisition

Detector: AV239 SN: 51-005EE1
Acquisition Start Date: 12/20/2017 7:23:04PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 11/17/2017 3:28:16PM
Bkgd Info: Sample: ICB;AV239; Det: AV239; Spectrum #1; 11/17/2017 3:28:16 PM

Energy Calibration: IC-9794;AV239-20171114
Efficiency Calibration:IC-9794;AV239-20171114
Calibration Date: 11/15/2017 8:27:30AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.25% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:12/20/2017 7:22:15PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	62.0	100.0	1770	2.0000	1768.00	8.278E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	52.3	80.2	83	4.0000	79.00	4.026E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	62.5	99.8	1701	3.0000	1698.00	6.954E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	72.6	100.1	2043	5.0000	2038.00	8.323E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:51:03AM 12/21/2017

Sample

Sample Name: Ver2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U232 Clean
AnalysisResultsID: 206425
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

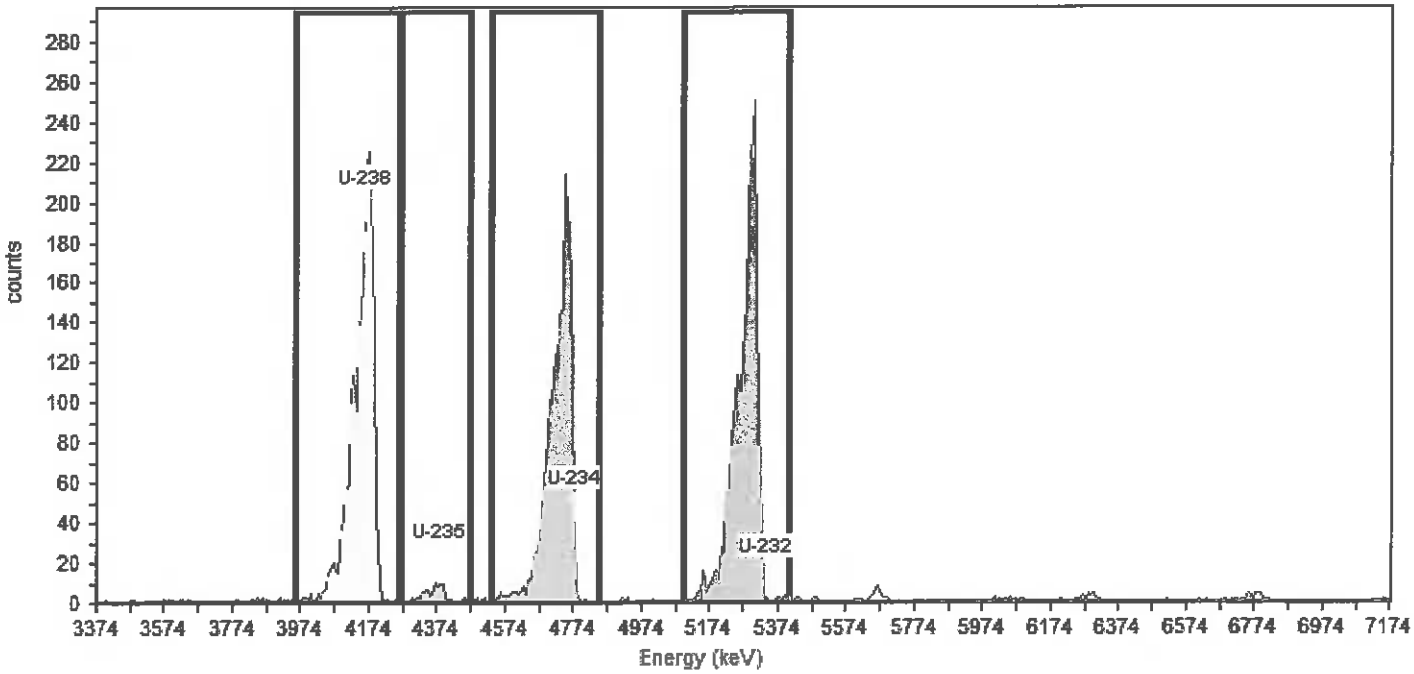
Tracer Name: UNAT_00013
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 11:48:31AM

Tracer Nuclide: U-238
Tracer Recovery: 103.73%

Acquisition

Detector: AV240 SN: 51-005Q1
Acquisition Start Date: 12/20/2017 7:23:05PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Background Date: 11/17/2017 3:28:16PM
Bkgd Info: Sample: ICB;AV240; Det: AV240; Spectrum #1; 11/17/2017 3:28:16 PM

Energy Calibration: IC-9795;AV240-20171114
Efficiency Calibration:IC-9795;AV240-20171114
Calibration Date: 11/15/2017 8:27:37AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.17% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:12/20/2017 7:22:15PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	63.1	100.0	1884	1.0000	1883.00	7.496E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	63.7	80.2	74	1.0000	73.00	3.493E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	71.3	99.8	1817	4.0000	1813.00	6.972E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	67.7	100.1	2005	1.0000	2004.00	7.685E+001	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:51:36AM 12/21/2017

Sample

Sample Name: Ver3 Type: Sample
Spectrum #1 Analysis #1

Sample Collection Date:
Comment:

Sample Volume : 0.10 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: U232 Clean
AnalysisResultsID: 206426
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

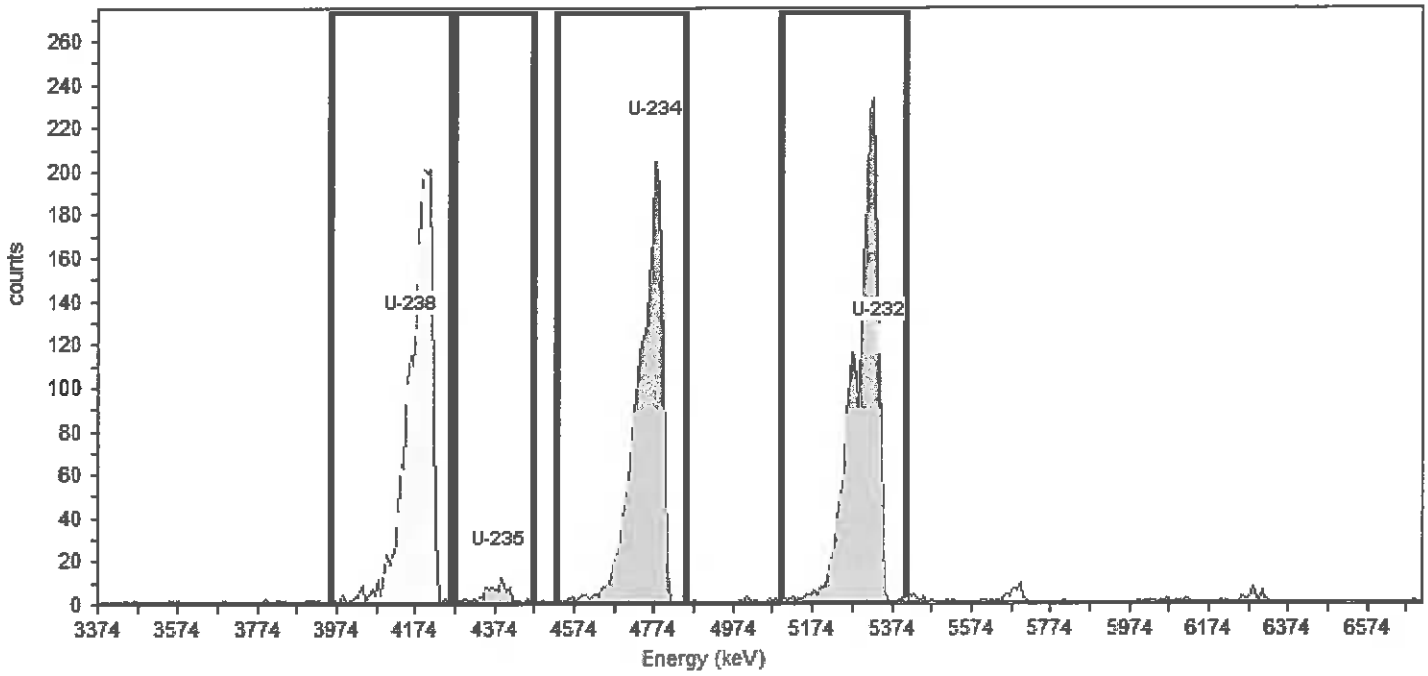
Tracer Name: UNAT_00013
Tracer Activity: 72.26 DPM / mL x (Vol.) 0.10 mL = 7.23 DPM
Tracer Ref. Date: 3/30/2008 11:48:31AM

Tracer Nuclide: U-238
Tracer Recovery: 122.50%

Acquisition

Detector: AV242 SN: 51-005P7
Acquisition Start Date: 12/20/2017 7:23:05PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 11/17/2017 3:28:17PM
Bkgd Info: Sample: ICB;AV242; Det: AV242; Spectrum #1; 11/17/2017 3:28:17 PM

Energy Calibration: IC-9884;AV242-20171114a
Efficiency Calibration:IC-9884;AV242-20171114a
Calibration Date: 11/15/2017 8:27:49AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI_U-232
Decay Correction:12/20/2017 7:22:15PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	70.6	100.0	1873	0.0000	1873.00	8.853E+001	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	60.4	80.2	81	1.0000	80.00	3.849E+000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.8	99.8	1864	4.0000	1860.00	7.191E+001	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	64.8	100.1	2039	12.0000	2027.00	7.814E+001	DPM/mL

U-232 Clean Tracer VER.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Standard Verification (coppt.)

Batch No. : _____

Balance ID : —

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	VER. 1	0.1	239	
2	2	1	240	
3	3		242	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n No. : UNAT-00013

Vol (mL) : 0.1

Ref Activity (dpm/mL) : _____

Act Ref Date : _____

Samples Spiked and Traced By:

SLB 12/19/17

Initials / Date

Verification Signature & Date:

PM 12/19/17

Initials / Date

LCS Standard ☐ N/A

Initials / Date

Isotope : U-232 Clean

Std Sol'n ID. : U-232-00040

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 82.245

Act Ref Date : 08-25-11

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.		☐	ST-RC-0040 Rev.		☐	ST-RC-0110 Rev.	
☐	ST-RC-0004 Rev.		☐	ST-RC-0041 Rev.		☐	ST-RC-0120 Rev.	
☐	ST-RC-0014 Rev.		☐	ST-RC-0050 Rev.		☐	ST-RC-0232 Rev.	
☐	ST-RC-0020 Rev.		☐	ST-RC-0090 Rev.		☐	ST-RC-0238 Rev.	
☐	ST-RC-0021 Rev.		☐	ST-RC-0100 Rev.		☐	ST-RC-0240 Rev.	
						☐	ST-RC-0241 Rev.	
						☐	ST-RC-0242 Rev.	
						☐	ST-RC-5016 Rev.	
						☐		
						☐		

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

U-232 Clean Tracer Ver.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Standard Verification ONLY

Batch No. : _____

(COPPA) Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	VER. 1 RC²: 136	0.1	235	RC: 247
2	2 RC²: 137	1	237	RC: 248
3	3 RC²: 138	1	238	Shift RC: 249
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Clean

Isotope : U-232

Std Sol'n No. : U-232-00040

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 82.245

Act Ref Date : 08-25-11

Samples Spiked and Traced By: SNB 12/19/17 (Initials / Date)

Verification Signature & Date: DAM 12/19/17 (Initials / Date)

LCS Standard ☐ N/A

		Initials / Date
Isotope :		
Std Sol'n ID. :		
Vol (mL) :		
Ref Activity (dpm/mL) :		
Act Ref Date :		

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☐	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☐	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:04:10AM 12/28/2017

Sample

Sample Name: Verification 1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: U-232 Clean Tracer Only
AnalysisID: 718500

Analyst: 60040

Tracer

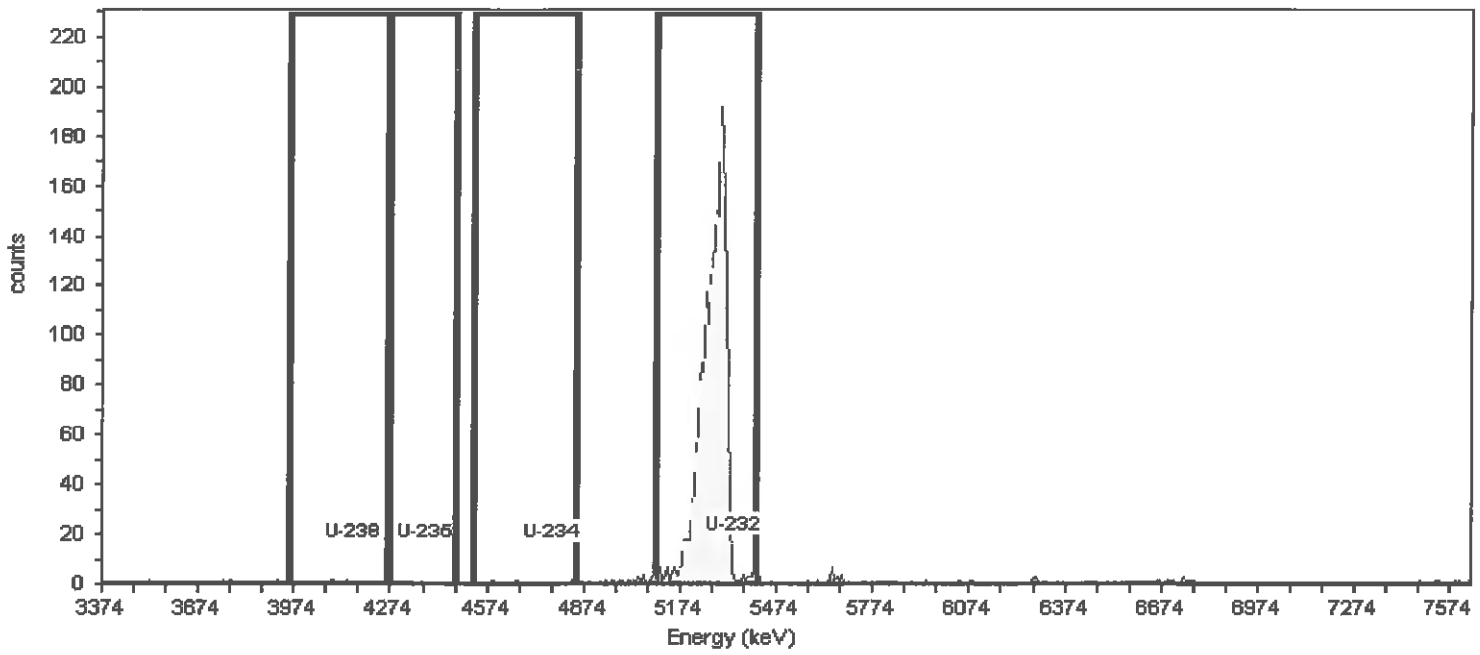
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM/mL x (Vol.)0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:00:28PM

Tracer Nuclide: U-232
Tracer Recovery: 104.22%

Acquisition

Detector: AV136
Serial Number: 49-169O2
Acquisition Start Date: 12/27/2017 4:45:29PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 12/19/2017 12:17:35PM
Background Info: Sample: ICB;AV136; Det: AV136; Spectrum #1; Dec-19-2017 12:17

Calibration Name: IC-9885;AV136-20170802
Calibration Date: 8/2/2017 4:16:31PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.16% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 12/27/2017 4:44:20PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	88.1	100.0	2	1.0000	1.00	0.041	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.0000	0.00	0.000	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	10.7	99.8	3	2.0000	1.00	0.041	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	80.0	100.1	1873	1.0000	1872.00	85.715	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:04:25AM 12/28/2017

Sample

Sample Name: Verification 2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: U-232 Clean Tracer Only
AnalysisID: 718499

Analyst: 60040

Tracer

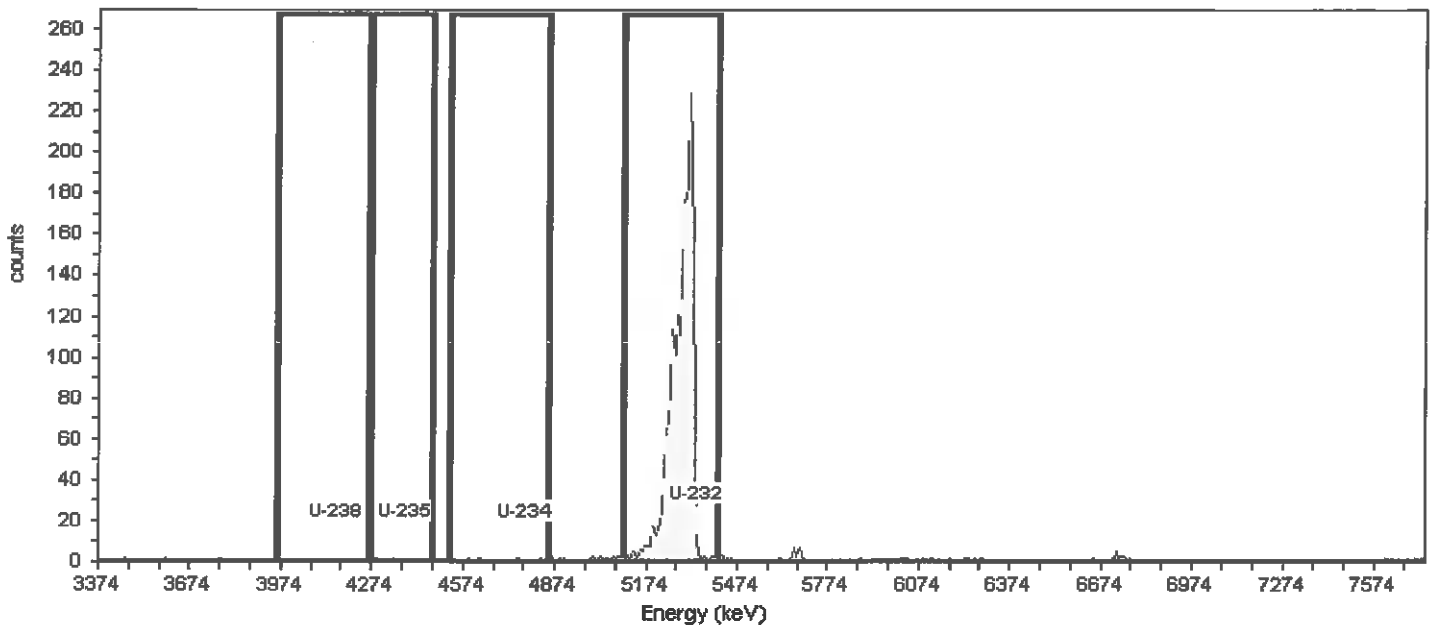
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM/mL x (Vol.)0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:00:28PM

Tracer Nuclide: U-232
Tracer Recovery: 121.04%

Acquisition

Detector: AV137
Serial Number: 49-16904
Acquisition Start Date: 12/27/2017 4:45:26PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 12/19/2017 12:17:34PM
Background Info: Sample: ICB;AV137; Det: AV137; Spectrum #1; Dec-19-2017 12:17

Calibration Name: IC-9886;AV137-20170802
Calibration Date: 8/2/2017 4:17:12PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.93% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 12/27/2017 4:44:20PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	.0	100.0	0	0.0000	0.00	0.000	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.3	80.2	3	0.0000	3.00	0.147	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	10.2	99.8	4	0.0000	4.00	0.157	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	71.3	100.1	1974	1.0000	1973.00	99.546	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:04:39AM 12/28/2017

Sample

Sample Name: Verification 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: U-232 Clean Tracer Only
AnalysisID: 718501

Analyst: 60040

Tracer

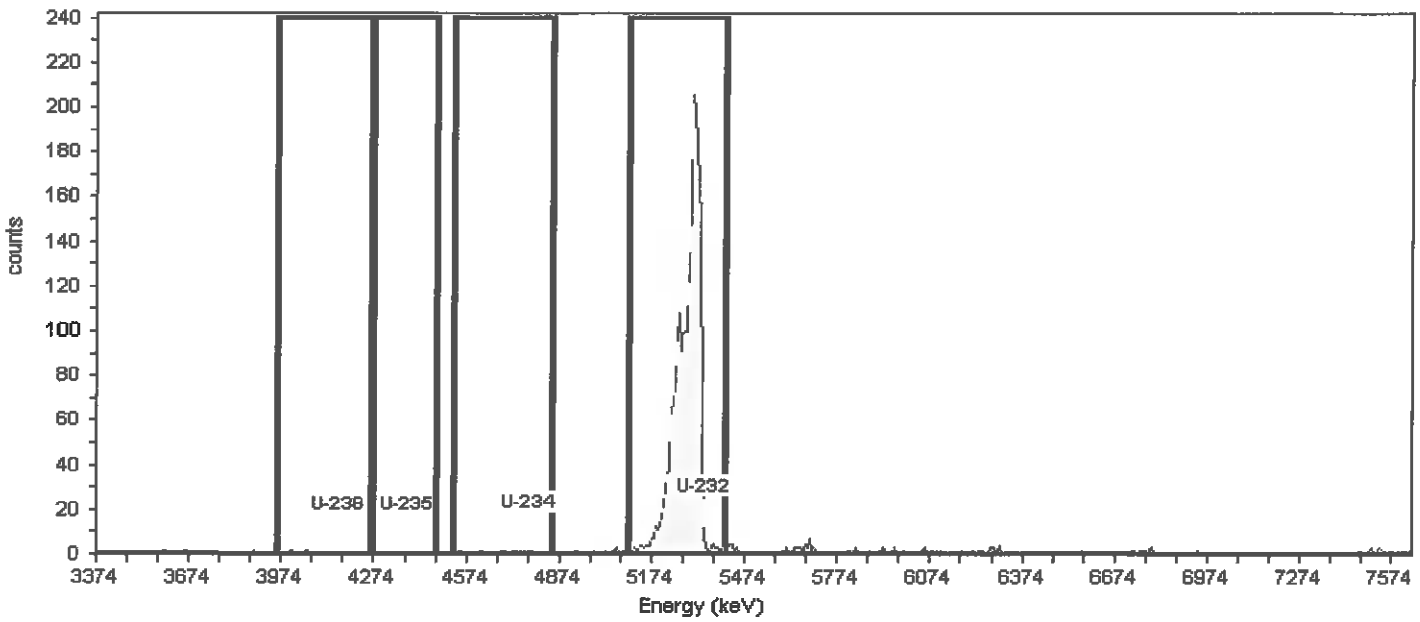
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM/mL x (Vol.)0.10 mL = 8.22 DPM
Tracer Ref. Date: 8/25/2011 12:00:28PM

Tracer Nuclide: U-232
Tracer Recovery: 104.17%

Acquisition

Detector: AV138
Serial Number: 49-179B7
Acquisition Start Date: 12/27/2017 4:45:25PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 12/19/2017 12:17:36PM
Background Info: Sample: ICB;AV138; Det: AV138; Spectrum #1; Dec-19-2017 12:17

Calibration Name: IC-7107;AV138-20170802
Calibration Date: 8/3/2017 8:14:16AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.42% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 12/27/2017 4:44:20PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	91.2	100.0	2	0.0000	2.00	0.082	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	1.0000	-1.00	-0.051	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	247.6	99.8	10	3.0000	7.00	0.287	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	75.8	100.1	1892	1.0000	1891.00	85.675	DPM/mL

Reagent

UNAT Ampoule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	**0.000052841**	**0.0072543**
Atom Ratio Uncertainty:	**0.000000082**	**0.0000040**

	^{234}U	^{235}U	^{238}U
Atom Percent:	**0.0052458**	**0.72017**	**99.27458**
Atom Percent Uncertainty:	**0.0000081**	**0.00039**	**0.00039**
Weight Percent:	**0.0051579**	**0.71114**	**99.28370**
Weight Percent Uncertainty:	**0.0000080**	**0.00038**	**0.00038**

Relative Atomic Weight:	**238.028918**
Relative Atomic Weight Uncertainty:	**0.000012**

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crl: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 μg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

UNAT_00014

St. Louis Radiological Standard Verification

Printed: 12/18/2017 8:24 AM

Standard ID Number: UNAT_00013
True Value = 70.689 dpm/mL
Date Analyzed: 11/28/2017

Radionuclide: U-234

	Replicates	
#1	72.749	dpm/mL
#2	75.297	dpm/mL
#3	73.437	dpm/mL

Mean = 73.8276667

1 sigma = 1.31815831

1.96 sigma = 2.58359

True Value minus 5% = 67.15455 (True Value - 5%)
True Value plus 5% = 74.22345 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: Rm 12·21·17

2nd Reviewed By/Date: ALD 12/18/17

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	3/30/2008 0:00		
Decayto Date/Time (t):	11/28/17 0:00		
Initial Activity (A_0):	70.69 dpm		
Initial Aliquot:	1 mL		
Initial Conc:	70.69123 dpm/mL		
***Soln. Density:**	1 g/mL		
Nuclide:	U-234		
Half-Life (days):	89668875	decay days	fraction
****Decay Factor:**	1.0000	3530.00	0.00004
Decay Corr Activity:	7.0689E+01 dpm		
Decay Corr Conc:	7.0689E+01 dpm/mL		

Conversion/Calculations

Final Activity Unit:	dpm
Activity Unit Factor:	1.00000
Final Volume Unit:	mL
Volume Unit Factor:	1.000
Final Concentration:	7.0689E+01 dpm/mL
Aliquot Volume:	1.0000E+00 mL
Final Activity (A):	7.0689E+01 dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:28PM 12/15/2017

Sample

Sample Name: Verification 1
SampleType: Sample

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Sample Collection Date:

Batch

Batch Name: U-232_00039
AnalysisID: 717874

Analyst: 60040

Tracer

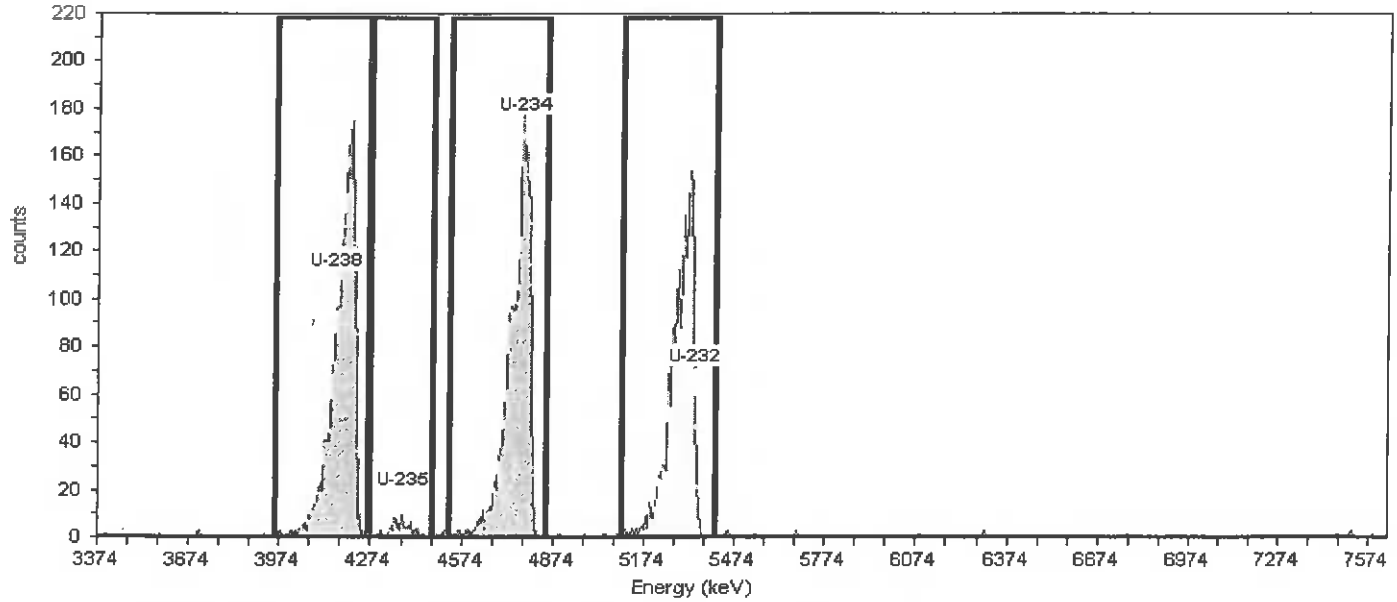
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 90.40%

Acquisition

Detector: AV118
Serial Number: 49-037F4
Acquisition Start Date: 11/28/2017 6:15:19PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:24PM
Background Info: Sample: ICB;AV118; Det: AV118; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9795;AV118-20170802
Calibration Date: 8/2/2017 1:38:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.06% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	78.5	100.0	1637	0.0000	1637.00	72.382	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	64.9	80.2	56	0.0000	56.00	3.087	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	75.3	99.8	1642	0.0000	1642.00	72.749	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	80.2	100.1	1524	1.0000	1523.00	70.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:58PM 12/15/2017

Sample

Sample Name: Verification 2
SampleType: Sample

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Sample Collection Date:

Batch

Batch Name: U-232_00039
AnalysisID: 717875

Analyst: 60040

Tracer

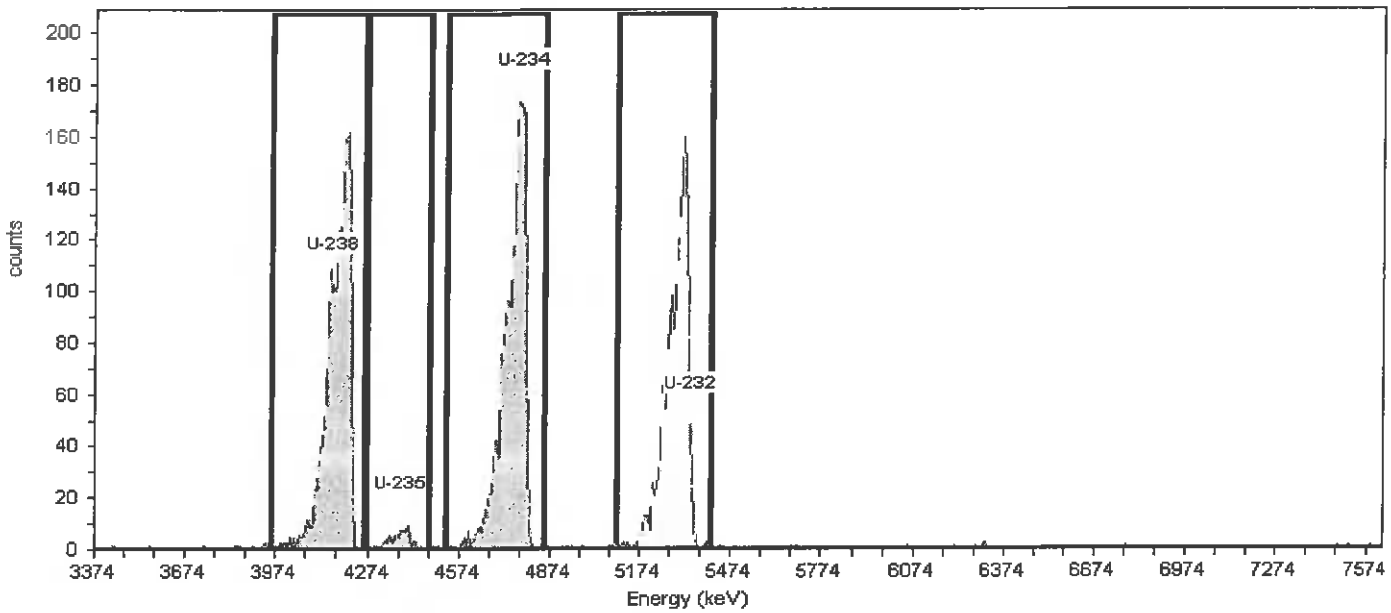
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 99.72%

Acquisition

Detector: AV119
Serial Number: 49-037G6
Acquisition Start Date: 11/28/2017 6:15:20PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:26PM
Background Info: Sample: ICB;AV119; Det: AV119; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9817;AV119-20170802
Calibration Date: 8/2/2017 1:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.42% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	84.0	100.0	1604	0.0000	1604.00	71.534	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	61.4	80.2	69	0.0000	69.00	3.837	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	71.1	99.8	1686	1.0000	1685.00	75.297	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	78.4	100.1	1513	3.0000	1510.00	77.261	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:34:11PM 12/15/2017

Sample

Sample Name: Verification 3
SampleType: Sample

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Sample Collection Date:

Batch

Batch Name: U-232_00039
AnalysisID: 717876

Analyst: 60040

Tracer

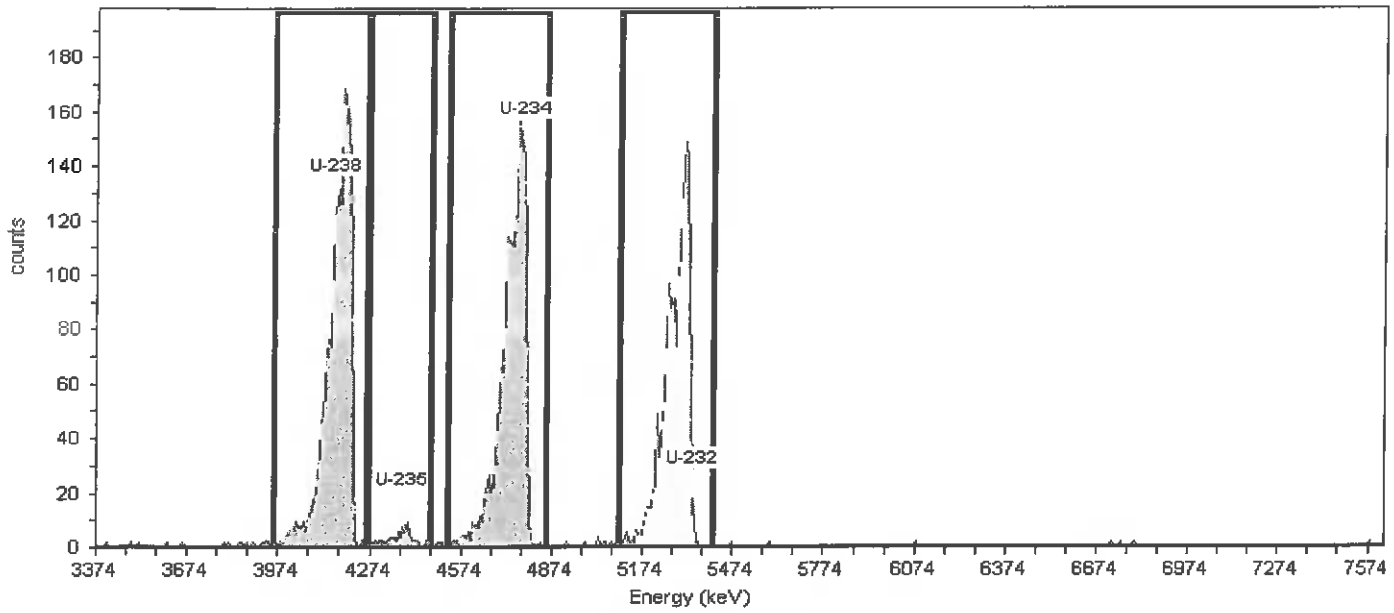
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 104.37%

Acquisition

Detector: AV120
Serial Number: 49-037W3
Acquisition Start Date: 11/28/2017 6:15:21PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:28PM
Background Info: Sample: ICB;AV120; Det: AV120; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9884;AV120-20170802
Calibration Date: 8/2/2017 1:39:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.48% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.0	100.0	1748	1.0000	1747.00	77.552	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	39.5	80.2	67	0.0000	67.00	3.708	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	80.4	99.8	1651	0.0000	1651.00	73.437	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	89.6	100.1	1519	2.0000	1517.00	80.860	DPM/mL

Ref. 3·30·2008

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT_00013

Reagent ID: UNAT_00013

		Expiration Date:	12/22/2017
Description:	UNAT spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	1M HNO3
Reagent Volume:	200.000 mL	Solvent Lot:	n/a
Creation Date:	11/16/2016		
Open Date:			
Container(s):	1047854		
Comment:	only U-234 and U-238 are controlled as spike analytes, and therefore we have not verified the U-235		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-234	UNAT Parent_00001	12/22/2017	706.91200	dpm/mL	70.69123	dpm/mL
U-235	UNAT Parent_00001	12/22/2017	33.70600	dpm/mL	3.37064	dpm/mL
U-238	UNAT Parent_00001	12/22/2017	722.65000	dpm/mL	72.26499	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
UNAT Parent_00001	UNAT Parent		12/22/17				20.00000	mL

testAmerica

THE LEADER IN ENVIRONMENTAL TESTING

U-232 Tracer Ver.

Aliquot Only

Batch No.

Balance ID :

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	Ver 1	0.1	113	DC = 118
2	2	1	116	1 = 119
3	3	1	117	1 = 120
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n No. : UNAT-00013

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 72.2650 (U-238)

Act Ref Date : 3-30-08

New Brunswick

Samples Spiked and Traced By: SVB 11/22/17 (Initials / Date)

Verification Signature & Date: amm 11/22/2017 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : U-232 unclean

Std Sol'n ID. : U-232-00039

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 77.476

Act Ref Date : 04-07-03

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☐	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☐	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Uranium only via UTEVA

ST-RC-0238

Batch:

*All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

UTEVA lot: UTSR17E

11.4.4 UTEVA cartridge

11.4.5 5mL 3M HNO_3 — COMPLETED

11.4.6 Load sample

11.4.7 25mL 3M HNO_3 — COMPLETED

11.4.8 5mL 9M HCl — COMPLETED

11.4.9 20mL 5M HCl / 0.05M oxalic — COMPLETED

11.4.10-11.4.11 Elute into clean tube with 15mL 1M HCl — COMPLETED

Form: RAD-0060, Revised 09/17/13

St. Louis Radiological Standard Verification

Printed: 12/18/2017 8:22 AM

Standard ID Number: UNAT_00013
True Value = 72.265 dpm/mL
Date Analyzed: 11/28/2017

Radionuclide: U-238

	Replicates	
#1	72.382	dpm/mL
#2	71.534	dpm/mL
#3	77.552	dpm/mL

Mean = 73.8226667

1 sigma = 3.25741022

1.96 sigma = 6.384524

True Value minus 5% = 68.65175 (True Value - 5%)
True Value plus 5% = 75.87825 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DoD/DOE Consolidated QSM and LANL Statements of Work

1st Reviewed By/Date: Rm 12-18-17

2nd Reviewed By/Date: ALD 12/18/17

Decay Calculations

Raw Sample/Standard Information

Initial Date/Time (t_0):	3/30/2008 0:00		
Decayto Date/Time (t):	11/28/17 0:00		
Initial Activity (A_0):	72.26 dpm		
Initial Aliquot:	1 mL		
Initial Conc:	72.26499 dpm/mL		
***Soln. Density:**	1 g/mL		
Nuclide:	U-238		
Half-Life (days):	1.63194E+12	decay days	fraction
****Decay Factor:**	1.0000	3530.00	0.00000
Decay Corr Activity:	7.2265E+01 dpm		
Decay Corr Conc:	7.2265E+01 dpm/mL		

Conversion/Calculations

Final Activity Unit:	dpm
Activity Unit Factor:	1.00000
Final Volume Unit:	mL
Volume Unit Factor:	1.000
Final Concentration:	7.2265E+01 dpm/mL
Aliquot Volume:	1.0000E+00 mL
Final Activity (A):	7.2265E+01 dpm

** Uses basic decay equation: $A = A_0 * \exp(-\ln(2)*(t-t_0)/(\text{half-life})$

* Soln. Density to be used when converting from liquid expressed in mass (g) units to liquid units (mL), and is only applied in that case.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:28PM 12/15/2017

Sample

Sample Name: Verification 1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: U-232_00039
AnalysisID: 717874

Analyst: 60040

Tracer

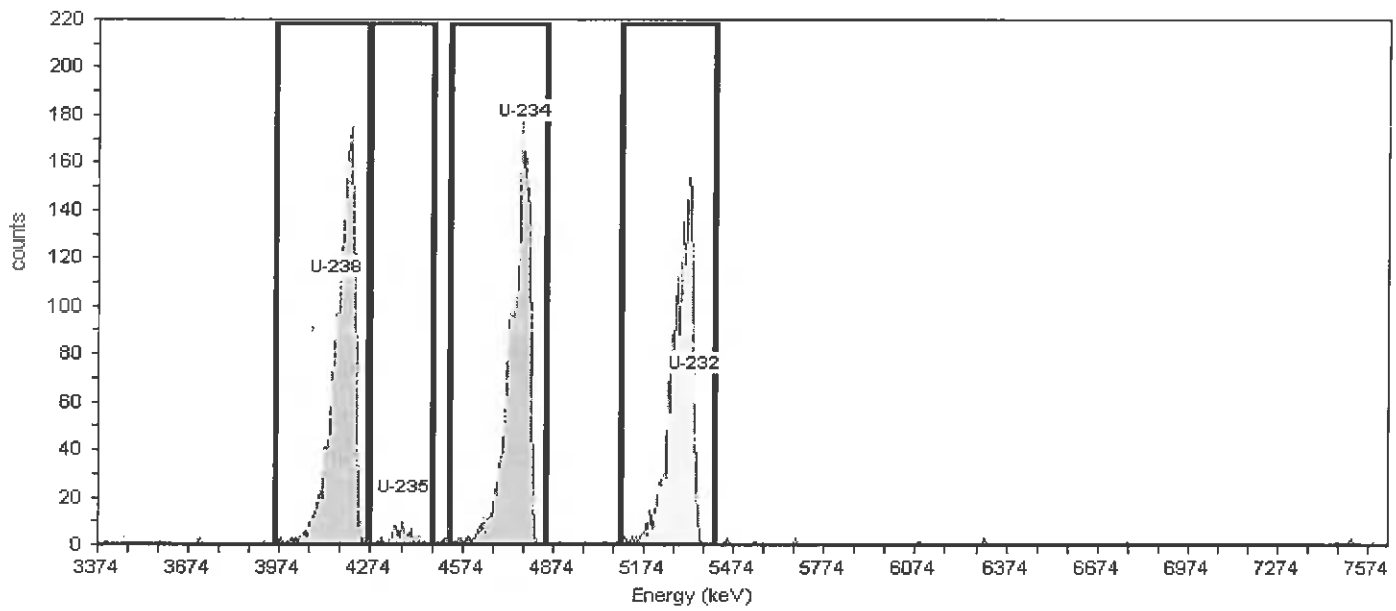
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 90.40%

Acquisition

Detector: AV118
Serial Number: 49-037F4
Acquisition Start Date: 11/28/2017 6:15:19PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:24PM
Background Info: Sample: ICB;AV118; Det: AV118; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9795;AV118-20170802
Calibration Date: 8/2/2017 1:38:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.06% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	78.5	100.0	1637	0.0000	1637.00	72.382	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	64.9	80.2	56	0.0000	56.00	3.087	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	75.3	99.8	1642	0.0000	1642.00	72.749	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	80.2	100.1	1524	1.0000	1523.00	70.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:33:58PM 12/15/2017

Sample

Sample Name: Verification 2
SampleType: Sample

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Sample Collection Date:

Batch

Batch Name: U-232_00039
AnalysisID: 717875

Analyst: 60040

Tracer

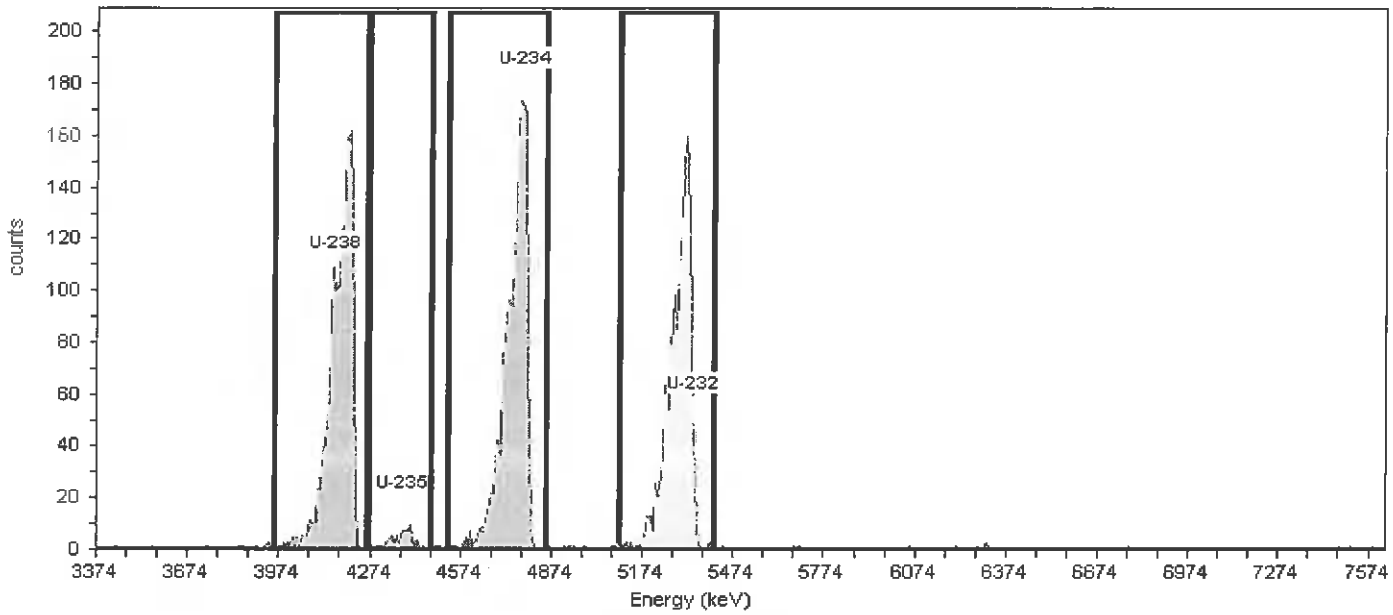
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 99.72%

Acquisition

Detector: AV119
Serial Number: 49-037G6
Acquisition Start Date: 11/28/2017 6:15:20PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:26PM
Background Info: Sample: ICB;AV119; Det: AV119; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9817;AV119-20170802
Calibration Date: 8/2/2017 1:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.42% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	84.0	100.0	1604	0.0000	1604.00	71.534	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	61.4	80.2	69	0.0000	69.00	3.837	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	71.1	99.8	1686	1.0000	1685.00	75.297	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	78.4	100.1	1513	3.0000	1510.00	77.261	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:34:11PM 12/15/2017

Sample

Sample Name: Verification 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: U-232_00039
AnalysisID: 717876

Analyst: 60040

Tracer

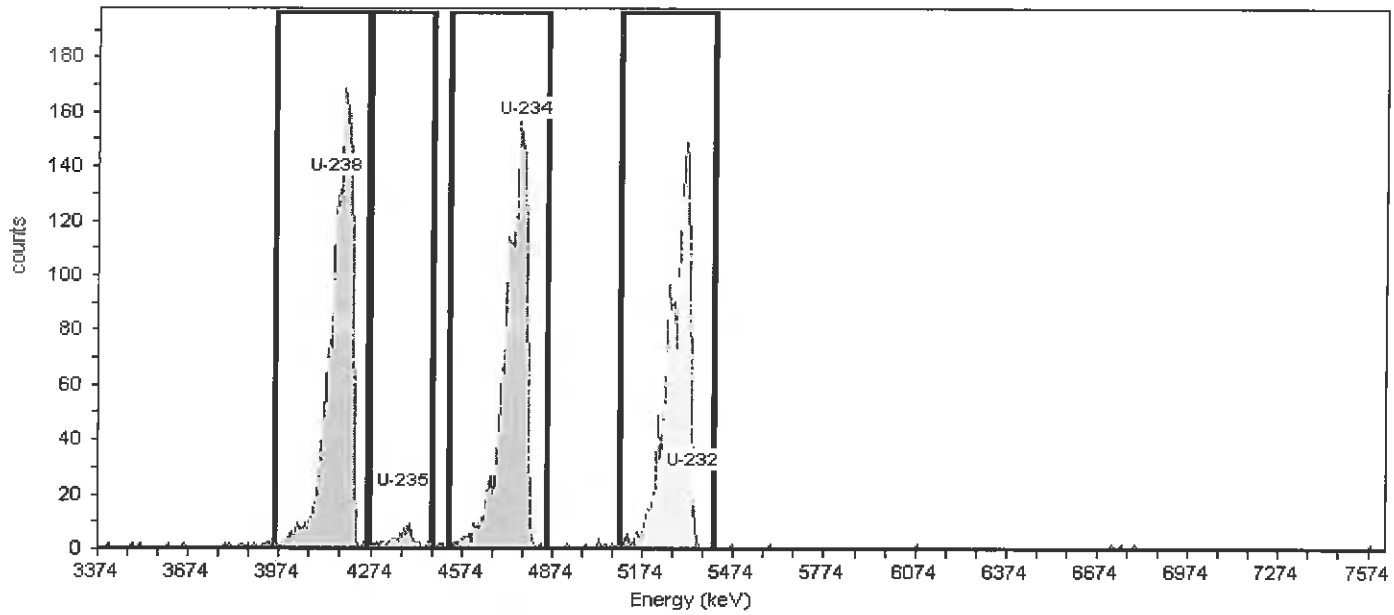
Tracer Name: U-232_00039
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 11:00:47PM

Tracer Nuclide: U-232
Tracer Recovery: 104.37%

Acquisition

Detector: AV120
Serial Number: 49-037W3
Acquisition Start Date: 11/28/2017 6:15:21PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Background Date: 11/18/2017 3:51:28PM
Background Info: Sample: ICB;AV120; Det: AV120; Spectrum #1; Nov-18-2017 15:51

Calibration Name: IC-9884;AV120-20170802
Calibration Date: 8/2/2017 1:39:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.48% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 11/28/2017 12:43:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.0	100.0	1748	1.0000	1747.00	77.552	DPM/mL
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	39.5	80.2	67	0.0000	67.00	3.708	DPM/mL
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	80.4	99.8	1651	0.0000	1651.00	73.437	DPM/mL
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	89.6	100.1	1519	2.0000	1517.00	80.860	DPM/mL

Rf. 3·30·2008

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

UNAT_00013

Reagent ID: UNAT_00013

		Expiration Date:	12/22/2017
Description:	UNAT spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	1M HNO3
Reagent Volume:	200.000 mL	Solvent Lot:	n/a
Creation Date:	11/16/2016		
Open Date:			
Container(s):	1047854		
Comment:	only U-234 and U-238 are controlled as spike analytes, and therefore we have not verified the U-235		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
U-234	UNAT Parent_00001	12/22/2017	706.91200	dpm/mL	70.69123	dpm/mL
U-235	UNAT Parent_00001	12/22/2017	33.70600	dpm/mL	3.37064	dpm/mL
U-238	UNAT Parent_00001	12/22/2017	722.65000	dpm/mL	72.26499	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
UNAT Parent_00001	UNAT Parent		12/22/17				20.00000	mL

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

U-232 Tracer Ver.

Aliquot Only

Batch No. :

960 [illegible]

Balance ID :

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	Ver 1	0.1	113	BC = 118
2	2		116	[illegible] = 119
3	3	1	117	[illegible] = 120
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

Tracer ☐ N/A

Initials / Date

Isotope : UNAT

Std Sol'n No. : UNAT-00013

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 72.2650 (U-238)

Act Ref Date : 3-30-05

New Brunswick

Samples Spiked and Traced By: SAB 11/22/17 (Initials / Date)

Verification Signature & Date: amm 11/22/2017 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : U-232 uncran

Std Sol'n ID. : U-232-00039

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 77.476

Act Ref Date : 04-07-03

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☐	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☐	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☐	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : _____

Date : _____

Reviewed by: _____

Date: _____

\\Slsvr01\RAD\MasterForms\RAD-C045 Rev(3)

Uranium only via UTEVA

ST-RC-0238

Batch: _____

*All rinses should flow at 1 mL/minute (only 3M HNO3 may be done at 3 mL/minute)

UTEVA lot: UTSR17E

11.4.4	UTEVA cartridge	
11.4.5	5mL 3M HNO_3	COMPLETED ☐
11.4.6	Load sample	
11.4.7	25mL 3M HNO_3	COMPLETED ☐
11.4.8	5mL 9M HCl	COMPLETED ☐
11.4.9	20mL 5M HCl / 0.05M oxalic	COMPLETED ☐
11.4.10-11.4.11	Elute into clean tube with 15mL 1M HCl	COMPLETED ☐

Form: RAD-0060, Revised 09/17/13

GENERAL CHEMISTRY

COVER PAGE
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-29881-1

SDG No.:

Project: Former Carnotite Site - Non-Rad Analysis

Client Sample ID	Lab Sample ID
CRC-B9-0406	160-29881-1
CRC-B6-0204	160-29881-2
CRC-B1-0406	160-29881-3
CRC-B7-0204	160-29881-4
CRC-B22-0506	160-29881-5
CRC-B7-0406	160-29881-6
CRC-B4-0608	160-29881-7
CRC-B14-0204	160-29881-8
CRC-B17-0204	160-29881-9
CRC-B5-0204	160-29881-10
CRC-B5-0608	160-29881-11
CRC-B11-0204	160-29881-12
CRC-B4-1012	160-29881-13
CRC-B4-1820	160-29881-14
CRC-B12-0002	160-29881-15
CRC-B12-0406	160-29881-16
CRC-B12-1214	160-29881-17
CRC-BK1-0203	160-29881-18
CRC-BK2-0102	160-29881-19
CRC-BK2-0304	160-29881-20
CRC-BK4-0102	160-29881-21
CRC-BK6-0002	160-29881-22
CRC-BK6-0406	160-29881-23
CRC-BK7-0405	160-29881-24
CRC-BK9-0506	160-29881-25
CRC-BK8-0102	160-29881-26
CRC-B4-2628	160-29881-27
CRC-B14-0608	160-29881-28
CRC-B14-1012	160-29881-29
CRC-B14-1618	160-29881-30
CRC-B14-2426	160-29881-31
CRC-B17-0406	160-29881-32
CRC-B17-0810	160-29881-33
CRC-B17-1820	160-29881-34
CRC-B17-2628	160-29881-35
CRC-B5-1214	160-29881-36
CRC-B5-1618	160-29881-37
CRC-B5-2224	160-29881-38
CRC-B5-2830	160-29881-39
CRC-B11-1214	160-29881-40
CRC-B11-2022	160-29881-41
CRC-B11-2628	160-29881-42

Comments:

9-IN
DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-29881-1

SDG Number:

Matrix: Solid Instrument ID: NOEQUIP

Method: Moisture RL Date: 01/28/2011 14:43

Analyte	Wavelength/ Mass	RL (%)	
Percent Moisture		0.1	
Percent Solids		0.1	

FORM IX - IN

9-IN
CALIBRATION BLANK DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job Number: 160-29881-1

SDG Number:

Matrix: Solid Instrument ID: NOEQUIP

Method: Moisture XRL Date: 01/28/2011 14:42

Analyte	Wavelength/ Mass	XRL (%)	
Percent Moisture		0.1	
Percent Solids		0.1	

FORM IX - IN

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Instrument ID: NOEQUIP Analysis Method: Moisture

Start Date: 07/31/2018 22:47 End Date: 07/31/2018 22:47

Lab Sample Id	D/F	Type	Time	Analytes	
				% Sol	Moist
160-29881-1	1	T	22:47	X	X
160-29881-1 DU	1	T	22:47	X	X
160-29881-2	1	T	22:47	X	X
160-29881-3	1	T	22:47	X	X
160-29881-4	1	T	22:47	X	X
160-29881-5	1	T	22:47	X	X
160-29881-6	1	T	22:47	X	X
160-29881-7	1	T	22:47	X	X
160-29881-8	1	T	22:47	X	X
160-29881-9	1	T	22:47	X	X
160-29881-10	1	T	22:47	X	X
160-29881-11	1	T	22:47	X	X
160-29881-12	1	T	22:47	X	X
160-29881-13	1	T	22:47	X	X
160-29881-14	1	T	22:47	X	X
160-29881-15	1	T	22:47	X	X
160-29881-16	1	T	22:47	X	X
160-29881-17	1	T	22:47	X	X
160-29881-18	1	T	22:47	X	X
160-29881-19	1	T	22:47	X	X
160-29881-20	1	T	22:47	X	X
160-29881-21	1	T	22:47	X	X
160-29881-22	1	T	22:47	X	X
160-29881-23	1	T	22:47	X	X
160-29881-24	1	T	22:47	X	X
160-29881-25	1	T	22:47	X	X
160-29881-26	1	T	22:47	X	X
160-29881-27	1	T	22:47	X	X
160-29881-28	1	T	22:47	X	X
160-29881-29	1	T	22:47	X	X
160-29881-30	1	T	22:47	X	X
160-29881-31	1	T	22:47	X	X
160-29881-32	1	T	22:47	X	X
160-29881-33	1	T	22:47	X	X
160-29881-34	1	T	22:47	X	X
160-29881-35	1	T	22:47	X	X
160-29881-36	1	T	22:47	X	X
160-29881-37	1	T	22:47	X	X
160-29881-38	1	T	22:47	X	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Instrument ID: NOEQUIP Analysis Method: Moisture

Start Date: 07/31/2018 22:47 End Date: 07/31/2018 22:47

Lab Sample Id	D/F	Type	Time	Analytes																							
				% Sol	Moist																						
160-29881-39	1	T	22:47	X	X																						
160-29881-40	1	T	22:47	X	X																						
160-29881-41	1	T	22:47	X	X																						
160-29881-42	1	T	22:47	X	X																						
160-29881-42 DU	1	T	22:47	X	X																						

Prep Types:
T = Total/NA

FORM XIII-IN

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379546 Batch Start Date: 07/31/18 22:47 Batch Analyst: Braatz, Steve D

Batch Method: Moisture Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	DISH#	DishWeight	SampleMassWet	SampleMassDry		
160-29881-A-1	CRC-B9-0406	Moisture	T	1	1.0116 g	11.8559 g	10.8942 g		
160-29881-A-1 DU	CRC-B9-0406	Moisture	T	2	1.0513 g	13.2831 g	12.1870 g		
160-29881-A-2	CRC-B6-0204	Moisture	T	3	1.0211 g	18.2353 g	17.3599 g		
160-29881-A-3	CRC-B1-0406	Moisture	T	4	1.0340 g	18.9686 g	18.2989 g		
160-29881-A-4	CRC-B7-0204	Moisture	T	5	1.0308 g	14.6278 g	14.2742 g		
160-29881-A-5	CRC-B22-0506	Moisture	T	6	1.0492 g	11.7351 g	11.4574 g		
160-29881-A-6	CRC-B7-0406	Moisture	T	7	1.0572 g	14.2293 g	14.0418 g		
160-29881-A-7	CRC-B4-0608	Moisture	T	8	1.0507 g	13.9629 g	13.6345 g		
160-29881-A-8	CRC-B14-0204	Moisture	T	9	1.0447 g	14.8414 g	14.1739 g		
160-29881-A-9	CRC-B17-0204	Moisture	T	10	1.0330 g	19.0515 g	17.4413 g		
160-29881-A-10	CRC-B5-0204	Moisture	T	11	1.0301 g	11.7467 g	10.2765 g		
160-29881-A-11	CRC-B5-0608	Moisture	T	12	1.0591 g	9.0552 g	8.7591 g		
160-29881-A-12	CRC-B11-0204	Moisture	T	13	1.0329 g	16.0302 g	15.1026 g		
160-29881-B-13	CRC-B4-1012	Moisture	T	14	1.0367 g	13.2871 g	11.9436 g		
160-29881-B-14	CRC-B4-1820	Moisture	T	15	1.0349 g	20.6154 g	16.7433 g		
160-29881-B-15	CRC-B12-0002	Moisture	T	16	1.0380 g	14.6572 g	13.8483 g		
160-29881-B-16	CRC-B12-0406	Moisture	T	17	1.0321 g	13.6515 g	13.0972 g		
160-29881-B-17	CRC-B12-1214	Moisture	T	18	1.0312 g	14.5147 g	12.6071 g		
160-29881-A-18	CRC-BK1-0203	Moisture	T	19	1.0217 g	12.6975 g	11.6669 g		
160-29881-A-19	CRC-BK2-0102	Moisture	T	20	1.0468 g	16.0509 g	14.2117 g		
160-29881-A-20	CRC-BK2-0304	Moisture	T	21	1.0494 g	15.9253 g	13.6734 g		
160-29881-A-21	CRC-BK4-0102	Moisture	T	22	1.0597 g	10.0693 g	9.3334 g		
160-29881-A-22	CRC-BK6-0002	Moisture	T	23	1.0297 g	18.7752 g	16.3158 g		
160-29881-A-23	CRC-BK6-0406	Moisture	T	24	1.0633 g	11.4691 g	10.3407 g		
160-29881-A-24	CRC-BK7-0405	Moisture	T	25	1.0606 g	17.4642 g	15.7924 g		
160-29881-A-25	CRC-BK9-0506	Moisture	T	26	1.0583 g	14.1697 g	13.7322 g		
160-29881-A-26	CRC-BK8-0102	Moisture	T	27	1.0431 g	14.2365 g	13.0953 g		
160-29881-A-27	CRC-B4-2628	Moisture	T	28	1.0550 g	13.4483 g	10.9152 g		
160-29881-B-28	CRC-B14-0608	Moisture	T	29	1.0503 g	10.7305 g	10.5041 g		
160-29881-A-29	CRC-B14-1012	Moisture	T	30	1.0586 g	15.6425 g	13.3637 g		

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379546 Batch Start Date: 07/31/18 22:47 Batch Analyst: Braatz, Steve D

Batch Method: Moisture Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	DISH#	DishWeight	SampleMassWet	SampleMassDry		
160-29881-B-30	CRC-B14-1618	Moisture	T	31	1.0586 g	21.9888 g	17.7578 g		
160-29881-B-31	CRC-B14-2426	Moisture	T	32	1.0578 g	16.1941 g	13.3626 g		
160-29881-A-32	CRC-B17-0406	Moisture	T	33	1.0401 g	14.5080 g	13.2207 g		
160-29881-A-33	CRC-B17-0810	Moisture	T	34	1.0568 g	12.8452 g	11.6227 g		
160-29881-B-34	CRC-B17-1820	Moisture	T	35	1.0347 g	15.8211 g	13.0965 g		
160-29881-B-35	CRC-B17-2628	Moisture	T	36	1.0623 g	14.8754 g	11.3812 g		
160-29881-A-36	CRC-B5-1214	Moisture	T	37	1.0483 g	17.5499 g	14.7334 g		
160-29881-B-37	CRC-B5-1618	Moisture	T	38	1.0687 g	18.0107 g	14.2137 g		
160-29881-B-38	CRC-B5-2224	Moisture	T	39	1.0391 g	21.0513 g	17.2544 g		
160-29881-B-39	CRC-B5-2830	Moisture	T	40	1.0270 g	9.8394 g	6.9327 g		
160-29881-A-40	CRC-B11-1214	Moisture	T	41	1.0593 g	23.3592 g	19.4742 g		
160-29881-A-41	CRC-B11-2022	Moisture	T	42	1.0667 g	14.2480 g	11.3426 g		
160-29881-A-42	CRC-B11-2628	Moisture	T	43	1.0296 g	16.5933 g	14.3591 g		
160-29881-A-42 DU	CRC-B11-2628	Moisture	T	44	1.0514 g	15.3595 g	13.2798 g		

Batch Notes	
Balance ID	0034150065
Batch Comment	TRAY B
Date samples were placed in the oven	07/31/2018
Oven Temp In	103.0 Degrees C
Time samples were place in the oven	23:25
Oven ID	OA
Thermometer ID	A142186

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 380642

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Lab ID: MB 160-380642/1-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 19:55
Detector: AV54
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	-0.07154	0.0708	0.0710	U	pCi/g	1.00	0.133	385818

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.258	0.410	0.603		pCi/g	0.0533	6.05	86.8	30 - 110

Lab ID: LCS 160-380642/2-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 19:55
Detector: AV55
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.20	1.31	2.49		pCi/g	1.00	0.225	385819

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.80	0.880	1.33		pCi/g	0.129	12.1	97.7	30 - 110

Lab ID: 160-29881-1
Client ID: CRC-B9-0406
Sigma: 2

Analyzed: 08/28/18 19:55
Detector: AV56
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.00	0.208	0.225		pCi/g	1.00	0.135	385820

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.03	0.389	0.574		pCi/g	0.0614	6.04	83.3	30 - 110

Lab ID: 160-29881-1 DU
Client ID: CRC-B9-0406
Sigma: 2

Analyzed: 08/28/18 19:55
Detector: AV58
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.9443	0.195	0.211		pCi/g	1.00	0.125	385821

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.675	0.421	0.636		pCi/g	0.0437	6.03	94.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Lab ID: 160-29881-2 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B6-0204 | Detector: AV62 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	11.6	0.649	1.17		pCi/g	1.00	0.127	385822

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.49	0.347	0.513		pCi/g	0.0549	6.05	74.2	30 - 110

Lab ID: 160-29881-3 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B1-0406 | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.11	0.206	0.227		pCi/g	1.00	0.120	385824

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.93	0.362	0.550		pCi/g	0.0472	6.05	81.4	30 - 110

Lab ID: 160-29881-4 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B7-0204 | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	165	2.45	14.1		pCi/g	1.00	0.132	385825

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.63	0.359	0.529		pCi/g	0.0493	6.04	76.6	30 - 110

Lab ID: 160-29881-5 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B22-0506 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.311	0.133	0.136		pCi/g	1.00	0.126	385826

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.84	0.366	0.547		pCi/g	0.0429	6.04	80.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Lab ID: 160-29881-6
Client ID: CRC-B7-0406
Sigma: 2

Analyzed: 08/28/18 19:56
Detector: AV69
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	2.65	0.324	0.393		pCi/g	1.00	0.128	385828

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.66	0.366	0.536		pCi/g	0.0478	6.04	77.1	30 - 110

Lab ID: 160-29881-7
Client ID: CRC-B4-0608
Sigma: 2

Analyzed: 08/28/18 19:56
Detector: AV70
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.451	0.157	0.162		pCi/g	1.00	0.130	385830

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.85	0.387	0.562		pCi/g	0.0549	6.05	80.2	30 - 110

Lab ID: 160-29881-8
Client ID: CRC-B14-0204
Sigma: 2

Analyzed: 08/28/18 19:56
Detector: AV71
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	14.1	0.747	1.40		pCi/g	1.00	0.137	385831

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.08	0.408	0.591		pCi/g	0.0584	6.05	84.0	30 - 110

Lab ID: 160-29881-9
Client ID: CRC-B17-0204
Sigma: 2

Analyzed: 08/28/18 19:56
Detector: AV72
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	89.3	1.69	7.69		pCi/g	1.00	0.122	385832

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.76	0.419	0.640		pCi/g	0.0508	6.02	95.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Lab ID: 160-29881-10 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B5-0204 | Detector: AV73 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	8.76	0.552	0.920		pCi/g	1.00	0.128	385833

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.80	0.437	0.654		pCi/g	0.0548	6.05	95.8	30 - 110

Lab ID: 160-29881-11 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B5-0608 | Detector: AV74 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.182	0.117	0.118		pCi/g	1.00	0.127	385834

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.86	0.377	0.556		pCi/g	0.0354	6.04	80.4	30 - 110

Lab ID: 160-29881-12 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B11-0204 | Detector: AV75 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	10.3	0.578	1.04		pCi/g	1.00	0.118	385835

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	6.24	0.454	0.694		pCi/g	0.0462	6.04	103	30 - 110

Lab ID: 160-29881-13 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B4-1012 | Detector: AV77 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.204	0.118	0.120		pCi/g	1.00	0.126	385836

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.84	0.365	0.547		pCi/g	0.0425	6.06	79.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Lab ID: 160-29881-14 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B4-1820 | Detector: AV78 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.458	0.148	0.153		pCi/g	1.00	0.122	385837

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.91	0.365	0.551		pCi/g	0.0453	6.05	81.1	30 - 110

Lab ID: 160-29881-15 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B12-0002 | Detector: AV79 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.34	0.435	0.625		pCi/g	1.00	0.126	385838

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.84	0.365	0.547		pCi/g	0.0460	6.01	80.5	30 - 110

Lab ID: 160-29881-16 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B12-0406 | Detector: AV80 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.438	0.157	0.161		pCi/g	1.00	0.133	385840

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.44	0.356	0.516		pCi/g	0.0560	6.03	73.7	30 - 110

Lab ID: 160-29881-17 | Analyzed: 08/28/18 19:56 | Decay Corrected: No
Client ID: CRC-B12-1214 | Detector: AV81 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.129	0.108	0.109		pCi/g	1.00	0.126	385841

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.68	0.360	0.533		pCi/g	0.0386	6.04	77.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380642

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-380642/1-A	Thorium-230			-0.07154	U	pCi/g							-2.01496154

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-380642/2-A	Thorium-230		24.5	25.20		pCi/g	103	81 - 118					.406984448

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-1	Thorium-230	1.00		0.9443		pCi/g			6	0.13	0.36	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380642 Batch Start Date: 08/06/18 10:00 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/27/18 11:21

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00023	TRM-2 00002			
MB 160-380642/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-380642/2		ExtChrom, A-01-R		0.5016 g	0.2 mL	0.5016 g			
160-29881-A-1-B	CRC-B9-0406	ExtChrom, A-01-R	T	1.0028 g	0.2 mL				
160-29881-A-1-B DU	CRC-B9-0406	ExtChrom, A-01-R	T	1.0040 g	0.2 mL				
160-29881-A-2-B	CRC-B6-0204	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-3-B	CRC-B1-0406	ExtChrom, A-01-R	T	1.0009 g	0.2 mL				
160-29881-A-4-B	CRC-B7-0204	ExtChrom, A-01-R	T	1.0016 g	0.2 mL				
160-29881-A-5-B	CRC-B22-0506	ExtChrom, A-01-R	T	1.0024 g	0.2 mL				
160-29881-A-6-B	CRC-B7-0406	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-7-B	CRC-B4-0608	ExtChrom, A-01-R	T	1.0004 g	0.2 mL				
160-29881-A-8-B	CRC-B14-0204	ExtChrom, A-01-R	T	1.0004 g	0.2 mL				
160-29881-A-9-B	CRC-B17-0204	ExtChrom, A-01-R	T	1.0053 g	0.2 mL				
160-29881-A-10-B	CRC-B5-0204	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-11-B	CRC-B5-0608	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-12-B	CRC-B11-0204	ExtChrom, A-01-R	T	1.0031 g	0.2 mL				
160-29881-A-13-A	CRC-B4-1012	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
160-29881-A-14-A	CRC-B4-1820	ExtChrom, A-01-R	T	1.0002 g	0.2 mL				
160-29881-A-15-A	CRC-B12-0002	ExtChrom, A-01-R	T	1.0072 g	0.2 mL				
160-29881-A-16-A	CRC-B12-0406	ExtChrom, A-01-R	T	1.0047 g	0.2 mL				
160-29881-B-17-B	CRC-B12-1214	ExtChrom, A-01-R	T	1.0028 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380642 Batch Start Date: 08/06/18 10:00 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/27/18 11:21

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	nmn per scb
Column Date	8/24/18
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	8/27/18
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	TAT
Analyst ID - Reagent Drop	KNF per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:57:32PM 8/28/2018

Sample

Sample Name: MB 160-380642/1-A
SampleType: Blank
: MB 160-380642/1-A
Sample Collection Date: 8/27/2018 2:44:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739184

Analyst: 60040

Tracer

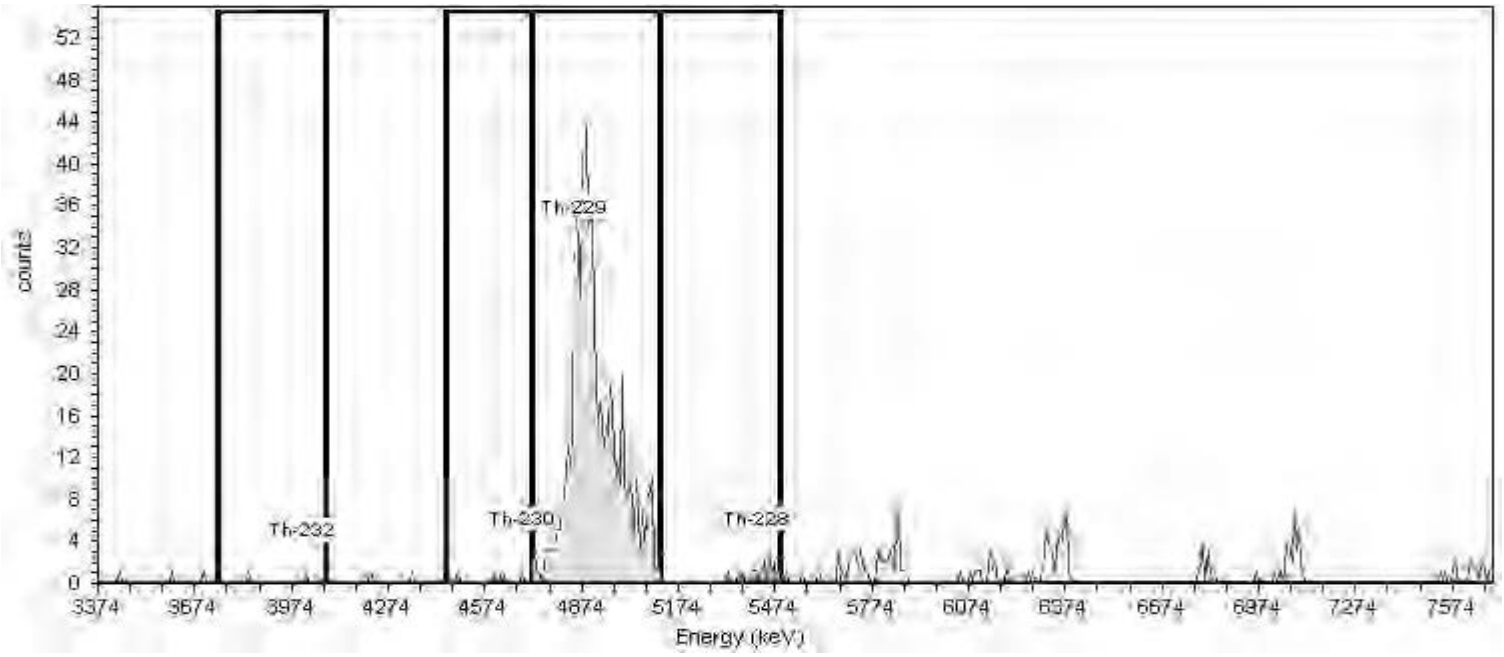
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.84%

Acquisition

Detector: AV54
Serial Number: 46-033P4
Acquisition Start Date: 8/28/2018 7:55:53PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:40PM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9792;AV54-05152018
Calibration Date: 5/15/2018 3:37:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.62% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:50PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	2	0.2500	1.75	0.016	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	10.2	99.7	4	1.5000	2.59	0.024	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.1	99.6	660	1.0000	659.22	5.260	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.0	99.8	18	4.2500	13.79	0.127	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:57:41PM 8/28/2018

Sample

Sample Name: LCS 160-380642/2-A
SampleType: Control
: LCS 160-380642/2-A
Sample Collection Date: 8/27/2018 2:44:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.5016g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739185

Analyst: 60040

Tracer

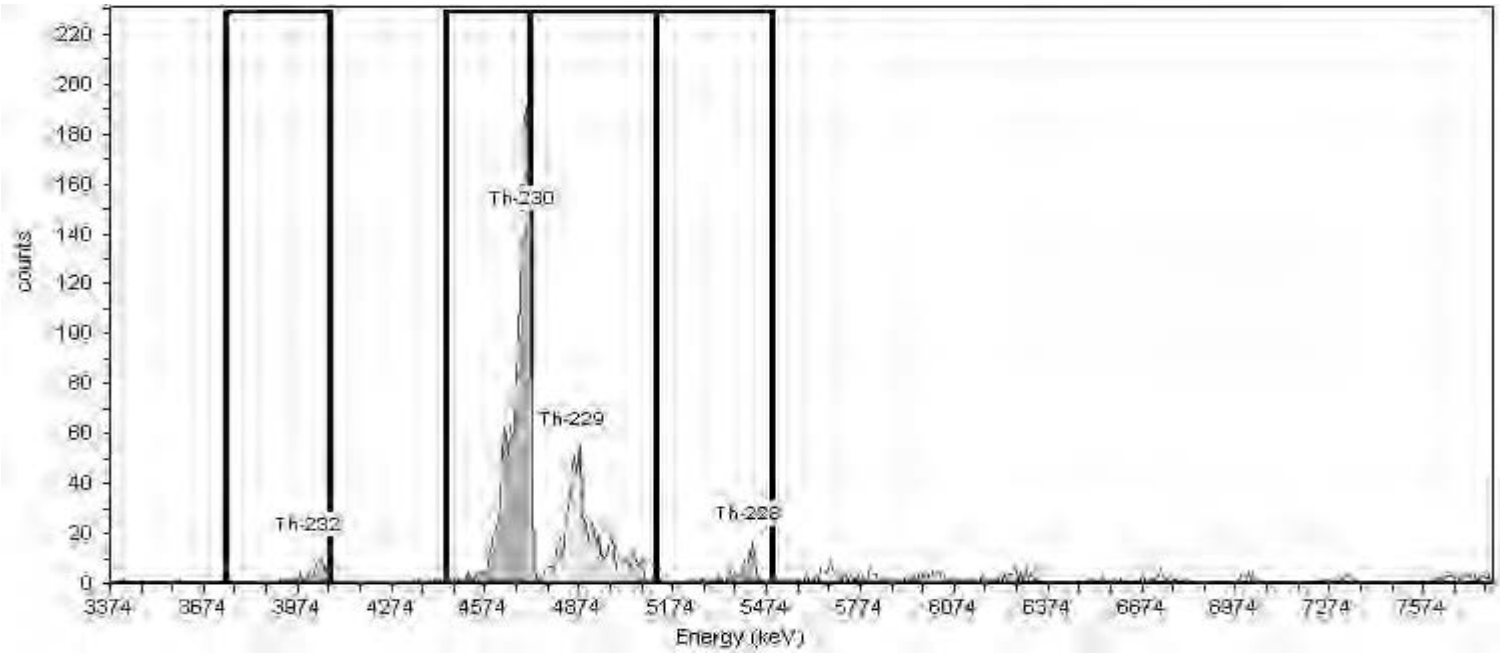
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 115.14%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 8/28/2018 7:55:55PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:41PM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9793;AV55-05152018
Calibration Date: 5/15/2018 3:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.96% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.1	100.2	56	1.2500	55.13	0.779	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	79.5	99.7	1471	3.2423	1468.00	20.841	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	851	1.5242	849.72	13.902	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.3	99.8	86	3.5320	82.55	1.171	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:51:00AM 8/29/2018

Sample

Sample Name: LCS 160-380642/2-A
SampleType: Control
: LCS 160-380642/2-A
Sample Collection Date: 8/27/2018 2:44:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.5016g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739261

Analyst: 60040

Tracer

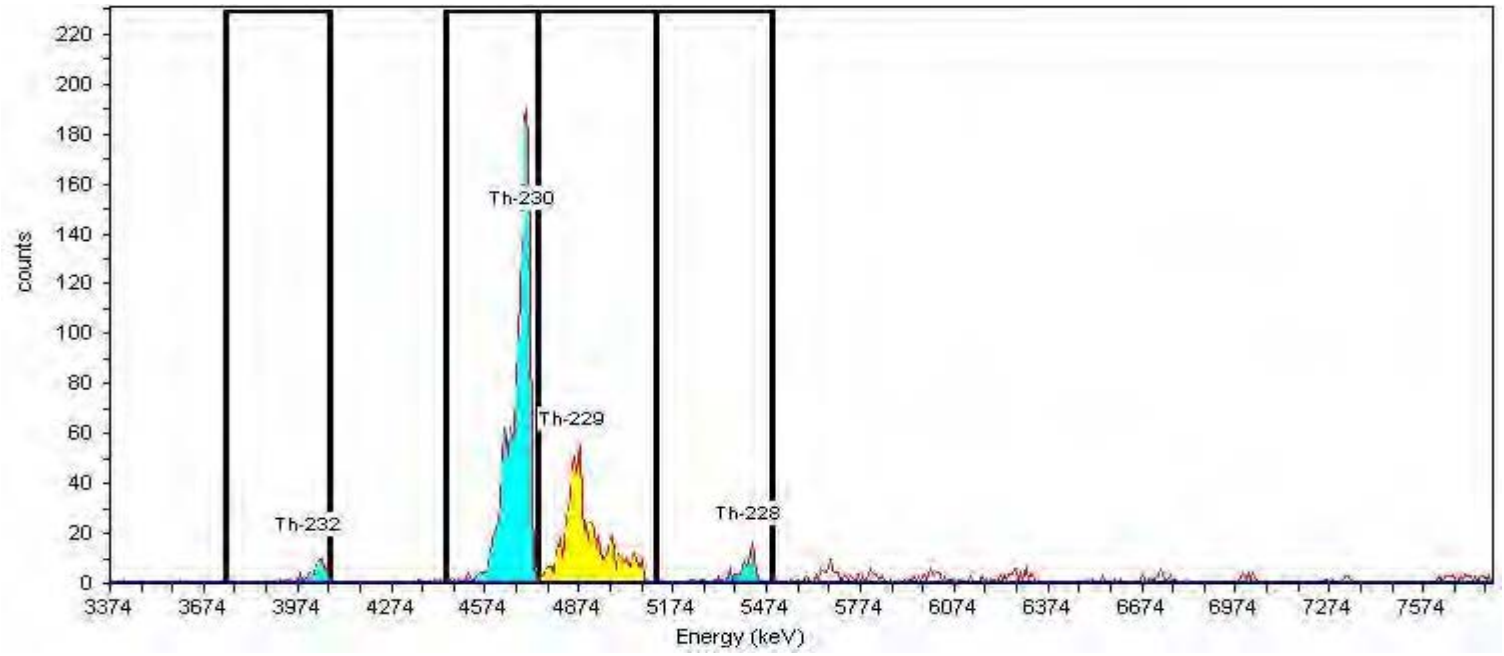
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 97.73%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 8/28/2018 7:55:55PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:41PM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9793;AV55-05152018
Calibration Date: 5/15/2018 3:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.96% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.1	100.2	56	1.2500	55.13	0.917	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	24.2	99.7	1516	3.5000	1512.50	25.297	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	69.8	99.6	723	1.7500	721.25	11.801	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.3	99.8	86	3.5320	82.55	1.380	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:57:50PM 8/28/2018

Sample

Sample Name: 160-29881-A-1-E
SampleType: Sample
: 160-29881-A-1-E
Sample Collection Date: 7/12/2018 7:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739186

Analyst: 60040

Tracer

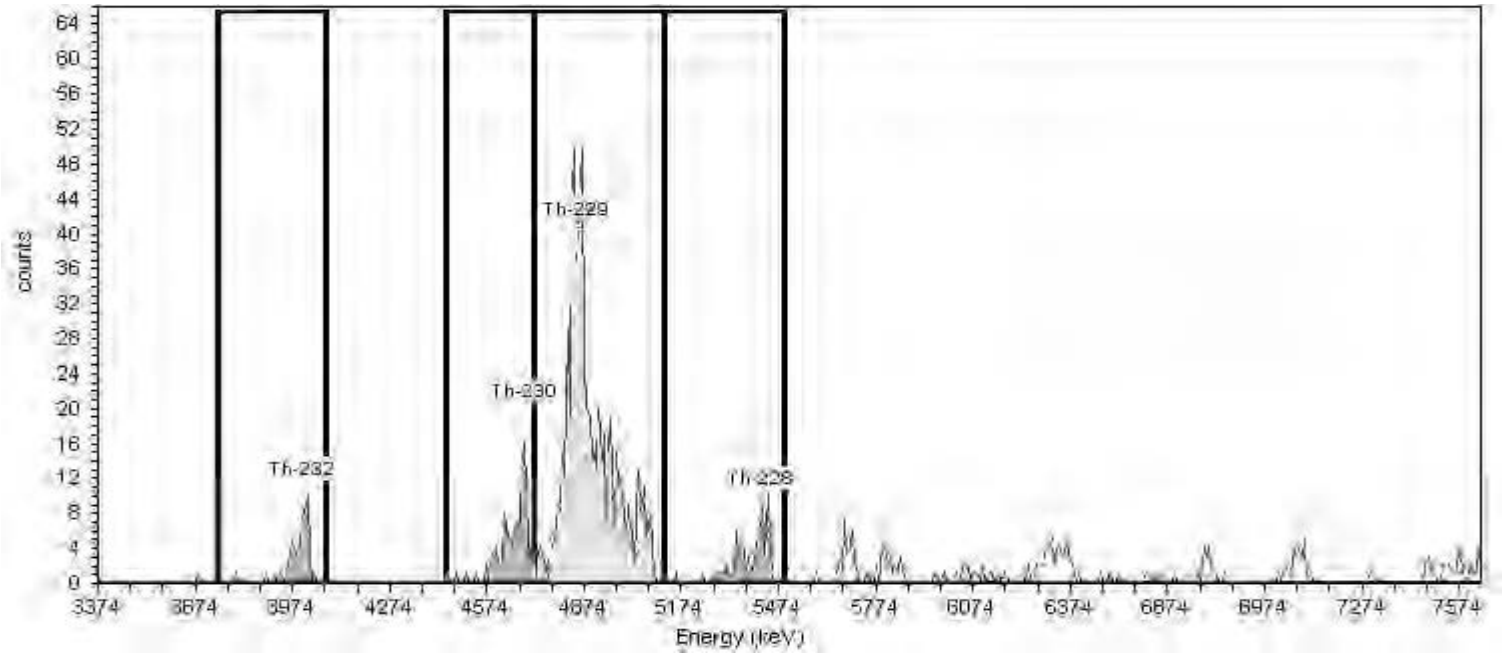
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.58%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 8/28/2018 7:55:57PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:42PM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9795;AV56-05152018
Calibration Date: 5/15/2018 3:38:31PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.25% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.5	100.2	55	0.7500	54.25	0.475	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.8	99.7	114	2.1463	111.42	0.979	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.6	99.6	689	2.4603	686.42	5.108	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.9	99.8	79	4.7180	74.28	0.653	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:44:41AM 8/29/2018

Sample

Sample Name: 160-29881-A-1-E
SampleType: Sample
: 160-29881-A-1-E
Sample Collection Date: 7/12/2018 7:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739255

Analyst: 60040

Tracer

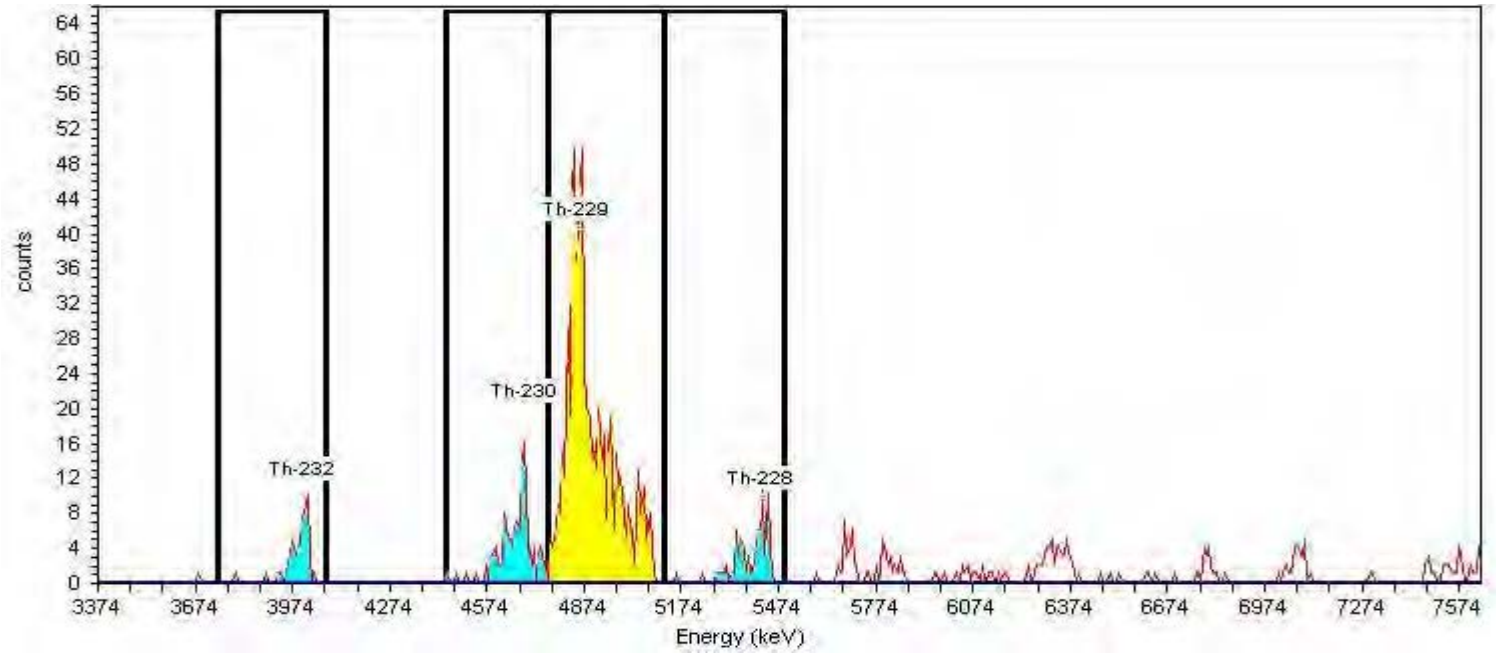
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.33%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 8/28/2018 7:55:57PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:42PM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9795;AV56-05152018
Calibration Date: 5/15/2018 3:38:31PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.25% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.5	100.2	55	0.7500	54.25	0.482	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4761.5	58.6	99.7	125	2.2500	122.75	1.095	pCi/g
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	66.6	99.0	674	2.0000	672.00	5.032	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.9	99.8	79	4.7180	74.28	0.662	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:57:59PM 8/28/2018

Sample

Sample Name: 160-29881-A-1-F DU
SampleType: Sample
: 160-29881-A-1-F DU
Sample Collection Date: 7/12/2018 7:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0040g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739187

Analyst: 60040

Tracer

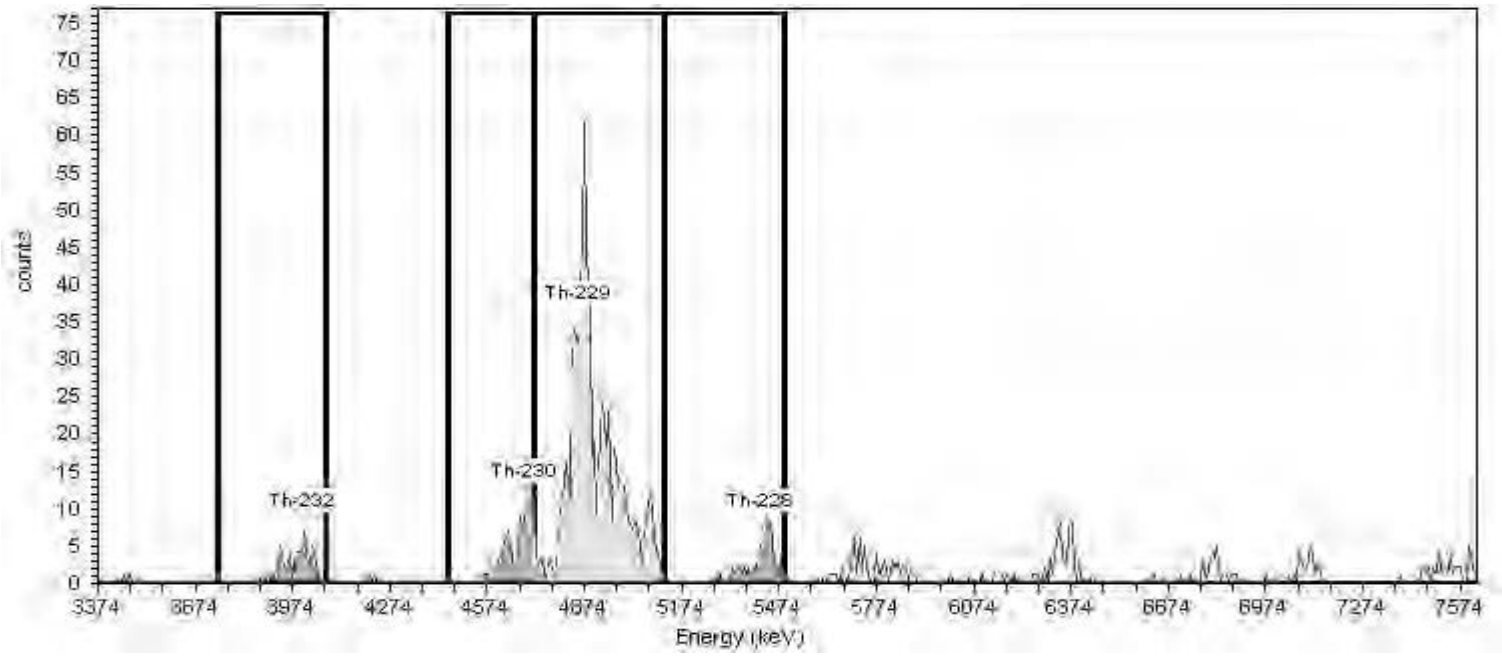
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.03%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 8/28/2018 7:55:58PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:45PM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9885;AV58-05152018
Calibration Date: 5/15/2018 3:38:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.05% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	39.2	100.2	57	0.2500	56.75	0.458	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	74.4	99.7	117	1.2500	115.60	0.938	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	63.1	99.6	743	0.5000	742.35	5.793	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	30.0	99.8	71	3.5000	67.59	0.548	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:43:19AM 8/29/2018

Sample

Sample Name: 160-29881-A-1-F DU
SampleType: Sample
: 160-29881-A-1-F DU
Sample Collection Date: 7/12/2018 7:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0040g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739254

Analyst: 60040

Tracer

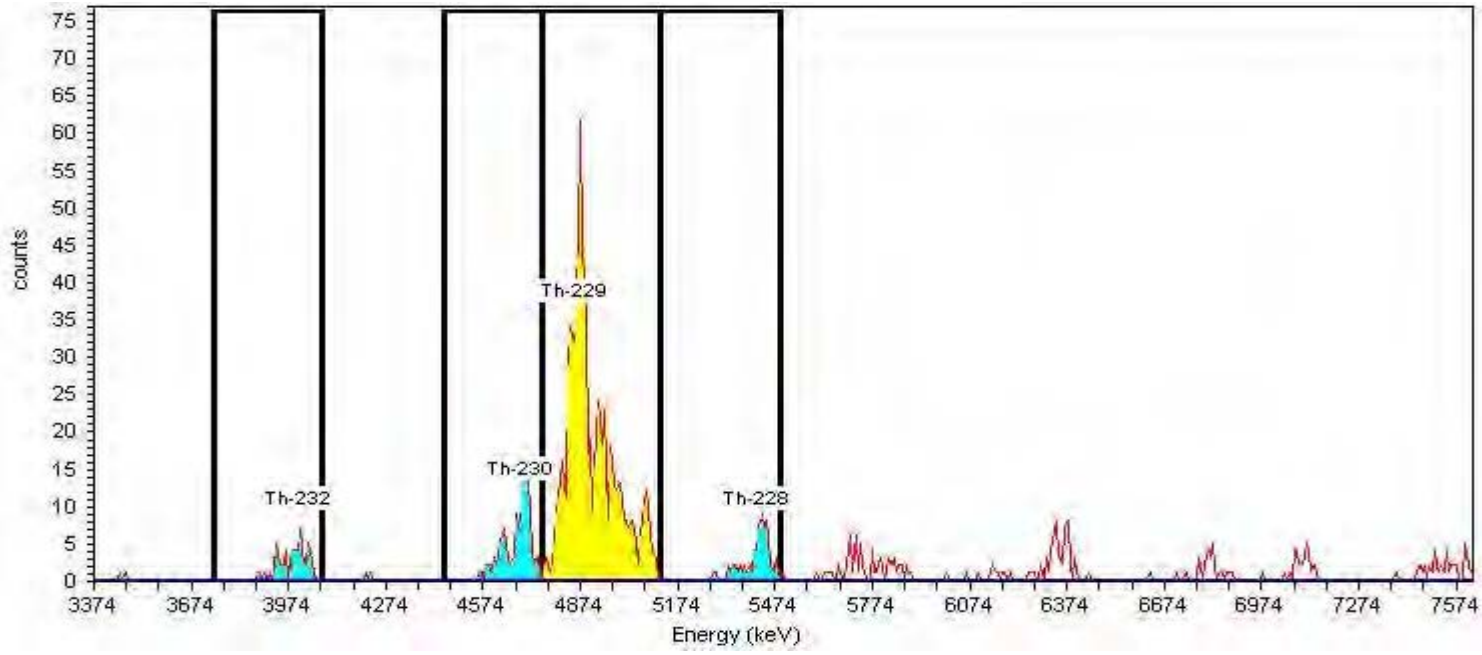
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 94.11%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 8/28/2018 7:55:58PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/14/2018 6:49:45PM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9885;AV58-05152018
Calibration Date: 5/15/2018 3:38:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.05% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	39.2	100.2	57	0.2500	56.75	0.468	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	43.8	99.7	127	1.5000	125.50	1.040	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	63.1	99.6	728	0.5000	727.50	5.677	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	30.0	99.8	71	3.5000	67.59	0.560	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:08PM 8/28/2018

Sample

Sample Name: 160-29881-A-2-C
SampleType: Sample
: 160-29881-A-2-C
Sample Collection Date: 7/11/2018 4:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739188

Analyst: 60040

Tracer

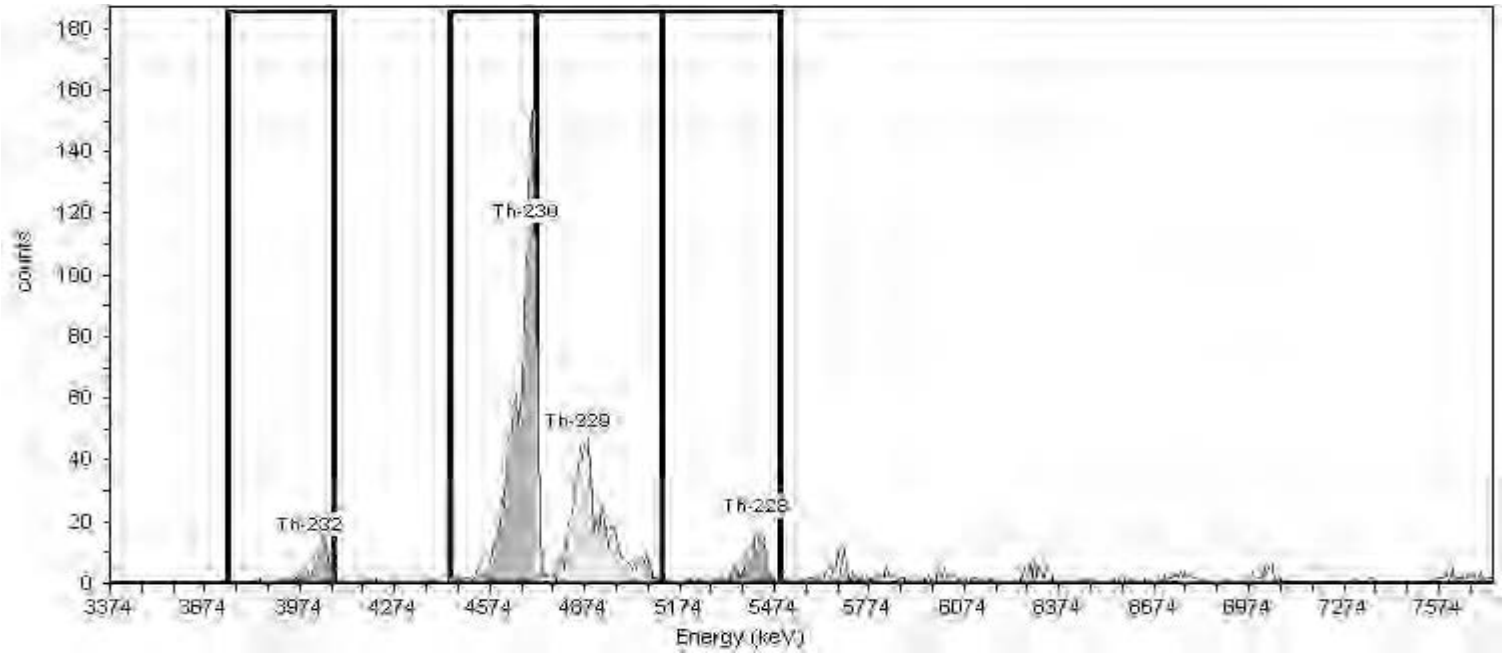
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 87.78%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 8/28/2018 7:56:00PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:05PM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.3	99.8	122	4.2500	117.66	0.888	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.5	100.2	95	0.3937	94.52	0.710	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	1218	0.2577	1218.04	9.196	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	804	2.2577	801.35	5.316	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:59AM 8/29/2018

Sample

Sample Name: 160-29881-A-2-C
SampleType: Sample
: 160-29881-A-2-C
Sample Collection Date: 7/11/2018 4:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739256

Analyst: 60040

Tracer

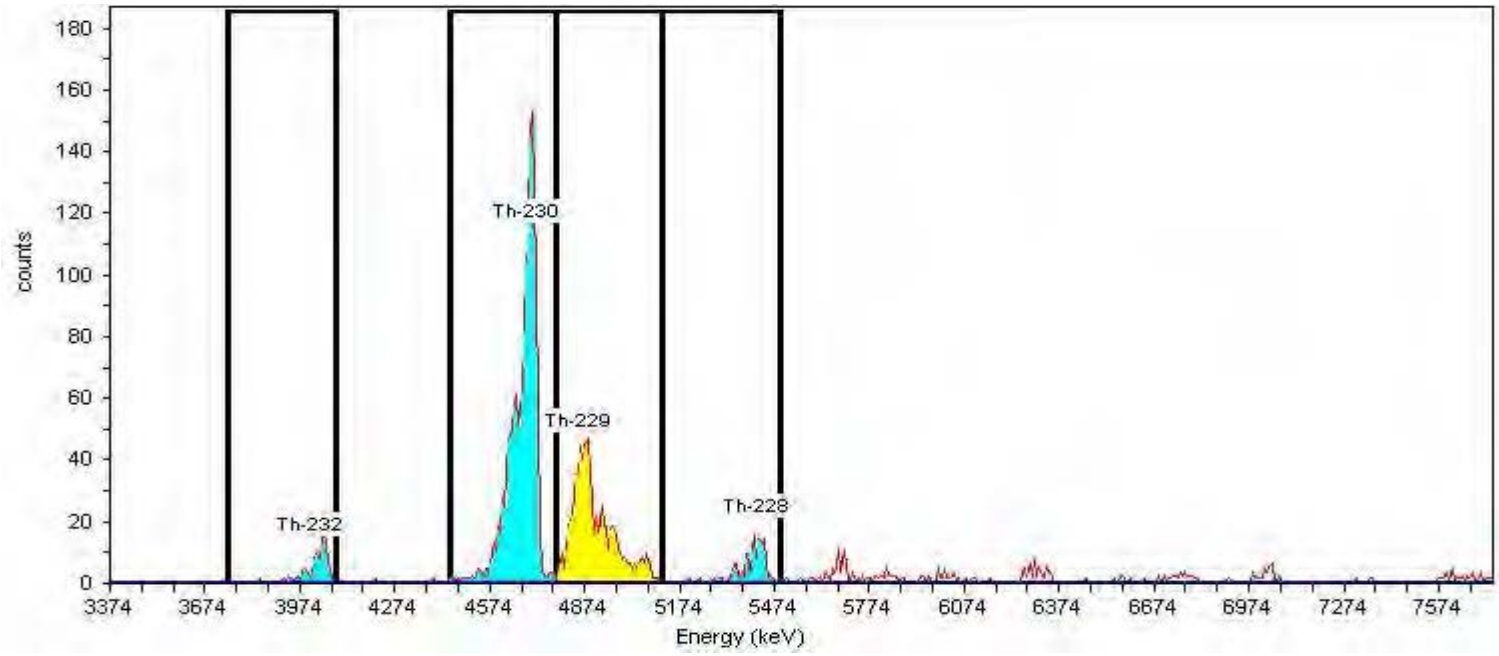
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 74.17%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 8/28/2018 7:56:00PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:05PM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4082.9	21.3	100.2	97	0.5000	96.50	0.858	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4783.9	57.4	99.7	1307	0.7500	1306.25	11.672	pCi/g
Th-229	4848.0	4,845.3	2.7	4783.9	5119.5	77.9	98.8	673	2.0000	671.00	4.492	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.3	99.8	122	4.2500	117.66	1.051	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:17PM 8/28/2018

Sample

Sample Name: 160-29881-A-3-C
SampleType: Sample
: 160-29881-A-3-C
Sample Collection Date: 7/10/2018 10:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0009g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739189

Analyst: 60040

Tracer

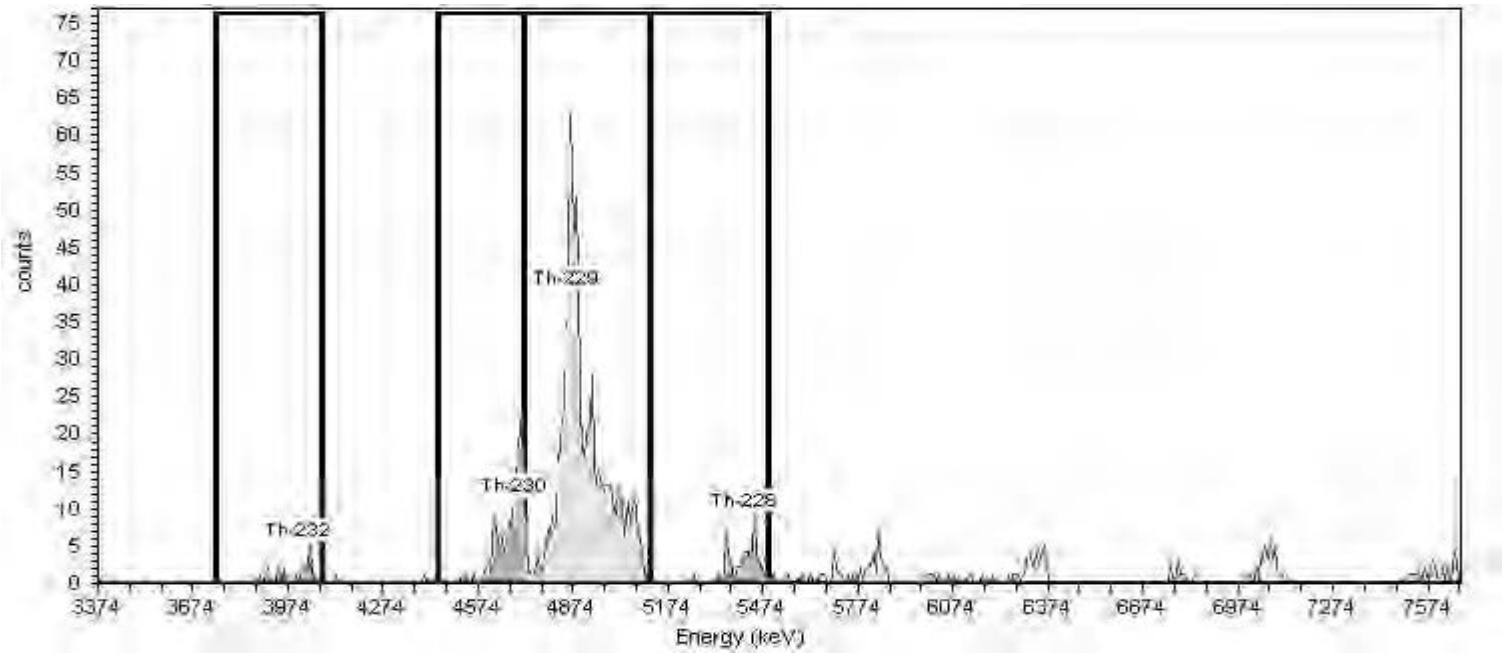
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.15%

Acquisition

Detector: AV64
Serial Number: 43-028v3
Acquisition Start Date: 8/28/2018 7:56:01PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:19PM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	12.2	100.2	21	0.2500	20.75	0.165	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	1.9	99.7	140	0.7500	139.00	1.108	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.4	99.6	760	1.2500	758.50	5.032	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	16.9	99.8	58	4.7284	53.27	0.424	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:46:47AM 8/29/2018

Sample

Sample Name: 160-29881-A-3-C
SampleType: Sample
: 160-29881-A-3-C
Sample Collection Date: 7/10/2018 10:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0009g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739257

Analyst: 60040

Tracer

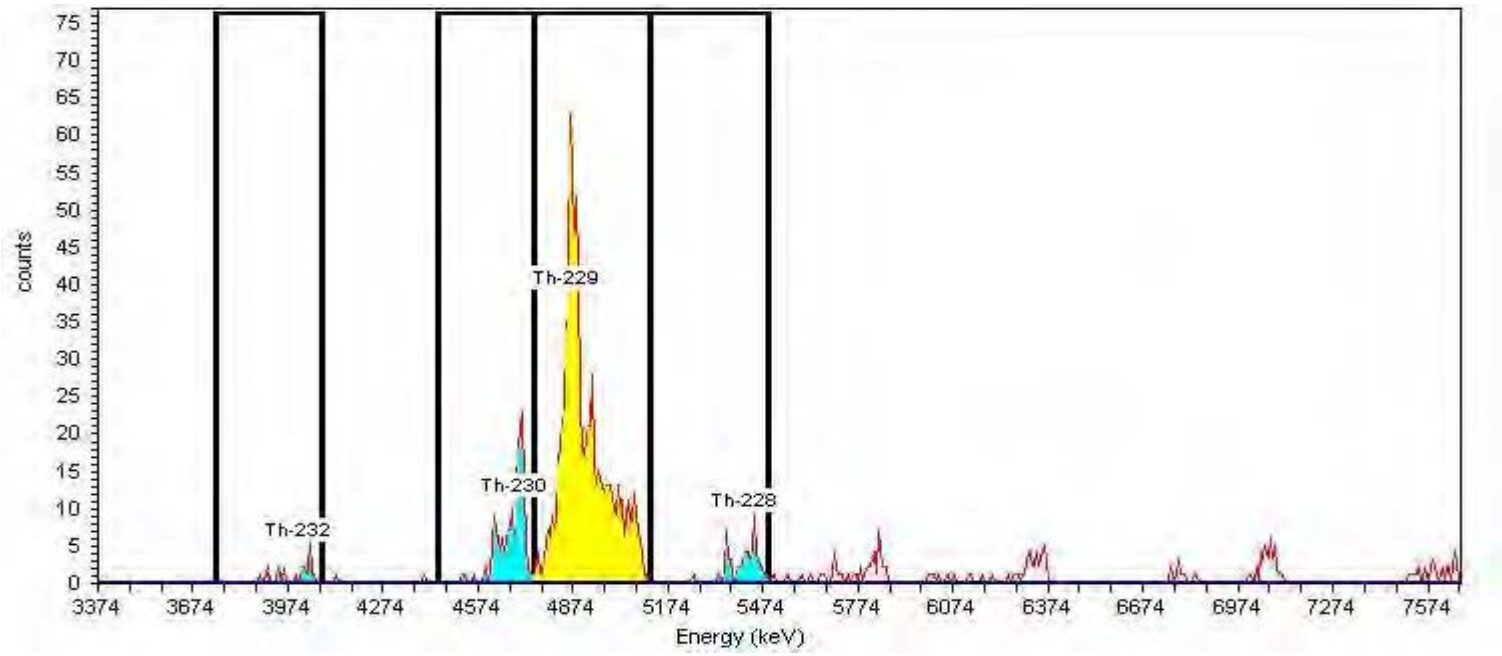
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.43%

Acquisition

Detector: AV64
Serial Number: 43-028v3
Acquisition Start Date: 8/28/2018 7:56:01PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:19PM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	12.2	100.2	21	0.2500	20.75	0.168	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	16.9	99.7	149	0.7500	148.25	1.207	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	62.4	99.6	744	1.2500	742.75	4.927	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	16.9	99.8	58	4.7283	53.27	0.433	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:27PM 8/28/2018

Sample

Sample Name: 160-29881-A-4-D
SampleType: Sample
: 160-29881-A-4-D
Sample Collection Date: 7/11/2018 11:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0016g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739190

Analyst: 60040

Tracer

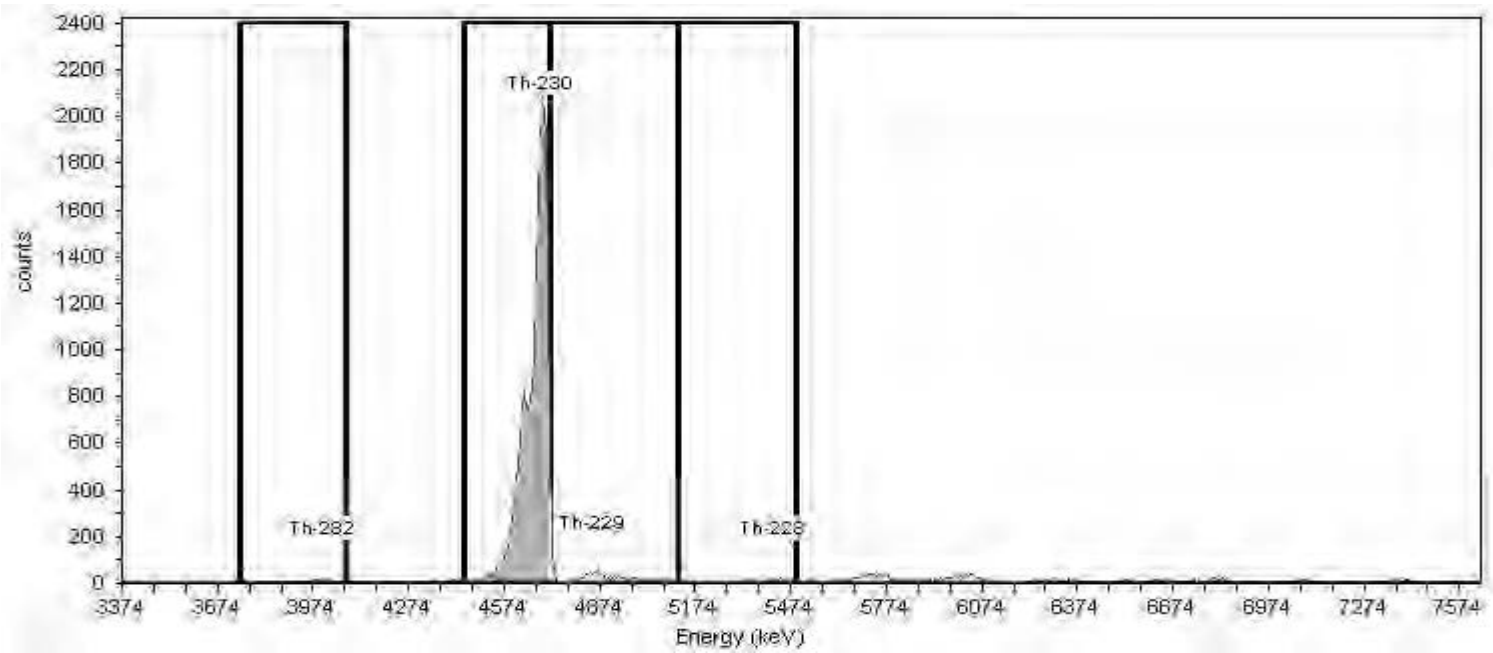
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 145.35%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 8/28/2018 7:56:03PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:20PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.0	100.2	112	1.2500	110.75	0.526	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.5	99.7	18018	1.2500	18016.85	85.921	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	1268	1.2500	1266.78	8.789	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	35.6	99.8	112	4.5000	107.59	0.513	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:47:49AM 8/29/2018

Sample

Sample Name: 160-29881-A-4-D
SampleType: Sample
: 160-29881-A-4-D
Sample Collection Date: 7/11/2018 11:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0016g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739258

Analyst: 60040

Tracer

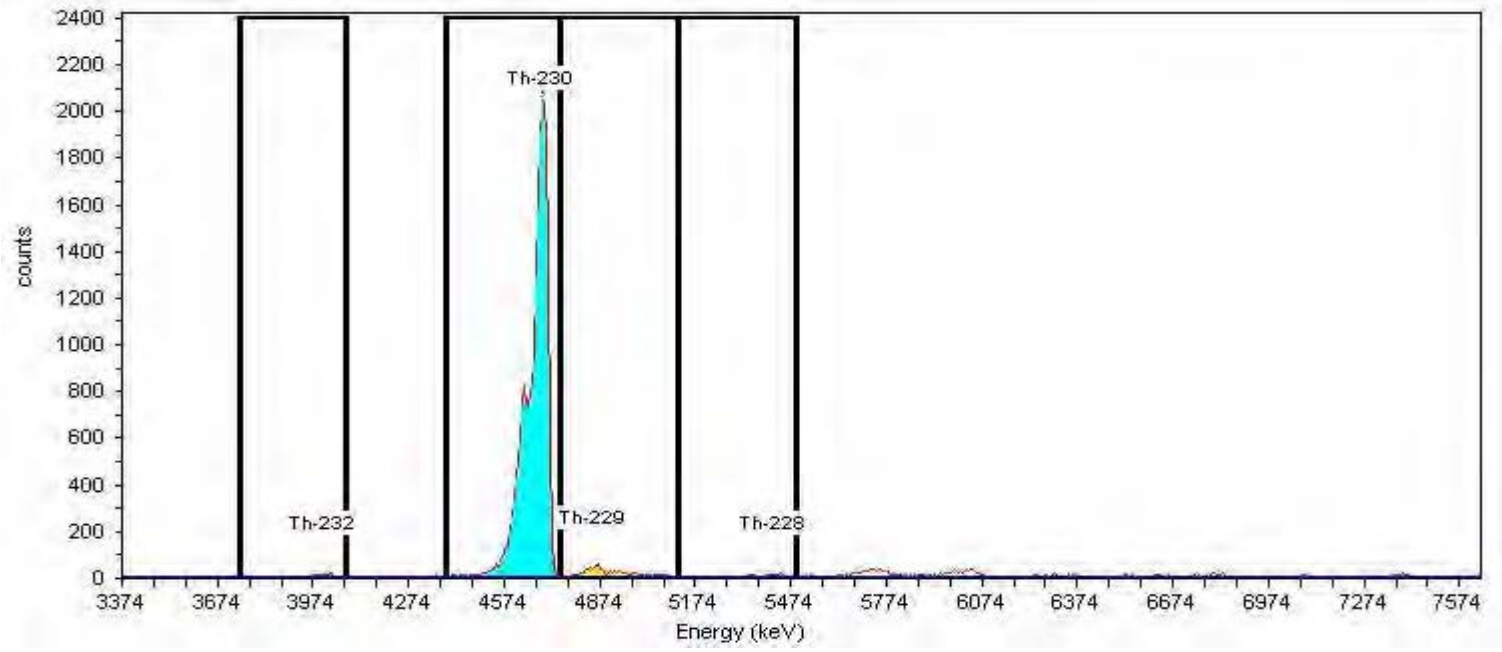
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 76.62%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 8/28/2018 7:56:03PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:20PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.0	100.2	112	1.2500	110.75	0.997	pCi/g
Th-230	4688.0	4,687.5	0.5	4388.6	4746.6	47.1	99.7	18256	1.5000	18254.50	165.150	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	68.4	99.6	669	1.2500	667.75	4.633	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	35.6	99.8	112	4.5000	107.59	0.973	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:40PM 8/28/2018

Sample

Sample Name: 160-29881-A-5-C
SampleType: Sample
: 160-29881-A-5-C
Sample Collection Date: 7/12/2018 12:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0024g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739191

Analyst: 60040

Tracer

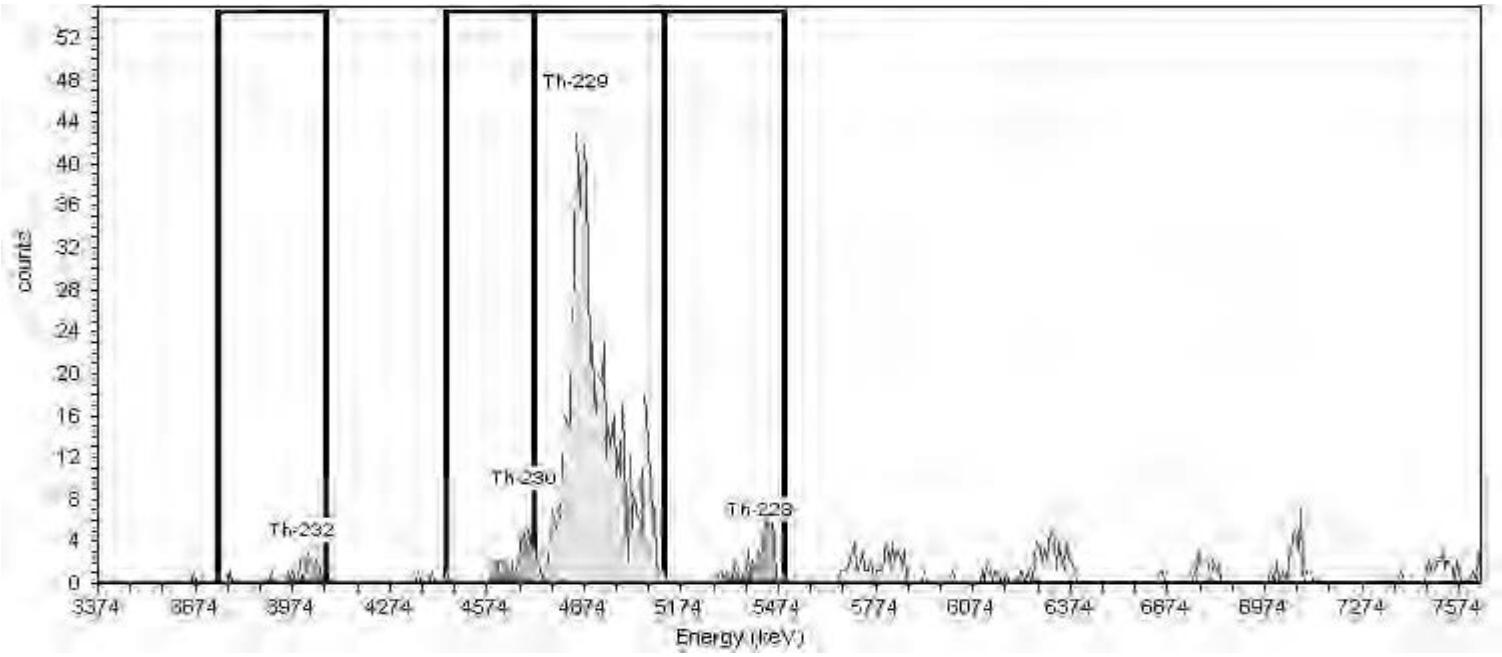
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.79%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 8/28/2018 7:56:04PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:21PM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370620;AV66-05152018
Calibration Date: 5/15/2018 3:40:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.12% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	17	1.0000	16.00	0.136	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	49.7	99.7	43	1.0000	41.63	0.357	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.7	99.6	705	0.7500	704.19	4.881	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	23.5	99.8	51	2.7500	48.16	0.413	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:04AM 8/29/2018

Sample

Sample Name: 160-29881-A-5-C
SampleType: Sample
: 160-29881-A-5-C
Sample Collection Date: 7/12/2018 12:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0024g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739259

Analyst: 60040

Tracer

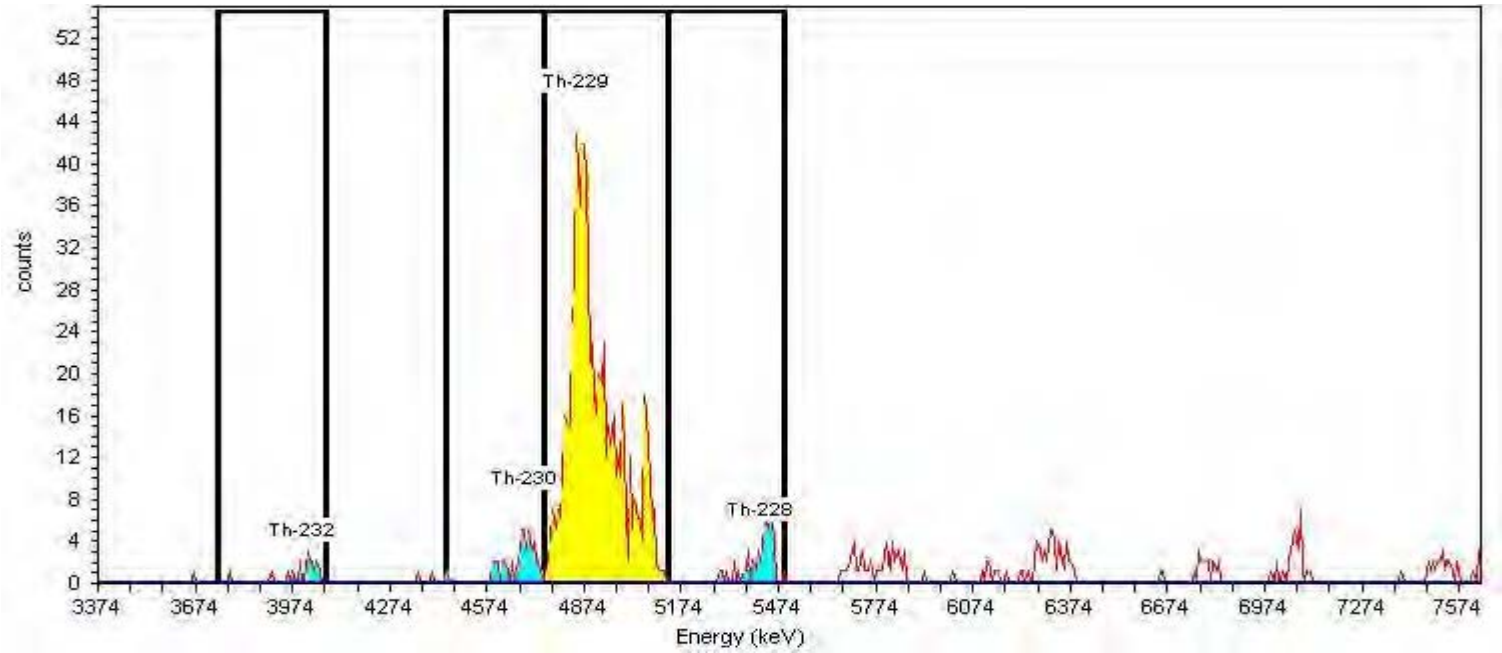
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.11%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 8/28/2018 7:56:04PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:21PM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370620;AV66-05152018
Calibration Date: 5/15/2018 3:40:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.12% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	17	1.0000	16.00	0.138	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	48.6	99.7	48	1.0000	47.00	0.406	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5134.4	75.7	99.6	699	0.7500	698.25	4.840	pCi/g
Th-228	5420.0	5,423.3	-3.3	5134.4	5492.4	29.7	99.8	50	2.7500	47.25	0.408	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:49PM 8/28/2018

Sample

Sample Name: 160-29881-A-6-C
SampleType: Sample
: 160-29881-A-6-C
Sample Collection Date: 7/11/2018 3:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739192

Analyst: 60040

Tracer

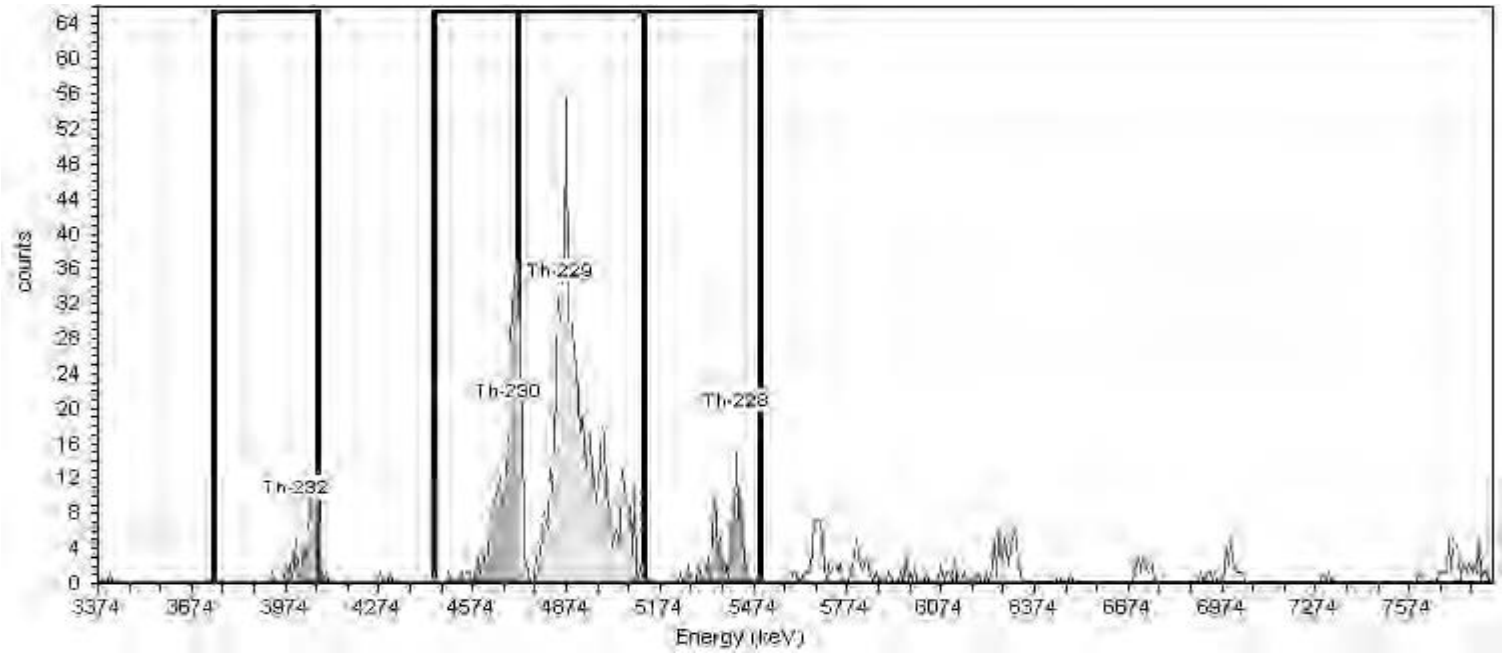
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.66%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 8/28/2018 7:56:06PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:23PM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	58	0.3646	58.09	0.491	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	248	0.5000	247.79	2.106	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.6	99.6	712	1.0000	710.73	5.058	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	92.4	99.8	92	3.2500	88.88	0.755	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:50AM 8/29/2018

Sample

Sample Name: 160-29881-A-6-C
SampleType: Sample
: 160-29881-A-6-C
Sample Collection Date: 7/11/2018 3:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739260

Analyst: 60040

Tracer

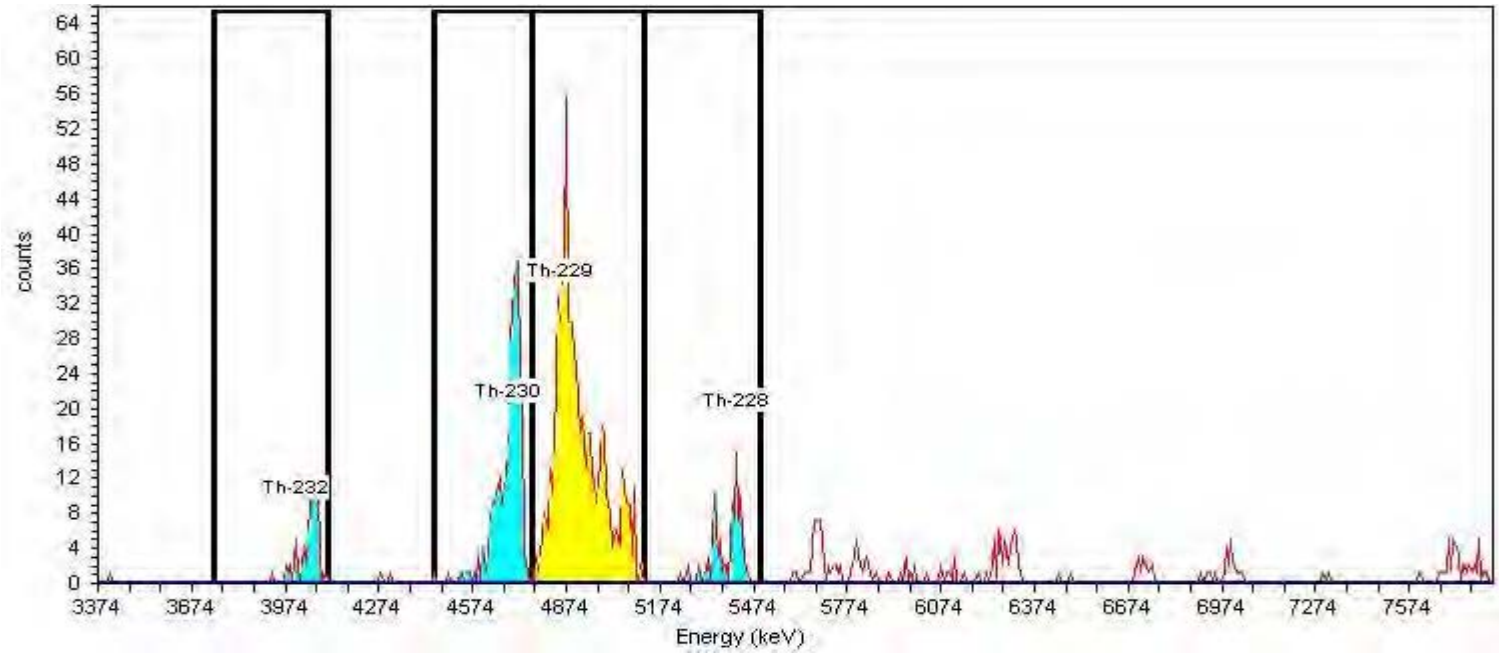
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 77.12%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 8/28/2018 7:56:06PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:23PM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4105.3	18.9	100.2	74	0.5000	73.50	0.674	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4761.5	42.3	99.7	298	0.5000	297.50	2.743	pCi/g
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	71.6	99.0	652	1.0000	651.00	4.662	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	92.4	99.8	92	3.2500	88.88	0.819	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:58:58PM 8/28/2018

Sample

Sample Name: 160-29881-A-7-C
SampleType: Sample
: 160-29881-A-7-C
Sample Collection Date: 7/26/2018 11:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0004g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739193

Analyst: 60040

Tracer

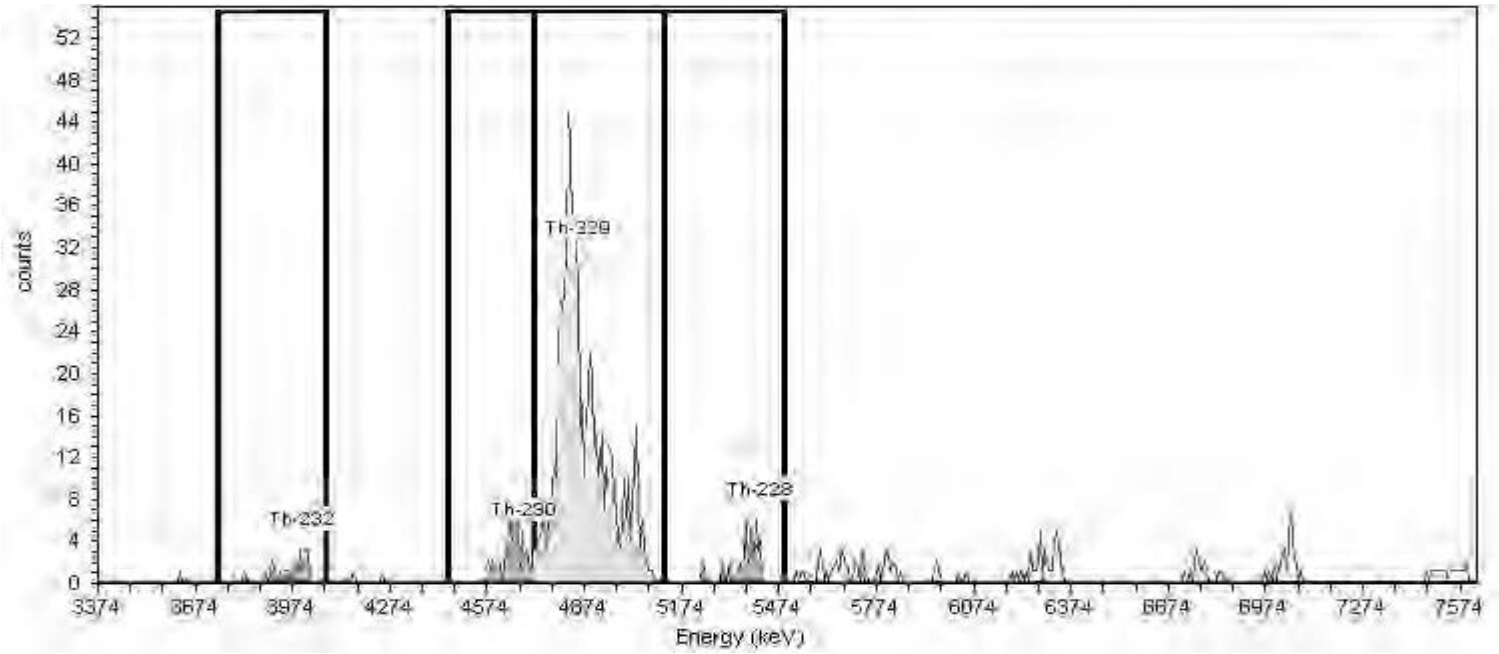
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.17%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 8/28/2018 7:56:08PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:26PM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8877;AV70-05152018
Calibration Date: 5/15/2018 6:36:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.40% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.0	100.2	23	0.5000	22.50	0.215	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	62.4	99.7	57	0.2500	56.75	0.546	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	630	1.2500	628.75	4.854	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.9	99.8	40	3.7500	36.16	0.348	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:59:07PM 8/28/2018

Sample

Sample Name: 160-29881-A-8-D
SampleType: Sample
: 160-29881-A-8-D
Sample Collection Date: 7/27/2018 12:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0004g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739194

Analyst: 60040

Tracer

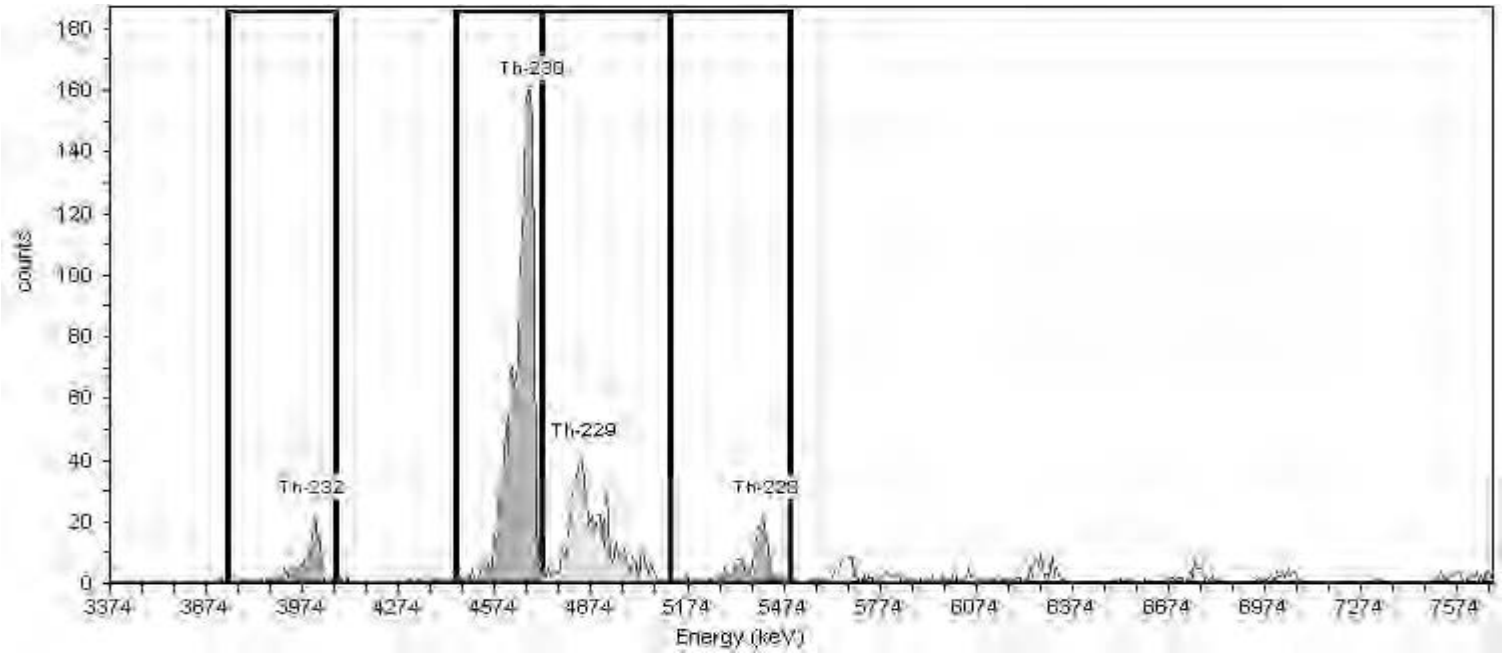
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.98%

Acquisition

Detector: AV71
Serial Number: 48-158EE6
Acquisition Start Date: 8/28/2018 7:56:09PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:28PM
Background Info: Sample: ICB;AV71; Det: AV71; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9520;AV71-05152018
Calibration Date: 5/15/2018 6:36:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.00% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.8	100.2	131	0.5000	130.50	1.265	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.2	99.7	1459	1.2500	1458.06	14.207	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.8	99.6	622	1.2660	620.73	5.084	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.8	99.8	160	4.5160	155.48	1.514	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:59:15PM 8/28/2018

Sample

Sample Name: 160-29881-A-9-D
SampleType: Sample
: 160-29881-A-9-D
Sample Collection Date: 7/27/2018 4:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0053g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739195

Analyst: 60040

Tracer

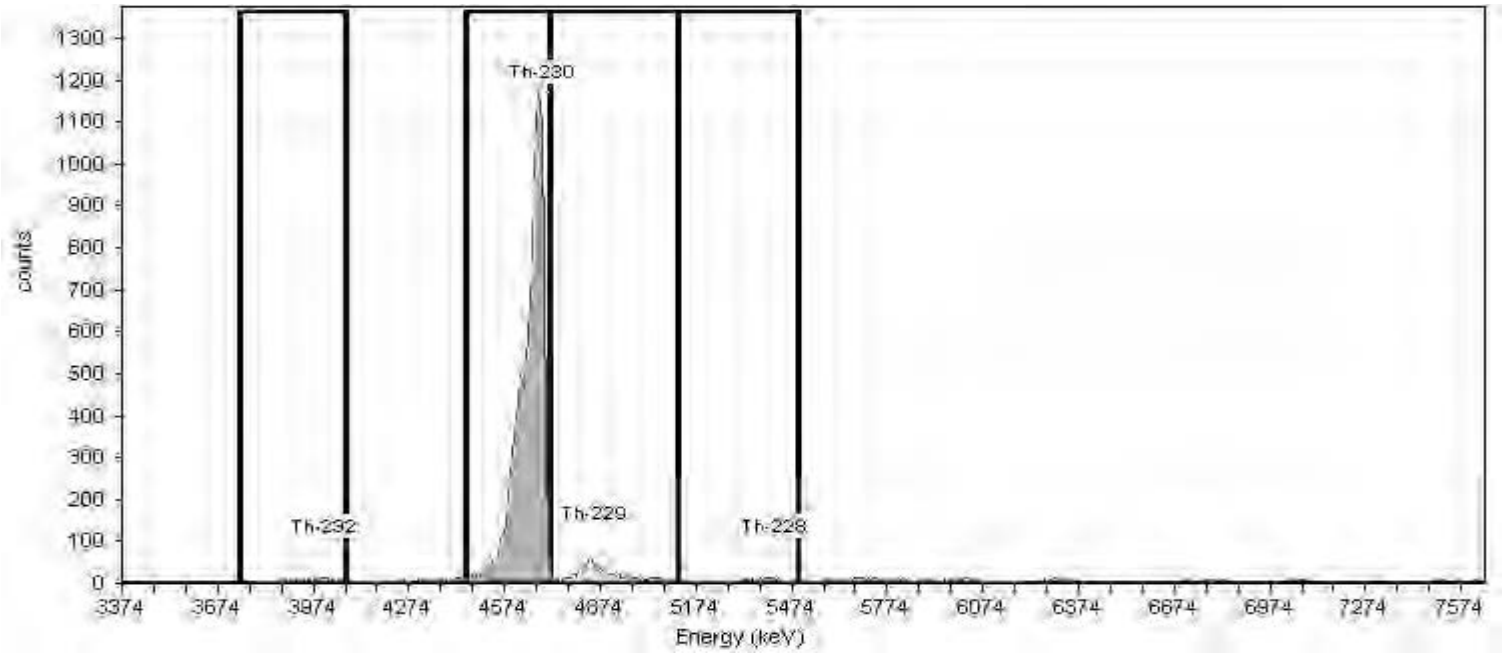
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.68%

Acquisition

Detector: AV72
Serial Number: 48-05a21
Acquisition Start Date: 8/28/2018 7:56:10PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:08PM
Background Info: Sample: ICB;AV72; Det: AV72; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-9792;AV72-05152018
Calibration Date: 5/15/2018 6:36:51PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.58% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.4	100.2	100	1.5000	98.50	0.780	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.8	99.7	11226	1.5693	11224.77	89.381	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.1	99.6	757	0.9923	755.88	5.764	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	74.2	99.8	110	3.7500	106.25	0.846	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:59:24PM 8/28/2018

Sample

Sample Name: 160-29881-A-10-C
SampleType: Sample
: 160-29881-A-10-C
Sample Collection Date: 7/30/2018 11:35:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739196

Analyst: 60040

Tracer

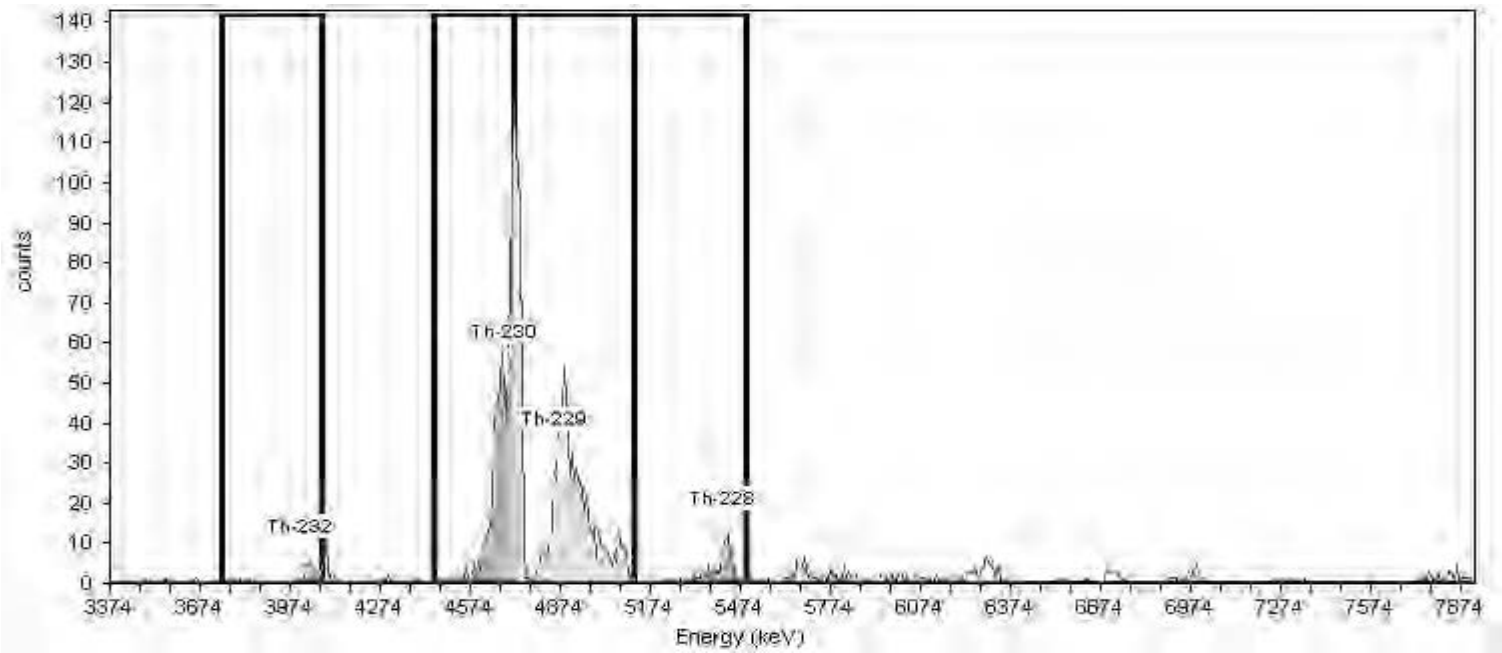
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 144.85%

Acquisition

Detector: AV73
Serial Number: 46-03321
Acquisition Start Date: 8/28/2018 7:56:11PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:31PM
Background Info: Sample: ICB;AV73; Det: AV73; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.9	100.2	30	1.4709	28.53	0.159	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.7	99.7	683	0.9923	681.67	3.823	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	1081	1.9923	1078.67	8.772	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	40.3	99.8	81	4.5000	76.59	0.429	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:42:04AM 8/29/2018

Sample

Sample Name: 160-29881-A-10-C
SampleType: Sample
: 160-29881-A-10-C
Sample Collection Date: 7/30/2018 11:35:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739253

Analyst: 60040

Tracer

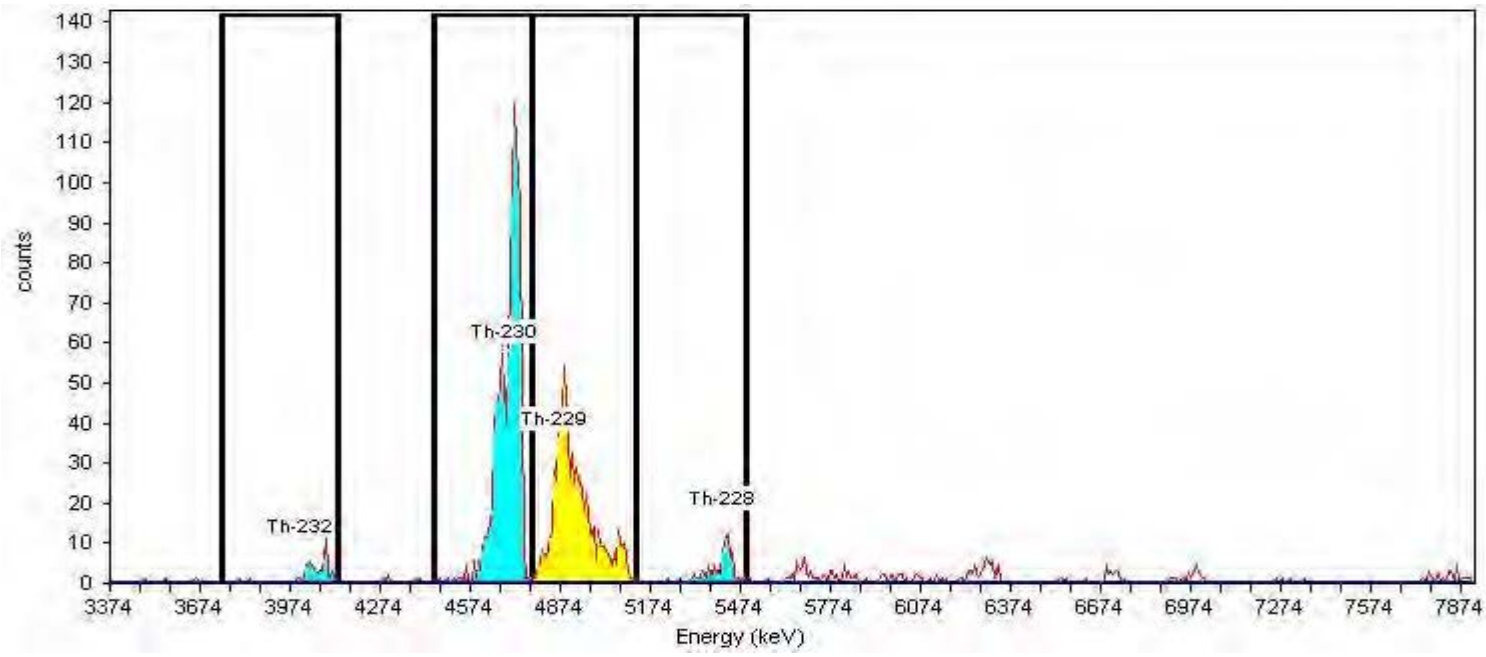
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.80%

Acquisition

Detector: AV73
Serial Number: 46-03321
Acquisition Start Date: 8/28/2018 7:56:11PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:31PM
Background Info: Sample: ICB;AV73; Det: AV73; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4127.6	12.7	100.2	57	2.0000	55.00	0.464	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4776.4	40.3	99.7	1046	1.7500	1044.25	8.856	pCi/g
Th-229	4848.0	4,845.3	2.7	4776.4	5126.9	96.9	98.8	708	1.0000	707.00	5.802	pCi/g
Th-228	5420.0	5,423.3	-3.3	5126.9	5492.4	55.3	99.8	80	4.5000	75.50	0.640	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:59:33PM 8/28/2018

Sample

Sample Name: 160-29881-A-11-C
SampleType: Sample
: 160-29881-A-11-C
Sample Collection Date: 7/30/2018 11:40:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739197

Analyst: 60040

Tracer

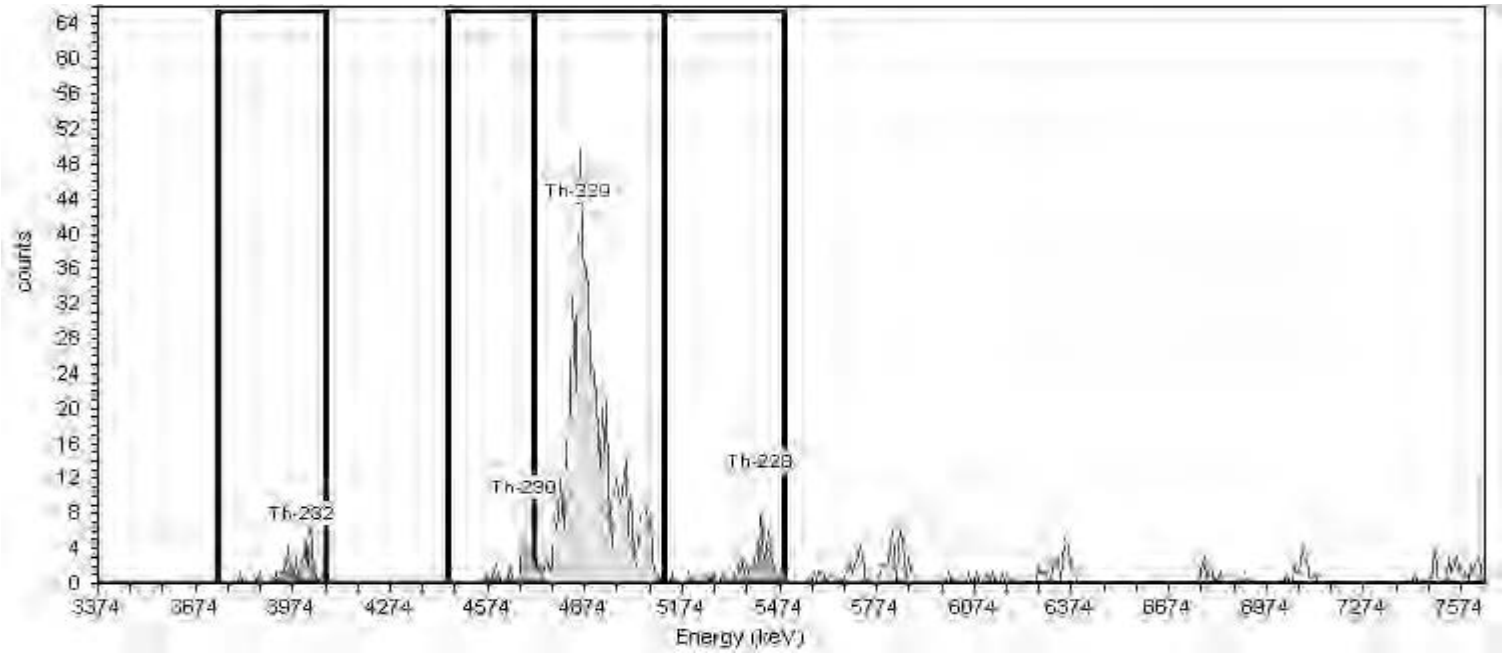
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.43%

Acquisition

Detector: AV74
Serial Number: 50-051C6
Acquisition Start Date: 8/28/2018 7:56:13PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:33PM
Background Info: Sample: ICB;AV74; Det: AV74; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9795;AV74-05152018
Calibration Date: 5/15/2018 6:37:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.68% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.2	99.8	52	3.2284	48.77	0.444	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	14.0	100.2	37	0.5000	36.50	0.330	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	104.0	99.7	31	0.5000	30.50	0.278	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.1	99.6	664	0.2500	663.75	4.862	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:59:51PM 8/28/2018

Sample

Sample Name: 160-29881-A-12-D
SampleType: Sample
: 160-29881-A-12-D
Sample Collection Date: 7/30/2018 2:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0031g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739198

Analyst: 60040

Tracer

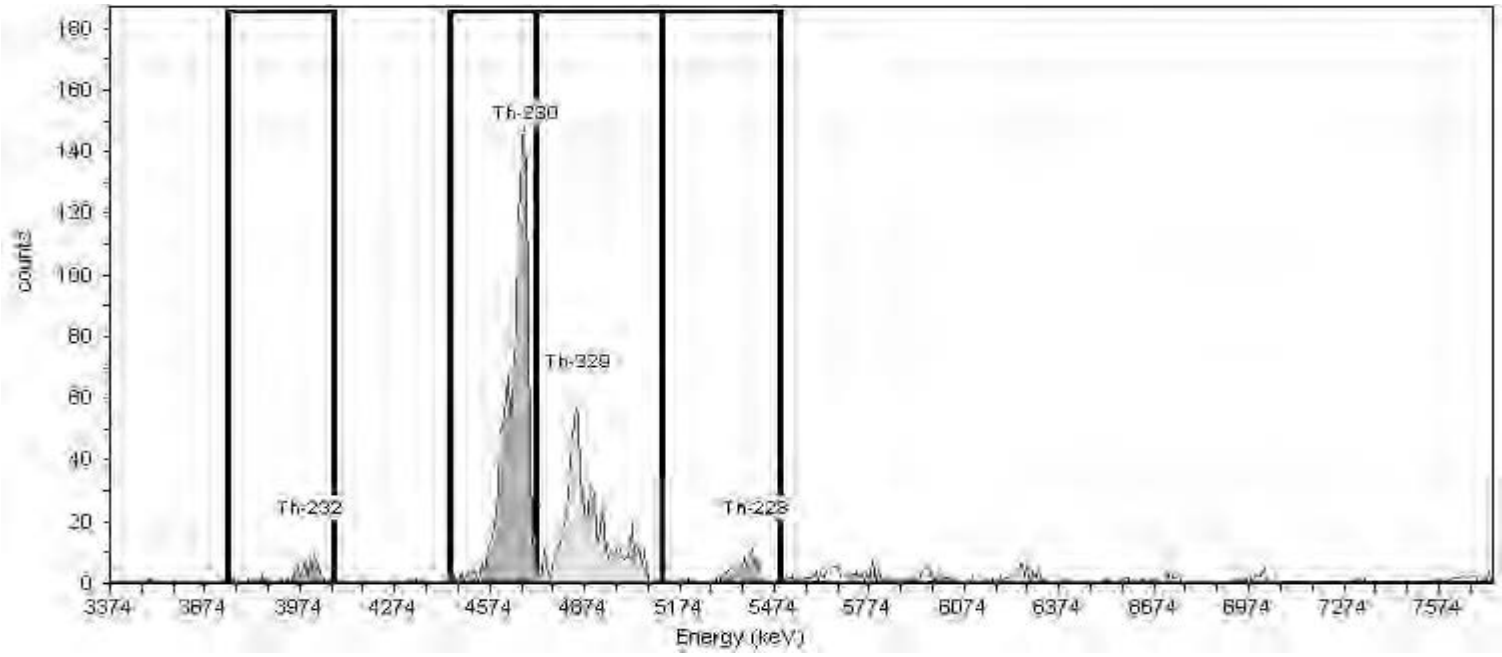
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 103.41%

Acquisition

Detector: AV75
Serial Number: 51-082B4
Acquisition Start Date: 8/28/2018 7:56:14PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:35PM
Background Info: Sample: ICB;AV75; Det: AV75; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9817;AV75-05152018
Calibration Date: 5/15/2018 6:37:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.76% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.9	100.2	65	0.2500	64.75	0.514	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.5	99.7	1301	0.7500	1299.84	10.365	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.2	99.6	757	0.5000	756.47	6.244	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.4	99.8	82	3.2500	78.75	0.628	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:00AM 8/29/2018

Sample

Sample Name: 160-29881-A-13-C
SampleType: Sample
: 160-29881-A-13-C
Sample Collection Date: 7/26/2018 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739199

Analyst: 60040

Tracer

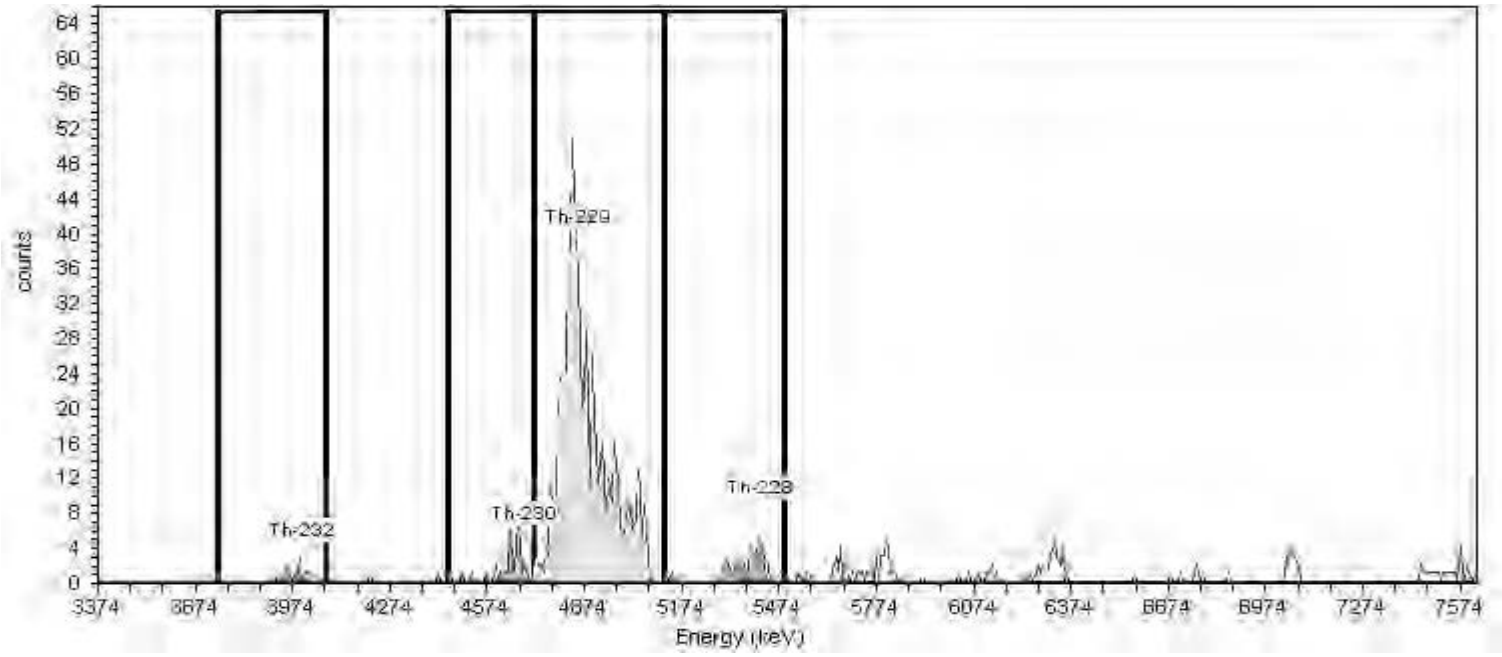
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 79.92%

Acquisition

Detector: AV77
Serial Number: 49-155N7
Acquisition Start Date: 8/28/2018 7:56:15PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:37PM
Background Info: Sample: ICB;AV77; Det: AV77; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-138446;AV77-05152018a
Calibration Date: 5/15/2018 6:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.42% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	89.2	100.2	14	0.5000	13.50	0.115	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	13.5	99.7	36	1.1730	34.86	0.300	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	82.0	99.6	705	0.7500	704.28	4.844	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	75.4	99.8	49	1.9784	47.02	0.404	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:09AM 8/29/2018

Sample

Sample Name: 160-29881-A-14-C
SampleType: Sample
: 160-29881-A-14-C
Sample Collection Date: 7/26/2018 11:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0002g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739200

Analyst: 60040

Tracer

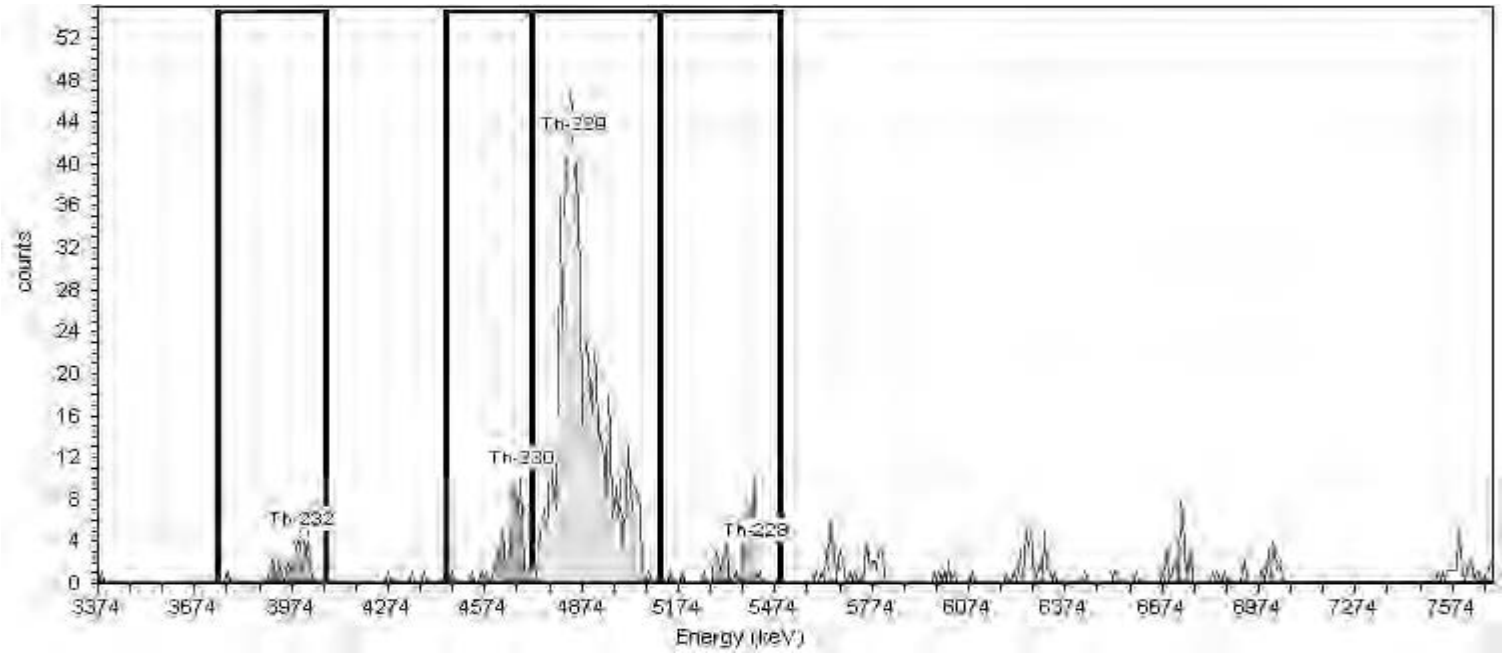
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.13%

Acquisition

Detector: AV78
Serial Number: 46-033FF4
Acquisition Start Date: 8/28/2018 7:56:16PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:13PM
Background Info: Sample: ICB;AV78; Det: AV78; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV78-05152018
Calibration Date: 5/15/2018 6:37:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.77% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	65.1	100.2	35	1.0000	34.00	0.283	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.9	99.7	67	0.7500	66.28	0.554	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.6	99.6	725	1.0000	724.03	4.912	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	42.3	99.8	58	2.7500	55.25	0.461	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:44AM 8/29/2018

Sample

Sample Name: 160-29881-A-15-C
SampleType: Sample
: 160-29881-A-15-C
Sample Collection Date: 7/26/2018 12:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0072g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739201

Analyst: 60040

Tracer

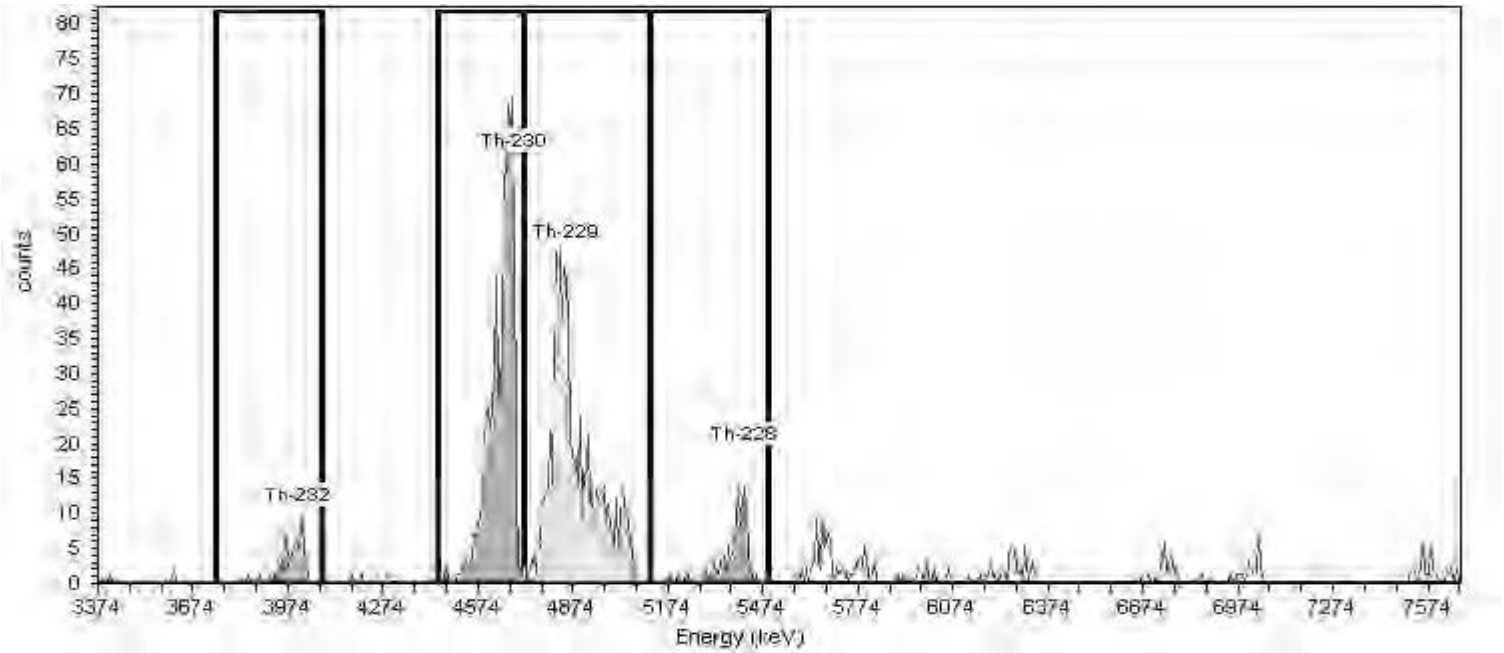
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.51%

Acquisition

Detector: AV79
Serial Number: 46-033Q5
Acquisition Start Date: 8/28/2018 7:56:17PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:42PM
Background Info: Sample: ICB;AV79; Det: AV79; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370621;AV79-05152018
Calibration Date: 5/15/2018 6:38:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.16% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	77.3	100.2	66	0.7500	65.25	0.555	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.3	99.7	637	1.2500	635.69	5.433	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.2	99.6	704	1.0000	702.94	4.841	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.1	99.8	99	3.5000	95.50	0.816	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:55:53PM 8/28/2018

Sample

Sample Name: 160-29881-A-16-C
SampleType: Sample
: 160-29881-A-16-C
Sample Collection Date: 7/26/2018 12:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0047g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739182

Analyst: 60040

Tracer

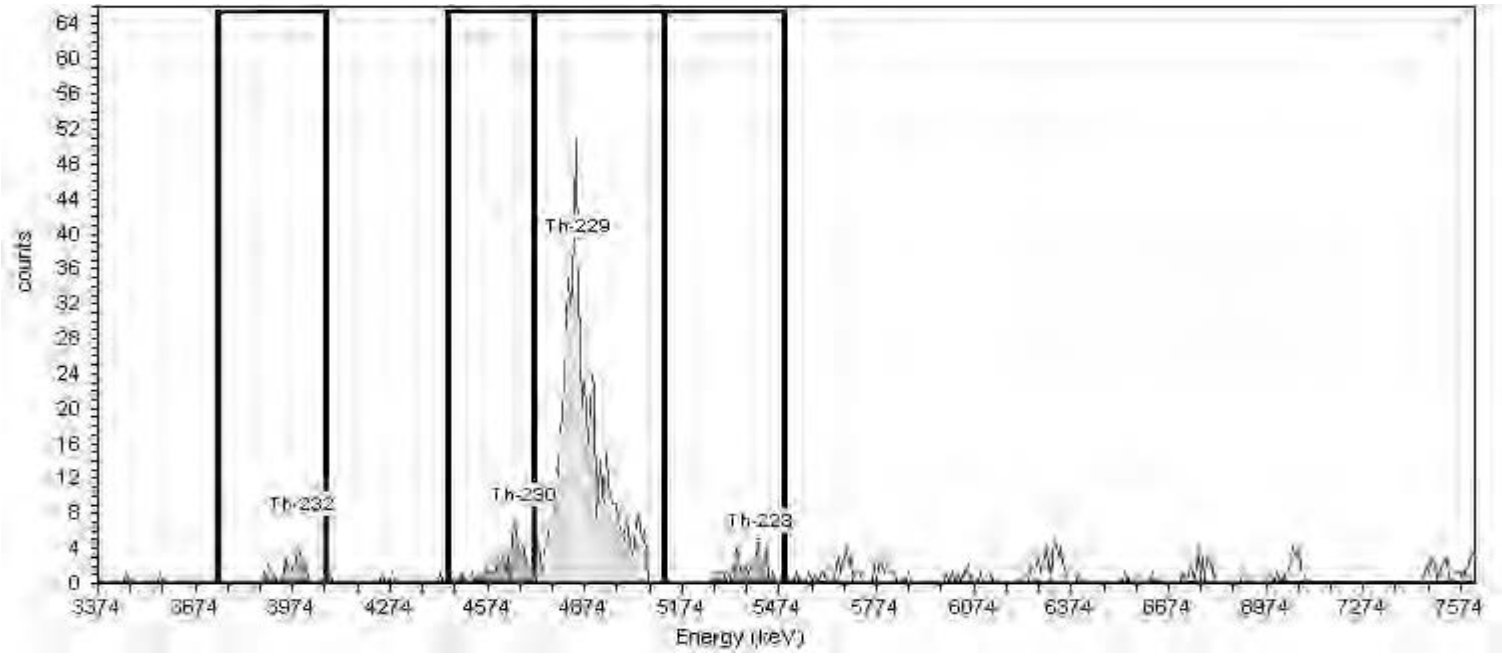
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 73.67%

Acquisition

Detector: AV80
Serial Number: 46-03305
Acquisition Start Date: 8/28/2018 7:56:18PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:15PM
Background Info: Sample: ICB;AV80; Det: AV80; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1370622;AV80-05152018
Calibration Date: 5/15/2018 6:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	58.2	100.2	27	1.7500	25.25	0.243	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	48.5	99.7	56	0.7500	55.22	0.534	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.3	99.6	625	1.7500	623.22	4.441	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.3	99.8	39	3.5000	35.50	0.343	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:56:45PM 8/28/2018

Sample

Sample Name: 160-29881-B-17-D
SampleType: Sample
: 160-29881-B-17-D
Sample Collection Date: 7/26/2018 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380642
AnalysisID: 739183

Analyst: 60040

Tracer

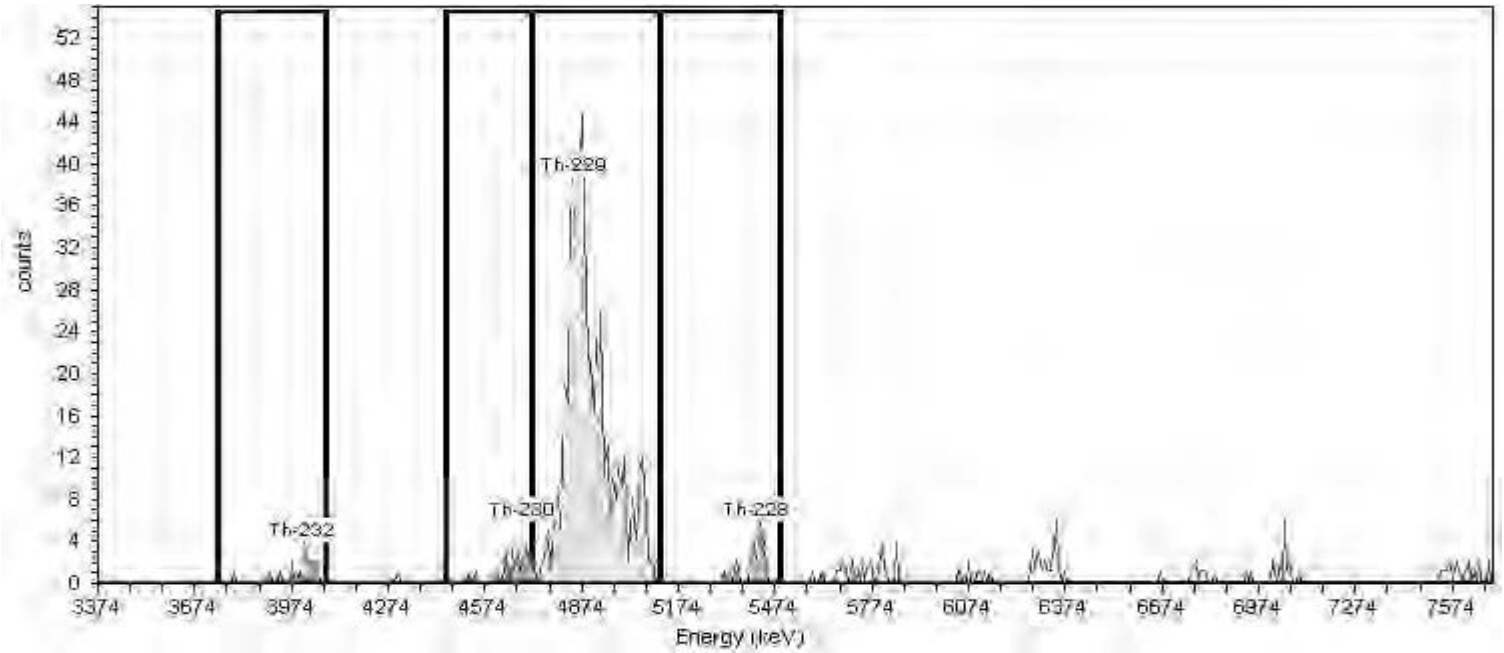
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 77.59%

Acquisition

Detector: AV81
Serial Number: 52-104X5
Acquisition Start Date: 8/28/2018 7:56:19PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:46PM
Background Info: Sample: ICB;AV81; Det: AV81; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV81-05152018
Calibration Date: 5/15/2018 6:38:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.25% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/28/2018 7:51:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.3	100.2	22	0.2500	21.75	0.192	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	46.9	99.7	26	0.7500	25.28	0.224	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.5	99.6	680	0.5000	679.53	4.686	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.9	99.8	32	2.7500	29.25	0.260	pCi/g

Prep Batch: 380676

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380676

Lab ID: MB 160-380676/1-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV24
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	-0.05776	0.0737	0.0739	U	pCi/g	1.00	0.133	385810

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.462	0.431	0.629		pCi/g	0.0565	6.05	90.2	30 - 110

Lab ID: LCS 160-380676/2-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV44
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	24.76	1.29	2.45		pCi/g	1.00	0.181	385813

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	9.916	0.737	1.11		pCi/g	0.0663	12.1	81.9	30 - 110

Lab ID: 160-29881-27
Client ID: CRC-B4-2628
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV45
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.429	0.148	0.152		pCi/g	1.00	0.123	385814

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.64	0.354	0.527		pCi/g	0.0418	6.04	76.8	30 - 110

Lab ID: 160-29881-27 DU
Client ID: CRC-B4-2628
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV47
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.5453	0.158	0.165		pCi/g	1.00	0.119	385816

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.890	0.368	0.552		pCi/g	0.0428	6.01	81.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380676

Lab ID: 160-29881-28 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B14-0608 | Detector: AV48 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.149	0.117	0.117		pCi/g	1.00	0.136	385817

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.36	0.348	0.505		pCi/g	0.0428	6.02	72.5	30 - 110

Lab ID: 160-29881-29 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B14-1012 | Detector: AV54 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.177	0.117	0.118		pCi/g	1.00	0.131	385818

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.39	0.415	0.614		pCi/g	0.0532	6.04	89.2	30 - 110

Lab ID: 160-29881-30 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B14-1618 | Detector: AV55 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.315	0.136	0.139		pCi/g	1.00	0.135	385819

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.78	0.436	0.652		pCi/g	0.0618	6.05	95.6	30 - 110

Lab ID: 160-29881-31 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B14-2426 | Detector: AV56 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.320	0.133	0.136		pCi/g	1.00	0.128	385820

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.401	0.604		pCi/g	0.0652	6.03	89.2	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380676

Lab ID: 160-29881-33 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B17-0810 | Detector: AV62 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.56	0.244	0.277		pCi/g	1.00	0.123	385822

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.71	0.353	0.530		pCi/g	0.0542	6.04	78.0	30 - 110

Lab ID: 160-29881-34 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B17-1820 | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.415	0.141	0.145		pCi/g	1.00	0.119	385824

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.97	0.364	0.554		pCi/g	0.0474	6.05	82.2	30 - 110

Lab ID: 160-29881-35 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B17-2628 | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.496	0.152	0.157		pCi/g	1.00	0.123	385825

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.08	0.376	0.569		pCi/g	0.0493	6.04	84.1	30 - 110

Lab ID: 160-29881-36 | Analyzed: 08/28/18 02:46 | Decay Corrected: No
Client ID: CRC-B5-1214 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.256	0.125	0.127		pCi/g	1.00	0.125	385826

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.90	0.369	0.553		pCi/g	0.0429	6.05	81.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380676

Lab ID: 160-29881-37
Client ID: CRC-B5-1618
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV69
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.545	0.172	0.178		pCi/g	1.00	0.134	385828

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.34	0.354	0.508		pCi/g	0.0480	6.06	71.7	30 - 110

Lab ID: 160-29881-38
Client ID: CRC-B5-2224
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV70
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.543	0.165	0.172		pCi/g	1.00	0.127	385830

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.98	0.392	0.573		pCi/g	0.0546	6.03	82.7	30 - 110

Lab ID: 160-29881-39
Client ID: CRC-B5-2830
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV71
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.515	0.159	0.165		pCi/g	1.00	0.128	385831

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.62	0.429	0.638		pCi/g	0.0583	6.03	93.2	30 - 110

Lab ID: 160-29881-40
Client ID: CRC-B11-1214
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV72
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.297	0.126	0.129		pCi/g	1.00	0.121	385832

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.80	0.421	0.644		pCi/g	0.0509	6.03	96.2	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380676

Lab ID: 160-29881-41
Client ID: CRC-B11-2022
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV73
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.335	0.137	0.139		pCi/g	1.00	0.127	385833

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.69	0.432	0.644		pCi/g	0.0614	6.05	94.0	30 - 110

Lab ID: 160-29881-42
Client ID: CRC-B11-2628
Sigma: 2

Analyzed: 08/28/18 02:46
Detector: AV74
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.455	0.155	0.160		pCi/g	1.00	0.128	385834

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.76	0.373	0.547		pCi/g	0.0354	6.03	79.0	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-380676/1-A	Thorium-230			-0.05776	U	pCi/g							-1.5632837

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-380676/2-A	Thorium-230		24.5	24.76		pCi/g	101	81 - 118					.15544954

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-27	Thorium-230	0.429		0.5453		pCi/g			24	0.37	1.03	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380676 Batch Start Date: 08/06/18 14:11 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:38

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00023	TRM-2 00002			
MB 160-380676/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-380676/2		ExtChrom, A-01-R		0.5001 g	0.2 mL	0.5001 g			
160-29881-A-27-B	CRC-B4-2628	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-27-B DU	CRC-B4-2628	ExtChrom, A-01-R	T	1.0068 g	0.2 mL				
160-29881-B-28-B	CRC-B14-0608	ExtChrom, A-01-R	T	1.0053 g	0.2 mL				
160-29881-B-29-A	CRC-B14-1012	ExtChrom, A-01-R	T	1.0020 g	0.2 mL				
160-29881-B-30-B	CRC-B14-1618	ExtChrom, A-01-R	T	1.0014 g	0.2 mL				
160-29881-A-31-A	CRC-B14-2426	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
160-29881-A-33-B	CRC-B17-0810	ExtChrom, A-01-R	T	1.0031 g	0.2 mL				
160-29881-A-34-A	CRC-B17-1820	ExtChrom, A-01-R	T	1.0012 g	0.2 mL				
160-29881-B-35-B	CRC-B17-2628	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-B-36-A	CRC-B5-1214	ExtChrom, A-01-R	T	1.0009 g	0.2 mL				
160-29881-A-37-A	CRC-B5-1618	ExtChrom, A-01-R	T	0.9998 g	0.2 mL				
160-29881-B-38-B	CRC-B5-2224	ExtChrom, A-01-R	T	1.0047 g	0.2 mL				
160-29881-B-39-B	CRC-B5-2830	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
160-29881-A-40-B	CRC-B11-1214	ExtChrom, A-01-R	T	1.0040 g	0.2 mL				
160-29881-B-41-A	CRC-B11-2022	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-42-B	CRC-B11-2628	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380676 Batch Start Date: 08/06/18 14:11 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:38

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	NMN per CMM
Column Date	08/23/2018
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/24/2018
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	TAT
Analyst ID - Reagent Drop	KNF per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:31AM 8/28/2018

Sample

Sample Name: MB 160-380676/1-A
SampleType: Blank
: MB 160-380676/1-A
Sample Collection Date: 8/24/2018 7:40:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739084

Analyst: 60040

Tracer

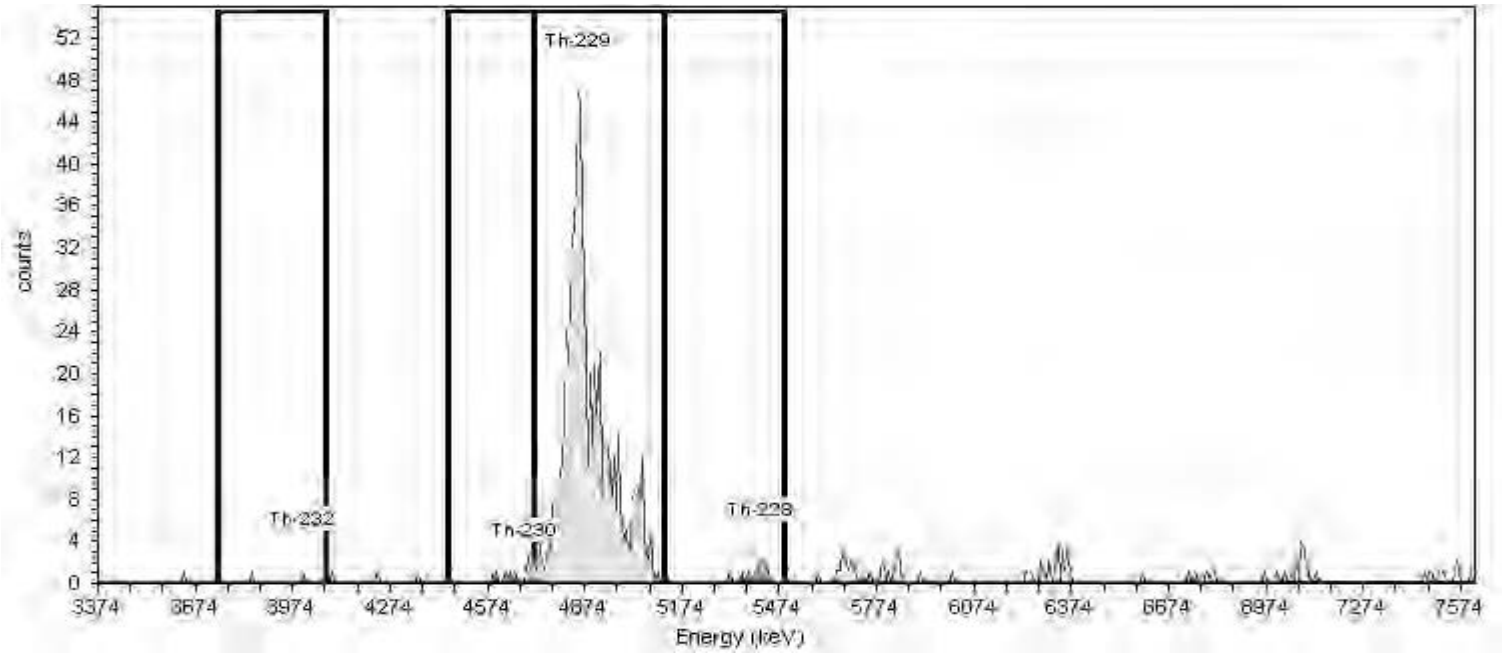
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.29%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 8/28/2018 2:46:06AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:56PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9817;AV24-05142018
Calibration Date: 5/15/2018 12:28:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.21% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	2	0.5000	1.50	0.014	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	14	1.2500	12.72	0.121	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.1	99.6	638	0.5160	637.45	5.408	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	12	2.5160	9.48	0.090	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:36:37PM 8/28/2018

Sample

Sample Name: MB 160-380676/1-A
SampleType: Blank
: MB 160-380676/1-A
Sample Collection Date: 8/24/2018 7:40:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739153

Analyst: 60040

Tracer

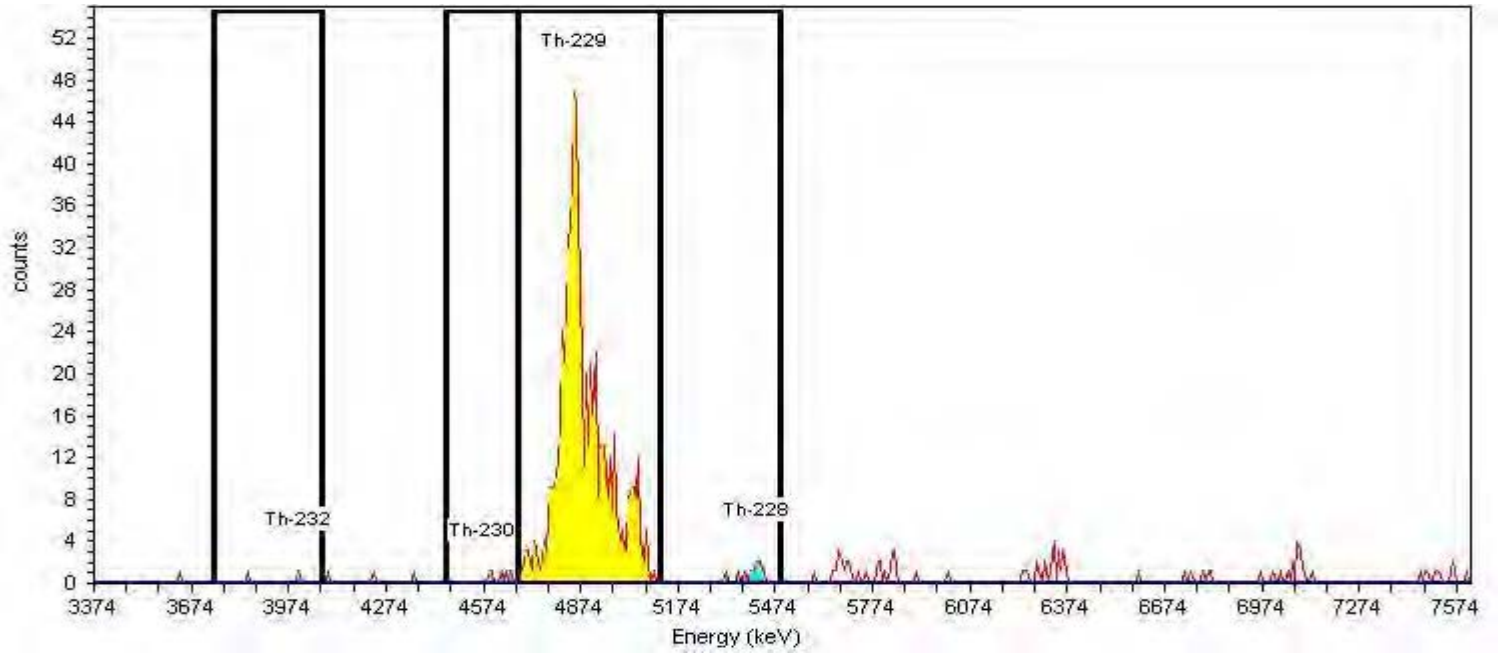
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.21%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 8/28/2018 2:46:06AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:56PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9817;AV24-05142018
Calibration Date: 5/15/2018 12:28:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.21% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	2	0.5000	1.50	0.014	pCi/g
Th-230	4567.6	4,687.5	-119.9	4455.8	4679.5	17.7	99.7	5	1.0000	4.00	0.038	pCi/g
Th-229	4848.0	4,845.3	2.7	4679.5	5119.5	69.1	99.8	646	1.0000	645.00	5.464	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	12	2.5160	9.48	0.089	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:48:01AM 8/28/2018

Sample

Sample Name: LCS 160-380676/2-A
SampleType: Control
: LCS 160-380676/2-A
Sample Collection Date: 8/24/2018 7:40:00PM

Spectrum #2 Analysis #1
Sample Weight : 0.5001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739085

Analyst: 60040

Tracer

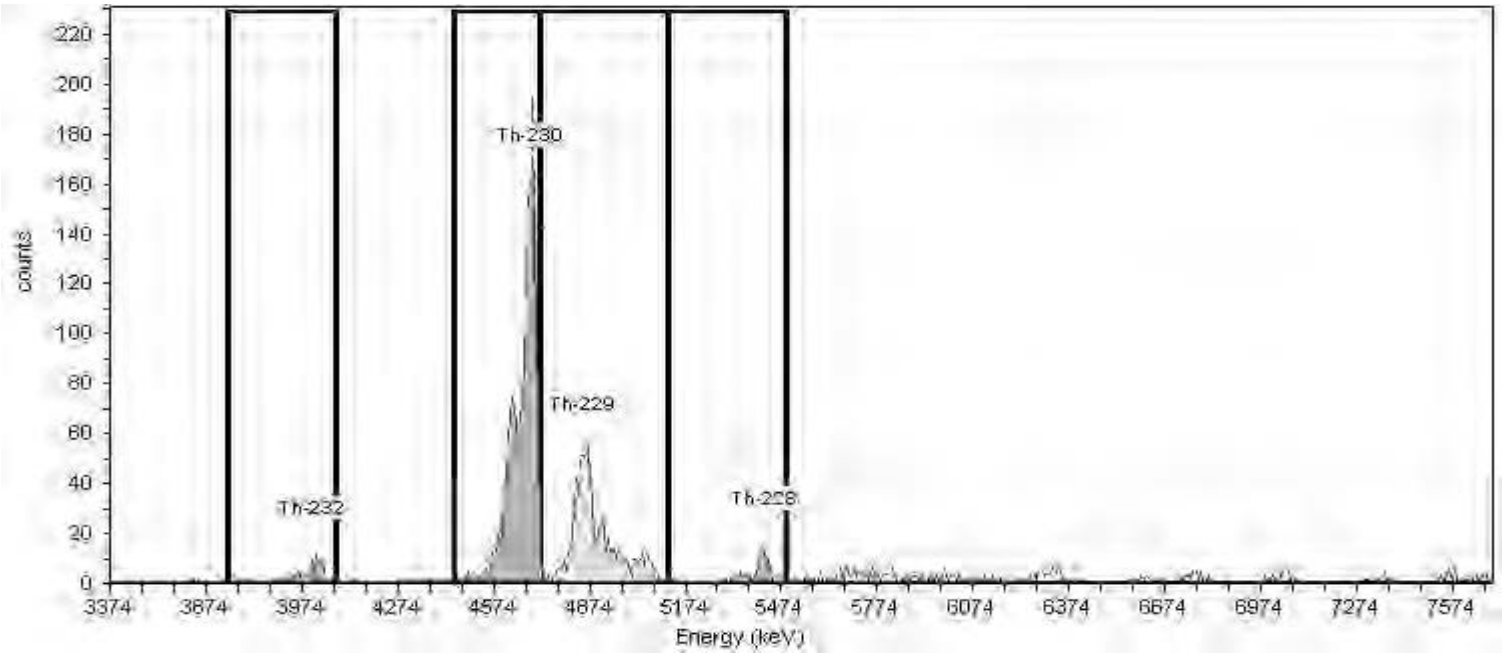
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.02%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 8/28/2018 2:46:08AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/13/2018 2:35:50PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Aug-13-2018 14:35

Calibration Name: IC-1368446;AV44-05142018
Calibration Date: 5/15/2018 12:26:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.49% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.9	100.2	71	0.5000	70.50	1.157	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.4	99.7	1486	0.0000	1485.69	24.507	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.9	99.6	734	0.2500	733.50	10.054	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.5	99.8	82	5.0000	77.06	1.273	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:37:57PM 8/28/2018

Sample

Sample Name: LCS 160-380676/2-A
SampleType: Control
: LCS 160-380676/2-A
Sample Collection Date: 8/24/2018 7:40:00PM

Spectrum #2 Analysis #1
Sample Weight : 0.5001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739154

Analyst: 60040

Tracer

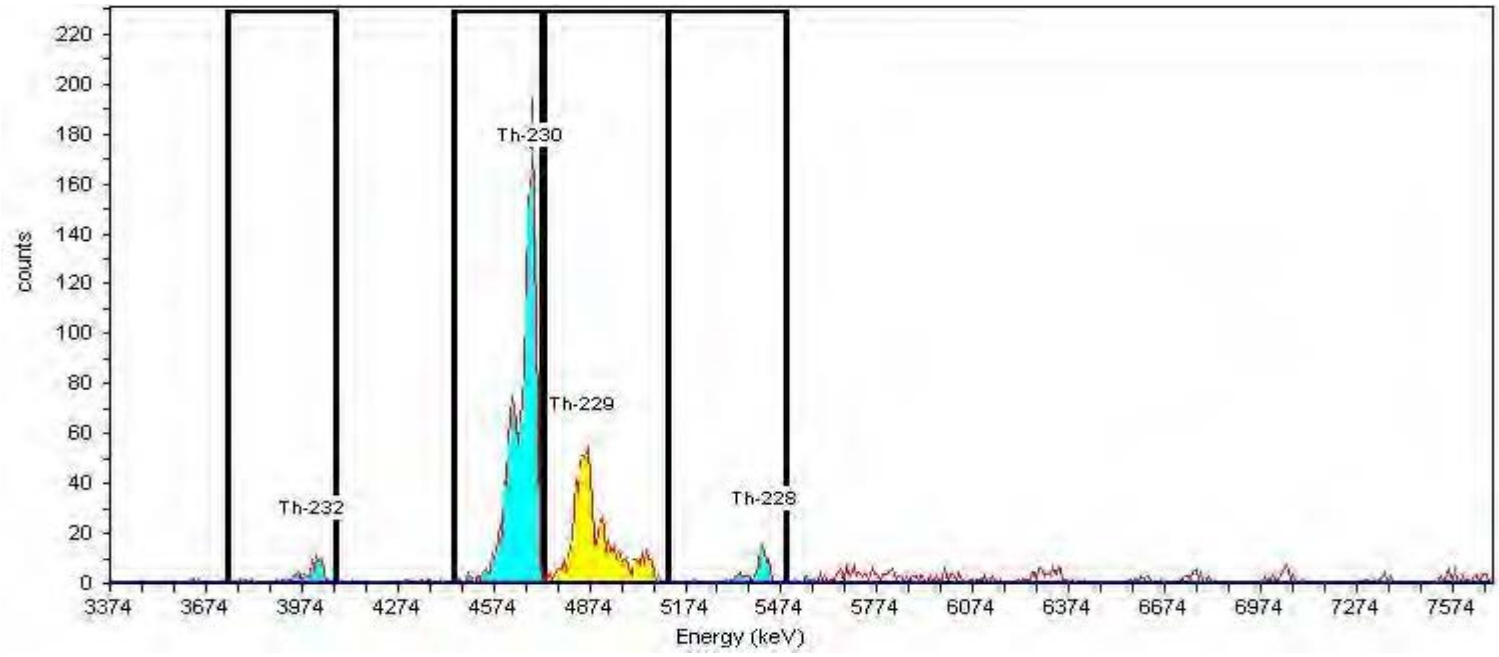
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.91%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 8/28/2018 2:46:08AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/13/2018 2:35:50PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Aug-13-2018 14:35

Calibration Name: IC-1368446;AV44-05142018
Calibration Date: 5/15/2018 12:26:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.49% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.9	100.2	71	0.5000	70.50	1.173	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	26.3	99.7	1487	0.0000	1487.00	24.859	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	66.9	99.6	724	0.2500	723.75	9.920	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.5	99.8	82	5.0000	77.06	1.291	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:48:10AM 8/28/2018

Sample

Sample Name: 160-29881-A-27-D
SampleType: Sample
: 160-29881-A-27-D
Sample Collection Date: 7/27/2018 9:20:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739086

Analyst: 60040

Tracer

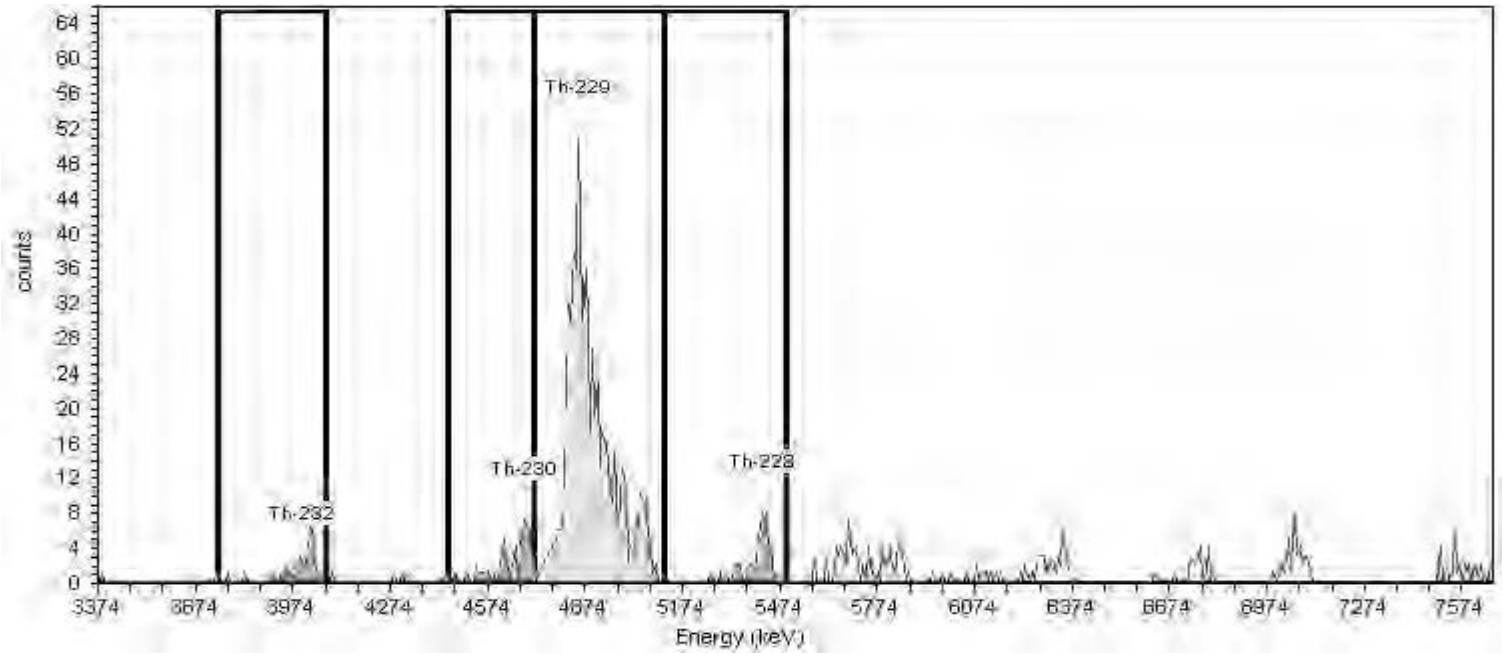
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 76.83%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 8/28/2018 2:46:10AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:01PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1368447;AV45-05142018a
Calibration Date: 5/15/2018 12:29:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.95% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	12.5	100.2	43	1.1437	41.86	0.364	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.8	99.7	60	0.2500	59.97	0.525	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.3	99.6	691	0.7660	690.14	4.645	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.0	99.8	52	3.7660	48.23	0.423	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:00AM 8/28/2018

Sample

Sample Name: 160-29881-A-27-E DU
SampleType: Sample
: 160-29881-A-27-E DU
Sample Collection Date: 7/27/2018 9:20:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0068g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739087

Analyst: 60040

Tracer

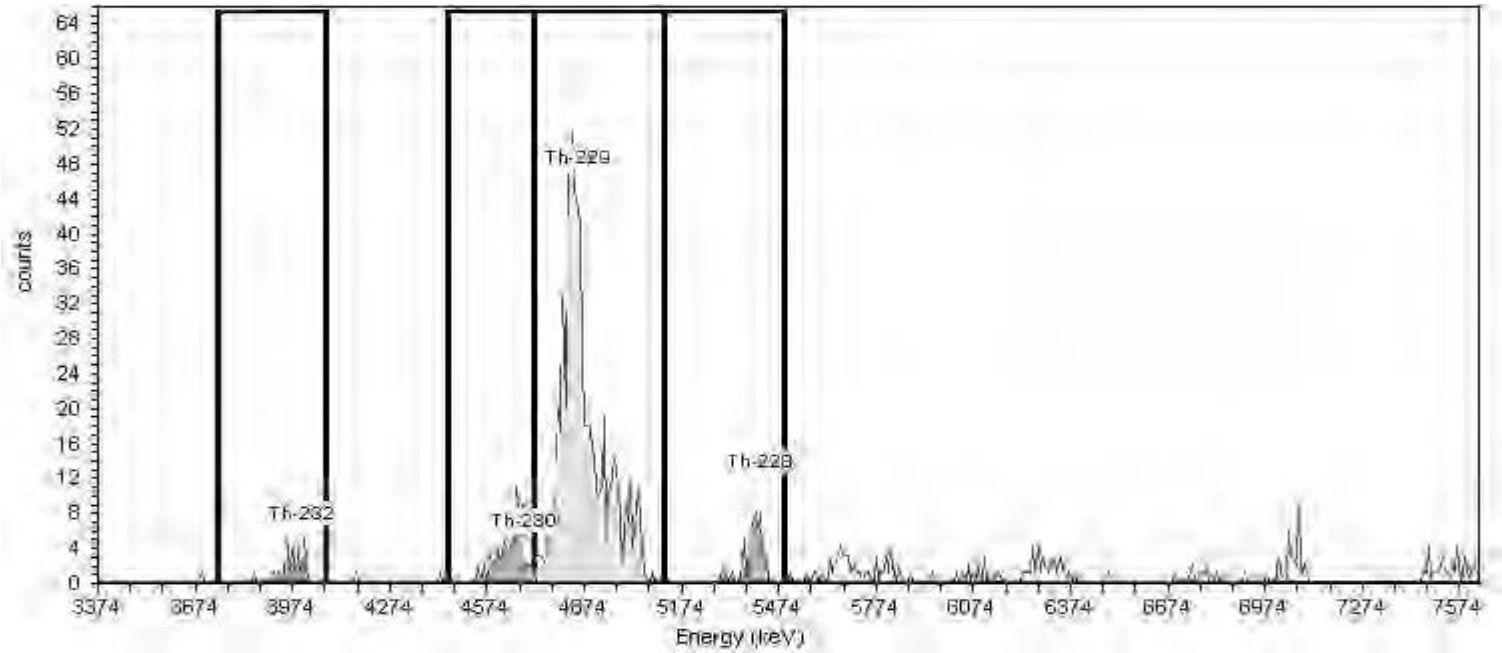
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.31%

Acquisition

Detector: AV47
Serial Number: 46-032336
Acquisition Start Date: 8/28/2018 2:46:11AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:05PM
Background Info: Sample: ICB;AV47; Det: AV47; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370622;AV47-05142018
Calibration Date: 5/15/2018 12:27:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.02% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	82.5	100.2	31	0.8854	30.11	0.255	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.1	99.7	75	0.0000	75.28	0.641	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.6	99.6	707	0.7500	706.22	4.891	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.2	99.8	55	2.7500	52.25	0.445	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:10AM 8/28/2018

Sample

Sample Name: 160-29881-B-28-D
SampleType: Sample
: 160-29881-B-28-D
Sample Collection Date: 7/27/2018 12:15:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0053g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739088

Analyst: 60040

Tracer

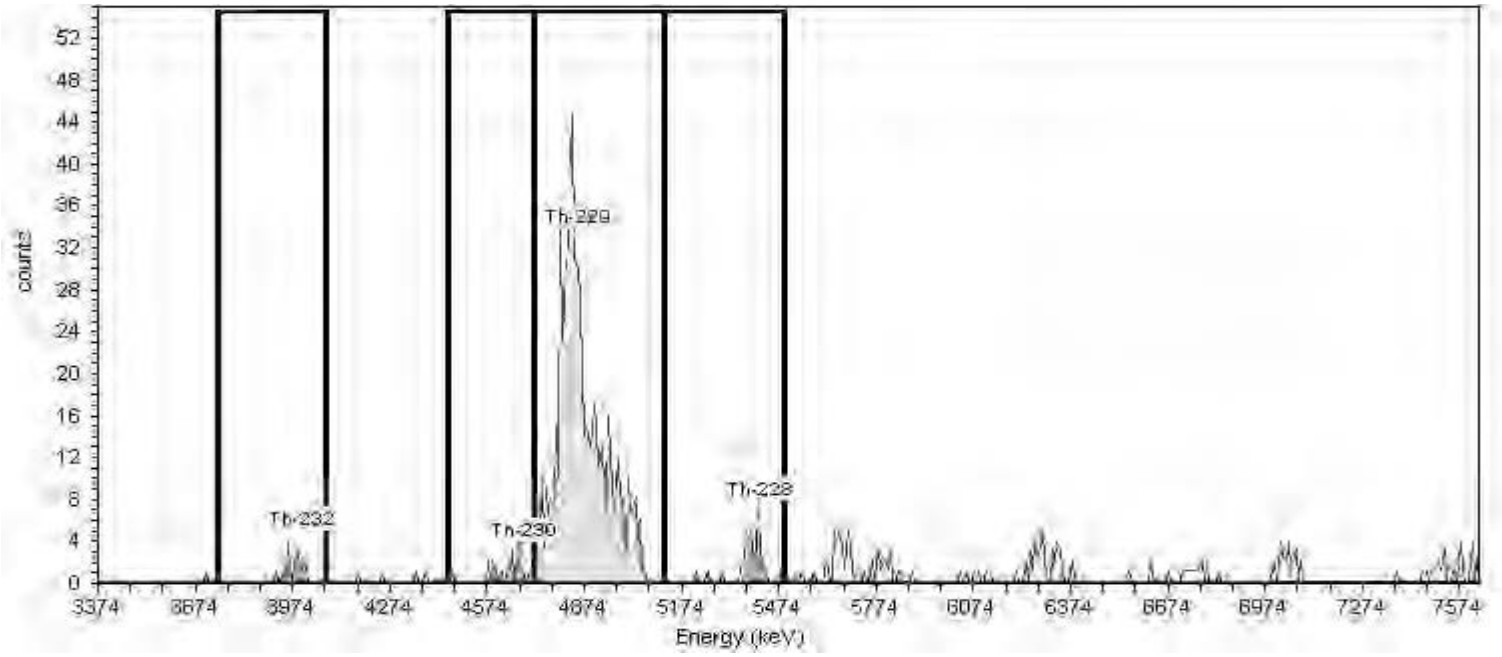
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 72.47%

Acquisition

Detector: AV48
Serial Number: 46-033P6
Acquisition Start Date: 8/28/2018 2:46:13AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:06PM
Background Info: Sample: ICB;AV48; Det: AV48; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV48-05142018
Calibration Date: 5/15/2018 12:27:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.06% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	59.9	100.2	17	0.5000	16.50	0.157	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	16.1	99.7	27	1.4230	25.58	0.244	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.1	99.6	631	0.7500	630.25	4.366	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	66.0	99.8	40	3.0000	37.00	0.354	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:19AM 8/28/2018

Sample

Sample Name: 160-29881-B-29-C
SampleType: Sample
: 160-29881-B-29-C
Sample Collection Date: 7/27/2018 12:20:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0020g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739089

Analyst: 60040

Tracer

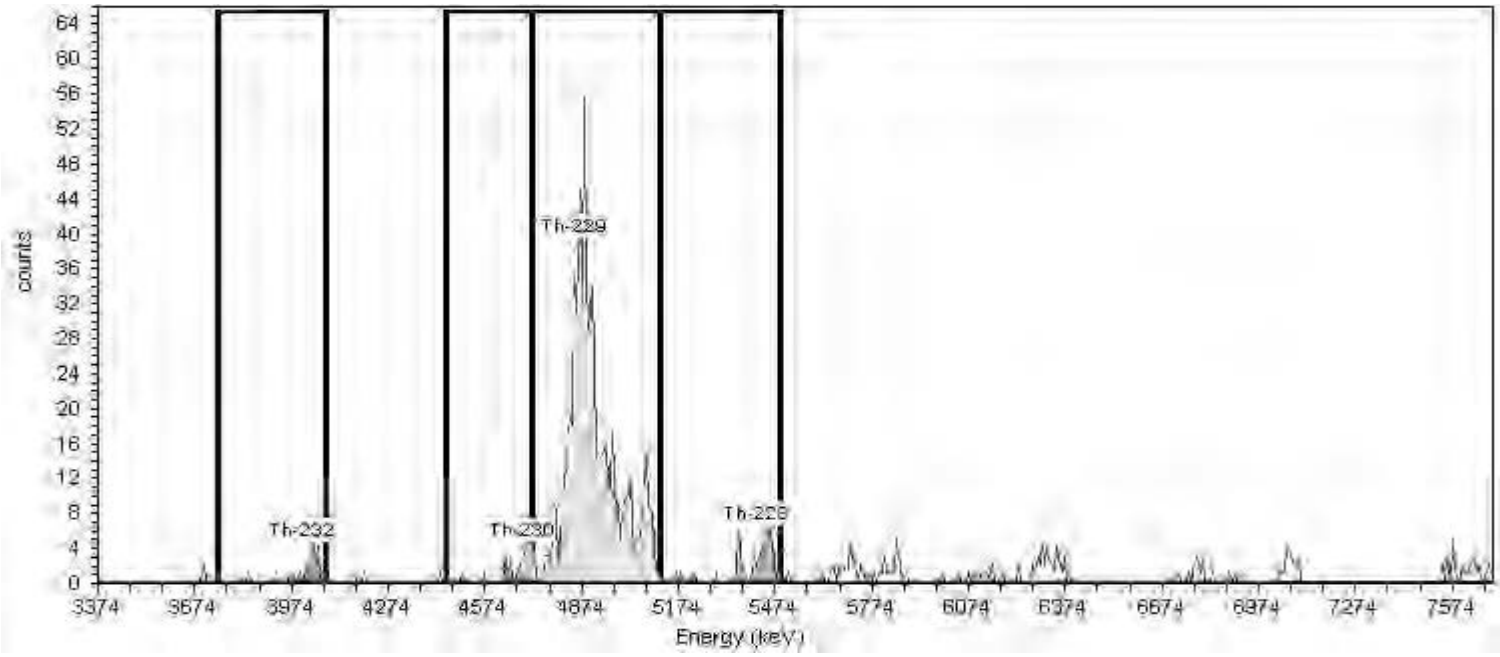
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.72%

Acquisition

Detector: AV54
Serial Number: 46-033P4
Acquisition Start Date: 8/28/2018 2:46:14AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/14/2018 6:49:40PM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9792;AV54-05152018
Calibration Date: 5/15/2018 3:37:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.62% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:11PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	29.6	100.2	22	0.2500	22.21	0.196	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	2.3	99.7	28	1.5000	26.47	0.235	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.7	99.6	682	1.0000	681.03	5.423	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	27.1	99.8	56	4.2500	51.73	0.460	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:28:22PM 8/28/2018

Sample

Sample Name: 160-29881-B-29-C
SampleType: Sample
: 160-29881-B-29-C
Sample Collection Date: 7/27/2018 12:20:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0020g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739148

Analyst: 60040

Tracer

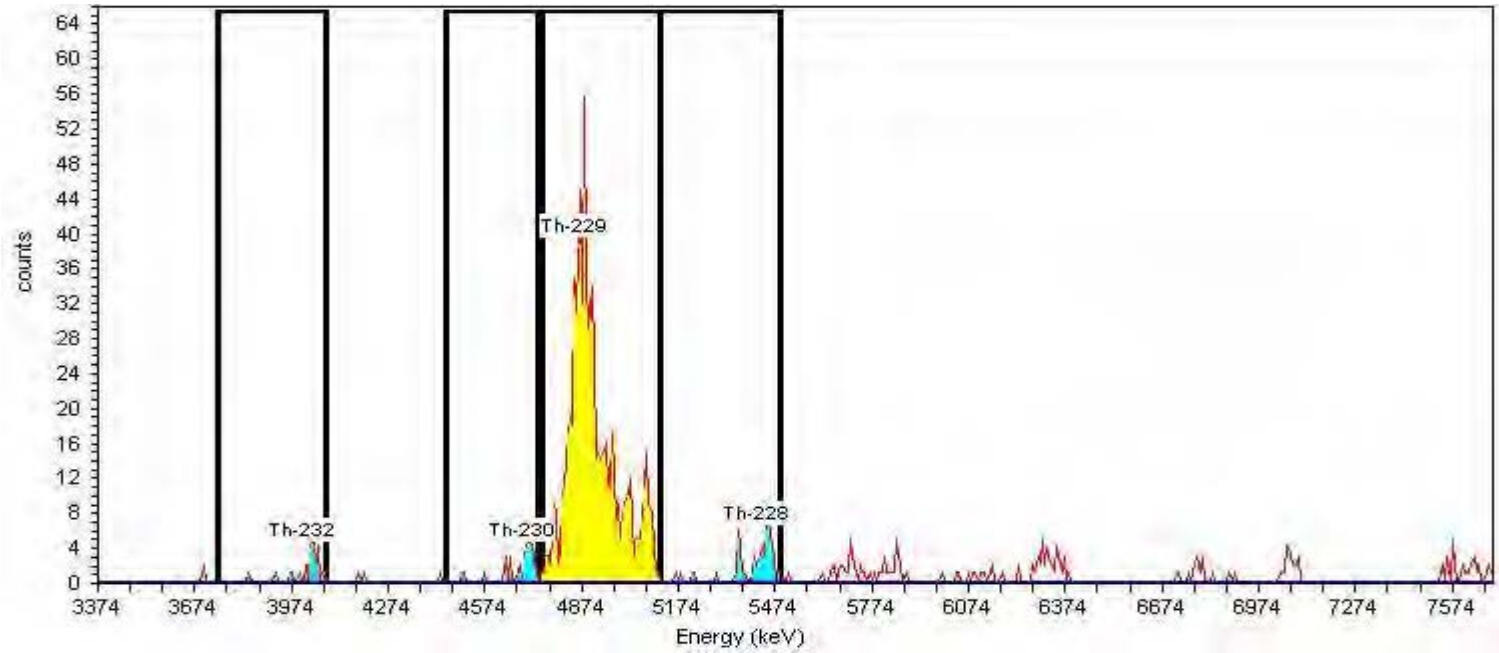
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.19%

Acquisition

Detector: AV54
Serial Number: 46-033P4
Acquisition Start Date: 8/28/2018 2:46:14AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/14/2018 6:49:40PM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9792;AV54-05152018
Calibration Date: 5/15/2018 3:37:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.62% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:11PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	29.6	100.2	22	0.2500	22.21	0.197	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	30.1	99.7	32	1.5000	30.50	0.272	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	77.7	99.6	678	1.0000	677.00	5.391	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	27.1	99.8	56	4.2500	51.73	0.462	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:29AM 8/28/2018

Sample

Sample Name: 160-29881-B-30-D
SampleType: Sample
: 160-29881-B-30-D
Sample Collection Date: 7/27/2018 12:25:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0014g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739090

Analyst: 60040

Tracer

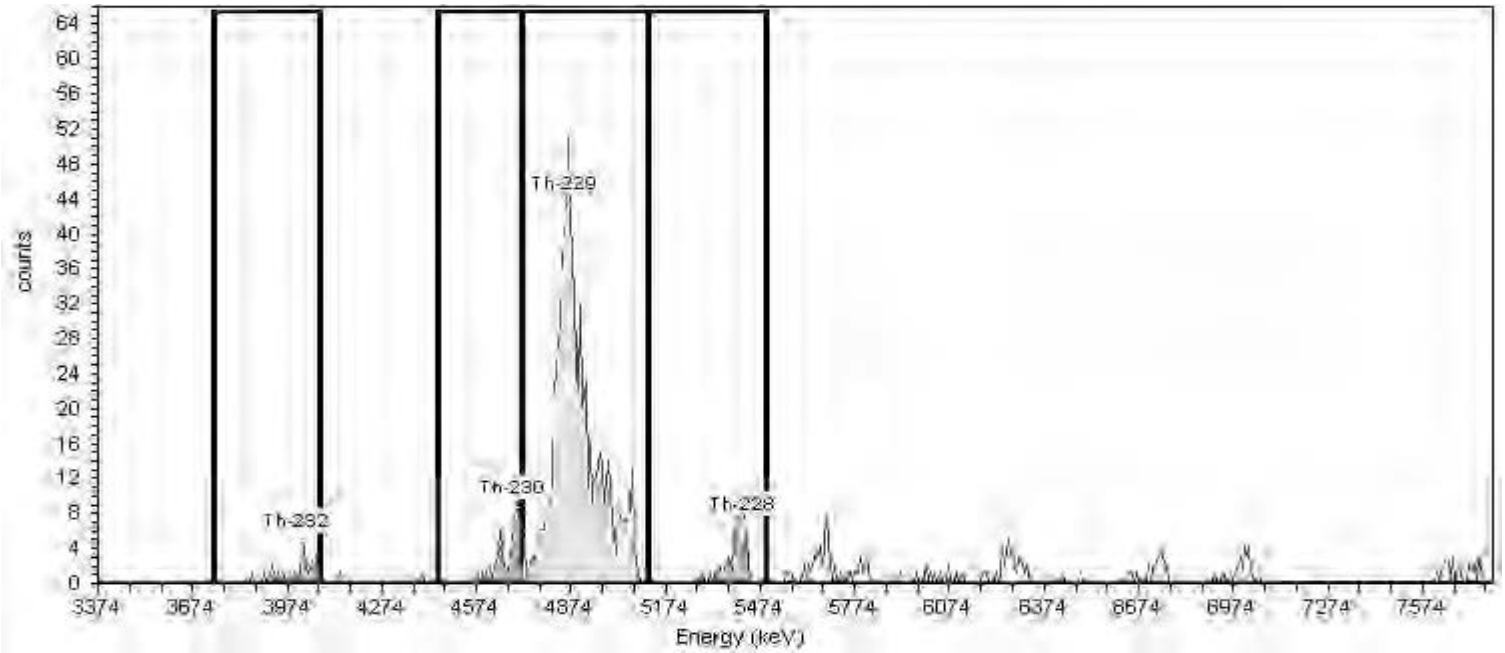
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.62%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 8/28/2018 2:46:16AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/14/2018 6:49:41PM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9793;AV55-05152018
Calibration Date: 5/15/2018 3:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.96% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:11PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	41.1	100.2	30	1.2500	29.21	0.249	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.2	99.7	51	3.2423	47.91	0.410	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.0	99.6	707	1.5242	705.63	5.783	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.6	99.8	59	3.5320	55.47	0.476	pCi/g

TestAmerica
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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:38AM 8/28/2018

Sample

Sample Name: 160-29881-A-31-C
SampleType: Sample
: 160-29881-A-31-C
Sample Collection Date: 7/27/2018 12:30:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0035g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739091

Analyst: 60040

Tracer

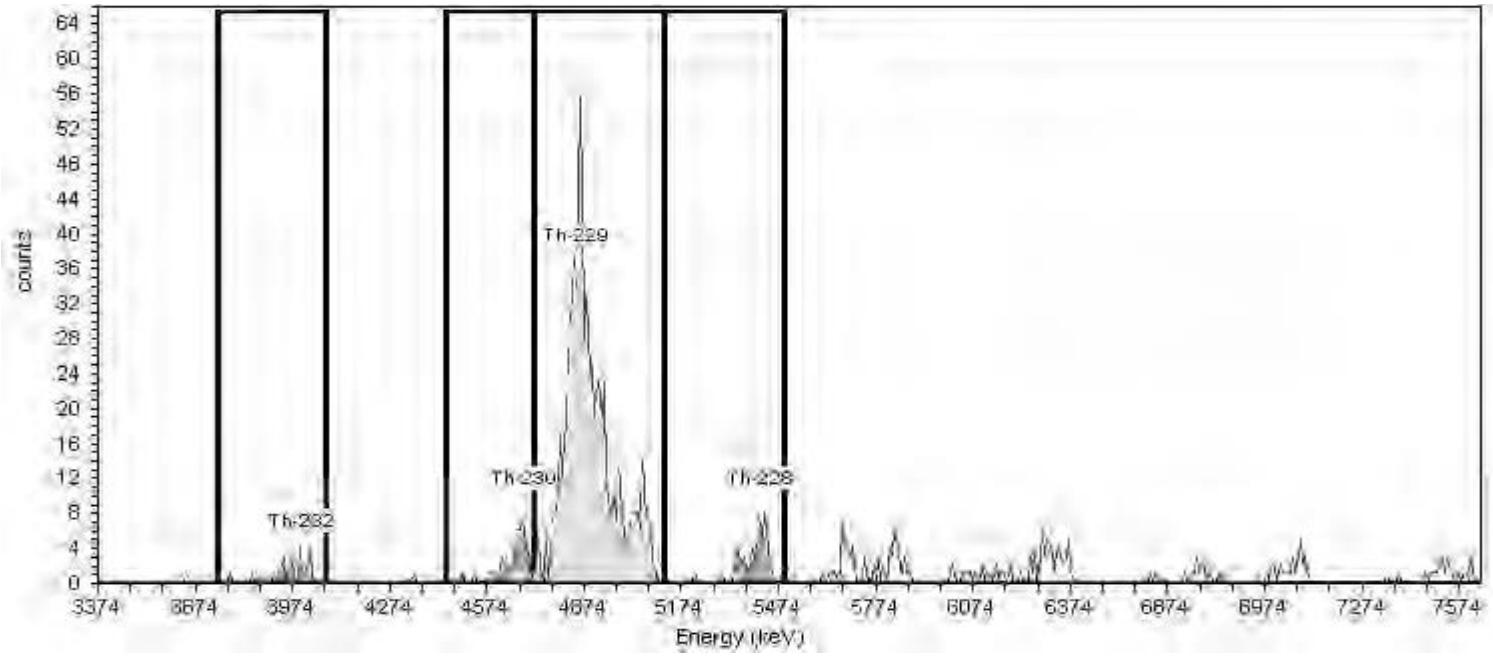
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.15%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 8/28/2018 2:46:18AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/14/2018 6:49:42PM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1; Aug-14-2018 18:49

Calibration Name: IC-9795;AV56-05152018
Calibration Date: 5/15/2018 3:38:31PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.25% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	101.1	100.2	27	0.7500	26.25	0.218	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.5	99.7	52	2.1463	49.88	0.416	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	98.3	99.6	726	2.4603	723.57	5.381	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.3	99.8	58	4.7180	53.28	0.445	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:50:56AM 8/28/2018

Sample

Sample Name: 160-29881-A-33-D
SampleType: Sample
: 160-29881-A-33-D
Sample Collection Date: 7/27/2018 4:25:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0031g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739093

Analyst: 60040

Tracer

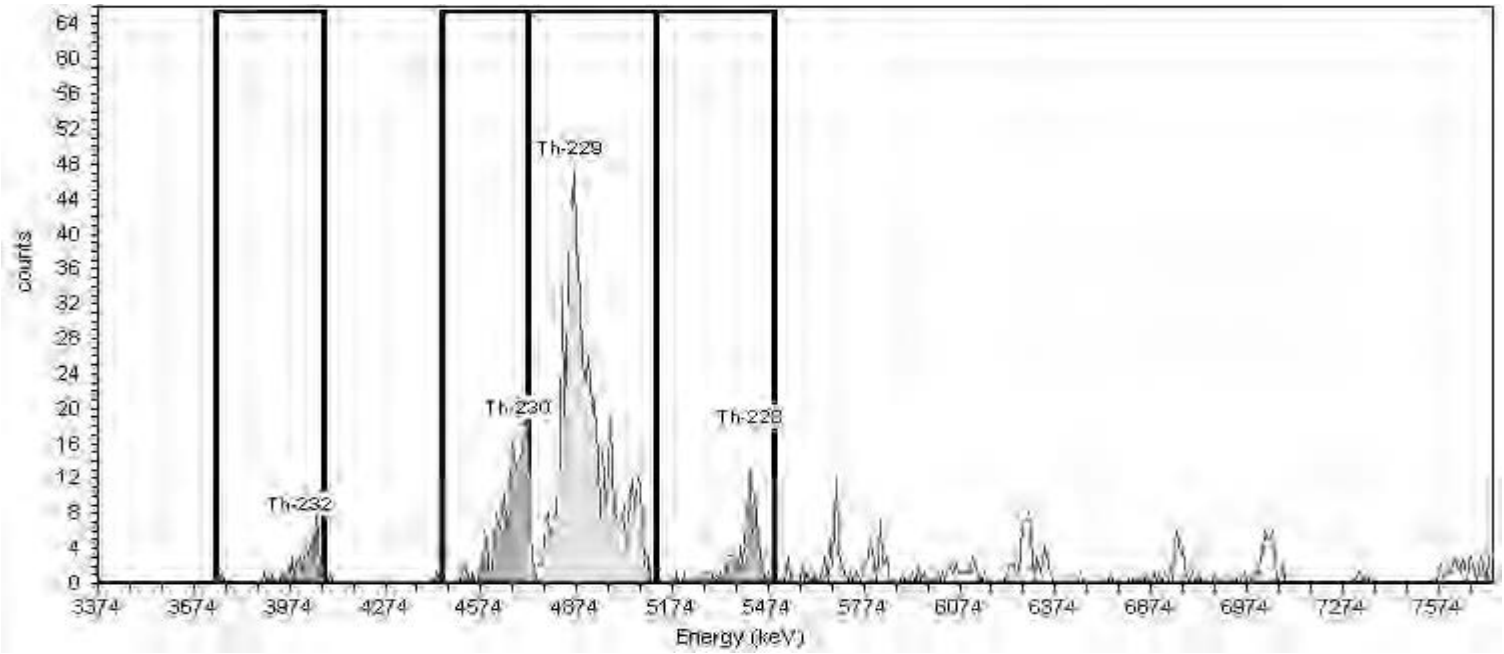
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.44%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 8/28/2018 2:46:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/13/2018 2:36:05PM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.9	100.2	47	0.3937	46.52	0.380	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	22.2	99.7	186	0.2577	185.34	1.522	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.5	99.6	737	2.2577	734.34	4.857	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.6	99.8	85	4.2500	80.75	0.665	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:29PM 8/28/2018

Sample

Sample Name: 160-29881-A-33-D
SampleType: Sample
: 160-29881-A-33-D
Sample Collection Date: 7/27/2018 4:25:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0031g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739151

Analyst: 60040

Tracer

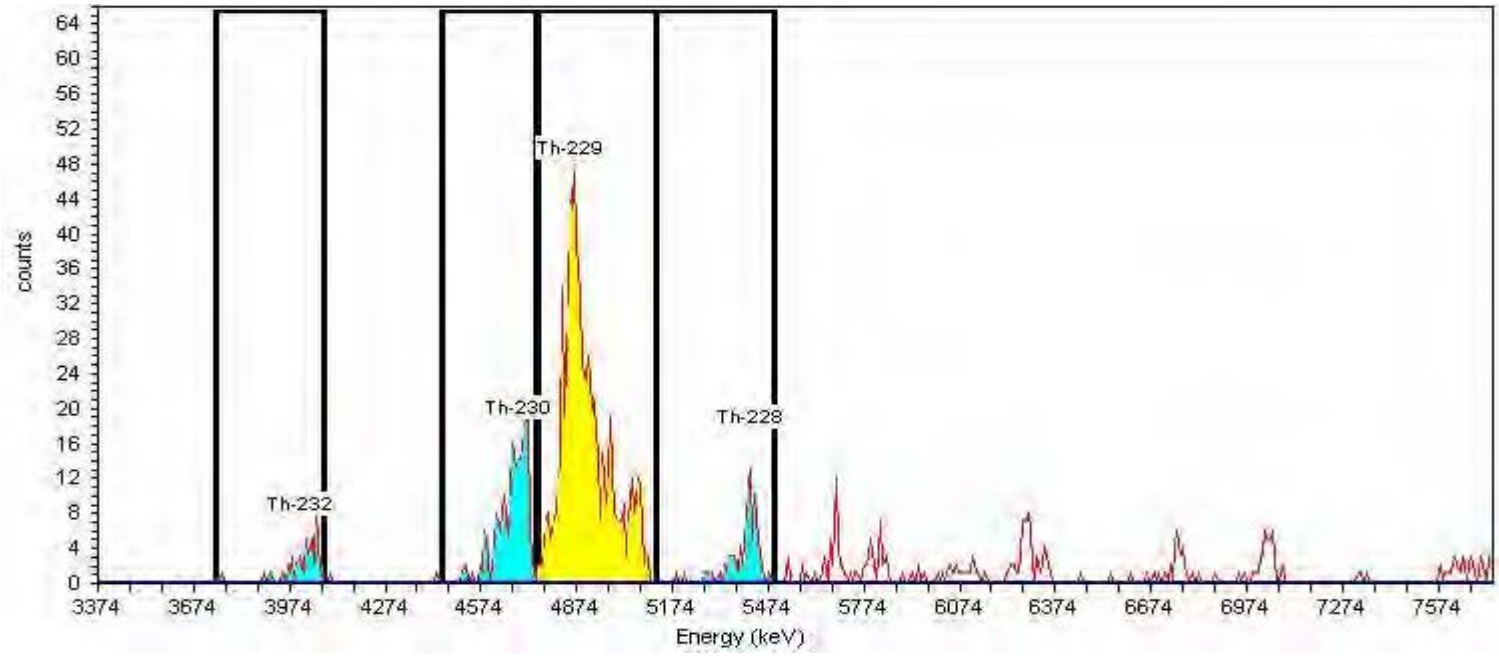
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 78.00%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 8/28/2018 2:46:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/13/2018 2:36:05PM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.9	100.2	47	0.3937	46.52	0.392	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	20.3	99.7	196	0.7500	195.25	1.654	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	89.5	99.6	714	2.0000	712.00	4.709	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	61.6	99.8	85	4.2500	80.75	0.685	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:14AM 8/28/2018

Sample

Sample Name: 160-29881-A-34-C
SampleType: Sample
: 160-29881-A-34-C
Sample Collection Date: 7/27/2018 4:30:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0012g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739094

Analyst: 60040

Tracer

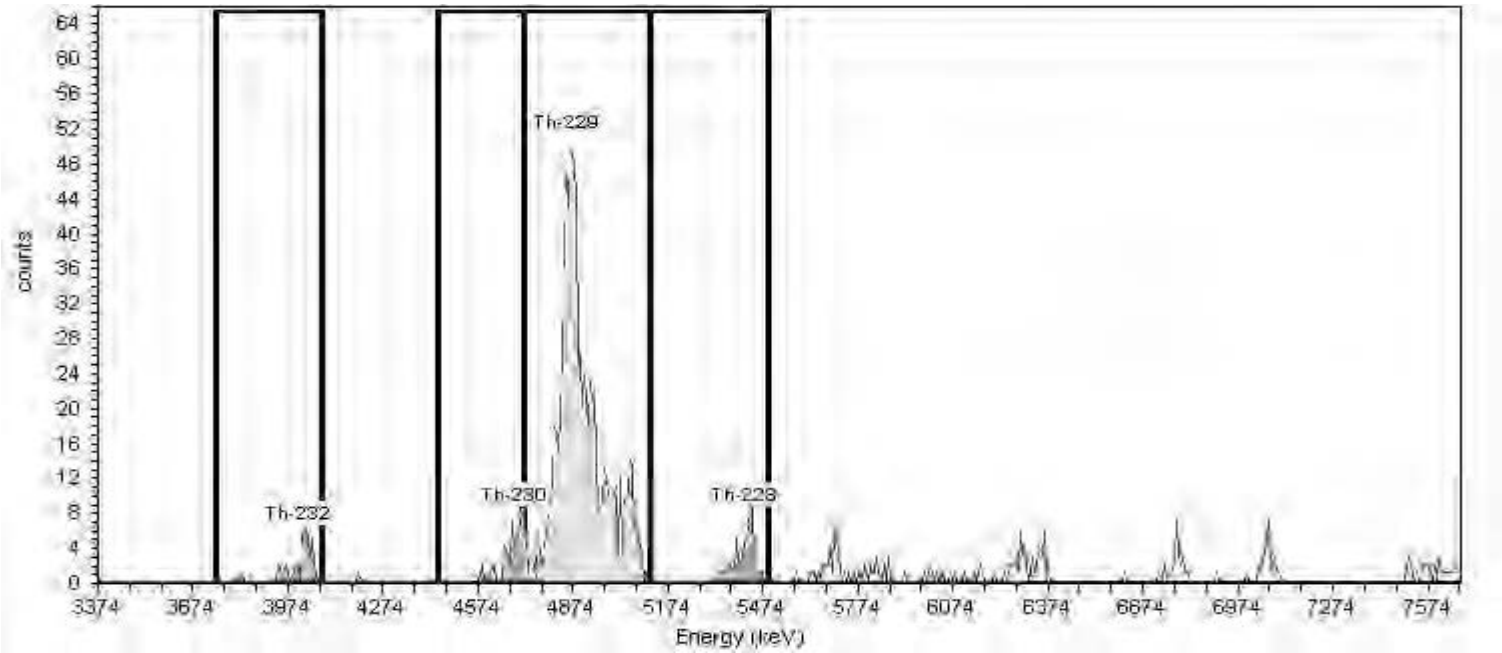
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.06%

Acquisition

Detector: AV64
Serial Number: 43-028v3
Acquisition Start Date: 8/28/2018 2:46:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:19PM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.3	100.2	40	0.2500	39.75	0.315	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.2	99.7	53	0.7500	52.19	0.416	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.6	99.6	759	1.2500	757.69	5.025	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.2	99.8	56	4.7284	51.27	0.410	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:07PM 8/28/2018

Sample

Sample Name: 160-29881-A-34-C
SampleType: Sample
: 160-29881-A-34-C
Sample Collection Date: 7/27/2018 4:30:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0012g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739150

Analyst: 60040

Tracer

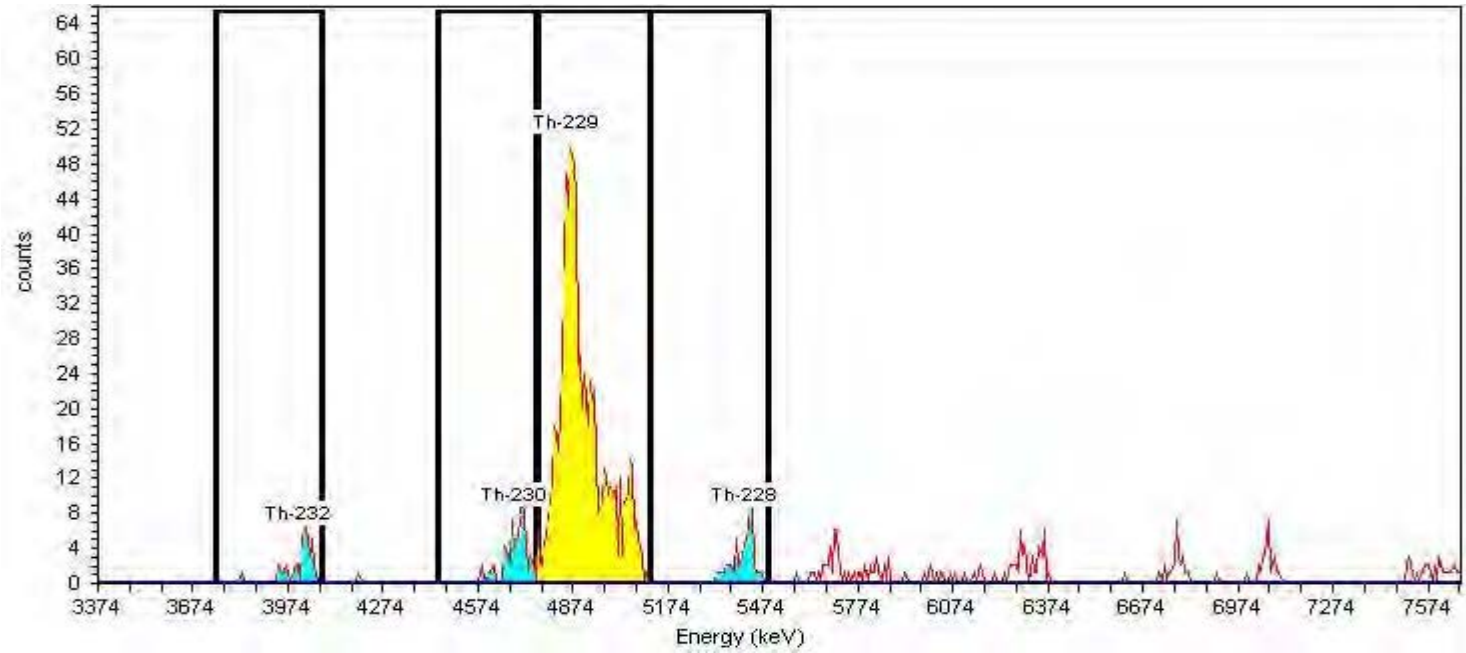
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.17%

Acquisition

Detector: AV64
Serial Number: 43-028v3
Acquisition Start Date: 8/28/2018 2:46:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:19PM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.3	100.2	40	0.2500	39.75	0.319	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	31.0	99.7	64	0.7500	63.25	0.510	pCi/g
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	71.6	99.0	746	1.2500	744.75	4.970	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.2	99.8	56	4.7283	51.27	0.414	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:23AM 8/28/2018

Sample

Sample Name: 160-29881-B-35-D
SampleType: Sample
: 160-29881-B-35-D
Sample Collection Date: 7/30/2018 8:45:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739095

Analyst: 60040

Tracer

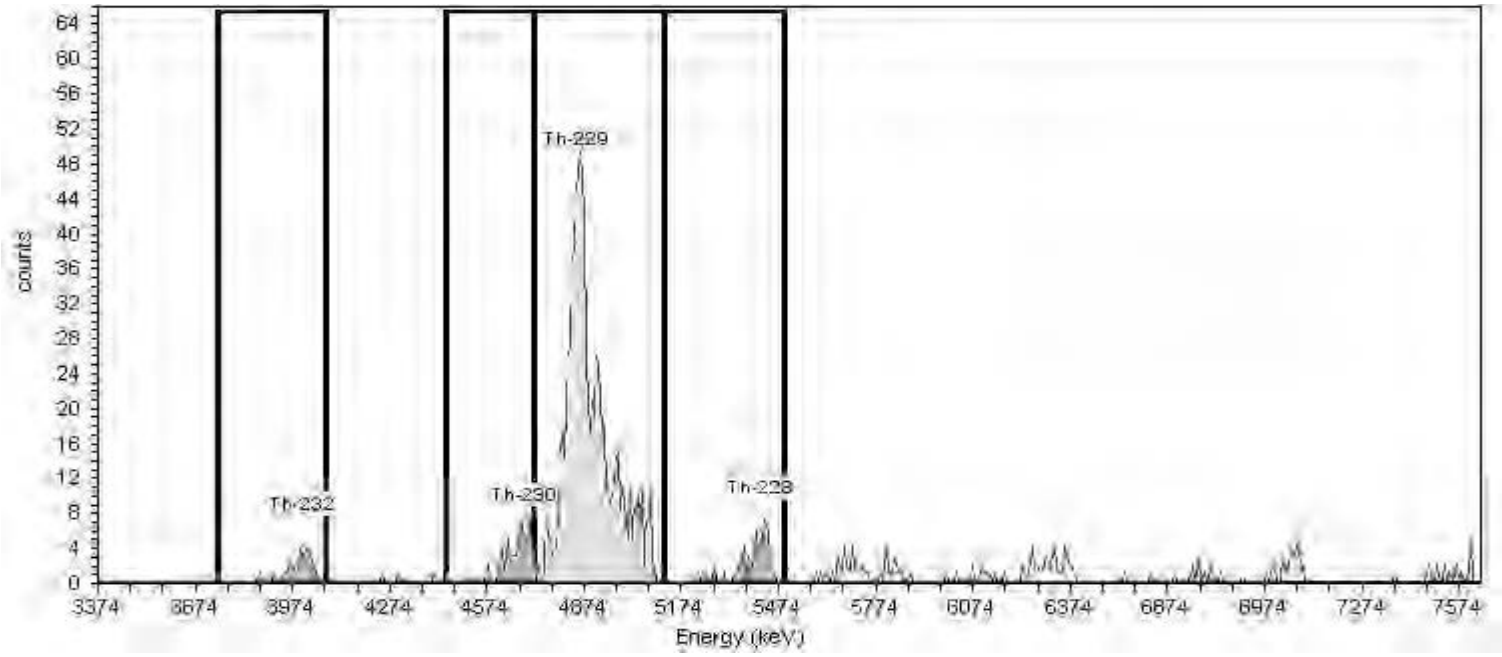
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.64%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 8/28/2018 2:46:25AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:20PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:09PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.2	100.2	33	1.2500	31.75	0.259	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.8	99.7	71	1.2500	69.35	0.568	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.9	99.6	739	1.2500	737.66	5.117	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	68.0	99.8	56	4.5000	51.50	0.422	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:42:20PM 8/28/2018

Sample

Sample Name: 160-29881-B-35-D
SampleType: Sample
: 160-29881-B-35-D
Sample Collection Date: 7/30/2018 8:45:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739157

Analyst: 60040

Tracer

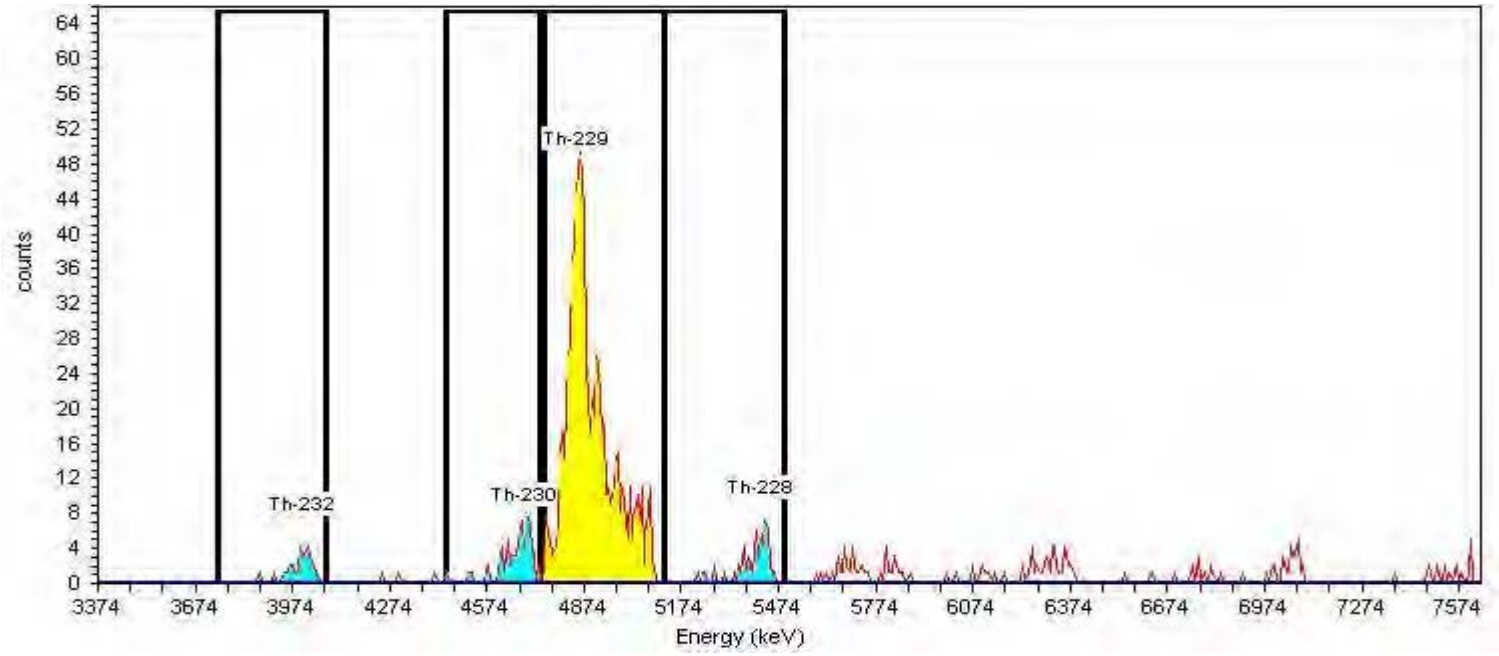
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.07%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 8/28/2018 2:46:25AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:20PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:09PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.2	100.2	33	1.2500	31.75	0.260	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	19.3	99.7	73	1.2500	71.75	0.591	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	74.9	99.6	734	1.2500	732.75	5.083	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	68.0	99.8	56	4.5000	51.50	0.425	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:32AM 8/28/2018

Sample

Sample Name: 160-29881-B-36-C
SampleType: Sample
: 160-29881-B-36-C
Sample Collection Date: 7/30/2018 11:45:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0009g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739096

Analyst: 60040

Tracer

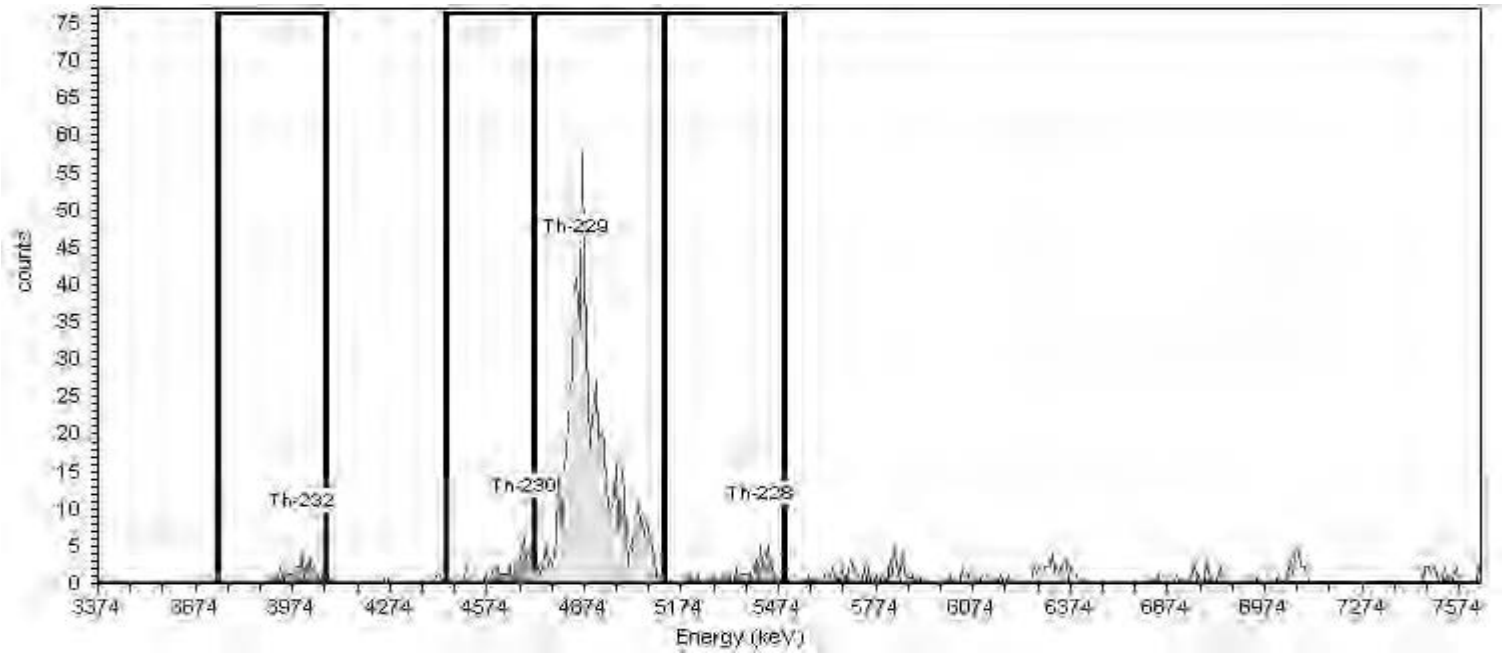
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 81.03%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 8/28/2018 2:46:26AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/11/2018 5:17:21PM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370620;AV66-05152018
Calibration Date: 5/15/2018 3:40:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.12% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:09PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.8	100.2	28	1.0000	27.00	0.230	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	47.4	99.7	42	1.0000	41.00	0.351	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.3	99.6	707	0.7500	706.31	4.903	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.3	99.8	36	2.7500	33.31	0.286	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:41AM 8/28/2018

Sample

Sample Name: 160-29881-A-37-D
SampleType: Sample
: 160-29881-A-37-D
Sample Collection Date: 7/30/2018 11:50:00AM

Spectrum #2 Analysis #1
Sample Weight : 0.9998g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739097

Analyst: 60040

Tracer

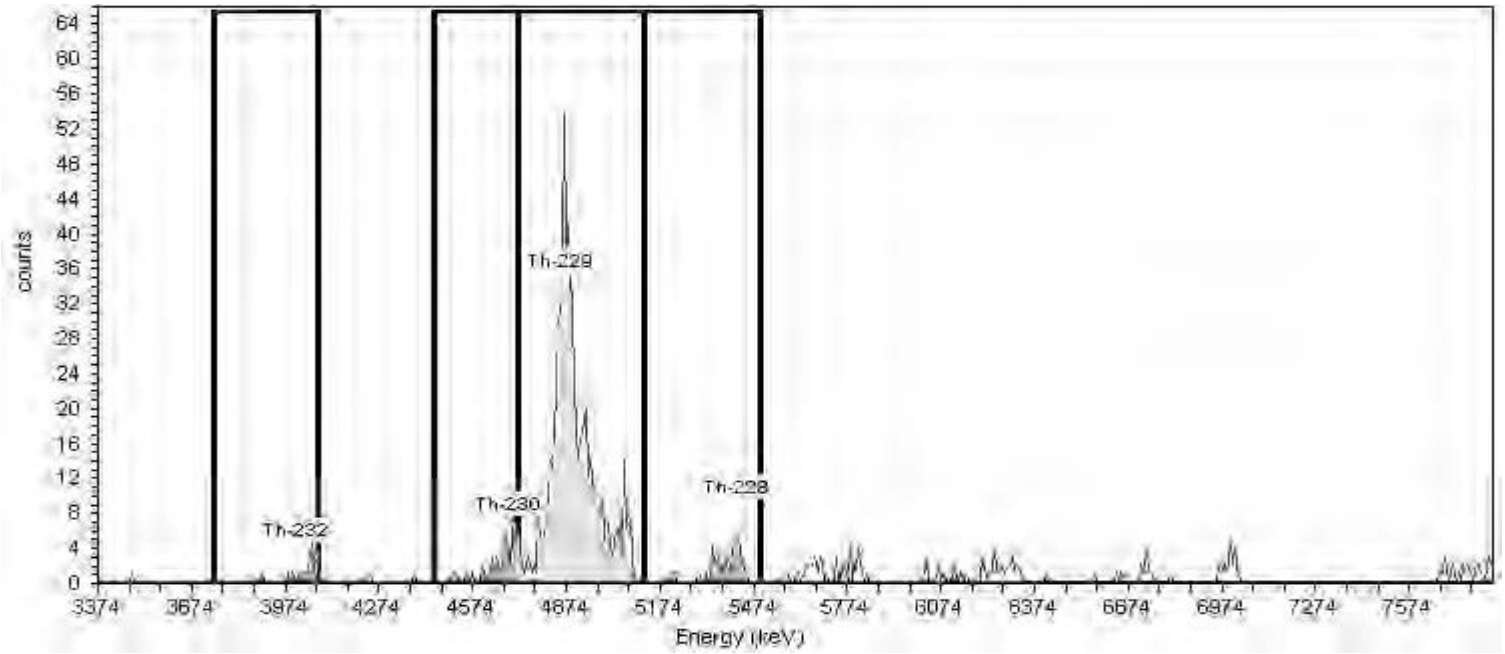
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 72.86%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 8/28/2018 2:46:28AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:23PM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	14.9	100.2	17	0.3646	16.47	0.160	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	41.6	99.7	52	0.5000	51.44	0.503	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.0	99.6	620	1.0000	618.94	4.413	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	98.1	99.8	47	3.2500	43.75	0.429	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:00PM 8/28/2018

Sample

Sample Name: 160-29881-A-37-D
SampleType: Sample
: 160-29881-A-37-D
Sample Collection Date: 7/30/2018 11:50:00AM

Spectrum #2 Analysis #1
Sample Weight : 0.9998g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739149

Analyst: 60040

Tracer

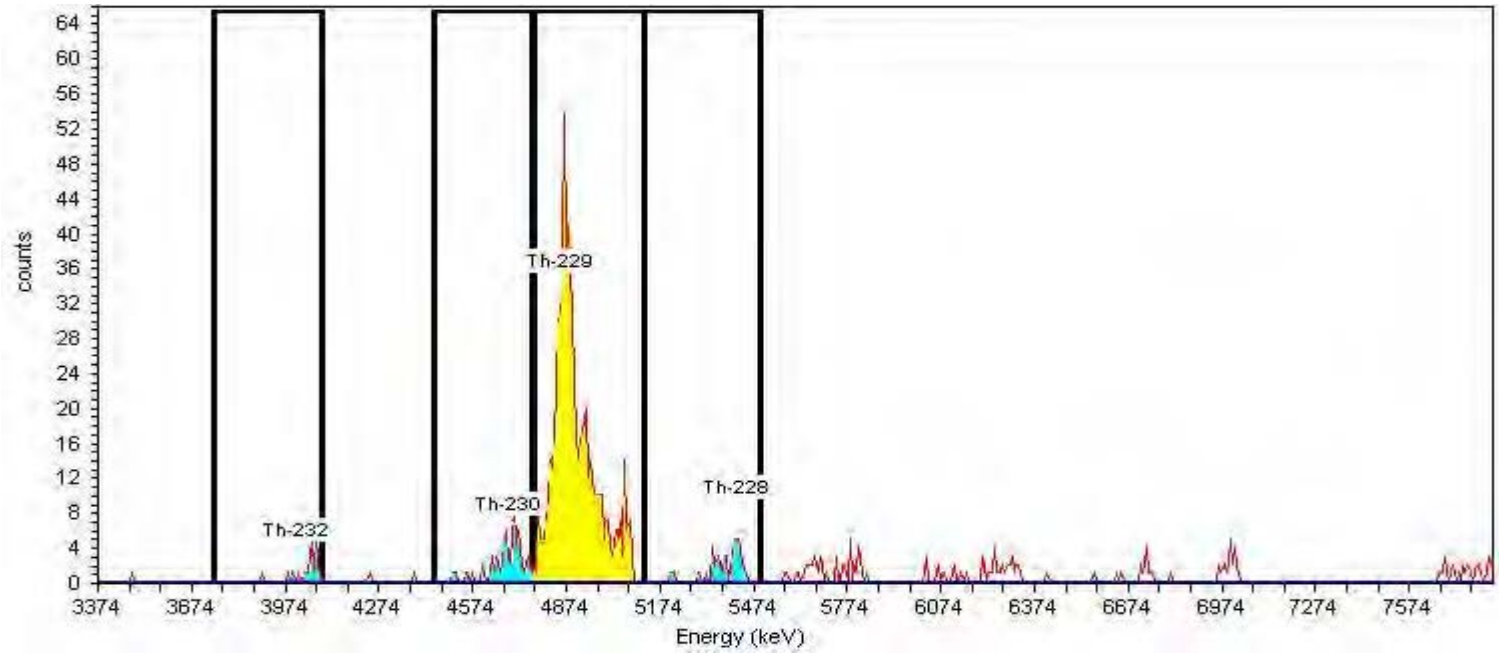
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 71.74%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 8/28/2018 2:46:28AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:23PM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4090.3	27.1	100.2	22	0.5000	21.50	0.212	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4761.5	53.9	99.7	65	0.5000	64.50	0.640	pCi/g
Th-229	4848.0	4,845.3	2.7	4769.0	5119.5	65.0	98.8	605	1.0000	604.00	4.346	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	98.1	99.8	47	3.2500	43.75	0.435	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:50AM 8/28/2018

Sample

Sample Name: 160-29881-B-38-D
SampleType: Sample
: 160-29881-B-38-D
Sample Collection Date: 7/30/2018 11:55:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0047g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739098

Analyst: 60040

Tracer

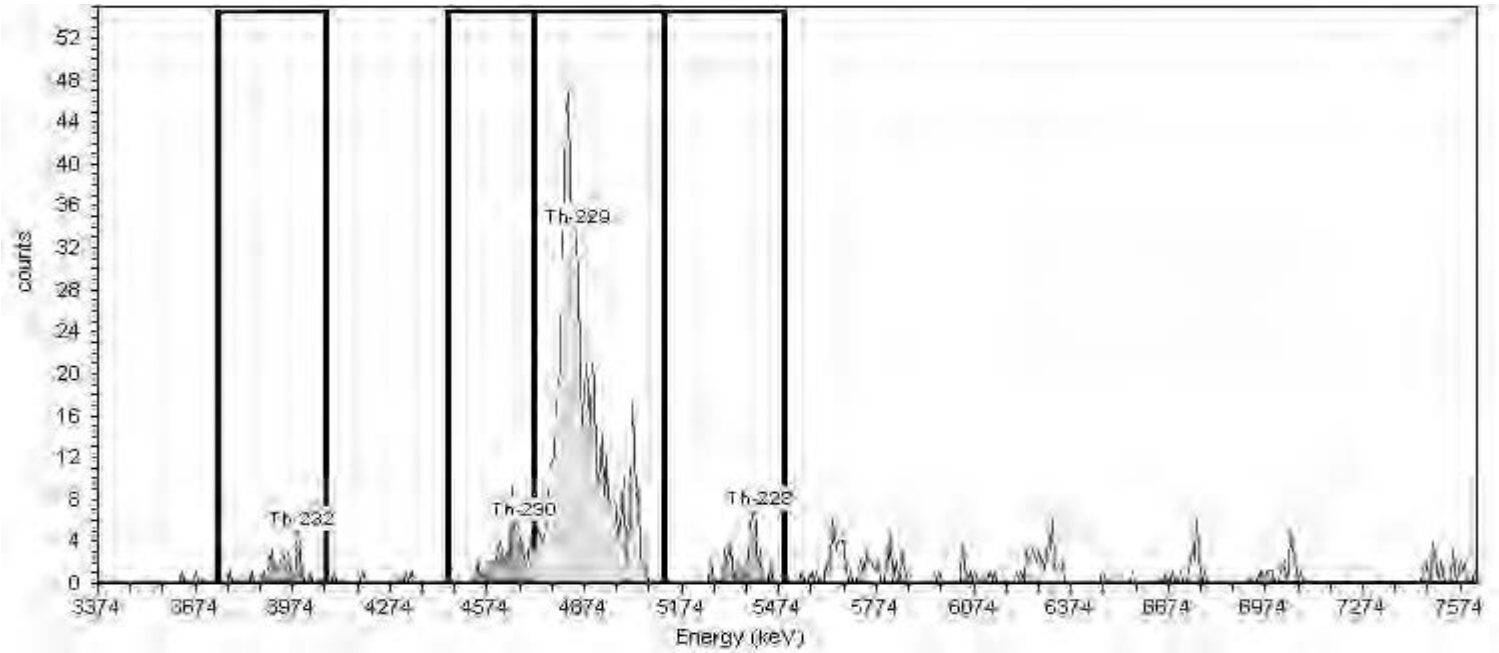
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 82.72%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 8/28/2018 2:46:29AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:26PM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8877;AV70-05152018
Calibration Date: 5/15/2018 6:36:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.40% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	111.5	100.2	34	0.5000	33.50	0.309	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	96.0	99.7	69	0.2500	68.75	0.638	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.2	99.6	650	1.2500	648.75	4.987	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.3	99.8	45	3.7500	41.25	0.384	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:51:59AM 8/28/2018

Sample

Sample Name: 160-29881-B-39-D
SampleType: Sample
: 160-29881-B-39-D
Sample Collection Date: 7/30/2018 12:00:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0035g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739099

Analyst: 60040

Tracer

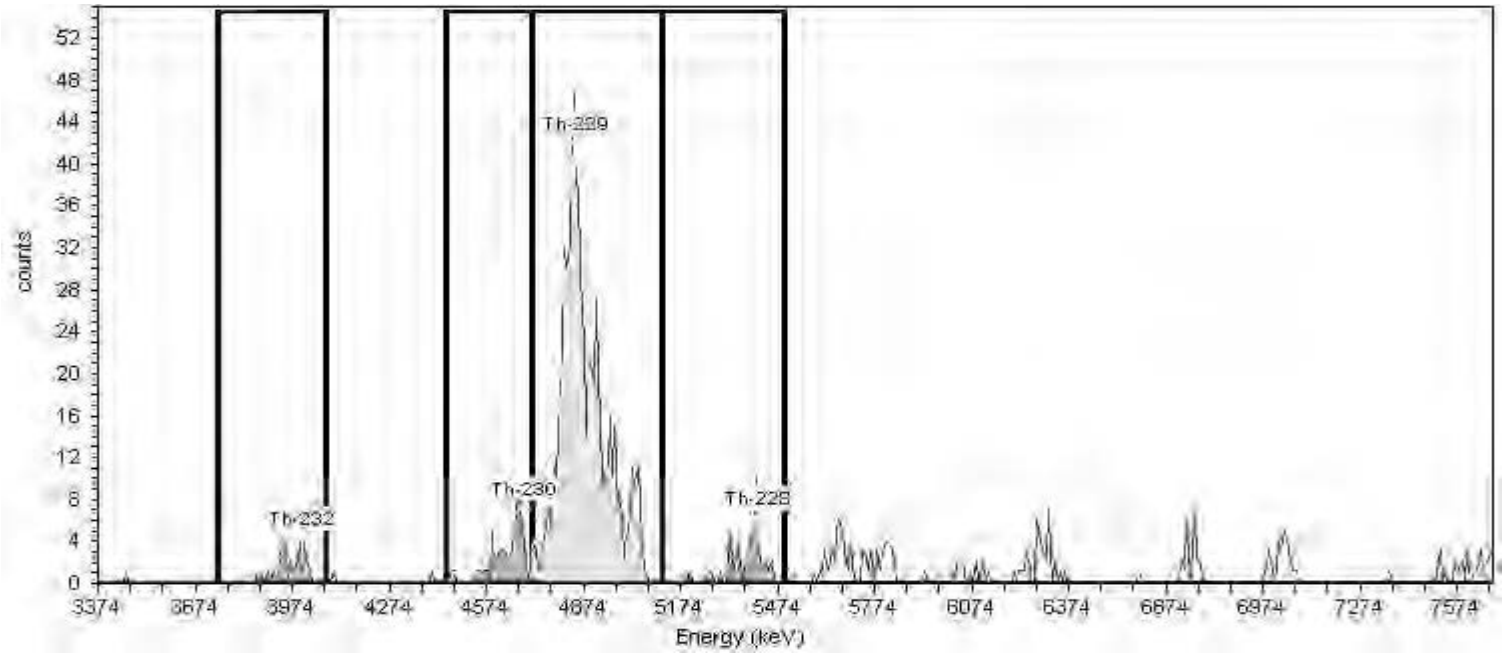
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 93.18%

Acquisition

Detector: AV71
Serial Number: 48-158EE6
Acquisition Start Date: 8/28/2018 2:46:30AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:28PM
Background Info: Sample: ICB;AV71; Det: AV71; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9520;AV71-05152018
Calibration Date: 5/15/2018 6:36:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.00% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	103.9	100.2	33	0.5000	32.50	0.283	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.8	99.7	71	1.2500	69.72	0.610	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.9	99.6	690	1.2660	688.70	5.623	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.8	99.8	57	4.5160	52.48	0.460	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:08AM 8/28/2018

Sample

Sample Name: 160-29881-A-40-D
SampleType: Sample
: 160-29881-A-40-D
Sample Collection Date: 7/30/2018 2:20:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0040g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739100

Analyst: 60040

Tracer

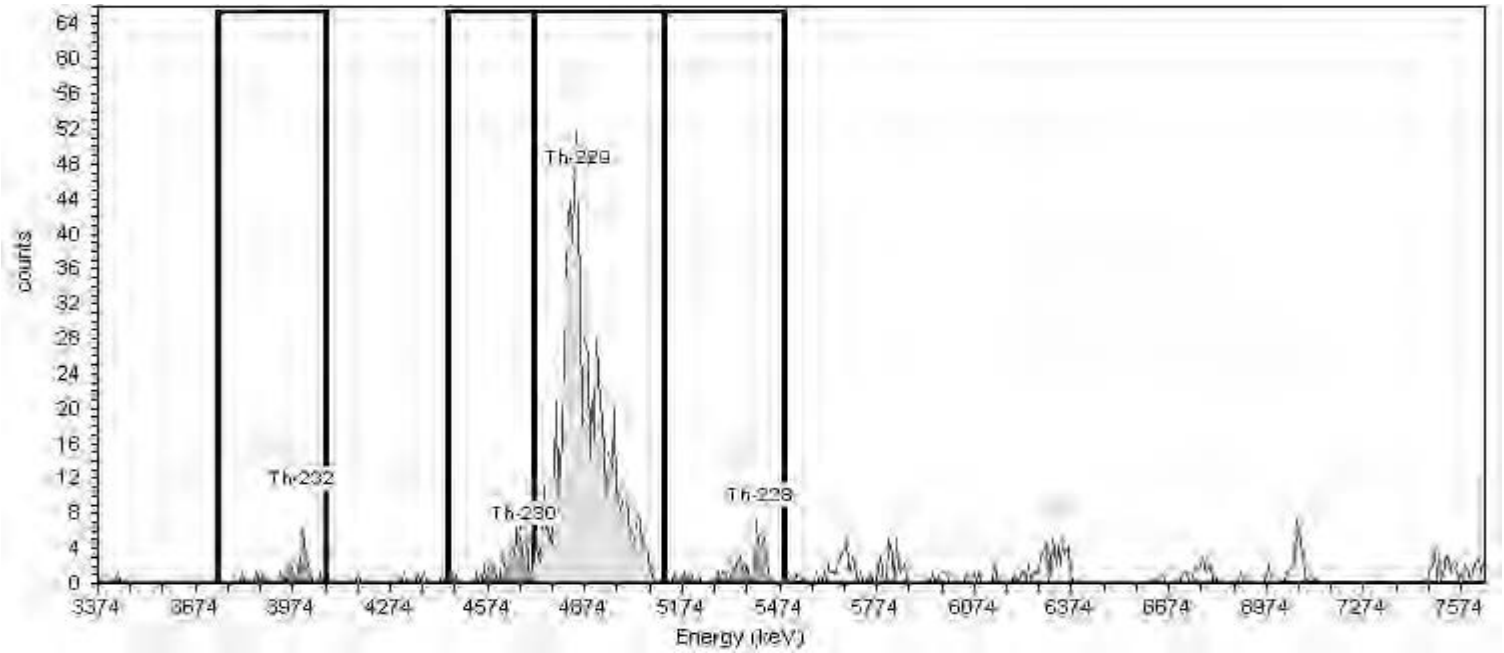
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.21%

Acquisition

Detector: AV72
Serial Number: 48-05a21
Acquisition Start Date: 8/28/2018 2:46:32AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:08PM
Background Info: Sample: ICB;AV72; Det: AV72; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-9792;AV72-05152018
Calibration Date: 5/15/2018 6:36:51PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.58% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	53.1	100.2	23	1.5000	21.50	0.170	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.4	99.7	51	1.5693	49.49	0.392	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.9	99.6	761	0.9923	760.07	5.804	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	84.2	99.8	46	3.7500	42.25	0.336	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:21AM 8/28/2018

Sample

Sample Name: 160-29881-B-41-C
SampleType: Sample
: 160-29881-B-41-C
Sample Collection Date: 7/30/2018 2:35:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739101

Analyst: 60040

Tracer

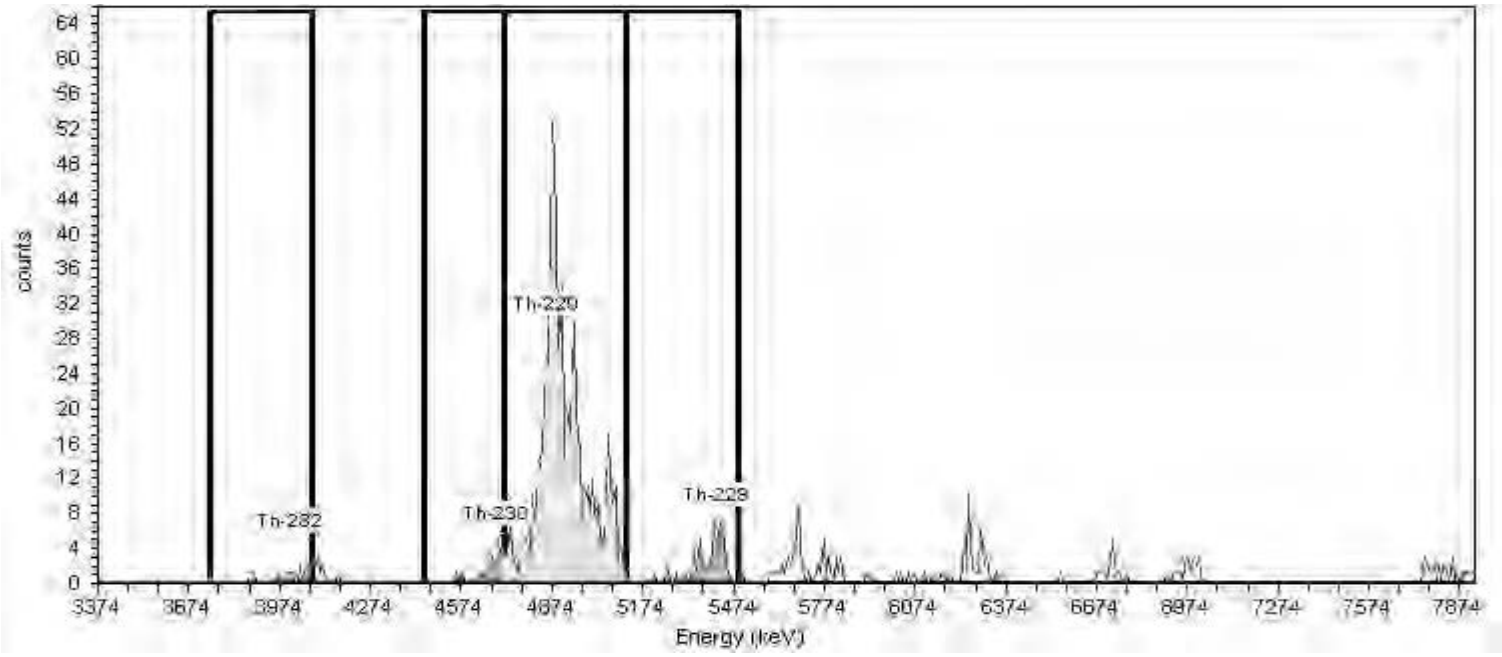
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.48%

Acquisition

Detector: AV73
Serial Number: 46-03321
Acquisition Start Date: 8/28/2018 2:46:33AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:31PM
Background Info: Sample: ICB;AV73; Det: AV73; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.5	100.2	13	1.4709	11.73	0.099	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.5	99.7	33	0.9923	32.04	0.273	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	64.0	99.6	713	1.9923	711.04	5.782	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	103.8	99.8	64	4.5000	59.59	0.508	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:39:56PM 8/28/2018

Sample

Sample Name: 160-29881-B-41-C
SampleType: Sample
: 160-29881-B-41-C
Sample Collection Date: 7/30/2018 2:35:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0001g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739156

Analyst: 60040

Tracer

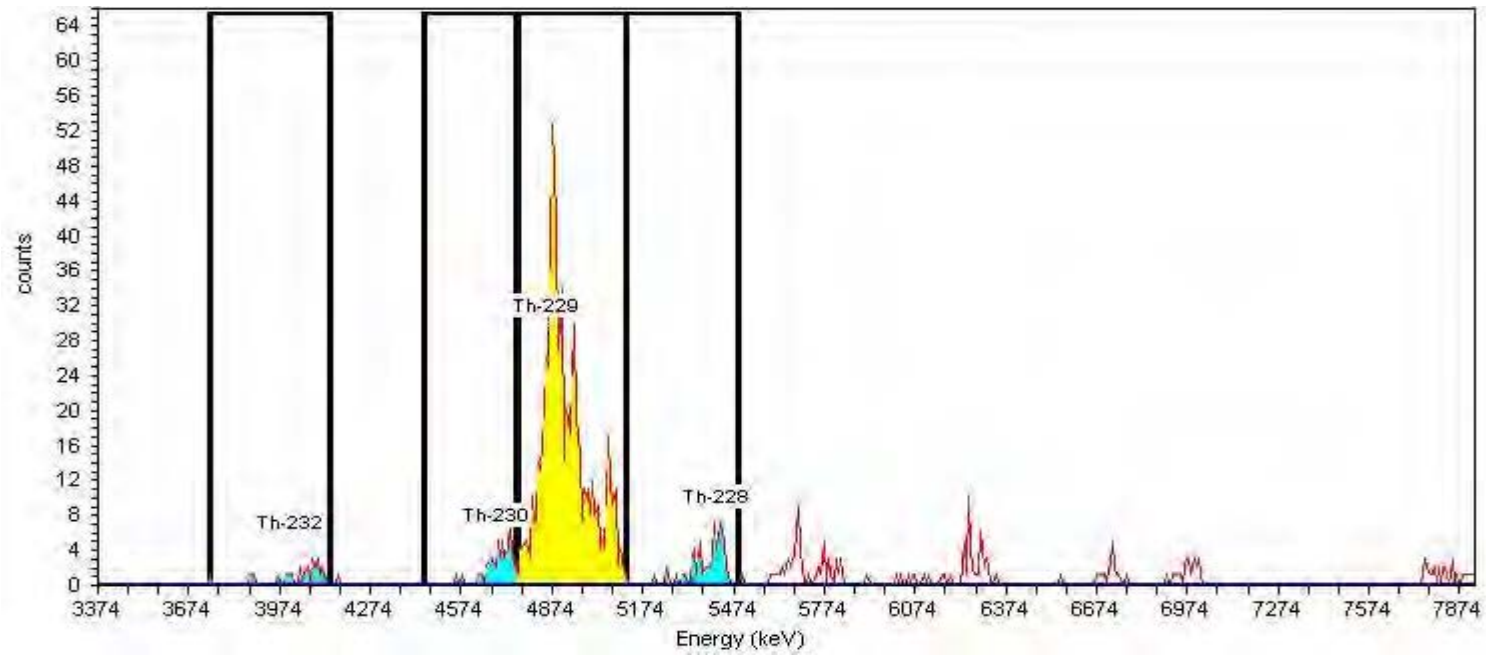
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 93.99%

Acquisition

Detector: AV73
Serial Number: 46-03321
Acquisition Start Date: 8/28/2018 2:46:33AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:31PM
Background Info: Sample: ICB;AV73; Det: AV73; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4135.1	26.7	100.2	26	2.0000	24.00	0.206	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	34.9	99.7	51	1.2500	49.75	0.430	pCi/g
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	64.0	99.0	697	1.5000	695.50	5.692	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	103.8	99.8	64	4.5000	59.59	0.516	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:30AM 8/28/2018

Sample

Sample Name: 160-29881-A-42-D
SampleType: Sample
: 160-29881-A-42-D
Sample Collection Date: 7/30/2018 2:50:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0036g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 380676
AnalysisID: 739102

Analyst: 60040

Tracer

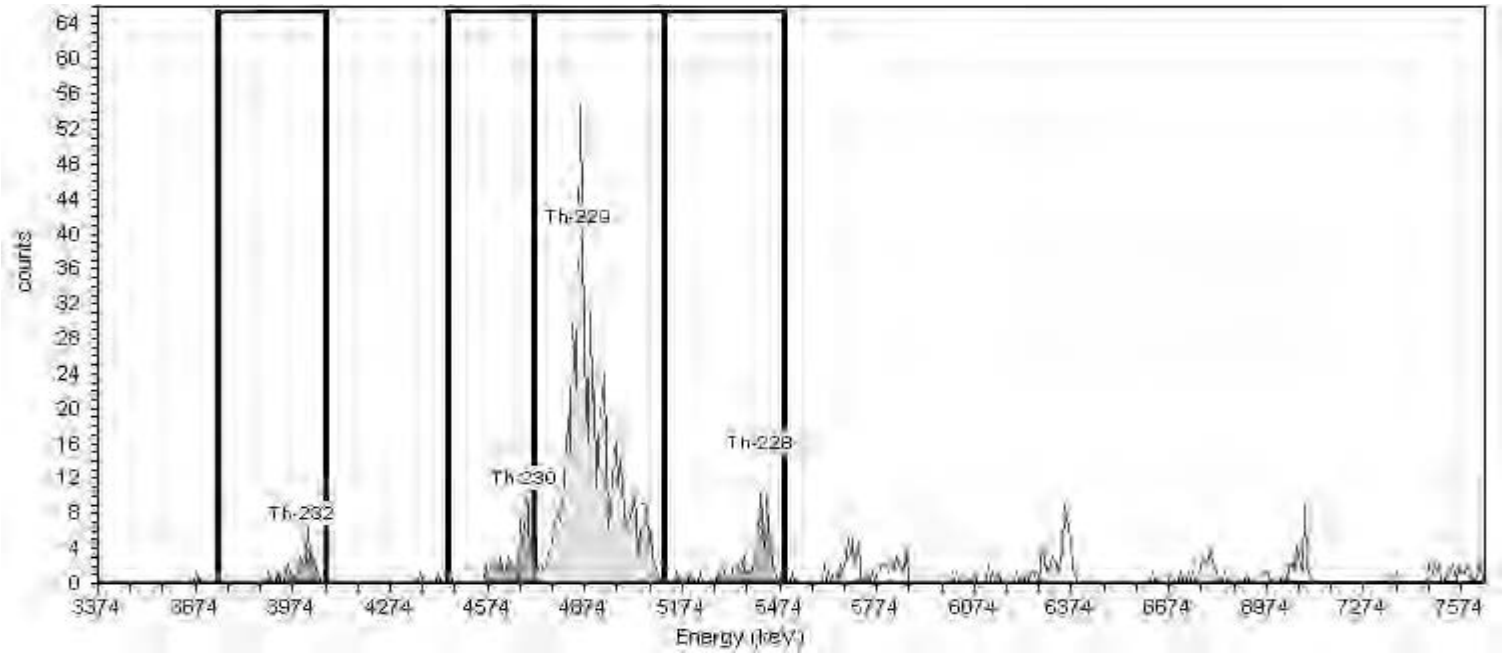
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 78.98%

Acquisition

Detector: AV74
Serial Number: 50-051C6
Acquisition Start Date: 8/28/2018 2:46:35AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:33PM
Background Info: Sample: ICB;AV74; Det: AV74; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9795;AV74-05152018
Calibration Date: 5/15/2018 6:37:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.68% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:15:10PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	41.4	100.2	31	0.5000	30.50	0.281	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.2	99.7	60	0.5000	59.53	0.551	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.4	99.6	652	0.2500	651.78	4.766	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.0	99.8	71	3.2284	67.77	0.628	pCi/g

Prep Batch: 382139

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 382139

Lab ID: MB 160-382139/1-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV75
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	-0.02372	0.0762	0.0762	U	pCi/g	1.00	0.121	385835

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.943	0.444	0.668		pCi/g	0.0511	6.05	98.2	30 - 110

Lab ID: LCS 160-382139/2-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV77
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	23.26	1.23	2.31		pCi/g	1.00	0.192	385836

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.22	0.748	1.14		pCi/g	0.0845	12.0	84.9	30 - 110

Lab ID: 160-29881-18
Client ID: CRC-BK1-0203
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV78
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.03	0.209	0.226		pCi/g	1.00	0.127	385837

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.54	0.351	0.518		pCi/g	0.0451	6.03	75.4	30 - 110

Lab ID: 160-29881-18 DU
Client ID: CRC-BK1-0203
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV79
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.8286	0.198	0.210		pCi/g	1.00	0.134	385838

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.436	0.351	0.512		pCi/g	0.0463	6.05	73.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 382139

Lab ID: 160-29881-19
Client ID: CRC-BK2-0102
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV80
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.05	0.215	0.232		pCi/g	1.00	0.130	385840

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.62	0.363	0.532		pCi/g	0.0559	6.01	77.0	30 - 110

Lab ID: 160-29881-20
Client ID: CRC-BK2-0304
Sigma: 2

Analyzed: 08/28/18 19:45
Detector: AV8
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.509	0.162	0.167		pCi/g	1.00	0.132	385839

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.73	0.370	0.543		pCi/g	0.0448	6.02	78.5	30 - 110

Lab ID: 160-29881-21
Client ID: CRC-BK4-0102
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV82
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.753	0.183	0.193		pCi/g	1.00	0.122	385842

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.83	0.370	0.549		pCi/g	0.0473	6.03	80.0	30 - 110

Lab ID: 160-29881-22
Client ID: CRC-BK6-0002
Sigma: 2

Analyzed: 08/28/18 02:47
Detector: AV83
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.22	0.220	0.243		pCi/g	1.00	0.127	385843

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.35	0.402	0.603		pCi/g	0.0566	6.04	88.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 382139

Lab ID: 160-29881-23 | Analyzed: 08/28/18 02:47 | Decay Corrected: No
Client ID: CRC-BK6-0406 | Detector: AV85 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.876	0.204	0.216		pCi/g	1.00	0.132	385845

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.86	0.390	0.564		pCi/g	0.0636	6.05	80.4	30 - 110

Lab ID: 160-29881-24 | Analyzed: 08/28/18 02:47 | Decay Corrected: No
Client ID: CRC-BK7-0405 | Detector: AV86 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.654	0.168	0.177		pCi/g	1.00	0.119	385846

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	6.00	0.446	0.673		pCi/g	0.0464	6.05	99.2	30 - 110

Lab ID: 160-29881-25 | Analyzed: 08/28/18 02:47 | Decay Corrected: No
Client ID: CRC-BK9-0506 | Detector: AV88 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	0.397	0.154	0.157		pCi/g	1.00	0.137	385847

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.04	0.408	0.588		pCi/g	0.0617	6.03	83.5	30 - 110

Lab ID: 160-29881-26 | Analyzed: 08/28/18 02:47 | Decay Corrected: No
Client ID: CRC-BK8-0102 | Detector: AV91 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	1.09	0.220	0.238		pCi/g	1.00	0.140	385850

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.18	0.405	0.594		pCi/g	0.0443	6.04	85.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 382139

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-382139/1-A	Thorium-230			-0.02372	U	pCi/g							-.6225709 2

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-382139/2-A	Thorium-230		24.5	23.26		pCi/g	95	81 - 118					-.7360451 167

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-18	Thorium-230	1.03		0.8286		pCi/g			21	0.45	1.28	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 382139 Batch Start Date: 08/14/18 13:41 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00023	TRM-2 00002			
MB 160-382139/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-382139/2		ExtChrom, A-01-R		0.5028 g	0.2 mL	0.5028 g			
160-29881-A-18-B	CRC-BK1-0203	ExtChrom, A-01-R	T	1.0049 g	0.2 mL				
160-29881-A-18-B DU	CRC-BK1-0203	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
160-29881-A-19-B	CRC-BK2-0102	ExtChrom, A-01-R	T	1.0078 g	0.2 mL				
160-29881-A-20-B	CRC-BK2-0304	ExtChrom, A-01-R	T	1.0053 g	0.2 mL				
160-29881-A-21-B	CRC-BK4-0102	ExtChrom, A-01-R	T	1.0041 g	0.2 mL				
160-29881-A-22-B	CRC-BK6-0002	ExtChrom, A-01-R	T	1.0028 g	0.2 mL				
160-29881-A-23-B	CRC-BK6-0406	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
160-29881-A-24-B	CRC-BK7-0405	ExtChrom, A-01-R	T	1.0013 g	0.2 mL				
160-29881-A-25-B	CRC-BK9-0506	ExtChrom, A-01-R	T	1.0042 g	0.2 mL				
160-29881-A-26-B	CRC-BK8-0102	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	NMN per CMM
Column Date	08/23/2018
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/24/2018
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	TAT
Analyst ID - Reagent Drop	CMM per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 382139 Batch Start Date: 08/14/18 13:41 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:30

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:39AM 8/28/2018

Sample

Sample Name: MB 160-382139/1-A
SampleType: Blank
: MB 160-382139/1-A
Sample Collection Date: 8/24/2018 7:31:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739103

Analyst: 60040

Tracer

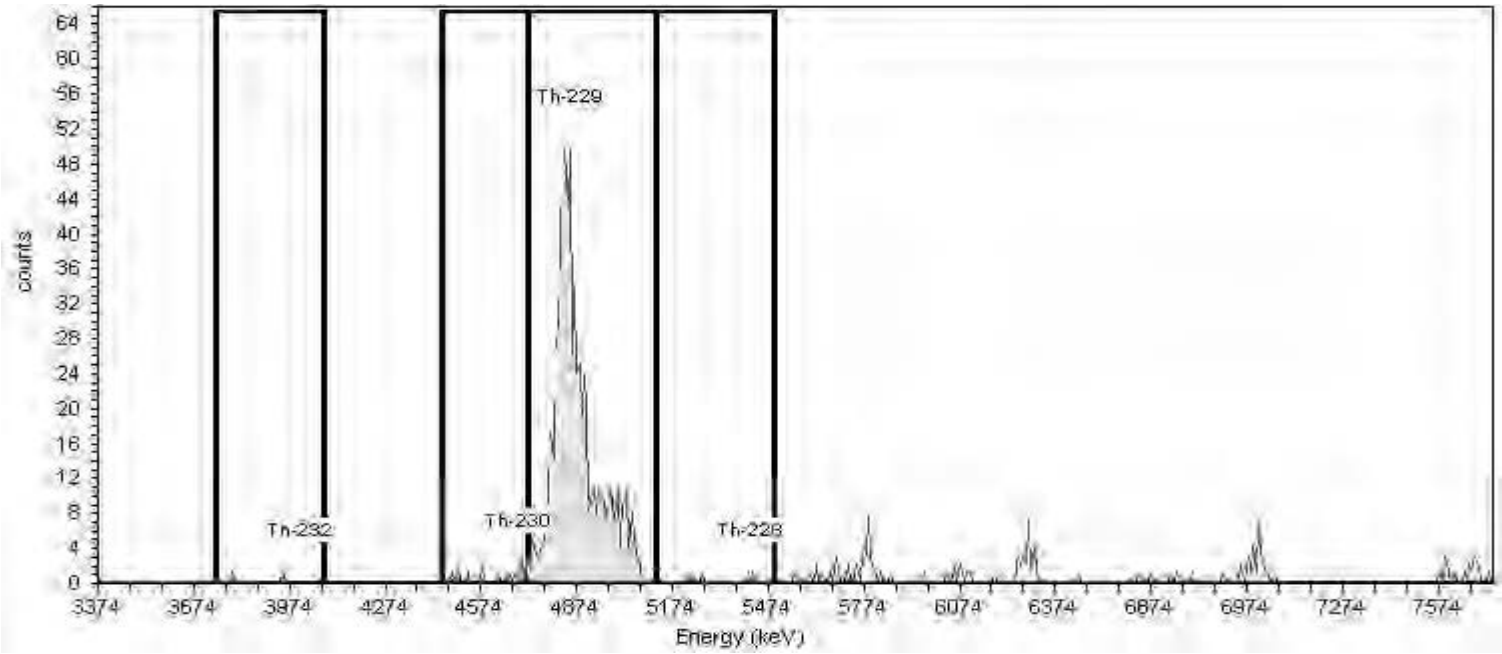
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 97.25%

Acquisition

Detector: AV75
Serial Number: 51-082B4
Acquisition Start Date: 8/28/2018 2:47:46AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:35PM
Background Info: Sample: ICB;AV75; Det: AV75; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9817;AV75-05152018
Calibration Date: 5/15/2018 6:37:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.76% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:18:00PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	42.4	100.2	2	0.2500	1.75	0.015	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.9	99.7	19	0.7500	18.19	0.155	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.9	99.6	712	0.5000	711.44	5.890	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	218.4	99.8	4	3.2500	0.75	0.006	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:18:28PM 8/28/2018

Sample

Sample Name: MB 160-382139/1-A
SampleType: Blank
: MB 160-382139/1-A
Sample Collection Date: 8/24/2018 7:31:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739143

Analyst: 60040

Tracer

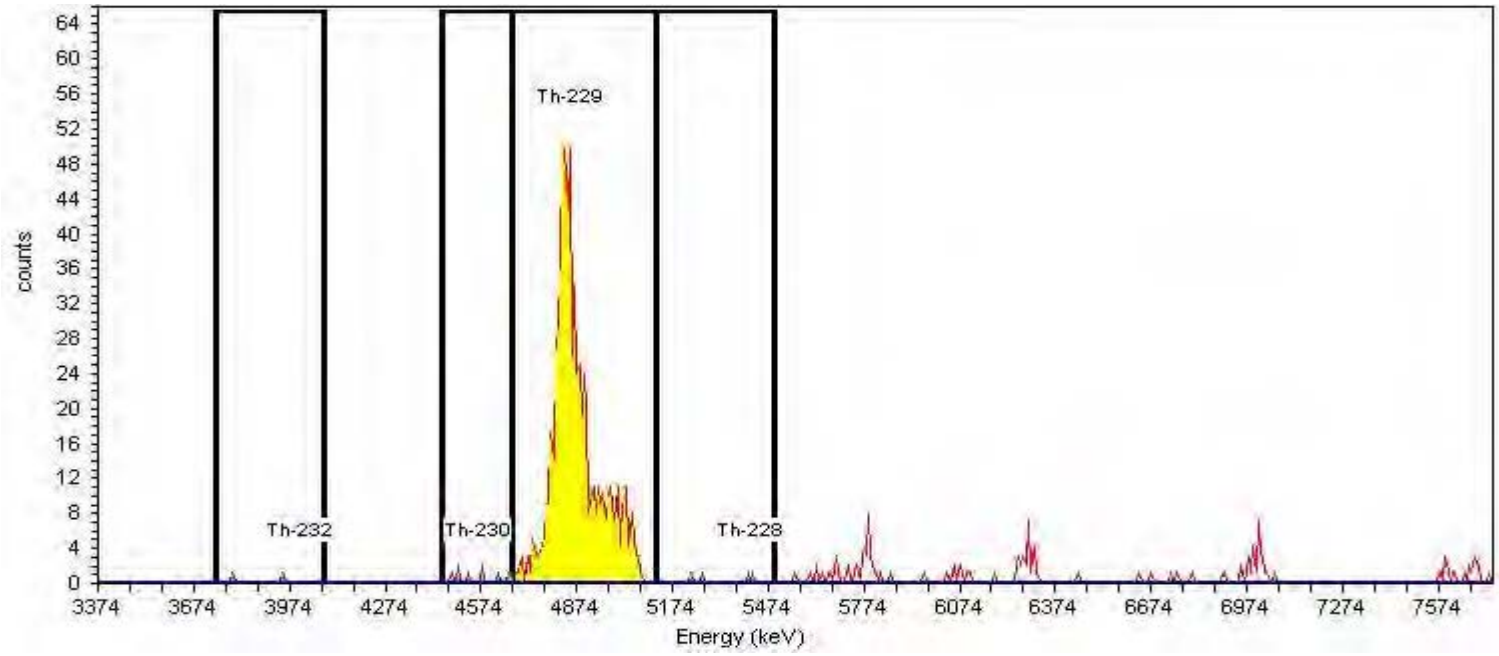
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 98.17%

Acquisition

Detector: AV75
Serial Number: 51-082B4
Acquisition Start Date: 8/28/2018 2:47:46AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:35PM
Background Info: Sample: ICB;AV75; Det: AV75; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9817;AV75-05152018
Calibration Date: 5/15/2018 6:37:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.76% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:18:00PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	42.4	100.2	2	0.2500	1.75	0.015	pCi/g
Th-230	4560.2	4,687.5	-127.3	4448.3	4672.0	14.9	99.7	9	0.5000	8.50	0.072	pCi/g
Th-229	4848.0	4,845.3	2.7	4672.0	5119.5	79.9	99.8	720	0.7500	719.25	5.946	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	218.4	99.8	4	3.2500	0.75	0.006	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:48AM 8/28/2018

Sample

Sample Name: LCS 160-382139/2-A
SampleType: Control
: LCS 160-382139/2-A
Sample Collection Date: 8/24/2018 7:31:00PM

Spectrum #2 Analysis #1
Sample Weight : 0.5028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739104

Analyst: 60040

Tracer

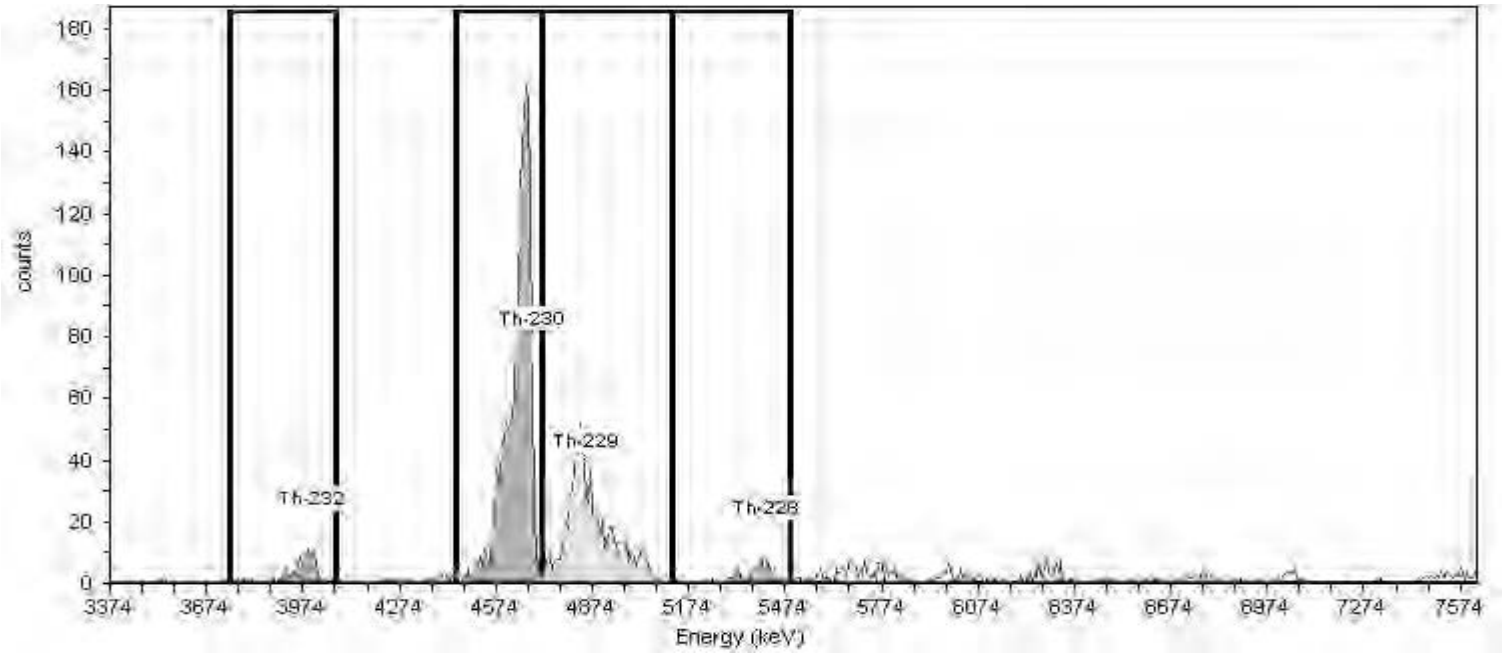
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 84.91%

Acquisition

Detector: AV77
Serial Number: 49-155N7
Acquisition Start Date: 8/28/2018 2:47:48AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:37PM
Background Info: Sample: ICB;AV77; Det: AV77; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-138446;AV77-05152018a
Calibration Date: 5/15/2018 6:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.42% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.4	100.2	86	0.5000	85.50	1.368	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	21.6	99.7	1453	1.1730	1452.29	23.358	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.1	99.6	749	0.7500	748.25	10.228	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	62.7	99.8	63	1.9784	61.02	0.983	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:57AM 8/28/2018

Sample

Sample Name: 160-29881-A-18-C
SampleType: Sample
: 160-29881-A-18-C
Sample Collection Date: 7/26/2018 1:10:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0049g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739105

Analyst: 60040

Tracer

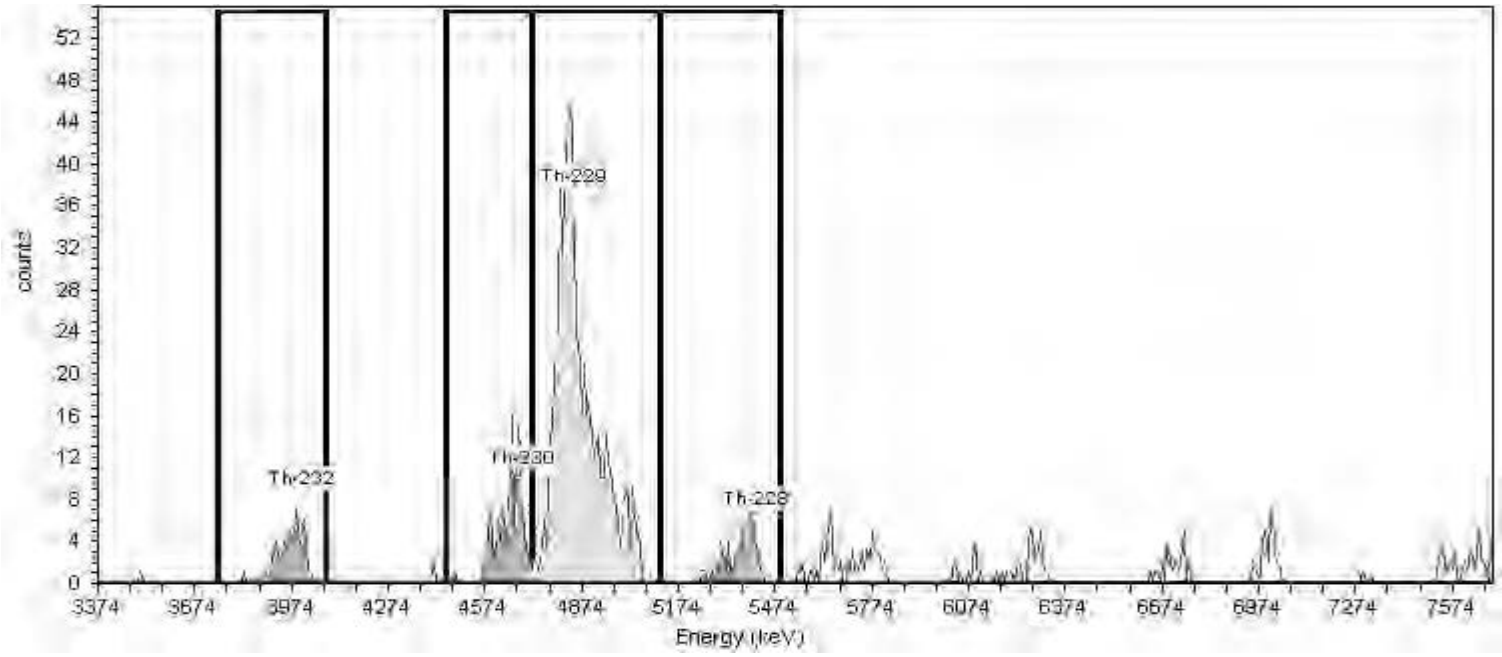
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 75.41%

Acquisition

Detector: AV78
Serial Number: 46-033FF4
Acquisition Start Date: 8/28/2018 2:47:50AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:13PM
Background Info: Sample: ICB;AV78; Det: AV78; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1368447;AV78-05152018
Calibration Date: 5/15/2018 6:37:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.77% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	91.1	100.2	64	1.0000	63.00	0.561	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.8	99.7	126	0.7500	125.28	1.121	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.5	99.6	674	1.0000	673.03	4.545	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.4	99.8	70	2.7500	67.25	0.603	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:06AM 8/28/2018

Sample

Sample Name: 160-29881-A-18-D DU
SampleType: Sample
: 160-29881-A-18-D DU
Sample Collection Date: 7/26/2018 1:10:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739106

Analyst: 60040

Tracer

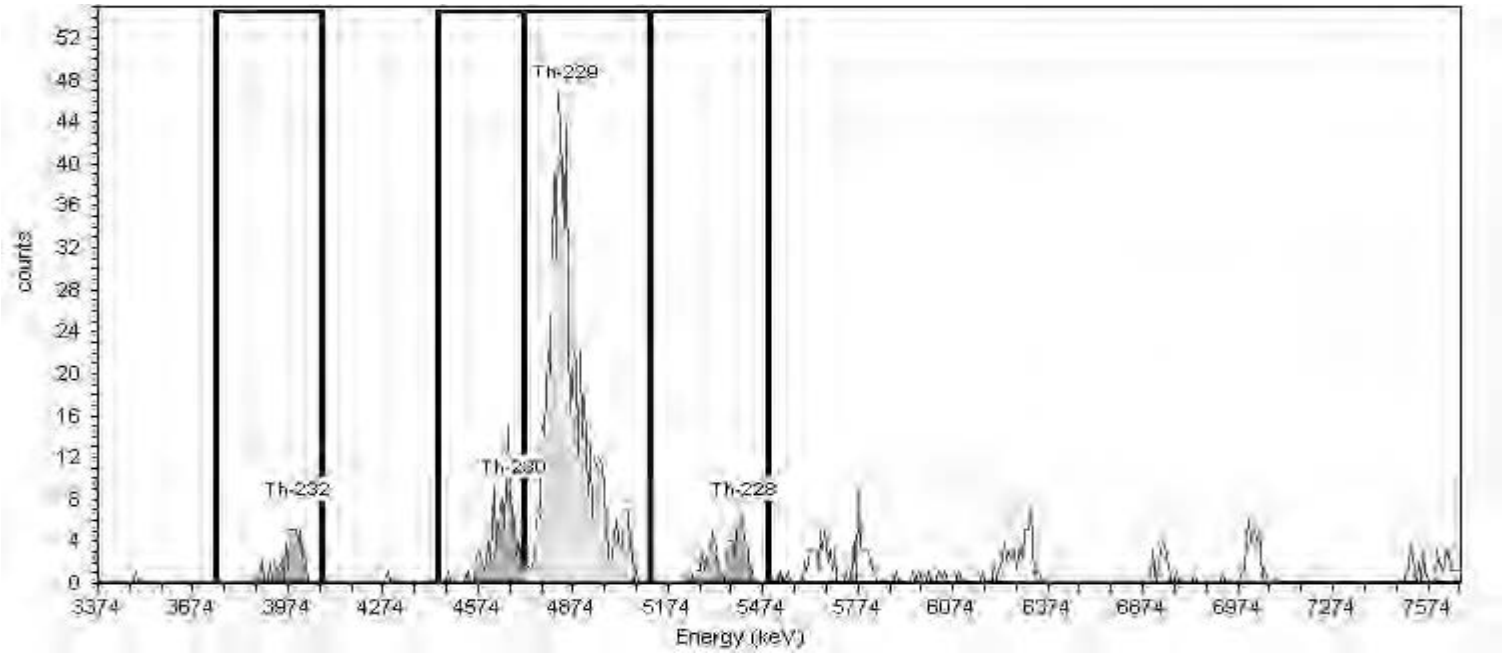
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 73.30%

Acquisition

Detector: AV79
Serial Number: 46-033Q5
Acquisition Start Date: 8/28/2018 2:47:51AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:42PM
Background Info: Sample: ICB;AV79; Det: AV79; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370621;AV79-05152018
Calibration Date: 5/15/2018 6:38:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.16% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.5	100.2	46	0.7500	45.25	0.425	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.6	99.7	99	1.2500	97.78	0.924	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.8	99.6	641	1.0000	640.03	4.437	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	131.3	99.8	73	3.5000	69.50	0.658	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:15AM 8/28/2018

Sample

Sample Name: 160-29881-A-19-C
SampleType: Sample
: 160-29881-A-19-C
Sample Collection Date: 7/26/2018 1:30:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0078g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739107

Analyst: 60040

Tracer

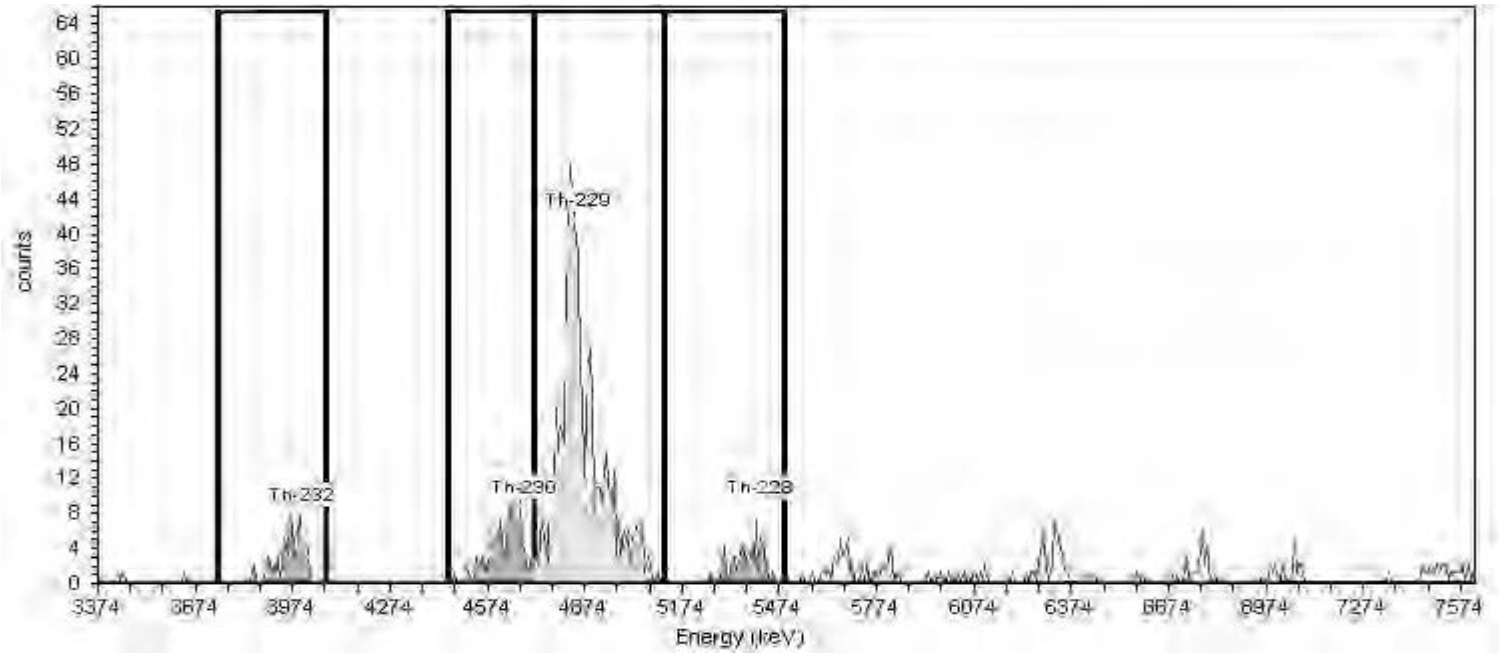
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 76.99%

Acquisition

Detector: AV80
Serial Number: 46-03305
Acquisition Start Date: 8/28/2018 2:47:53AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/13/2018 2:36:15PM
Background Info: Sample: ICB;AV80; Det: AV80; Spectrum #1; Aug-13-2018 14:36

Calibration Name: IC-1370622;AV80-05152018
Calibration Date: 5/15/2018 6:38:17PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	82.6	100.2	66	1.7500	64.25	0.589	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.1	99.7	125	0.7500	124.28	1.146	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.9	99.6	653	1.7500	651.28	4.627	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	114.1	99.8	56	3.5000	52.50	0.485	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:46:57PM 8/28/2018

Sample

Sample Name: 160-29881-A-20-C
SampleType: Sample
: 160-29881-A-20-C
Sample Collection Date: 7/26/2018 1:35:00PM

Spectrum #3 Analysis #1
Sample Weight : 1.0053g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739180

Analyst: 60040

Tracer

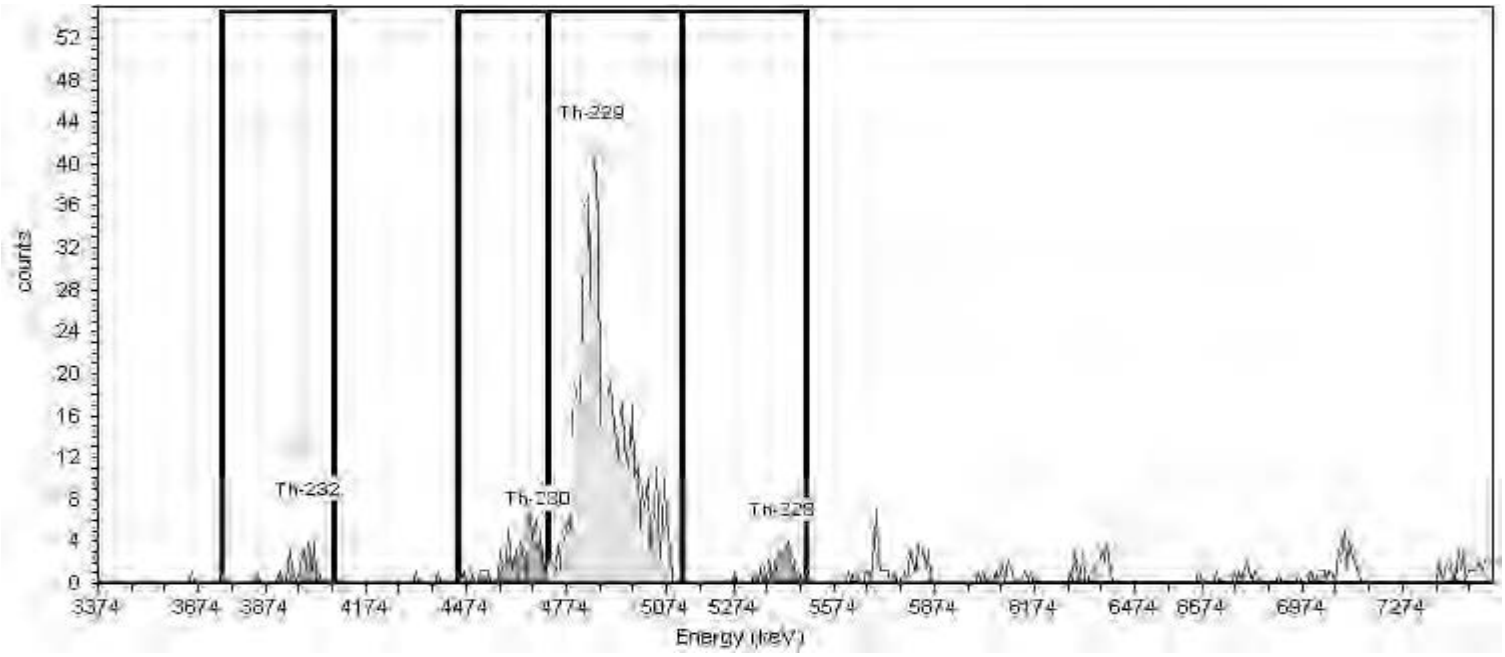
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 78.53%

Acquisition

Detector: AV8
Serial Number: 41-137Q6
Acquisition Start Date: 8/28/2018 7:45:49PM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:30PM
Background Info: Sample: ICB;AV8; Det: AV8; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9795;AV8-05142018
Calibration Date: 5/14/2018 6:26:27PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.96% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	62.7	100.2	25	1.7500	23.68	0.216	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.1	99.7	67	1.2577	65.74	0.604	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	82.8	99.6	656	0.7577	655.24	4.731	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.5	99.8	30	2.5000	27.41	0.252	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:33AM 8/28/2018

Sample

Sample Name: 160-29881-A-21-C
SampleType: Sample
: 160-29881-A-21-C
Sample Collection Date: 7/26/2018 2:00:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0041g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739108

Analyst: 60040

Tracer

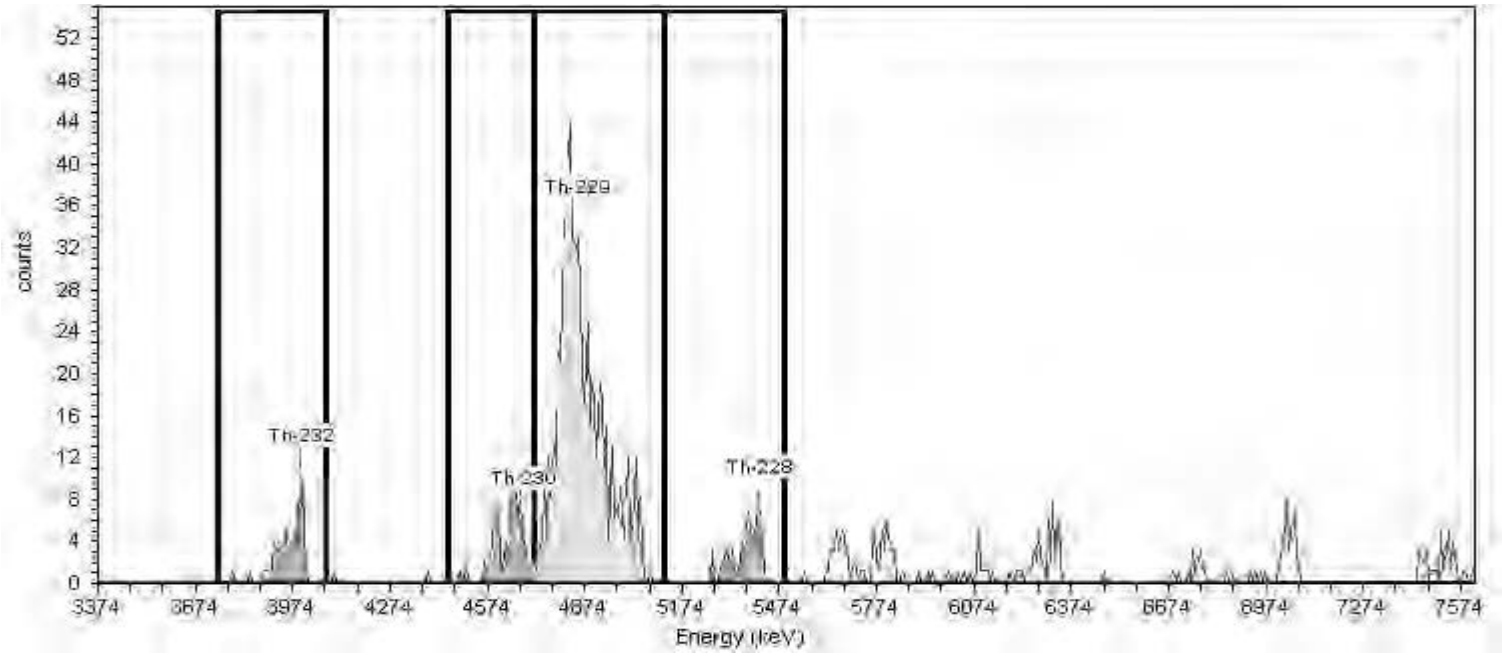
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.04%

Acquisition

Detector: AV82
Serial Number: 46-032EE5
Acquisition Start Date: 8/28/2018 2:47:55AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:48PM
Background Info: Sample: ICB;AV82; Det: AV82; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-1370620;AV82-05152018
Calibration Date: 5/15/2018 6:38:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.51% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	90.0	100.2	69	0.0000	69.00	0.607	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.5	99.7	96	0.0000	95.97	0.848	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.8	99.6	683	1.0000	681.97	4.828	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	66.3	99.8	66	3.5217	62.48	0.553	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:42AM 8/28/2018

Sample

Sample Name: 160-29881-A-22-C
SampleType: Sample
: 160-29881-A-22-C
Sample Collection Date: 7/26/2018 2:35:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739109

Analyst: 60040

Tracer

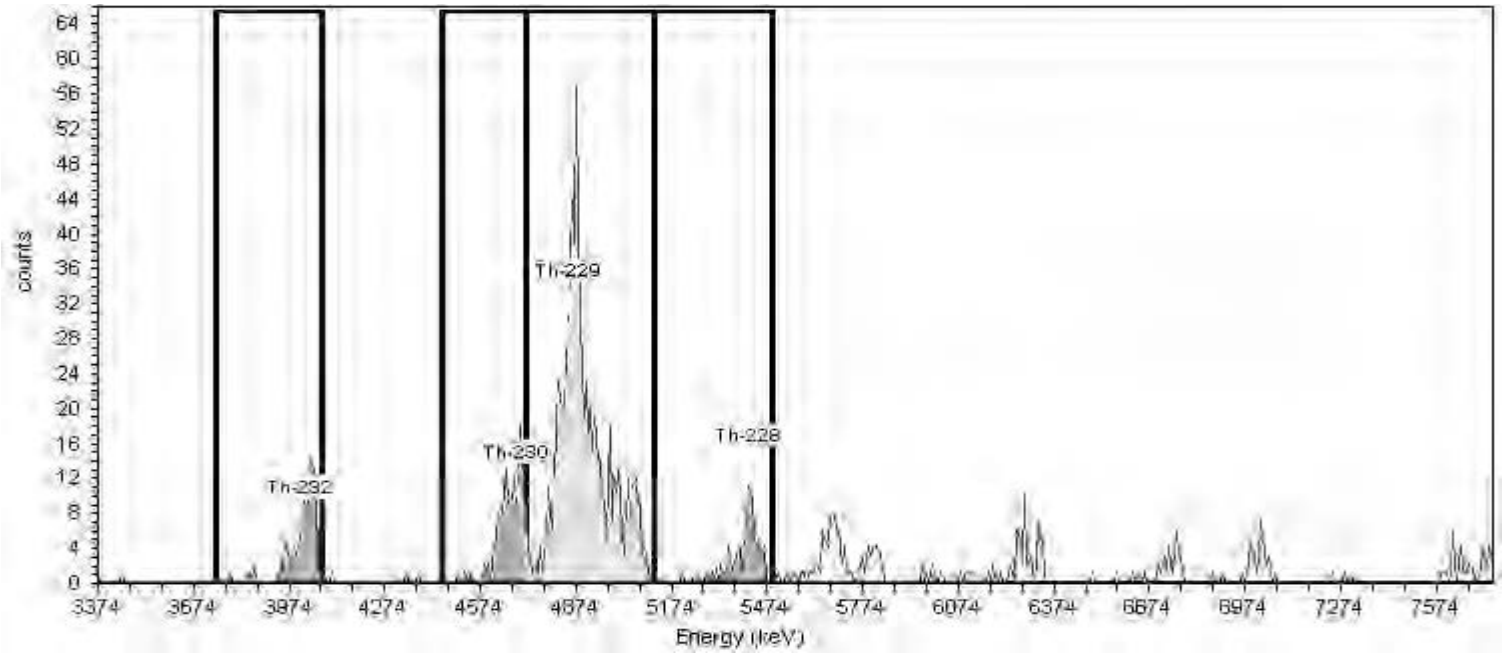
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 89.56%

Acquisition

Detector: AV83
Serial Number: 46-03306
Acquisition Start Date: 8/28/2018 2:47:56AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:49PM
Background Info: Sample: ICB;AV83; Det: AV83; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-7107;AV83-05162018a
Calibration Date: 5/17/2018 6:13:48AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.89% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.5	100.2	108	0.2500	107.29	0.899	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.7	99.7	151	1.4230	149.48	1.259	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.2	99.6	718	1.5000	716.41	5.409	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.6	99.8	82	3.2500	78.75	0.664	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:21:29PM 8/28/2018

Sample

Sample Name: 160-29881-A-22-C
SampleType: Sample
: 160-29881-A-22-C
Sample Collection Date: 7/26/2018 2:35:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0028g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739146

Analyst: 60040

Tracer

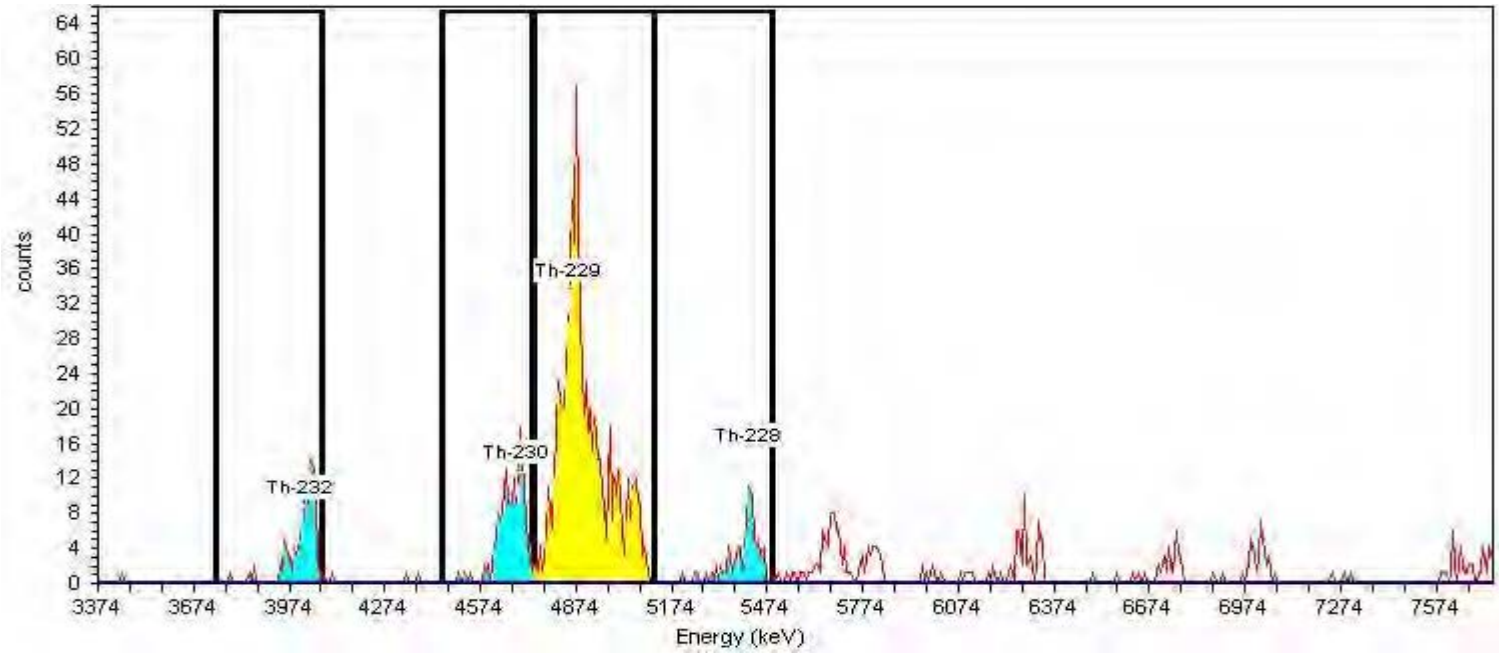
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 88.57%

Acquisition

Detector: AV83
Serial Number: 46-03306
Acquisition Start Date: 8/28/2018 2:47:56AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:49PM
Background Info: Sample: ICB;AV83; Det: AV83; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-7107;AV83-05162018a
Calibration Date: 5/17/2018 6:13:48AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.89% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.5	100.2	108	0.2500	107.29	0.909	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	27.2	99.7	156	1.5000	154.50	1.316	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	76.2	99.6	710	1.5000	708.50	5.349	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.6	99.8	82	3.2500	78.75	0.672	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:19AM 8/28/2018

Sample

Sample Name: 160-29881-A-23-C
SampleType: Sample
: 160-29881-A-23-C
Sample Collection Date: 7/26/2018 2:40:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0010g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739113

Analyst: 60040

Tracer

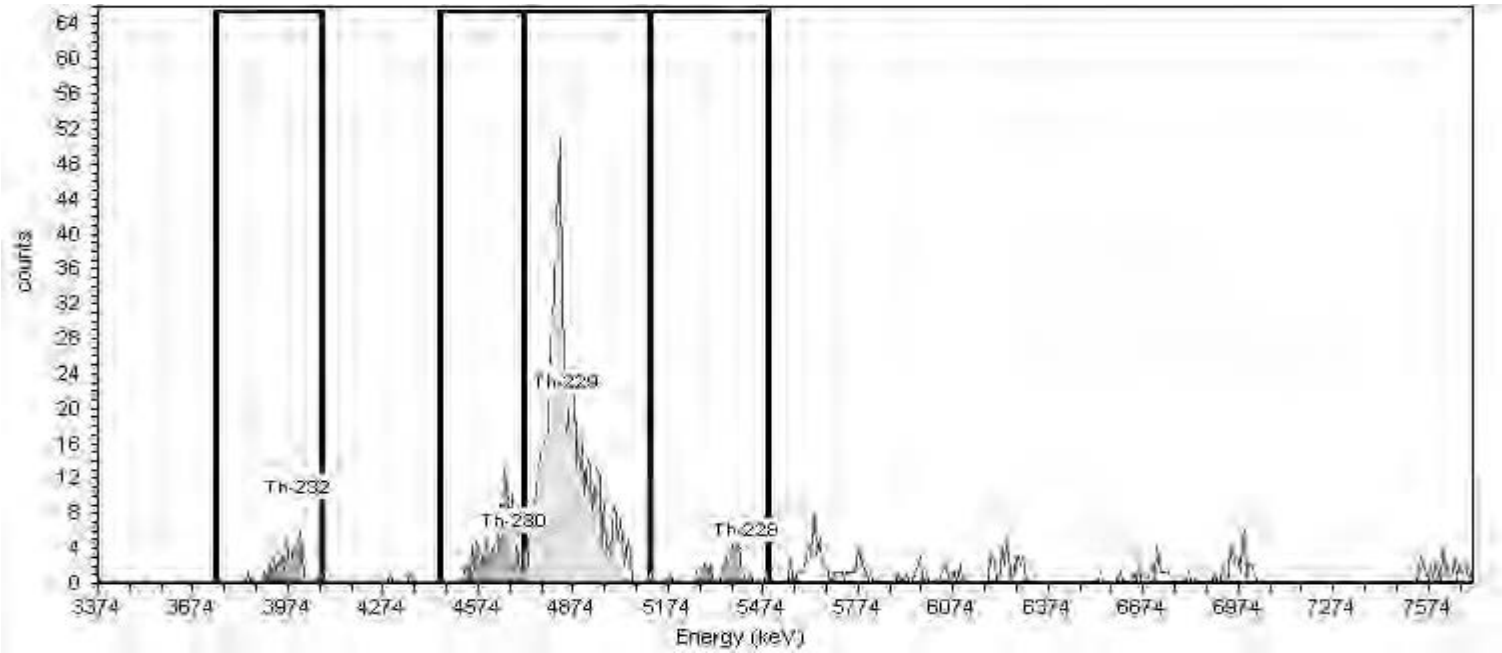
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 80.42%

Acquisition

Detector: AV85
Serial Number: 46-032EE7
Acquisition Start Date: 8/28/2018 2:47:57AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:53PM
Background Info: Sample: ICB;AV85; Det: AV85; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-8877;AV85-05162018a
Calibration Date: 5/17/2018 6:14:11AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.22% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	84.9	100.2	47	0.7500	46.71	0.449	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.1	99.7	101	0.4923	100.63	0.972	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.1	99.6	628	1.9923	626.07	4.865	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	41	3.5000	37.44	0.362	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:00AM 8/28/2018

Sample

Sample Name: 160-29881-A-24-C
SampleType: Sample
: 160-29881-A-24-C
Sample Collection Date: 7/26/2018 3:10:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0013g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739111

Analyst: 60040

Tracer

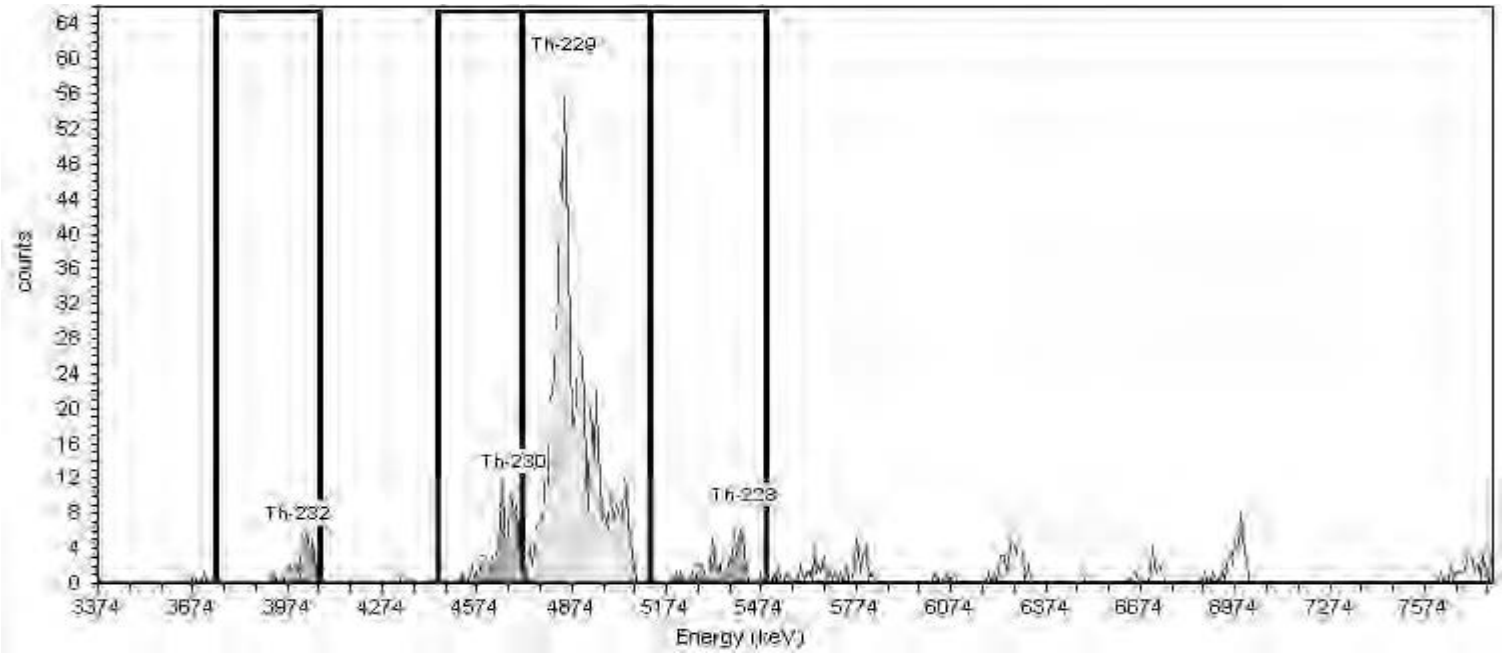
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 99.23%

Acquisition

Detector: AV86
Serial Number: 46-033Q6
Acquisition Start Date: 8/28/2018 2:47:58AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:53PM
Background Info: Sample: ICB;AV86; Det: AV86; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9520;AV86-05162018a
Calibration Date: 5/17/2018 6:14:27AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.68% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diffted keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	38	0.0000	38.00	0.316	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.5	99.7	90	0.2500	89.75	0.750	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.7	99.6	724	0.5000	723.50	6.002	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.7	99.8	53	3.7500	49.25	0.412	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:09AM 8/28/2018

Sample

Sample Name: 160-29881-A-25-C
SampleType: Sample
: 160-29881-A-25-C
Sample Collection Date: 7/26/2018 3:45:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0042g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739112

Analyst: 60040

Tracer

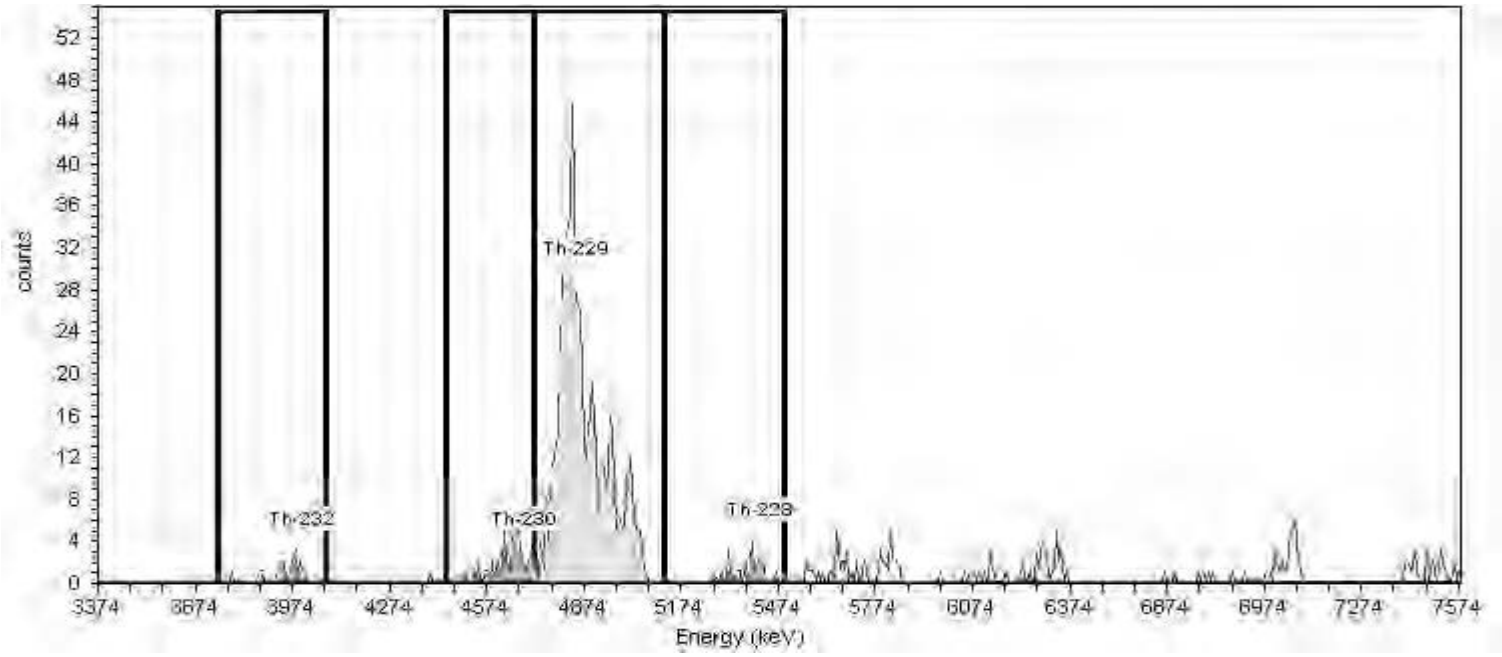
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.69%

Acquisition

Detector: AV88
Serial Number: 76-033FF1
Acquisition Start Date: 8/28/2018 2:47:58AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:55PM
Background Info: Sample: ICB;AV88; Det: AV88; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV88-05162018a
Calibration Date: 5/17/2018 6:14:39AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	87.8	100.2	19	0.2500	18.75	0.183	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.3	99.7	50	0.9230	49.08	0.482	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.4	99.6	615	1.5000	613.50	5.047	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.7	99.8	27	4.0000	22.91	0.225	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:20:28PM 8/28/2018

Sample

Sample Name: 160-29881-A-25-C
SampleType: Sample
: 160-29881-A-25-C
Sample Collection Date: 7/26/2018 3:45:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0042g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739145

Analyst: 60040

Tracer

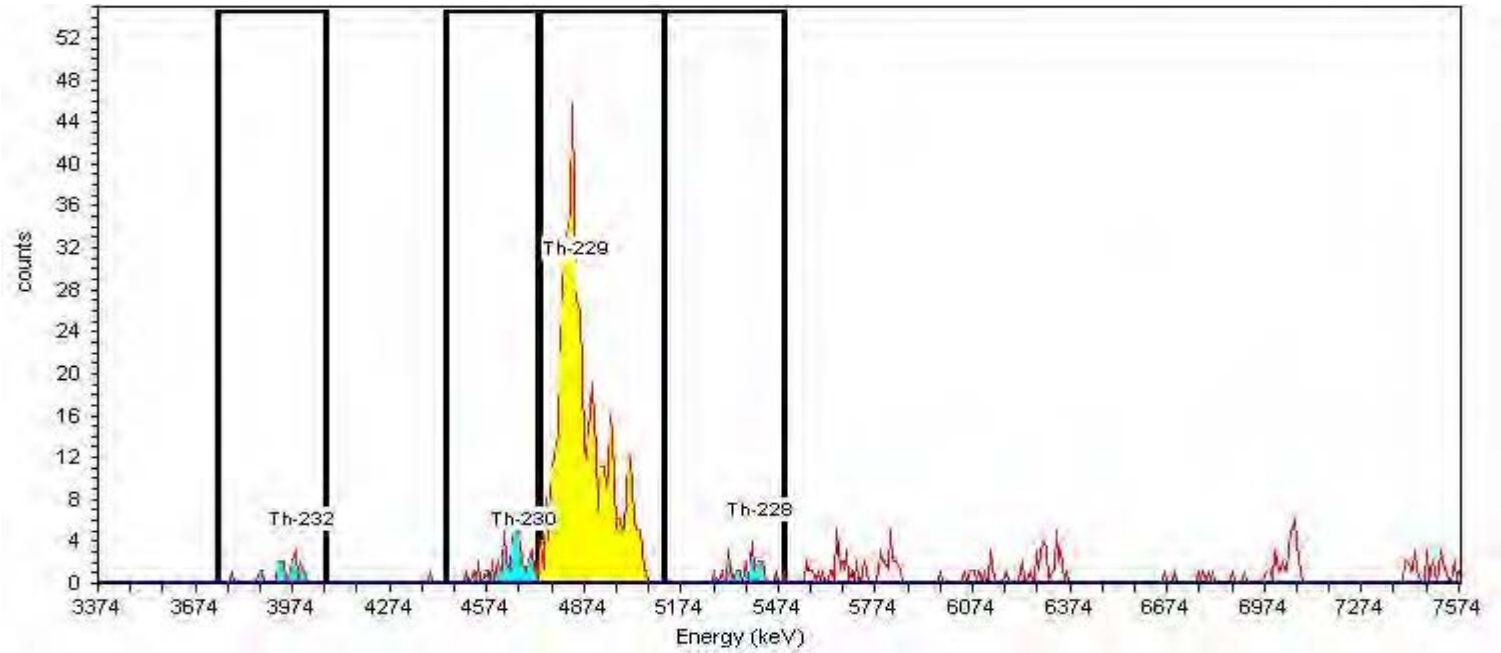
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 83.55%

Acquisition

Detector: AV88
Serial Number: 76-033FF1
Acquisition Start Date: 8/28/2018 2:47:58AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:55PM
Background Info: Sample: ICB;AV88; Det: AV88; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9793;AV88-05162018a
Calibration Date: 5/17/2018 6:14:39AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	87.8	100.2	19	0.2500	18.75	0.184	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	86.9	99.7	51	1.0000	50.00	0.492	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	73.4	99.6	614	1.5000	612.50	5.039	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.7	99.8	27	4.0000	22.91	0.226	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:36AM 8/28/2018

Sample

Sample Name: 160-29881-A-26-C
SampleType: Sample
: 160-29881-A-26-C
Sample Collection Date: 7/26/2018 4:00:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739114

Analyst: 60040

Tracer

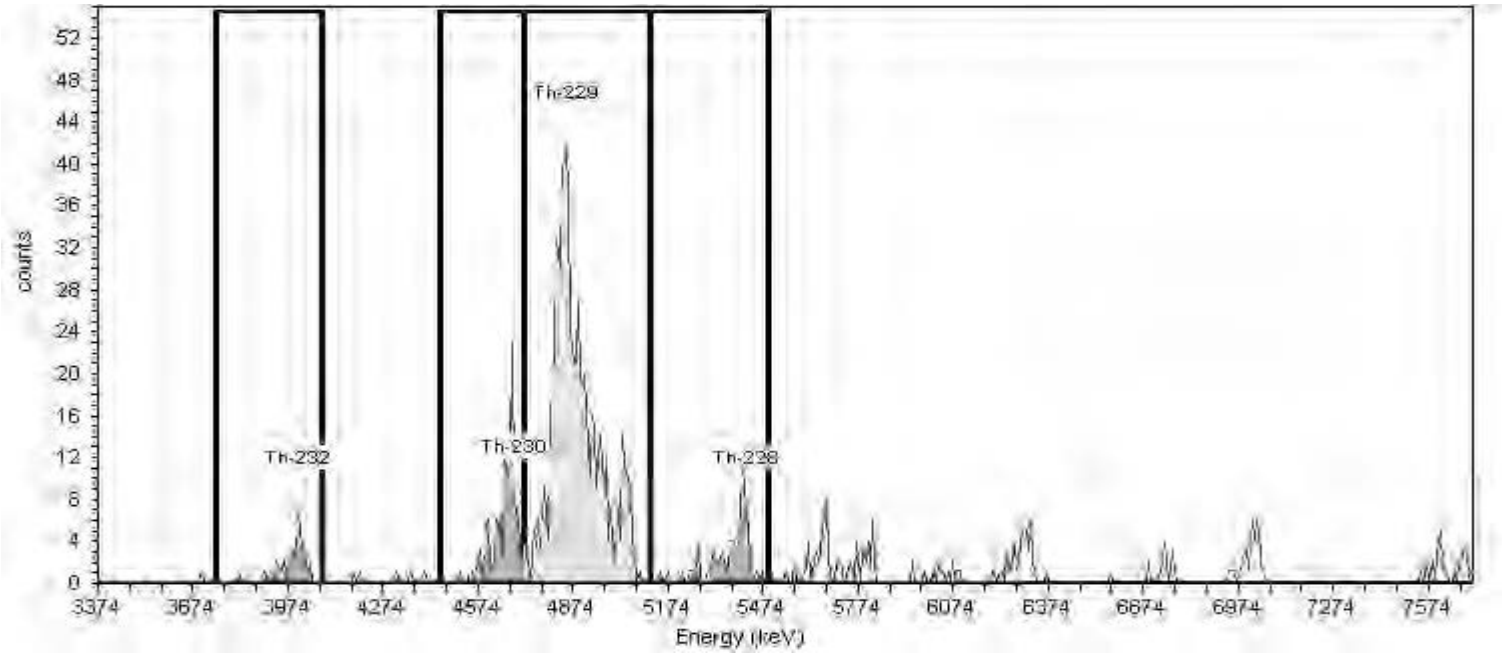
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 86.35%

Acquisition

Detector: AV91
Serial Number: 52-063gg5
Acquisition Start Date: 8/28/2018 2:47:59AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:59PM
Background Info: Sample: ICB;AV91; Det: AV91; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9885;AV91-05162018
Calibration Date: 5/17/2018 6:11:48AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 23.75% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	64.0	100.2	40	1.7500	38.25	0.348	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	19.1	99.7	122	2.0155	119.95	1.098	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.2	99.6	660	0.7655	659.20	5.214	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.3	99.8	75	4.2717	70.81	0.649	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:19:39PM 8/28/2018

Sample

Sample Name: 160-29881-A-26-C
SampleType: Sample
: 160-29881-A-26-C
Sample Collection Date: 7/26/2018 4:00:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 382139
AnalysisID: 739144

Analyst: 60040

Tracer

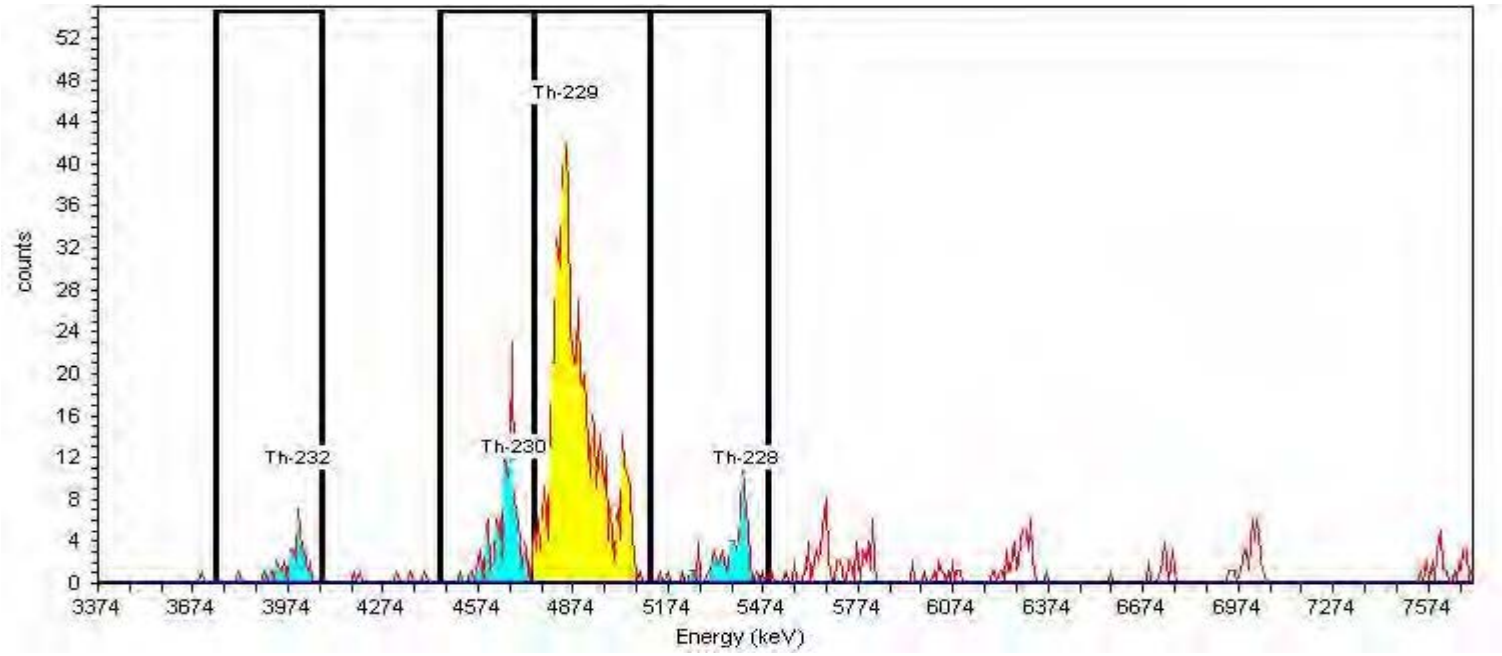
Tracer Name: Th-229_00023
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 12:00:17PM

Tracer Nuclide: Th-229
Tracer Recovery: 85.73%

Acquisition

Detector: AV91
Serial Number: 52-063gg5
Acquisition Start Date: 8/28/2018 2:47:59AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:17:59PM
Background Info: Sample: ICB;AV91; Det: AV91; Spectrum #1; Aug-11-2018 17:17

Calibration Name: IC-9885;AV91-05162018
Calibration Date: 5/17/2018 6:11:48AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.75% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/25/2018 4:17:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	64.0	100.2	40	1.7500	38.25	0.351	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	55.5	99.7	131	2.7500	128.25	1.182	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	88.2	99.6	655	0.5000	654.50	5.177	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.3	99.8	75	4.2717	70.81	0.654	pCi/g

Prep Batch: 386101

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 386101

Lab ID: MB 160-386101/1-A
Client ID:
Sigma: 2

Analyzed: 08/31/18 02:42
Detector: AV1
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	7.603	4.68	4.72	G	pCi/g	1.00	4.94	386524

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	392.8	29.3	44.1		pCi/g	4.28	426	92.1	30 - 110

Lab ID: LCS 160-386101/2-A
Client ID:
Sigma: 2

Analyzed: 08/31/18 02:42
Detector: AV3
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	27.20	1.37	2.66		pCi/g	1.00	0.229	386568

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.76	0.812	1.22		pCi/g	0.0741	12.0	89.5	30 - 110

Lab ID: 160-29881-32
Client ID: CRC-B17-0406
Sigma: 2

Analyzed: 08/31/18 02:42
Detector: AV4
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	361	29.3	42.2	G	pCi/g	1.00	4.11	386569

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	411	30.9	46.3		pCi/g	4.11	423	97.2	30 - 110

Lab ID: 160-29881-32 DU
Client ID: CRC-B17-0406
Sigma: 2

Analyzed: 08/31/18 02:42
Detector: AV7
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	373.6	30.2	43.6	G	pCi/g	1.00	4.46	386586

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	397.7	30.6	45.3		pCi/g	4.17	423	93.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 386101

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-386101/1-A	Thorium-230			7.603	G	pCi/g							3.21895286

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-386101/2-A	Thorium-230		24.5	27.20		pCi/g	111	81 - 118					1.5089365827

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-32	Thorium-230	361		373.6	G	pCi/g			3	0.15	0.42	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 386101 Batch Start Date: 08/29/18 11:36 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/30/18 15:58

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00024	TRM-2 00002	AnalysisComment		
MB 160-386101/1		ExtChrom, A-01-R		0.0142 g	0.2 mL		1:70 Dilution original aliquot 1.0		
LCS 160-386101/2		ExtChrom, A-01-R		0.5033 g	0.2 mL	0.5033 g			
160-29881-A-32-B	CRC-B17-0406	ExtChrom, A-01-R	T	0.0143 g	0.2 mL		1:70 Dilution origianal aliquot 1.0075		
160-29881-A-32-B DU	CRC-B17-0406	ExtChrom, A-01-R	T	0.0143 g	0.2 mL		1:70 Dilution original aliquot 1.0075		

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	nmn per scb
Column Date	8/29/18
Analyst ID - CoPrecipitation	scb
CoPrecipitation Date	8/30/18
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	CLP per scb
Analyst ID - Reagent Drop	KNF per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:16:18PM 8/31/2018

Sample

Sample Name: MB 160-386101/1-A
SampleType: Blank
: MB 160-386101/1-A
Sample Collection Date: 8/30/2018 4:17:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.0142g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739743

Analyst: 60040

Tracer

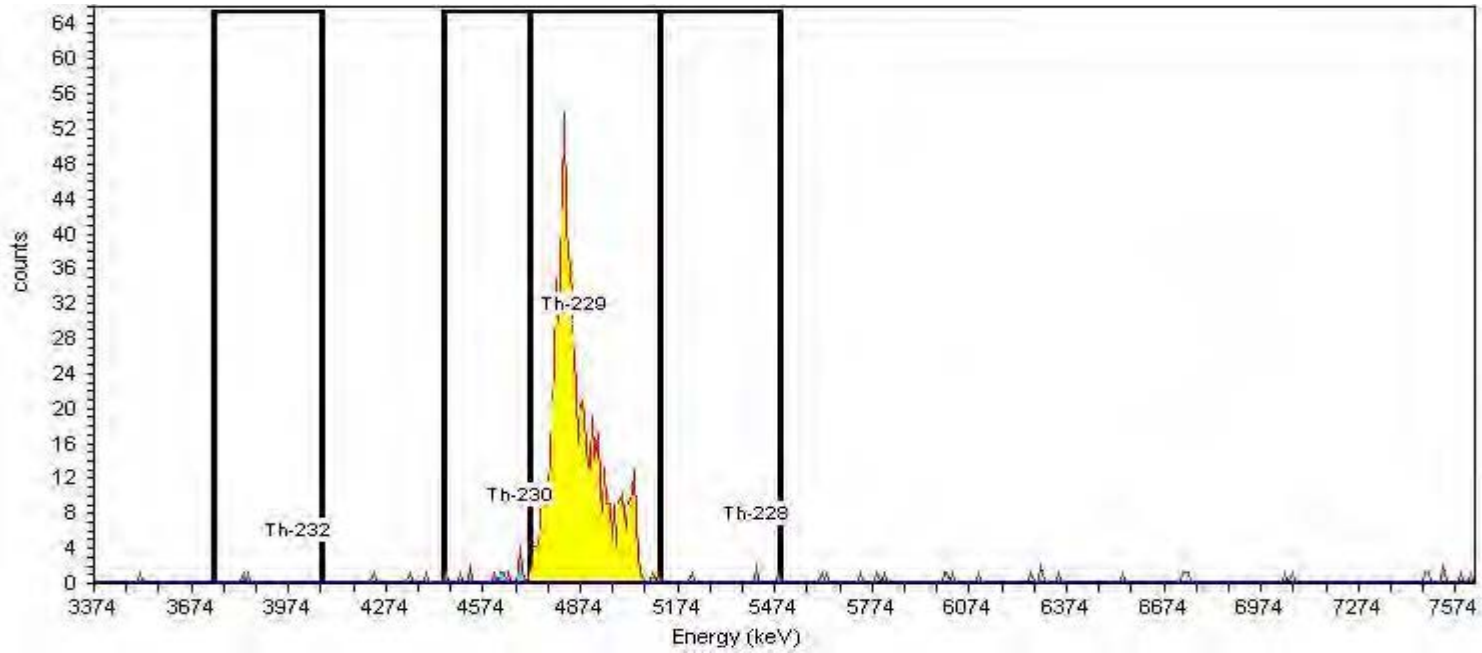
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.13%

Acquisition

Detector: AV1
Serial Number: 49-188 AA4
Acquisition Start Date: 8/31/2018 2:42:26AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:19:02PM
Background Info: Sample: ICB;AV1; Det: AV1; Spectrum #1; Aug-11-2018 17:19

Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.3	99.8	4	2.0000	2.06	1.219	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	43.4	100.2	2	1.6354	0.36	0.214	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	13.8	99.7	15	2.0000	13.03	7.698	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.5	99.6	723	1.7500	721.34	392.966	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:42:59AM 8/31/2018

Sample

Sample Name: LCS 160-386101/2-A
SampleType: Control
: LCS 160-386101/2-A
Sample Collection Date: 8/30/2018 4:17:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.5033g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739718

Analyst: 60040

Tracer

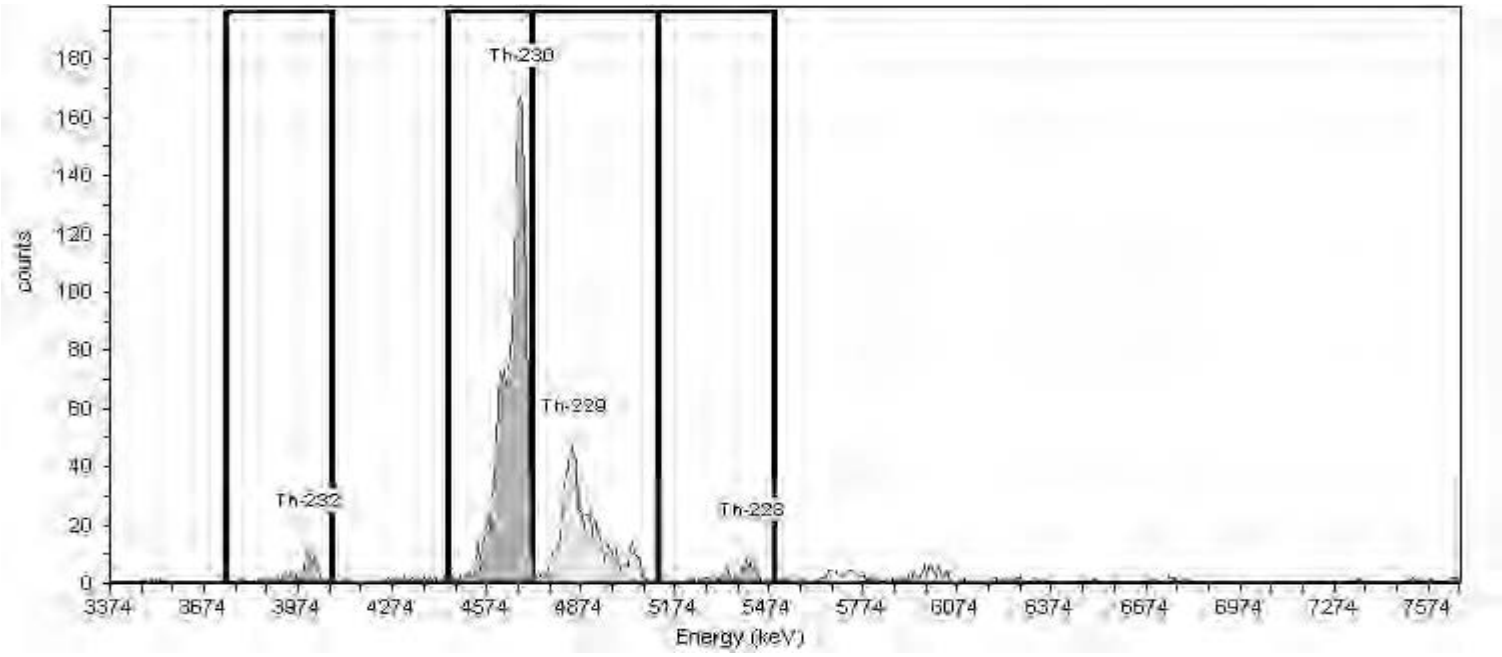
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.23%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 8/31/2018 2:42:27AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:27PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-8877;AV3-05142018
Calibration Date: 5/14/2018 6:25:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 24.44% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	52.1	100.2	77	1.8854	75.11	1.282	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.3	99.7	1597	3.5000	1593.56	27.339	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.0	99.6	701	0.2500	700.81	10.737	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.9	99.8	66	1.0000	65.00	1.114	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:23:58AM 8/31/2018

Sample

Sample Name: LCS 160-386101/2-A
SampleType: Control
: LCS 160-386101/2-A
Sample Collection Date: 8/30/2018 4:17:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.5033g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739726

Analyst: 60040

Tracer

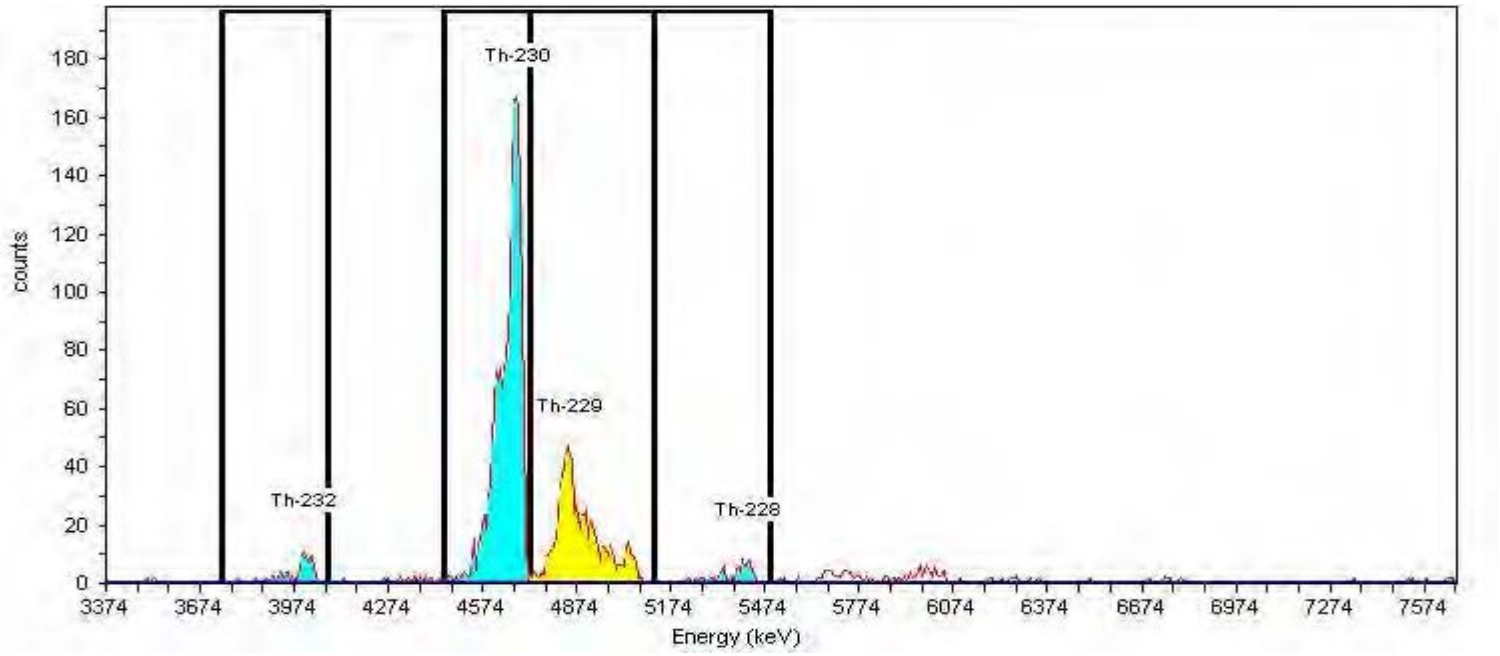
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.47%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 8/31/2018 2:42:27AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:27PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-8877;AV3-05142018
Calibration Date: 5/14/2018 6:25:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.44% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	52.1	100.2	77	1.8854	75.11	1.279	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	29.7	99.7	1599	3.5000	1595.50	27.297	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	75.0	99.6	703	0.2500	702.75	10.767	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.9	99.8	66	1.0000	65.00	1.111	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:43:08AM 8/31/2018

Sample

Sample Name: 160-29881-A-32-F
SampleType: Sample
: 160-29881-A-32-F
Sample Collection Date: 7/27/2018 4:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.0143g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739719

Analyst: 60040

Tracer

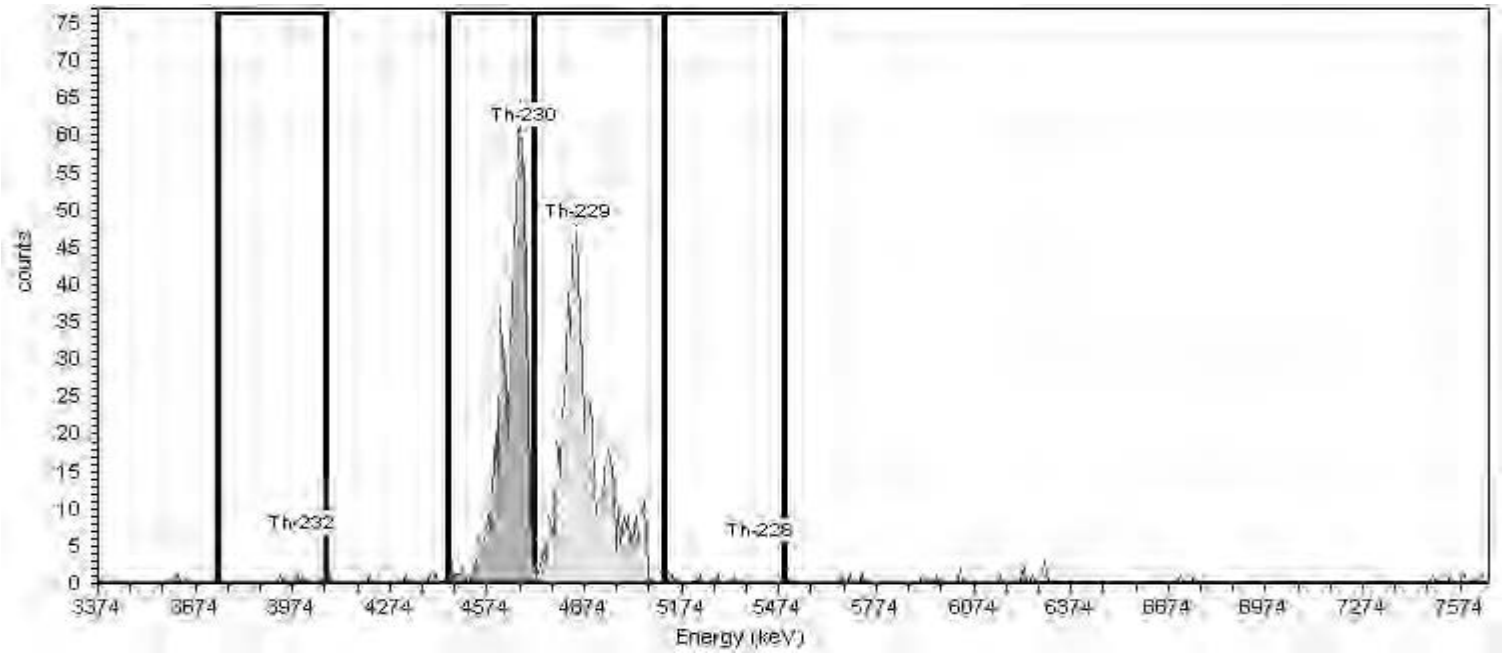
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 97.43%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 8/31/2018 2:42:29AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:28PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9520;AV4-05142018
Calibration Date: 5/14/2018 6:25:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.79% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	88.8	100.2	3	1.3646	1.64	0.965	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.0	99.7	608	1.0000	606.94	359.866	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.6	99.6	715	1.2500	713.69	412.659	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	34.6	99.8	4	2.2500	1.75	1.037	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:26:46AM 8/31/2018

Sample

Sample Name: 160-29881-A-32-F
SampleType: Sample
: 160-29881-A-32-F
Sample Collection Date: 7/27/2018 4:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.0143g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739728

Analyst: 60040

Tracer

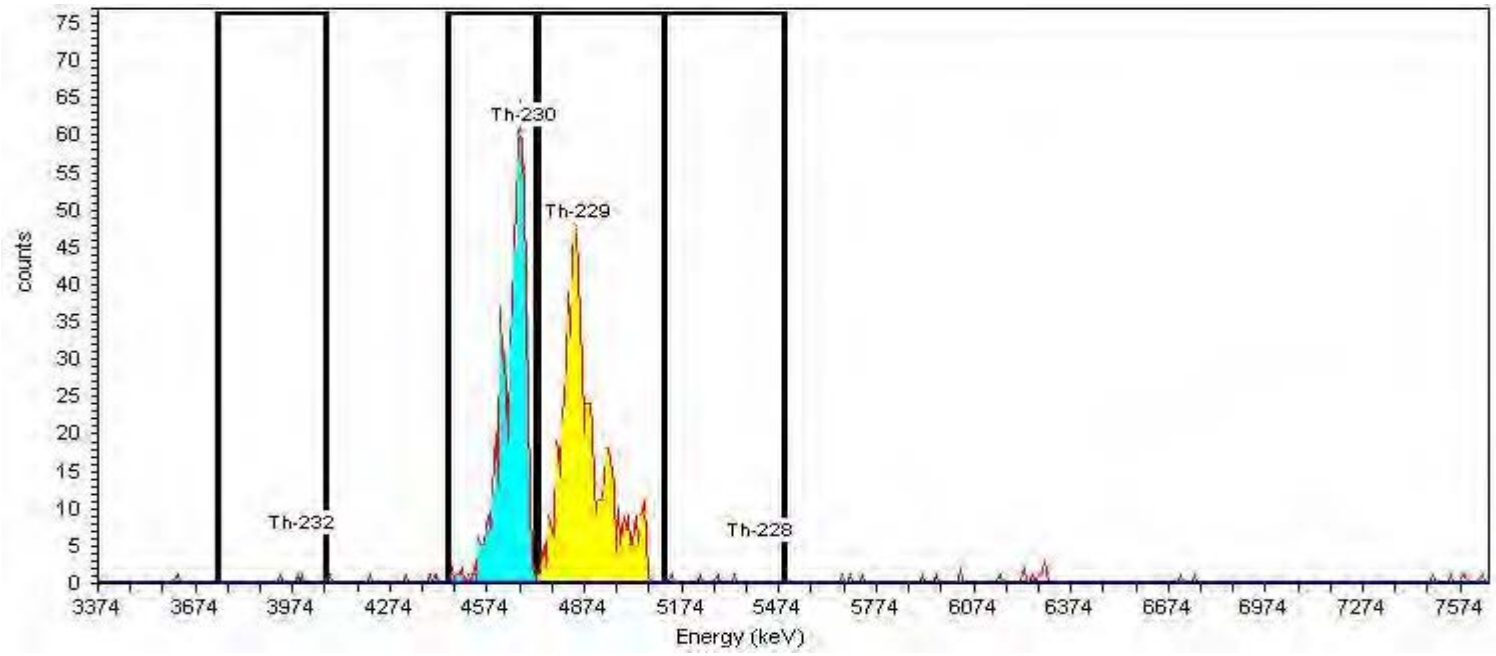
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 97.16%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 8/31/2018 2:42:29AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:28PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9520;AV4-05142018
Calibration Date: 5/14/2018 6:25:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.79% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	88.8	100.2	3	1.3646	1.64	0.967	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	36.3	99.7	608	1.0000	607.00	360.883	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	80.6	99.6	713	1.2500	711.75	411.538	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	34.6	99.8	4	2.2500	1.75	1.040	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:43:17AM 8/31/2018

Sample

Sample Name: 160-29881-A-32-G DU
SampleType: Sample
: 160-29881-A-32-G DU
Sample Collection Date: 7/27/2018 4:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.0143g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739720

Analyst: 60040

Tracer

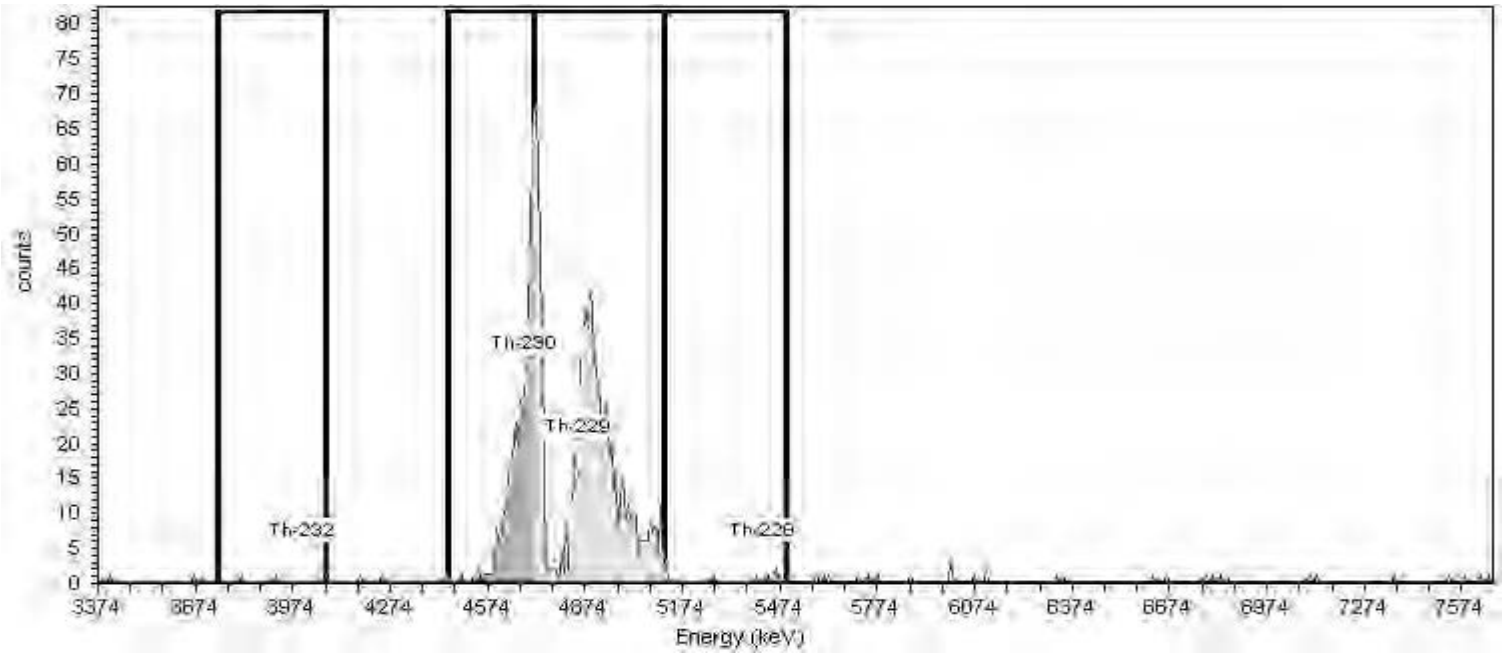
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 114.74%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 8/31/2018 2:42:31AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:28PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9793;AV7-05142018
Calibration Date: 5/14/2018 6:26:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 22.98% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Expected Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	3	0.5000	2.04	1.014	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	6.4	99.7	437	0.8270	436.20	217.805	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	.0	99.6	849	1.7500	847.47	485.985	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.0	99.8	10	1.7500	8.44	4.213	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:25:23AM 8/31/2018

Sample

Sample Name: 160-29881-A-32-G DU
SampleType: Sample
: 160-29881-A-32-G DU
Sample Collection Date: 7/27/2018 4:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.0143g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 386101
AnalysisID: 739727

Analyst: 60040

Tracer

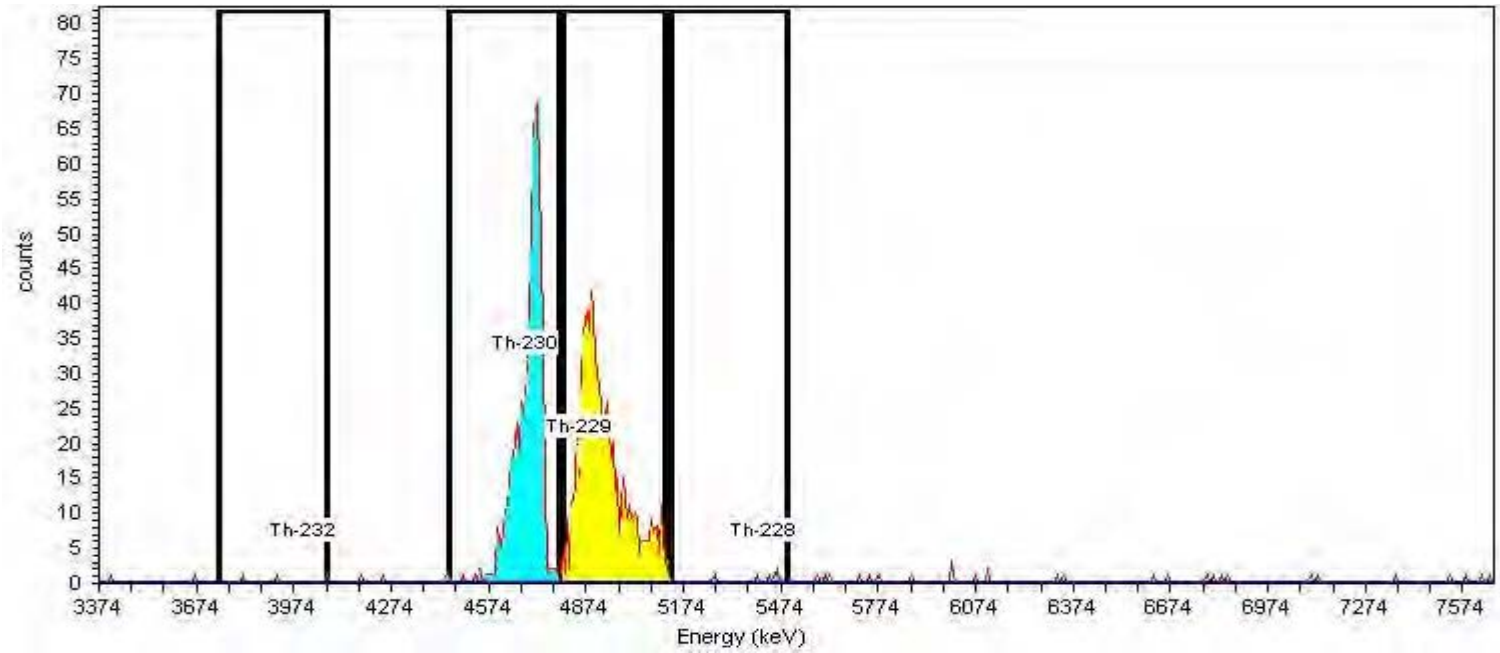
Tracer Name: Th-229_00024
Tracer Activity: 67.23 DPM/mL x (Vol.)0.20 mL = 13.45 DPM
Tracer Ref. Date: 8/6/2014 11:00:55AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.94%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 8/31/2018 2:42:31AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/11/2018 5:16:28PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Aug-11-2018 17:16

Calibration Name: IC-9793;AV7-05142018
Calibration Date: 5/14/2018 6:26:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.98% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 8/31/2018 2:38:14AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	3	0.5000	2.04	1.239	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4791.3	56.3	99.7	614	1.2500	612.75	373.705	pCi/g
Th-229	4848.0	4,845.3	2.7	4798.8	5134.4	101.4	97.5	680	1.2500	678.75	397.883	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.0	99.8	10	1.7500	8.44	5.145	pCi/g

Method A-01-R U

Isotopic Uranium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 380661

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Lab ID: MB 160-380661/1-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV187
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.01237	0.0240	0.0241	U	pCi/g	1.00	0.0462	385895
Uranium-235	0.01026	0.0205	0.0205	U	pCi/g	1.00	0.0308	385895
Uranium-238	0.01440	0.0236	0.0237	U	pCi/g	1.00	0.0398	385895

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.496	0.517	0.815		pCi/g	0.0551	6.91	108	30 - 110

Lab ID: LCS 160-380661/2-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV188
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	6.809	0.512	0.767		pCi/g	1.00	0.0594	385896
Uranium-238	6.472	0.498	0.737		pCi/g	1.00	0.0537	385896

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.276	0.468	0.705		pCi/g	0.0765	6.91	90.6	30 - 110

Lab ID: 160-29881-1
Client ID: CRC-B9-0406
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV189
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.523	0.136	0.143		pCi/g	1.00	0.0423	385897
Uranium-235	0.0653	0.0533	0.0536		pCi/g	1.00	0.0327	385897
Uranium-238	0.565	0.141	0.149		pCi/g	1.00	0.0423	385897

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.04	0.430	0.666		pCi/g	0.0573	6.89	87.5	30 - 110

Lab ID: 160-29881-1 DU
Client ID: CRC-B9-0406
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV190
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.5673	0.135	0.143		pCi/g	1.00	0.0388	385898
Uranium-235	0.03243	0.0408	0.0409	U	pCi/g	1.00	0.0617	385898
Uranium-238	0.4761	0.124	0.130		pCi/g	1.00	0.0448	385898

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.915	0.472	0.748		pCi/g	0.0772	6.88	100	30 - 110

Lab ID: 160-29881-2
Client ID: CRC-B6-0204
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV191
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	5.07	0.428	0.604		pCi/g	1.00	0.0438	385899
Uranium-235	0.214	0.0982	0.0998		pCi/g	1.00	0.0338	385899
Uranium-238	4.88	0.420	0.587		pCi/g	1.00	0.0437	385899

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.28	0.454	0.696		pCi/g	0.0644	6.90	90.7	30 - 110

Lab ID: 160-29881-3
Client ID: CRC-B1-0406
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV192
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	3.05	0.338	0.424		pCi/g	1.00	0.0451	385900
Uranium-235	0.0986	0.0700	0.0705		pCi/g	1.00	0.0649	385900
Uranium-238	3.09	0.339	0.427		pCi/g	1.00	0.0279	385900

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.79	0.426	0.647		pCi/g	0.0823	6.90	83.7	30 - 110

Lab ID: 160-29881-4
Client ID: CRC-B7-0204
Sigma: 2

Analyzed: 08/28/18 18:13
Detector: AV164
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 480

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	56.0	1.77	5.03		pCi/g	1.00	0.0985	385885
Uranium-235	2.51	0.418	0.469		pCi/g	1.00	0.0523	385885
Uranium-238	54.6	1.75	4.91		pCi/g	1.00	0.0983	385885

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	2.20	0.200	0.272		pCi/g	0.0607	6.89	31.8	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Lab ID: 160-29881-5 | Analyzed: 08/28/18 03:26 | Decay Corrected: No
Client ID: CRC-B22-0506 | Detector: AV206 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.579	0.144	0.152		pCi/g	1.00	0.0549	385908
Uranium-235	0.0635	0.0544	0.0547		pCi/g	1.00	0.0535	385908
Uranium-238	0.609	0.147	0.156		pCi/g	1.00	0.0429	385908

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.24	0.447	0.688		pCi/g	0.0447	6.89	90.2	30 - 110

Lab ID: 160-29881-6 | Analyzed: 08/28/18 03:26 | Decay Corrected: No
Client ID: CRC-B7-0406 | Detector: AV208 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	7.39	0.531	0.817		pCi/g	1.00	0.0781	385910
Uranium-235	0.414	0.140	0.144		pCi/g	1.00	0.0355	385910
Uranium-238	7.50	0.534	0.826		pCi/g	1.00	0.0285	385910

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.62	0.417	0.630		pCi/g	0.0680	6.89	81.3	30 - 110

Lab ID: 160-29881-7 | Analyzed: 08/28/18 03:26 | Decay Corrected: No
Client ID: CRC-B4-0608 | Detector: AV211 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.229	0.0889	0.0910		pCi/g	1.00	0.0414	385912
Uranium-235	0.000	0.00532	0.00532	U	pCi/g	1.00	0.0319	385912
Uranium-238	0.220	0.0871	0.0890		pCi/g	1.00	0.0413	385912

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.68	0.469	0.731		pCi/g	0.0647	6.90	96.4	30 - 110

Lab ID: 160-29881-8 | Analyzed: 08/28/18 03:26 | Decay Corrected: No
Client ID: CRC-B14-0204 | Detector: AV212 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	1.75	0.249	0.289		pCi/g	1.00	0.0265	385913
Uranium-235	0.104	0.0699	0.0705		pCi/g	1.00	0.0615	385913

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Lab ID: 160-29881-8
Client ID: CRC-B14-0204
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV212
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	1.72	0.247	0.286		pCi/g	1.00	0.0494	385913

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.58	0.470	0.725		pCi/g	0.0658	6.90	95.0	30 - 110

Lab ID: 160-29881-9
Client ID: CRC-B17-0204
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV213
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	18.3	1.01	1.84		pCi/g	1.00	0.0670	385914
Uranium-235	0.874	0.246	0.257		pCi/g	1.00	0.0833	385914
Uranium-238	18.2	1.00	1.82		pCi/g	1.00	0.0414	385914

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	3.87	0.348	0.476		pCi/g	0.0610	6.87	56.2	30 - 110

Lab ID: 160-29881-10
Client ID: CRC-B5-0204
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV215
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	1.72	0.250	0.289		pCi/g	1.00	0.0439	385915
Uranium-235	0.0536	0.0508	0.0510	U	pCi/g	1.00	0.0546	385915
Uranium-238	1.67	0.246	0.283		pCi/g	1.00	0.0438	385915

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.65	0.408	0.626		pCi/g	0.0580	6.90	81.5	30 - 110

Lab ID: 160-29881-11
Client ID: CRC-B5-0608
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV216
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.244	0.0941	0.0963		pCi/g	1.00	0.0272	385916
Uranium-235	0.00845	0.0232	0.0232	U	pCi/g	1.00	0.0545	385916
Uranium-238	0.187	0.0829	0.0844		pCi/g	1.00	0.0437	385916

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.33	0.386	0.591		pCi/g	0.0571	6.89	77.1	30 - 110

Lab ID: 160-29881-12
Client ID: CRC-B11-0204
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV217
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	1.58	0.230	0.265		pCi/g	1.00	0.0514	385917
Uranium-235	0.0621	0.0507	0.0509		pCi/g	1.00	0.0310	385917
Uranium-238	1.39	0.215	0.245		pCi/g	1.00	0.0249	385917

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.34	0.509	0.800		pCi/g	0.0589	6.88	106	30 - 110

Lab ID: 160-29881-13
Client ID: CRC-B4-1012
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV218
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.265	0.0976	0.100		pCi/g	1.00	0.0431	385918
Uranium-235	0.0111	0.0221	0.0222	U	pCi/g	1.00	0.0332	385918
Uranium-238	0.115	0.0640	0.0648		pCi/g	1.00	0.0266	385918

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.88	0.493	0.760		pCi/g	0.0693	6.91	99.3	30 - 110

Lab ID: 160-29881-14
Client ID: CRC-B4-1820
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV219
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.417	0.125	0.130		pCi/g	1.00	0.0571	385919
Uranium-235	0.0459	0.0459	0.0461		pCi/g	1.00	0.0344	385919
Uranium-238	0.493	0.135	0.142		pCi/g	1.00	0.0516	385919

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.80	0.423	0.646		pCi/g	0.0548	6.90	83.8	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Lab ID: 160-29881-15
Client ID: CRC-B12-0002
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV220
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	1.12	0.193	0.214		pCi/g	1.00	0.0400	385920
Uranium-235	0.0591	0.0506	0.0508		pCi/g	1.00	0.0497	385920
Uranium-238	1.10	0.191	0.212		pCi/g	1.00	0.0550	385920

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.62	0.459	0.721		pCi/g	0.0623	6.86	96.2	30 - 110

Lab ID: 160-29881-16
Client ID: CRC-B12-0406
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV222
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.170	0.0782	0.0795		pCi/g	1.00	0.0488	385922
Uranium-235	0.0108	0.0217	0.0217	U	pCi/g	1.00	0.0325	385922
Uranium-238	0.311	0.104	0.108		pCi/g	1.00	0.0421	385922

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.21	0.442	0.683		pCi/g	0.0773	6.87	90.0	30 - 110

Lab ID: 160-29881-17
Client ID: CRC-B12-1214
Sigma: 2

Analyzed: 08/28/18 03:26
Detector: AV225
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.180	0.0815	0.0829		pCi/g	1.00	0.0440	385923
Uranium-235	0.00849	0.0233	0.0234	U	pCi/g	1.00	0.0548	385923
Uranium-238	0.225	0.0909	0.0929		pCi/g	1.00	0.0440	385923

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.55	0.404	0.617		pCi/g	0.0684	6.89	80.4	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380661

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-380661/1-A	Uranium-234			0.01237	U	pCi/g							1.0280319
MB 160-380661/1-A	Uranium-235			0.01026	U	pCi/g							.99911917
MB 160-380661/1-A	Uranium-238			0.01440	U	pCi/g							1.21695087

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-380661/2-A	Uranium-234		6.37	6.809		pCi/g	107	84 - 120					.8380377943
LCS 160-380661/2-A	Uranium-238		6.51	6.472		pCi/g	99	82 - 122					-.0738896523

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-1	Uranium-234	0.523		0.5673		pCi/g			8	0.16	0.44	1	
160-29881-1	Uranium-235	0.0653		0.03243	U	pCi/g			67	0.35	0.98	1	
160-29881-1	Uranium-238	0.565		0.4761		pCi/g			17	0.32	0.90	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380661 Batch Start Date: 08/06/18 12:14 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:33

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00040	UNAT 00014			
MB 160-380661/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-380661/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-29881-A-1-B	CRC-B9-0406	ExtChrom, A-01-R	T	1.0028 g	0.2 mL				
160-29881-A-1-B DU	CRC-B9-0406	ExtChrom, A-01-R	T	1.0040 g	0.2 mL				
160-29881-A-2-B	CRC-B6-0204	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-3-B	CRC-B1-0406	ExtChrom, A-01-R	T	1.0009 g	0.2 mL				
160-29881-A-4-B	CRC-B7-0204	ExtChrom, A-01-R	T	1.0016 g	0.2 mL				
160-29881-A-5-B	CRC-B22-0506	ExtChrom, A-01-R	T	1.0024 g	0.2 mL				
160-29881-A-6-B	CRC-B7-0406	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-7-B	CRC-B4-0608	ExtChrom, A-01-R	T	1.0004 g	0.2 mL				
160-29881-A-8-B	CRC-B14-0204	ExtChrom, A-01-R	T	1.0004 g	0.2 mL				
160-29881-A-9-B	CRC-B17-0204	ExtChrom, A-01-R	T	1.0053 g	0.2 mL				
160-29881-A-10-B	CRC-B5-0204	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-11-B	CRC-B5-0608	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-12-B	CRC-B11-0204	ExtChrom, A-01-R	T	1.0031 g	0.2 mL				
160-29881-A-13-A	CRC-B4-1012	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
160-29881-A-14-A	CRC-B4-1820	ExtChrom, A-01-R	T	1.0002 g	0.2 mL				
160-29881-A-15-A	CRC-B12-0002	ExtChrom, A-01-R	T	1.0072 g	0.2 mL				
160-29881-A-16-A	CRC-B12-0406	ExtChrom, A-01-R	T	1.0047 g	0.2 mL				
160-29881-B-17-B	CRC-B12-1214	ExtChrom, A-01-R	T	1.0028 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380661 Batch Start Date: 08/06/18 12:14 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:33

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	NMN per CMM
Column Date	08/23/2018
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/24/2018
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	TAT
Analyst ID - Reagent Drop	KNF per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:30:05AM 8/28/2018

Sample

Sample Name: MB 160-380661/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-380661/1-A
Sample Collection Date: 8/24/2018 7:34:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226801
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

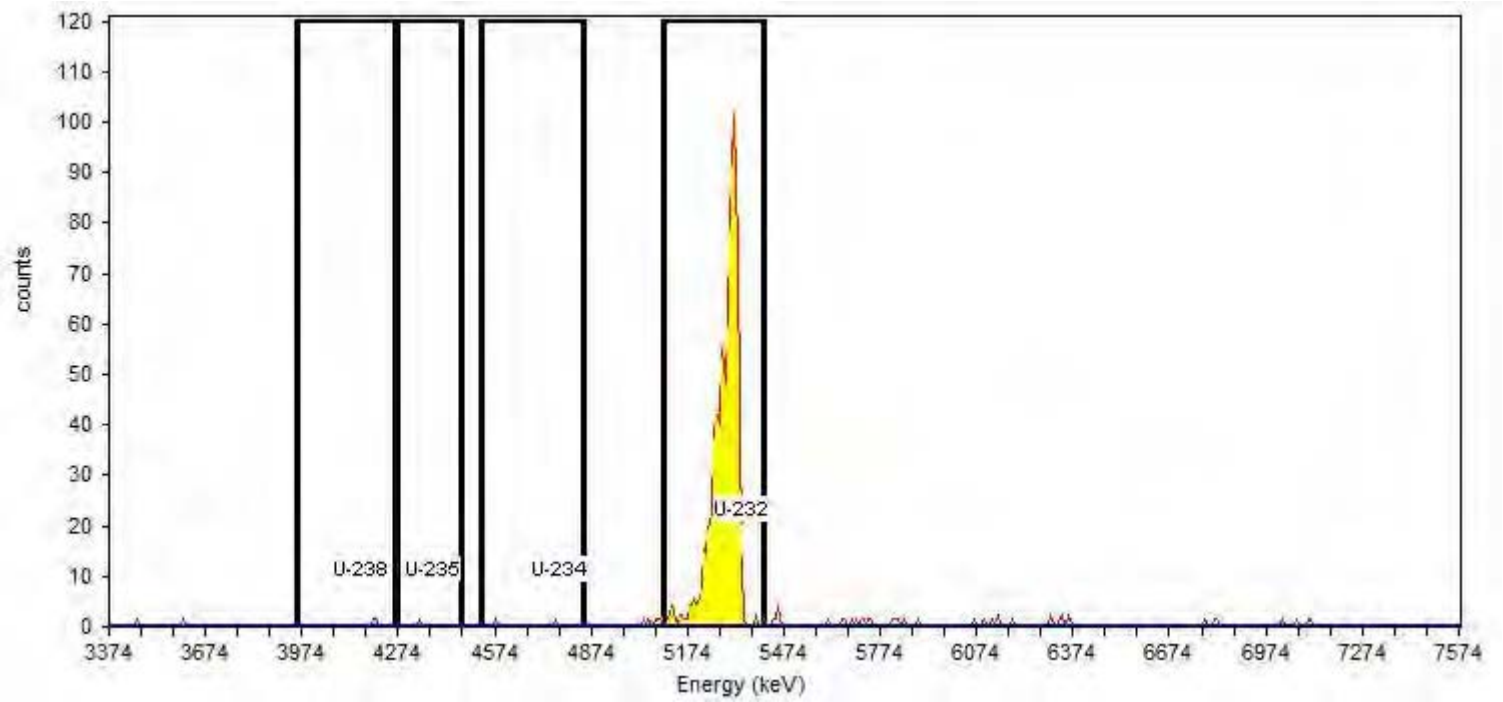
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 108.24%

Acquisition

Detector: AV187 SN: 50-119I2
Acquisition Start Date: 8/28/2018 3:26:33AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:51PM
Bkgd Info: Sample: ICB;AV187; Det: AV187; Spectrum #1; 8/21/2018 1:34:51 PM

Energy Calibration: IC-8875;AV187-20171113
Efficiency Calibration:IC-8875;AV187-20171113
Calibration Date: 11/14/2017 8:46:54AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.07% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:54AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	44.6	100.0	2	0.2500	1.75	1.440E-002	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.0000	1.00	1.026E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	61.6	99.8	2	0.5000	1.50	1.237E-002	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	67.2	100.1	843	0.7500	842.25	8.020E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:30:12AM 8/28/2018

Sample

Sample Name: LCS 160-380661/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-380661/2-A
Sample Collection Date: 8/24/2018 7:34:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226802
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

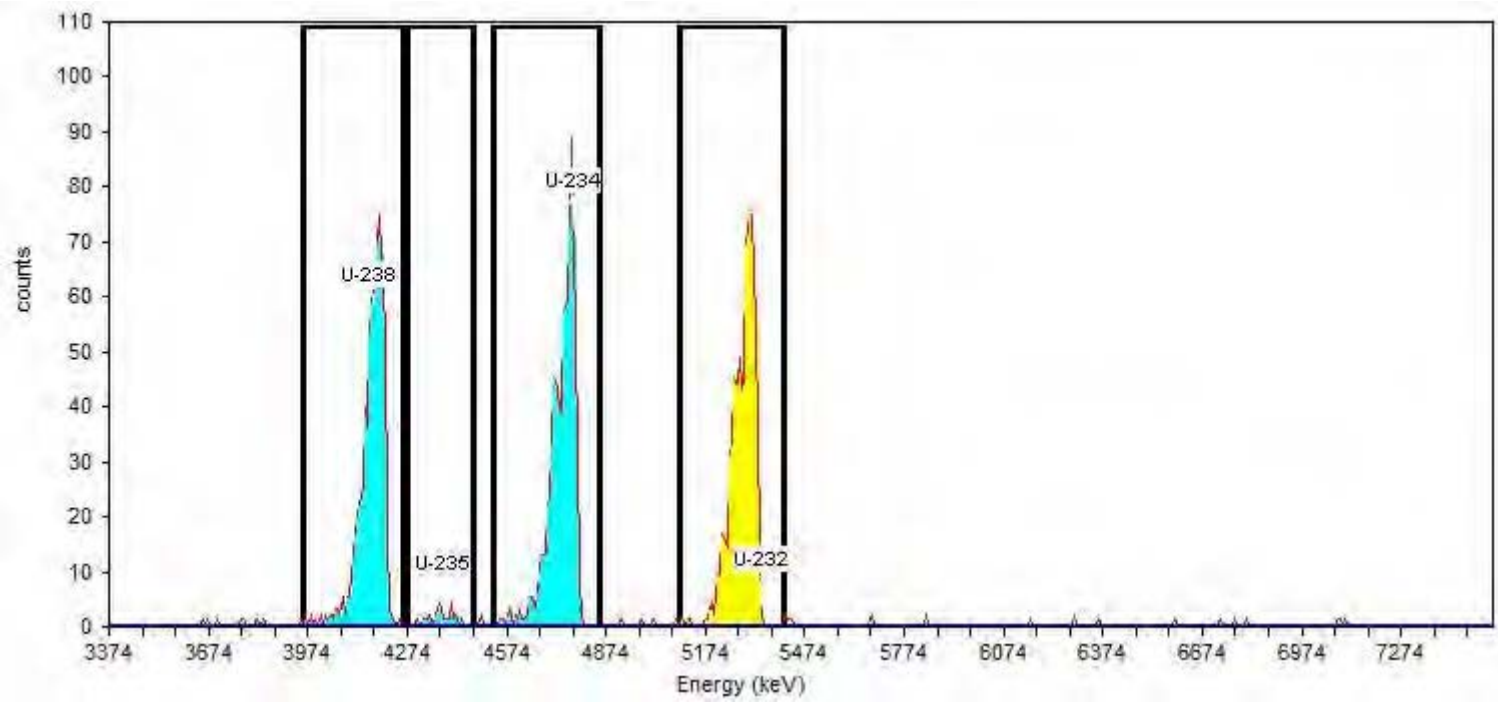
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 90.62%

Acquisition

Detector: AV188 SN: 50-110X4
Acquisition Start Date: 8/28/2018 3:26:34AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:52PM
Bkgd Info: Sample: ICB;AV188; Det: AV188; Spectrum #1; 8/20/2018 5:49:52 PM

Energy Calibration: IC-8876;AV188-20171113a
Efficiency Calibration:IC-8876;AV188-20171113a
Calibration Date: 11/14/2017 8:47:31AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.62% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	64.5	100.0	676	0.5000	675.50	6.472E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	21.3	80.2	26	0.0000	26.00	3.106E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	72.3	99.8	710	0.7500	709.25	6.809E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	79.2	100.1	726	2.5000	723.50	6.714E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:29AM 8/28/2018

Sample

Sample Name: 160-29881-A-1-G Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-1-G
Sample Collection Date: 7/12/2018 7:50:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226805
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

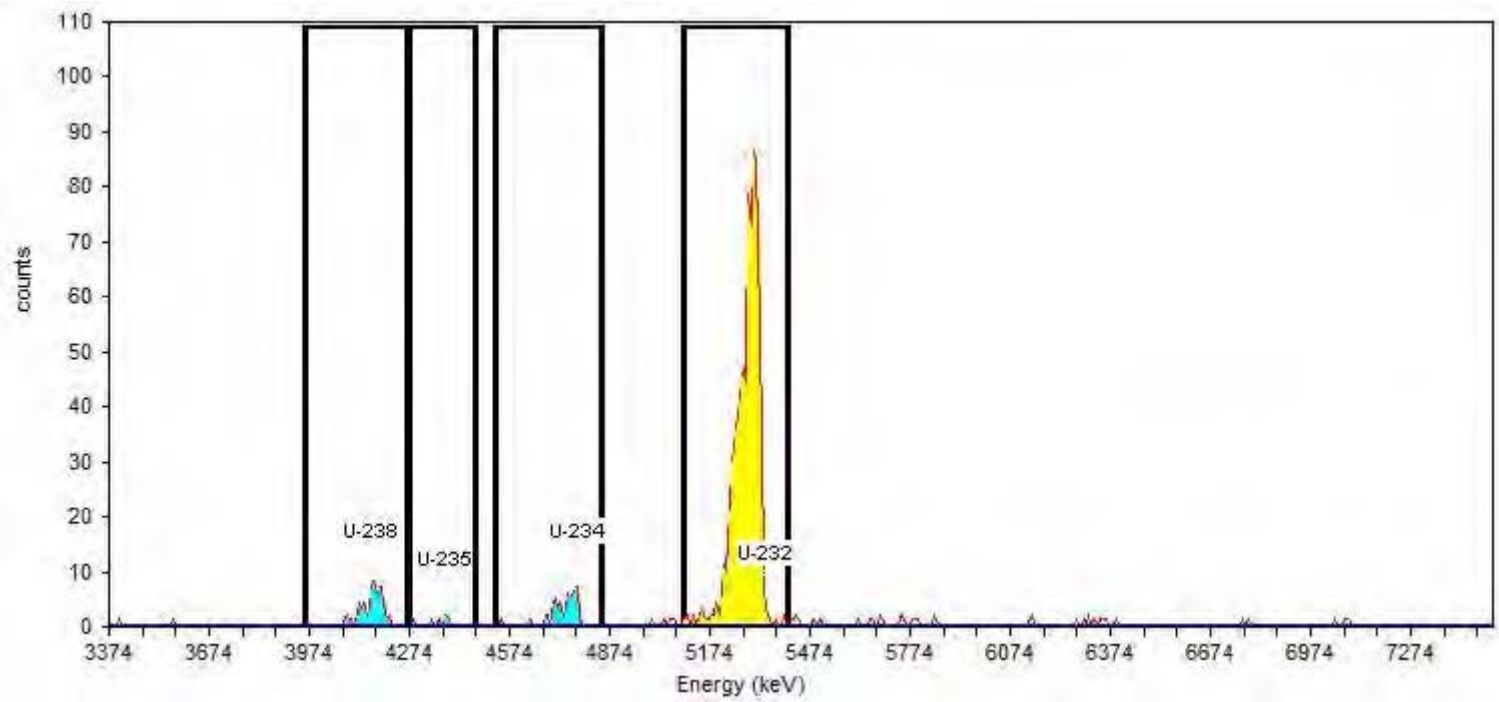
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 87.52%

Acquisition

Detector: AV189 SN: 50-112A3
Acquisition Start Date: 8/28/2018 3:26:34AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:52PM
Bkgd Info: Sample: ICB;AV189; Det: AV189; Spectrum #1; 8/20/2018 5:49:52 PM

Energy Calibration: IC-8877;AV189-20171113
Efficiency Calibration:IC-8877;AV189-20171113
Calibration Date: 11/14/2017 8:46:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.49% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	63.5	100.0	65	0.2500	64.75	5.655E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	16.7	80.2	6	0.0000	6.00	6.533E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	84.5	99.8	60	0.2500	59.75	5.228E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	68.3	100.1	793	1.5000	791.50	6.467E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:30:19AM 8/28/2018

Sample

Sample Name: 160-29881-A-1-H DU Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-1-H DU
Sample Collection Date: 7/12/2018 7:50:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226803
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

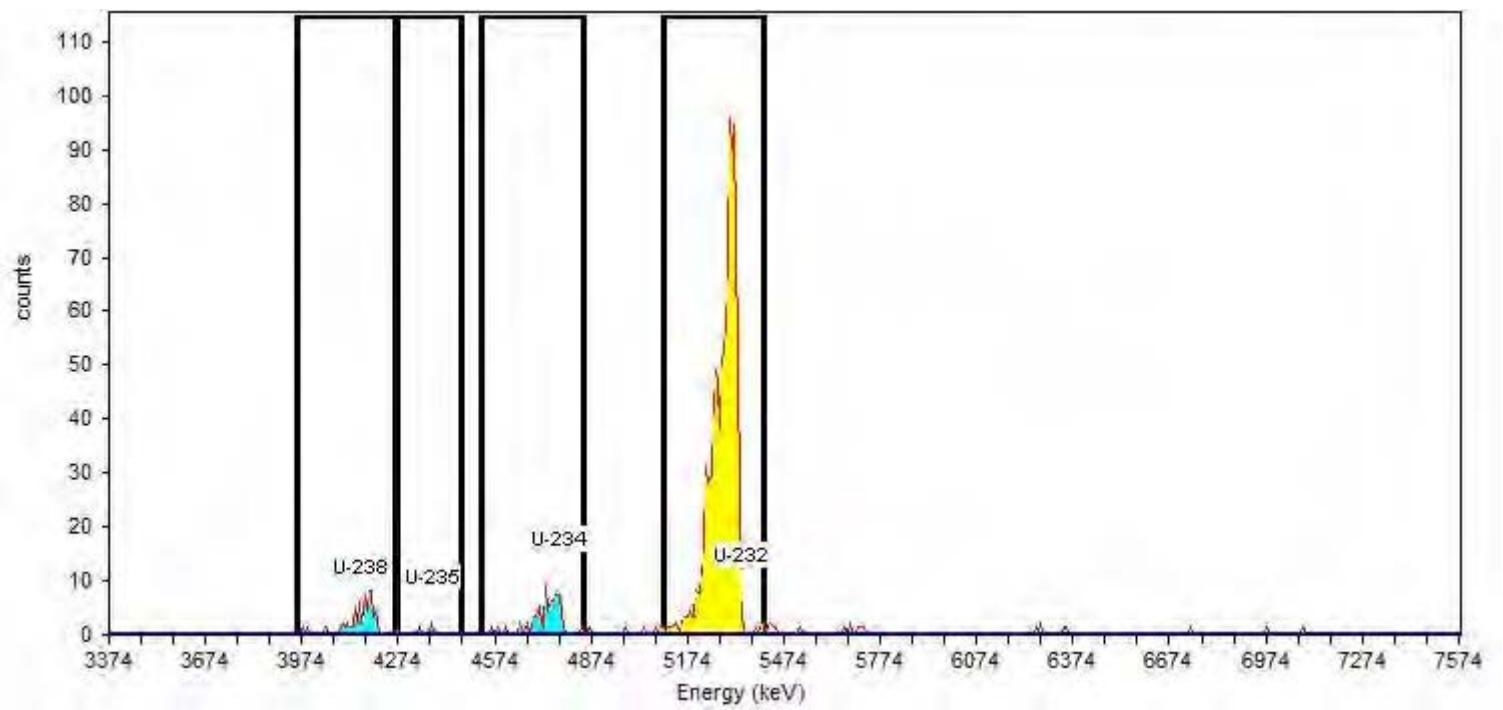
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 100.25%

Acquisition

Detector: AV190 SN: 50-119I7
Acquisition Start Date: 8/28/2018 3:26:34AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:51PM
Bkgd Info: Sample: ICB;AV190; Det: AV190; Spectrum #1; 8/21/2018 1:34:51 PM

Energy Calibration: IC-9520;AV190-20171113
Efficiency Calibration:IC-9520;AV190-20171113
Calibration Date: 11/14/2017 8:47:05AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.30% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	62.1	100.0	60	0.5000	59.50	4.761E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	4	0.7500	3.25	3.243E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	67.8	99.8	71	0.2500	70.75	5.673E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	65.5	100.1	866	3.2500	862.75	7.398E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:58AM 8/28/2018

Sample

Sample Name: 160-29881-A-2-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-2-D
Sample Collection Date: 7/11/2018 4:30:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226800
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

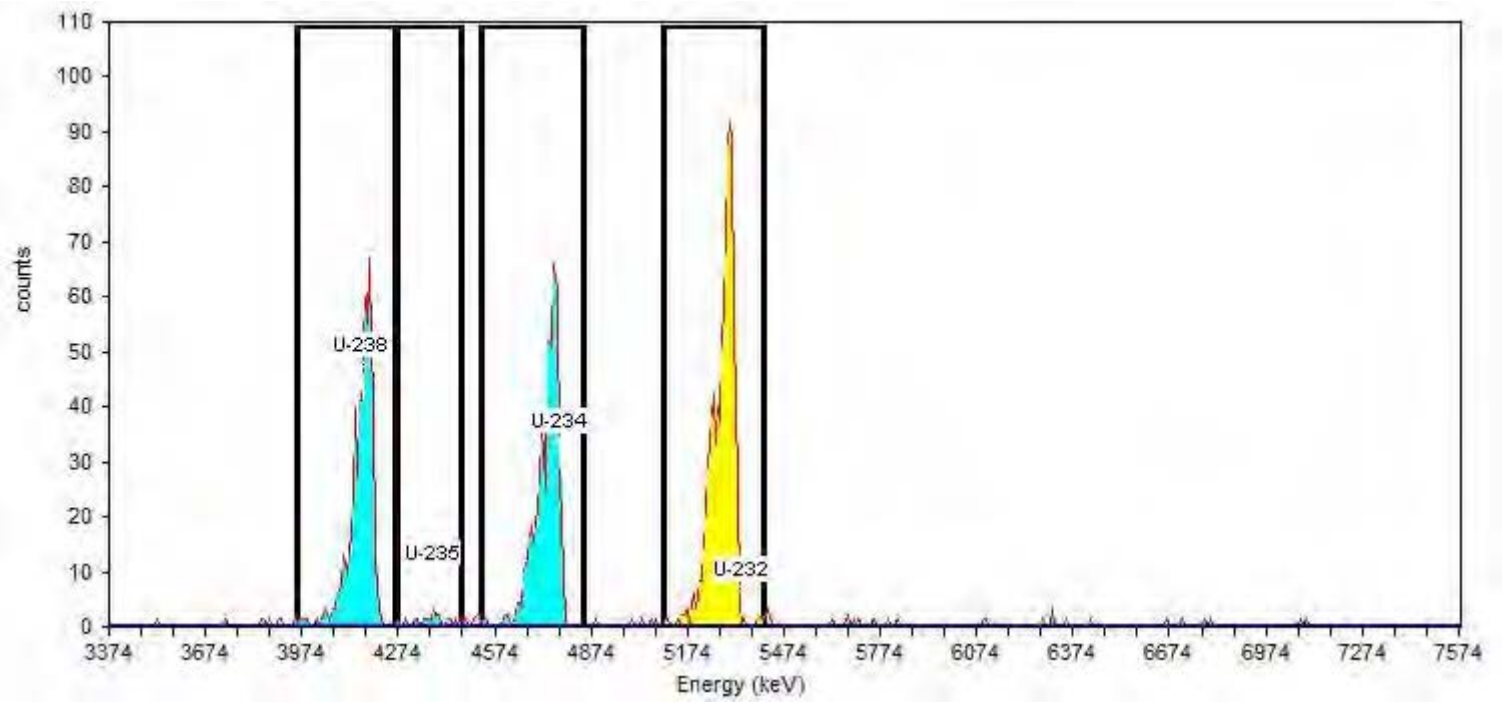
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 90.71%

Acquisition

Detector: AV191 SN: 50-112A2
Acquisition Start Date: 8/28/2018 3:26:34AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:53PM
Bkgd Info: Sample: ICB;AV191; Det: AV191; Spectrum #1; 8/20/2018 5:49:53 PM

Energy Calibration: IC-8879;AV191-20171113
Efficiency Calibration:IC-8879;AV191-20171113
Calibration Date: 11/14/2017 8:47:10AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.90% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	62.6	100.0	540	0.2500	539.75	4.876E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	25.2	80.2	19	0.0000	19.00	2.140E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	60.0	99.8	560	0.2500	559.75	5.067E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	59.3	100.1	769	1.7500	767.25	6.721E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:42AM 8/28/2018

Sample

Sample Name: 160-29881-A-3-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-3-D
Sample Collection Date: 7/10/2018 10:30:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226807
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

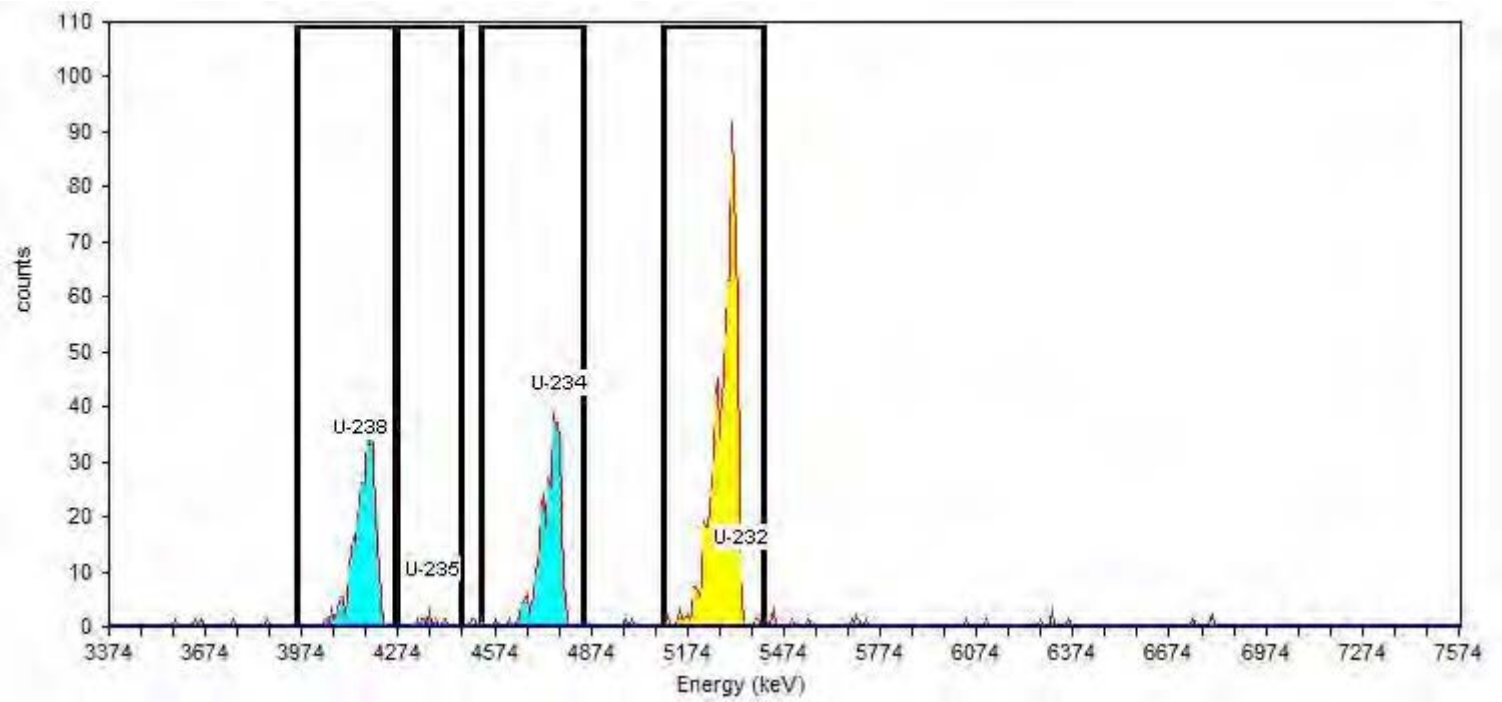
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 83.72%

Acquisition

Detector: AV192 SN: 50-119J7
Acquisition Start Date: 8/28/2018 3:26:35AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/21/2018 1:34:51PM
Bkgd Info: Sample: ICB;AV192; Det: AV192; Spectrum #1; 8/21/2018 1:34:51 PM

Energy Calibration: IC-9792;AV192-20171113
Efficiency Calibration:IC-9792;AV192-20171113
Calibration Date: 11/14/2017 8:47:16AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.09% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	68.0	100.0	332	0.0000	332.00	3.087E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	35.9	80.2	9	0.5000	8.50	9.855E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	67.1	99.8	328	0.2500	327.75	3.054E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.4	100.1	749	4.2500	744.75	6.197E+000	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:15:00AM 8/29/2018

Sample

Sample Name: 160-29881-A-4-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-4-E
Sample Collection Date: 7/11/2018 11:45:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226847
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

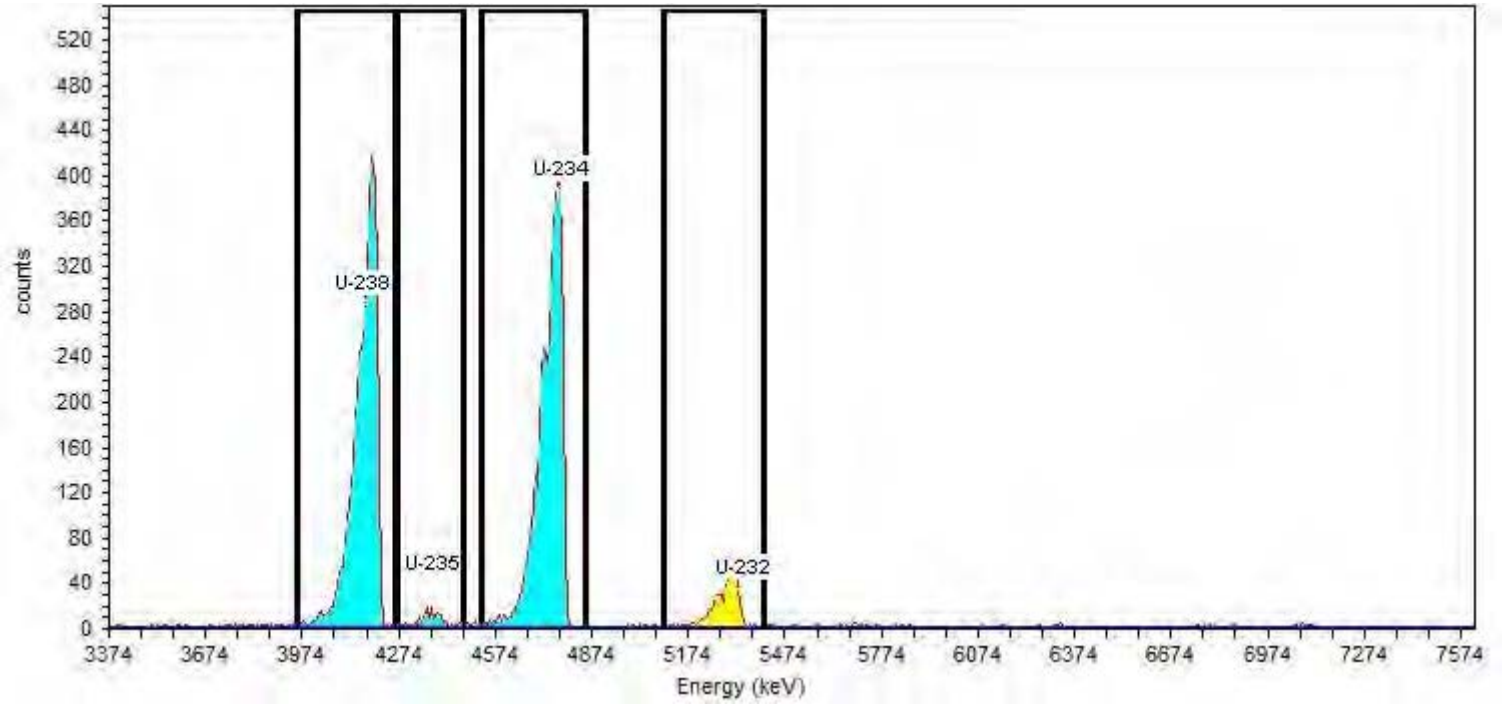
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 31.79%

Acquisition

Detector: AV164 SN: 50-112 A1
Acquisition Start Date: 8/28/2018 6:13:21PM
Live Time: 480.00 min.
Real Time: 480.00 min.
Background Date: 8/21/2018 1:34:49PM
Bkgd Info: Sample: ICB;AV164; Det: AV164; Spectrum #1; 8/21/2018 1:34:49 PM

Energy Calibration: IC-8875;AV164-20171113
Efficiency Calibration:IC-8875;AV164-20171113
Calibration Date: 11/13/2017 3:16:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.08% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 6:12:07PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	71.3	100.0	3906	1.0000	3905.00	5.459E+001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	66.1	80.2	144	0.0000	144.00	2.510E+000	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	74.0	99.8	3998	1.0000	3997.00	5.599E+001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	70.0	100.1	502	7.0000	495.00	2.352E+000	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:56AM 8/28/2018

Sample

Sample Name: 160-29881-A-5-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-5-D
Sample Collection Date: 7/12/2018 12:00:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226809
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

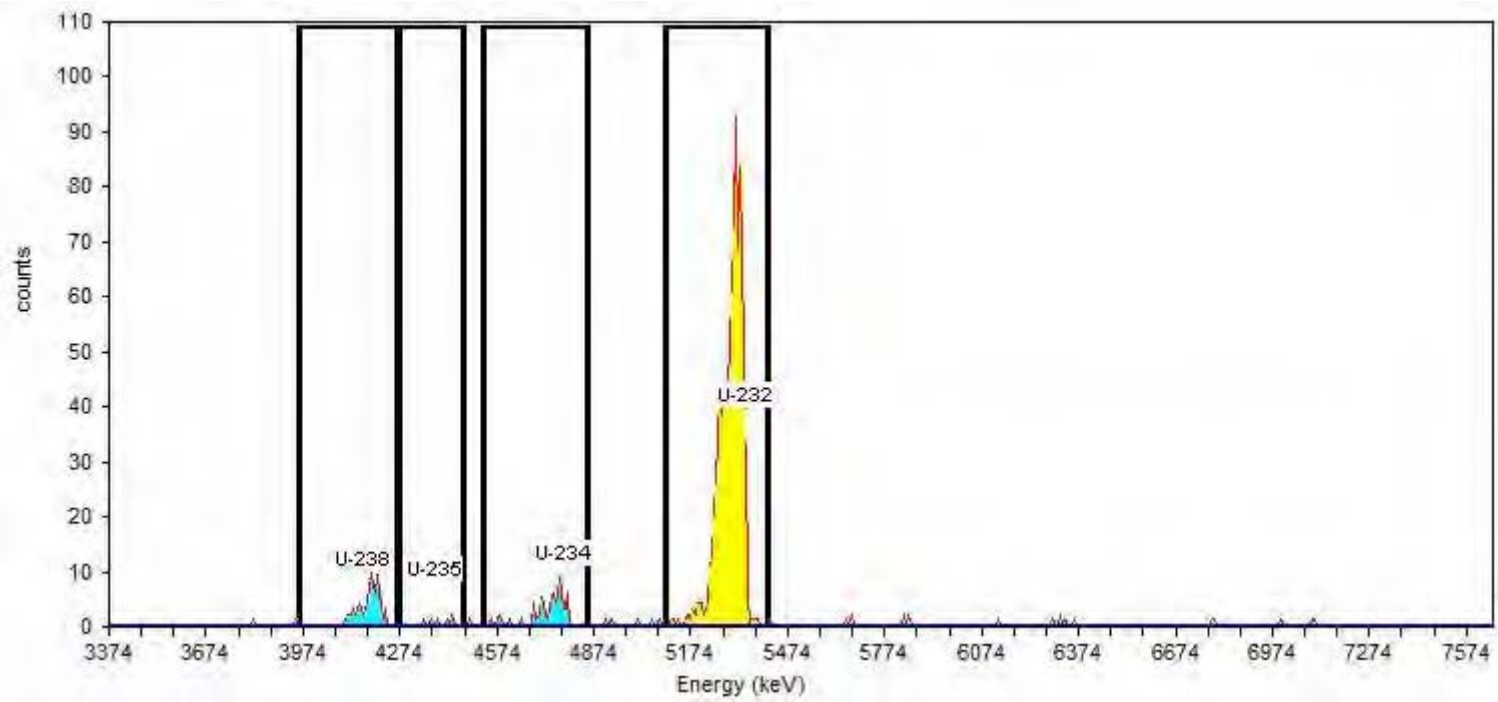
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 90.24%

Acquisition

Detector: AV206 SN: 5604420
Acquisition Start Date: 8/28/2018 3:26:35AM
Live Time: 240.00 min.
Real Time: 240.12 min.
Background Date: 8/20/2018 5:49:56PM
Bkgd Info: Sample: ICB;AV206; Det: AV206; Spectrum #1; 8/20/2018 5:49:56 PM

Energy Calibration: IC-8879;AV206-20171114
Efficiency Calibration:IC-8879;AV206-20171114
Calibration Date: 11/14/2017 12:00:54PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	55.5	100.0	69	0.2500	68.75	6.091E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	21.2	80.2	6	0.2500	5.75	6.352E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	78.7	99.8	66	0.7500	65.25	5.793E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	67.9	100.1	781	0.5000	780.50	6.671E+000	pCi/g

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:05AM 8/28/2018

Sample

Sample Name: 160-29881-A-6-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-6-D
Sample Collection Date: 7/11/2018 3:25:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226791
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

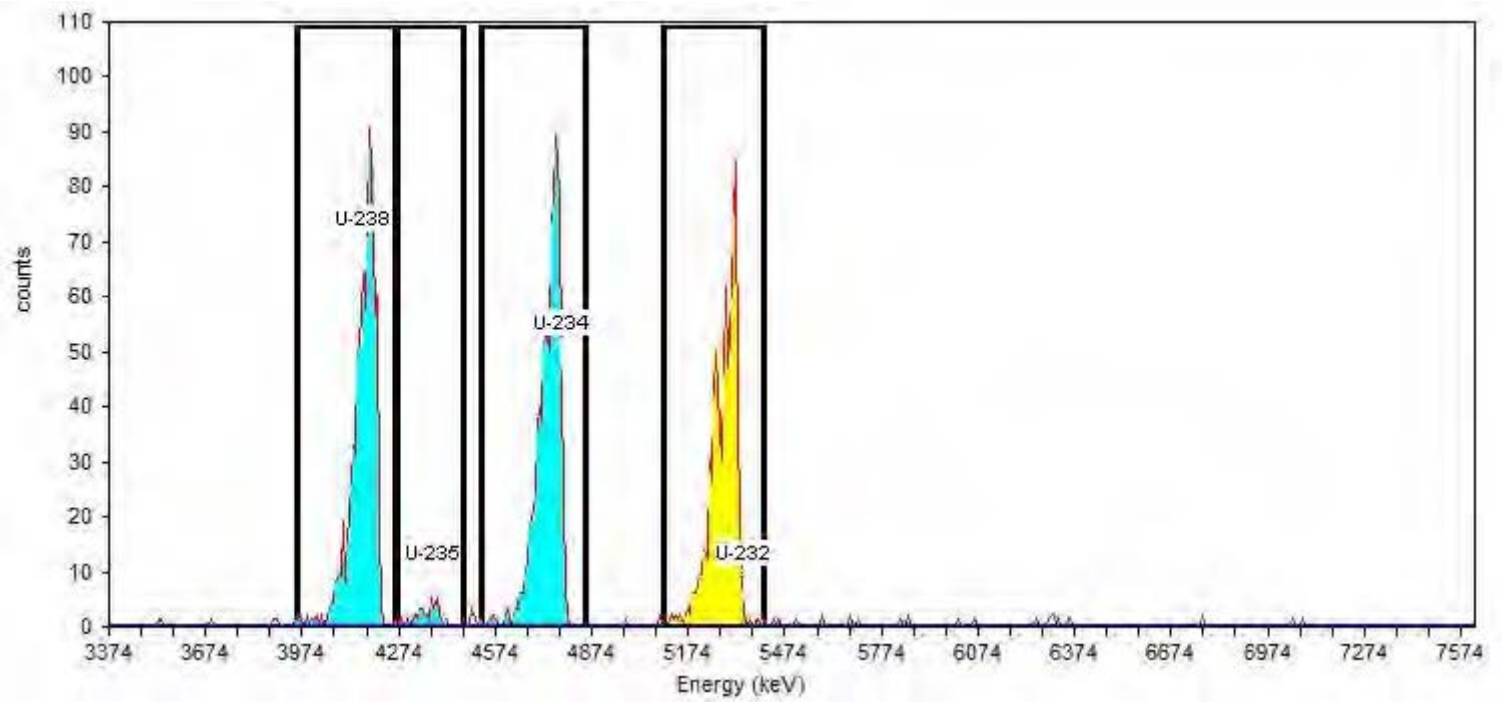
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 81.25%

Acquisition

Detector: AV208 SN: 50-112Z6
Acquisition Start Date: 8/28/2018 3:26:35AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/21/2018 1:34:50PM
Bkgd Info: Sample: ICB;AV208; Det: AV208; Spectrum #1; 8/21/2018 1:34:50 PM

Energy Calibration: IC-9793;AV208-20171114
Efficiency Calibration:IC-9793;AV208-20171114
Calibration Date: 11/14/2017 12:00:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.28% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	68.5	100.0	790	0.0000	790.00	7.503E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	63.3	80.2	35	0.0000	35.00	4.145E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	69.2	99.8	778	2.0000	776.00	7.385E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	81.2	100.1	731	2.5000	728.50	6.010E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:16AM 8/28/2018

Sample

Sample Name: 160-29881-A-7-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-7-D
Sample Collection Date: 7/26/2018 11:00:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226793
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

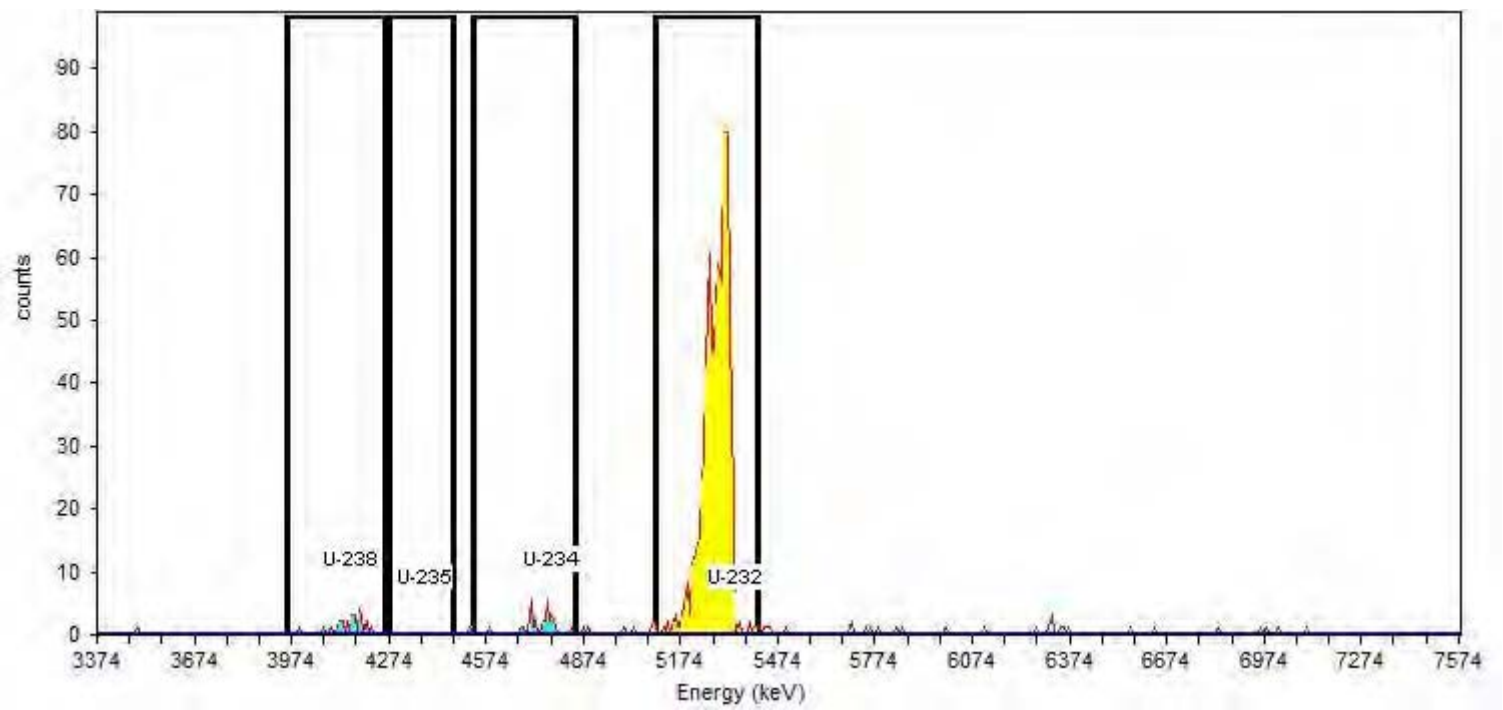
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 96.43%

Acquisition

Detector: AV211 SN: 50-117Z4
Acquisition Start Date: 8/28/2018 3:26:35AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:51PM
Bkgd Info: Sample: ICB;AV211; Det: AV211; Spectrum #1; 8/21/2018 1:34:51 PM

Energy Calibration: IC-9817;AV211-20171114a
Efficiency Calibration:IC-9817;AV211-20171114a
Calibration Date: 11/14/2017 12:01:51PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	72.5	100.0	26	0.2500	25.75	2.197E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.0000	0.00	0.000E+000	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	90.9	99.8	27	0.2500	26.75	2.286E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	82.5	100.1	814	1.7500	812.25	7.142E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:21AM 8/28/2018

Sample

Sample Name: 160-29881-A-8-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-8-E
Sample Collection Date: 7/27/2018 12:10:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226794
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

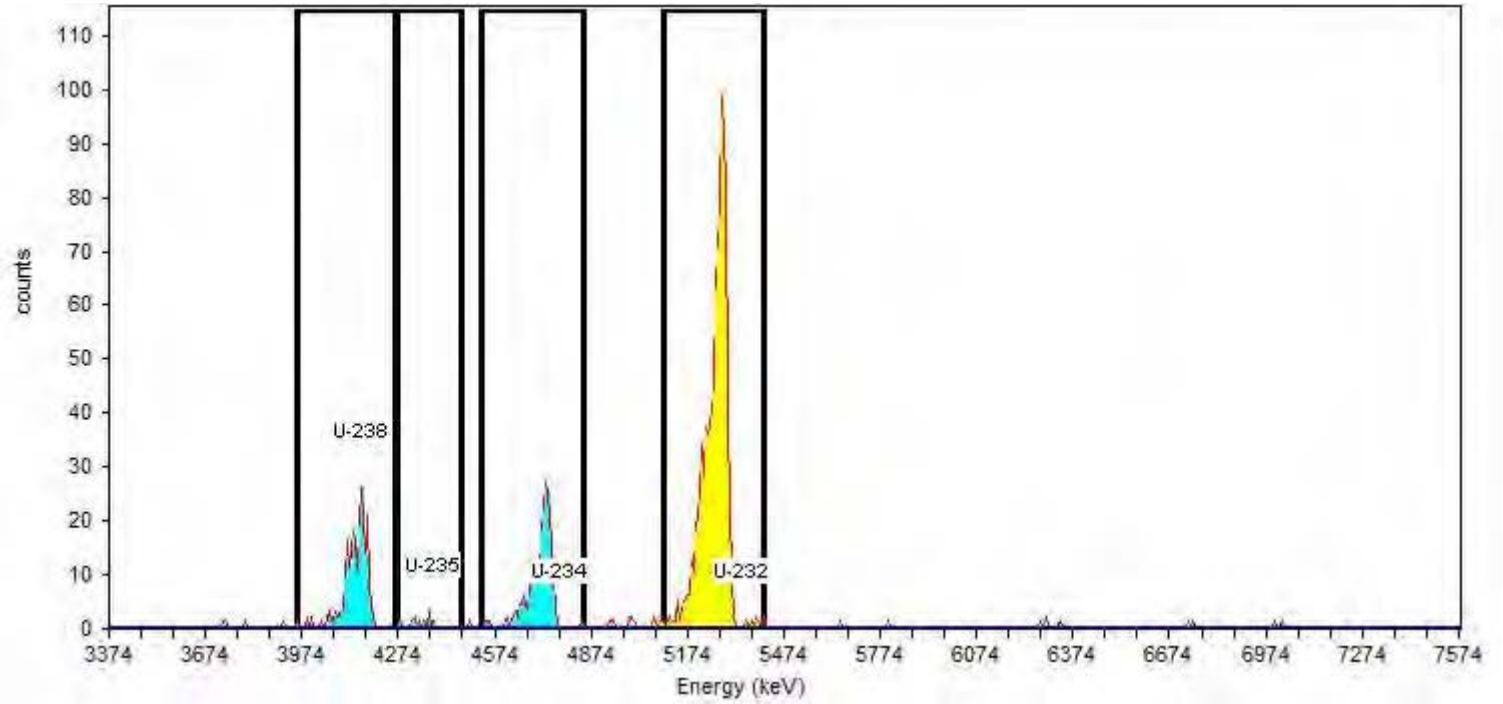
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 94.99%

Acquisition

Detector: AV212 SN: 49-155m5
Acquisition Start Date: 8/28/2018 3:26:36AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:51PM
Bkgd Info: Sample: ICB;AV212; Det: AV212; Spectrum #1; 8/21/2018 1:34:51 PM

Energy Calibration: IC-9884;AV212-20171114
Efficiency Calibration:IC-9884;AV212-20171114
Calibration Date: 11/14/2017 12:01:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.41% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	77.6	100.0	196	0.5000	195.50	1.723E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	67.2	80.2	10	0.5000	9.50	1.044E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	55.1	99.8	198	0.0000	198.00	1.748E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	61.8	100.1	788	1.7500	786.25	7.036E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:11AM 8/28/2018

Sample

Sample Name: 160-29881-A-9-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-9-E
Sample Collection Date: 7/27/2018 4:15:00PM
Comment:

Sample Weight : 1.01 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226792
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

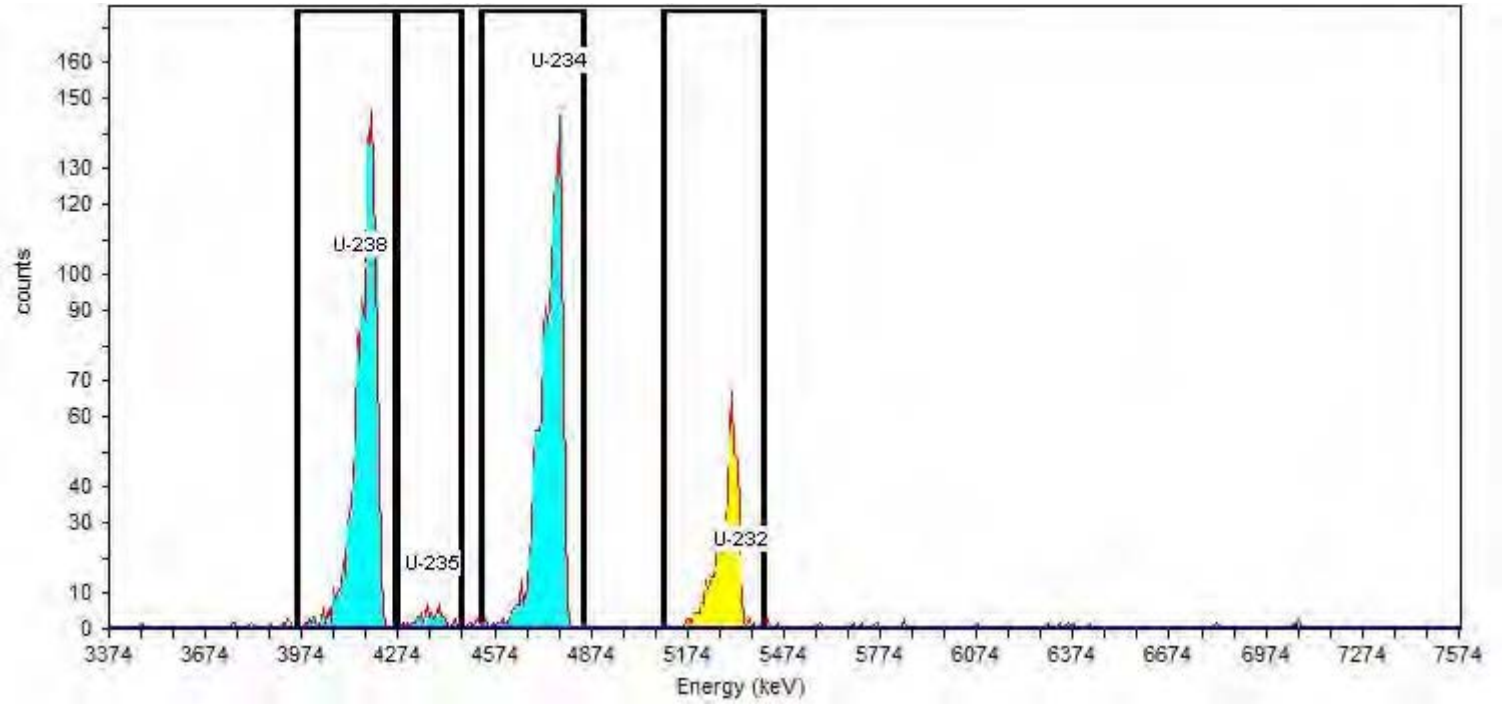
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 56.23%

Acquisition

Detector: AV213 SN: 54-011 Y1
Acquisition Start Date: 8/28/2018 3:26:36AM
Live Time: 240.00 min.
Real Time: 240.01 min.
Background Date: 8/21/2018 1:34:52PM
Bkgd Info: Sample: ICB;AV213; Det: AV213; Spectrum #1; 8/21/2018 1:34:52 PM

Energy Calibration: IC-9885;AV213-20171114
Efficiency Calibration:IC-9885;AV213-20171114
Calibration Date: 11/14/2017 12:01:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.04% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	65.7	100.0	1315	0.0000	1315.00	1.816E+001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	84.0	80.2	51	0.2500	50.75	8.739E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	76.4	99.8	1321	0.2500	1320.75	1.828E+001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	57.1	100.1	501	1.7500	499.25	4.144E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:34AM 8/28/2018

Sample

Sample Name: 160-29881-A-10-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-10-D
Sample Collection Date: 7/30/2018 11:35:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226796
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

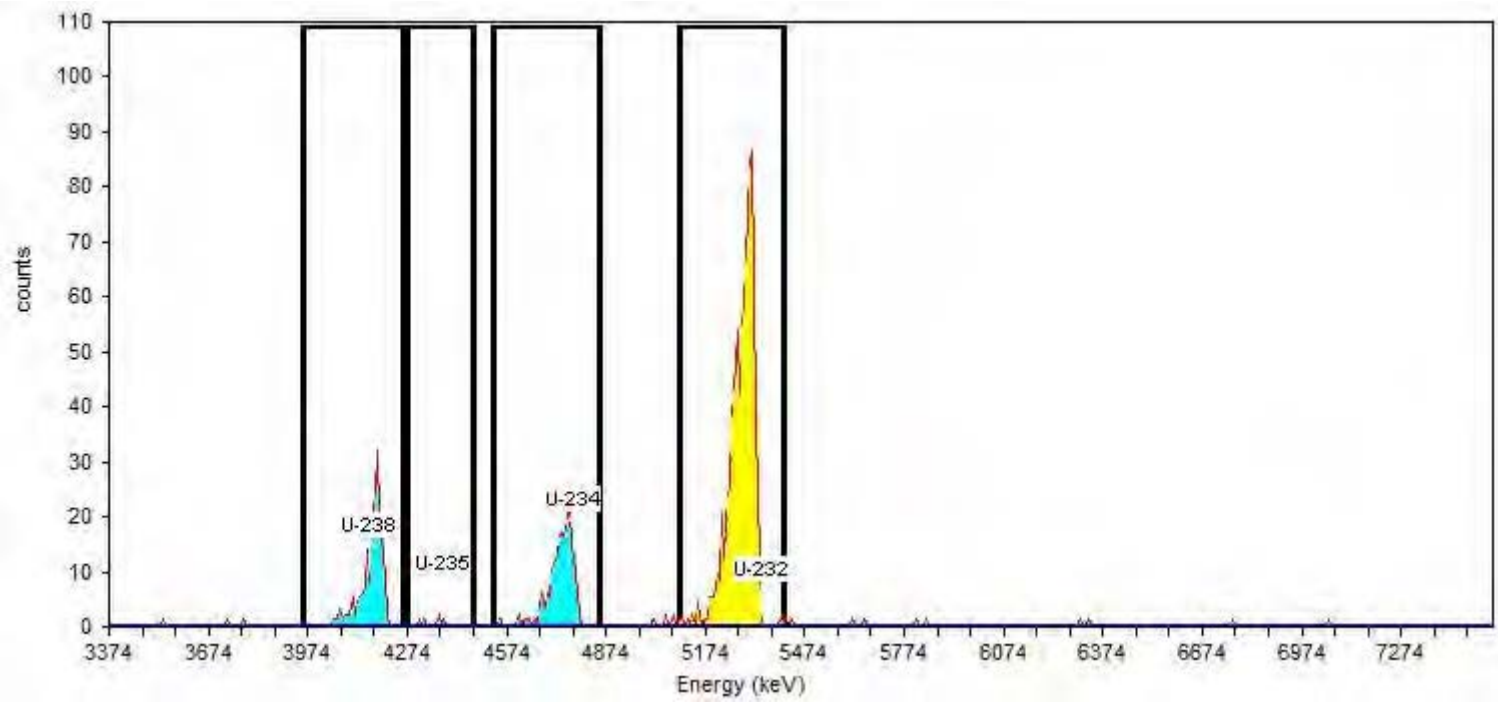
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 81.52%

Acquisition

Detector: AV215 SN: 50-119J4
Acquisition Start Date: 8/28/2018 3:26:36AM
Live Time: 240.00 min.
Real Time: 240.02 min.
Background Date: 8/20/2018 5:49:47PM
Bkgd Info: Sample: ICB;AV215; Det: AV215; Spectrum #1; 8/20/2018 5:49:47 PM

Energy Calibration: IC-7107;AV215-20171114
Efficiency Calibration:IC-7107;AV215-20171114
Calibration Date: 11/14/2017 3:23:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.45% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	52.3	100.0	185	0.2500	184.75	1.671E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	69.0	80.2	5	0.2500	4.75	5.357E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	70.2	99.8	190	0.2500	189.75	1.720E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	74.6	100.1	768	1.7500	766.25	6.040E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:40AM 8/28/2018

Sample

Sample Name: 160-29881-A-11-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-11-D
Sample Collection Date: 7/30/2018 11:40:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226797
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

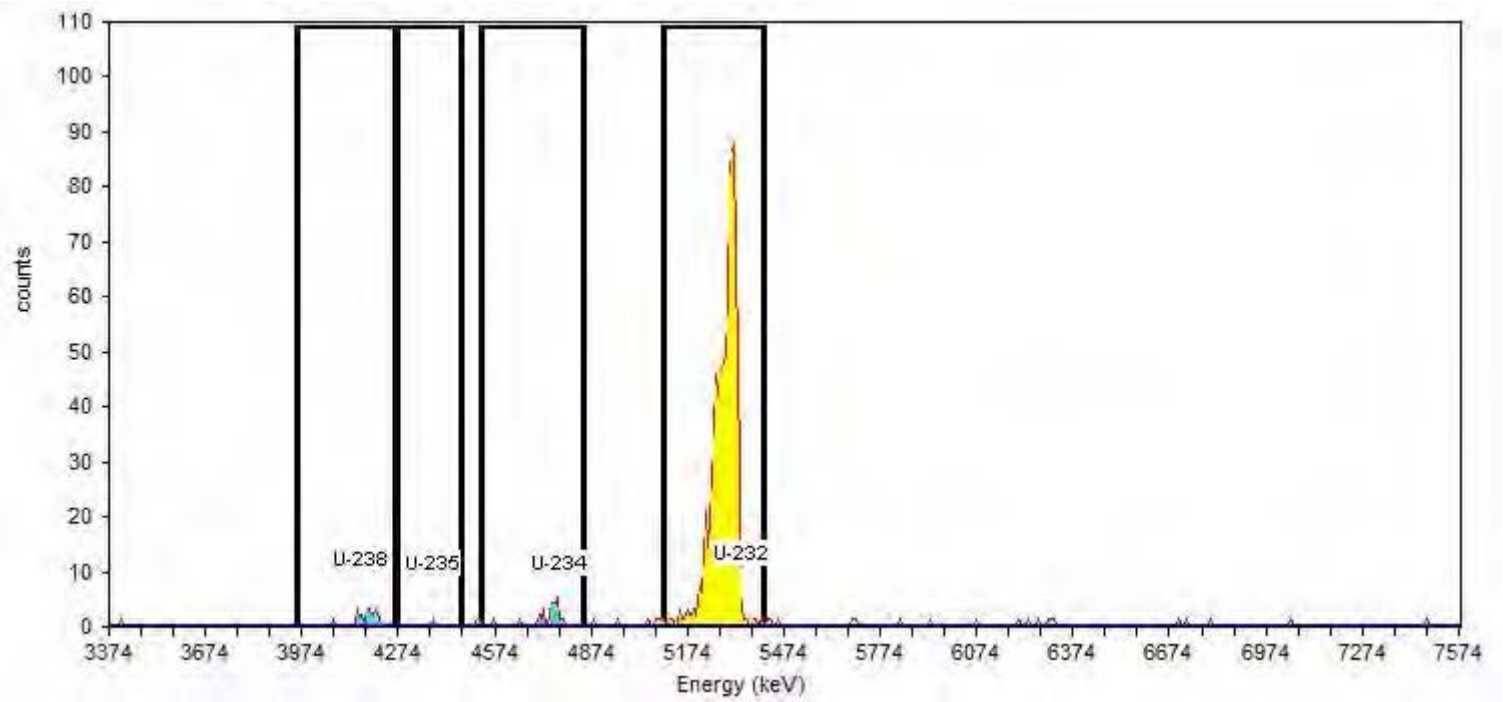
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 77.13%

Acquisition

Detector: AV216 SN: 50-117J5
Acquisition Start Date: 8/28/2018 3:26:37AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:48PM
Bkgd Info: Sample: ICB;AV216; Det: AV216; Spectrum #1; 8/20/2018 5:49:48 PM

Energy Calibration: IC-8874;AV216-20171114
Efficiency Calibration:IC-8874;AV216-20171114
Calibration Date: 11/14/2017 3:23:21PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.89% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	61.9	100.0	21	0.2500	20.75	1.874E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.2500	0.75	8.447E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	50.3	99.8	27	0.0000	27.00	2.444E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	75.1	100.1	768	2.0000	766.00	5.705E+000	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:27AM 8/28/2018

Sample

Sample Name: 160-29881-A-12-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-12-E
Sample Collection Date: 7/30/2018 2:10:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226795
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

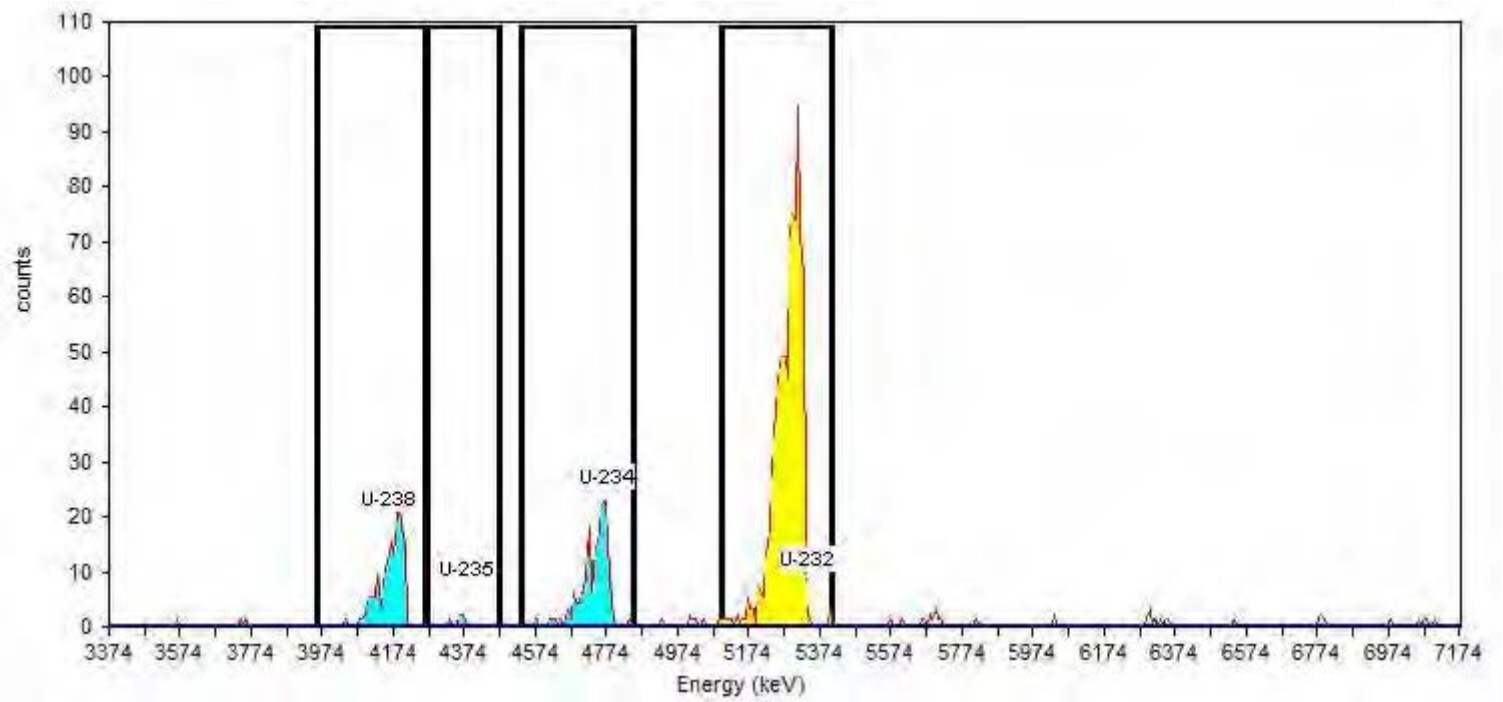
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 106.35%

Acquisition

Detector: AV217 SN: 50-117I2
Acquisition Start Date: 8/28/2018 3:26:37AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:48PM
Bkgd Info: Sample: ICB;AV217; Det: AV217; Spectrum #1; 8/20/2018 5:49:48 PM

Energy Calibration: IC-8875;AV217-20171114
Efficiency Calibration:IC-8875;AV217-20171114
Calibration Date: 11/14/2017 3:23:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.21% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	55.9	100.0	168	0.0000	168.00	1.394E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.9	80.2	6	0.0000	6.00	6.206E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	71.8	99.8	191	0.7500	190.25	1.581E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.8	100.1	834	1.0000	833.00	7.856E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:52AM 8/28/2018

Sample

Sample Name: 160-29881-A-13-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-13-D
Sample Collection Date: 7/26/2018 11:10:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226799
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

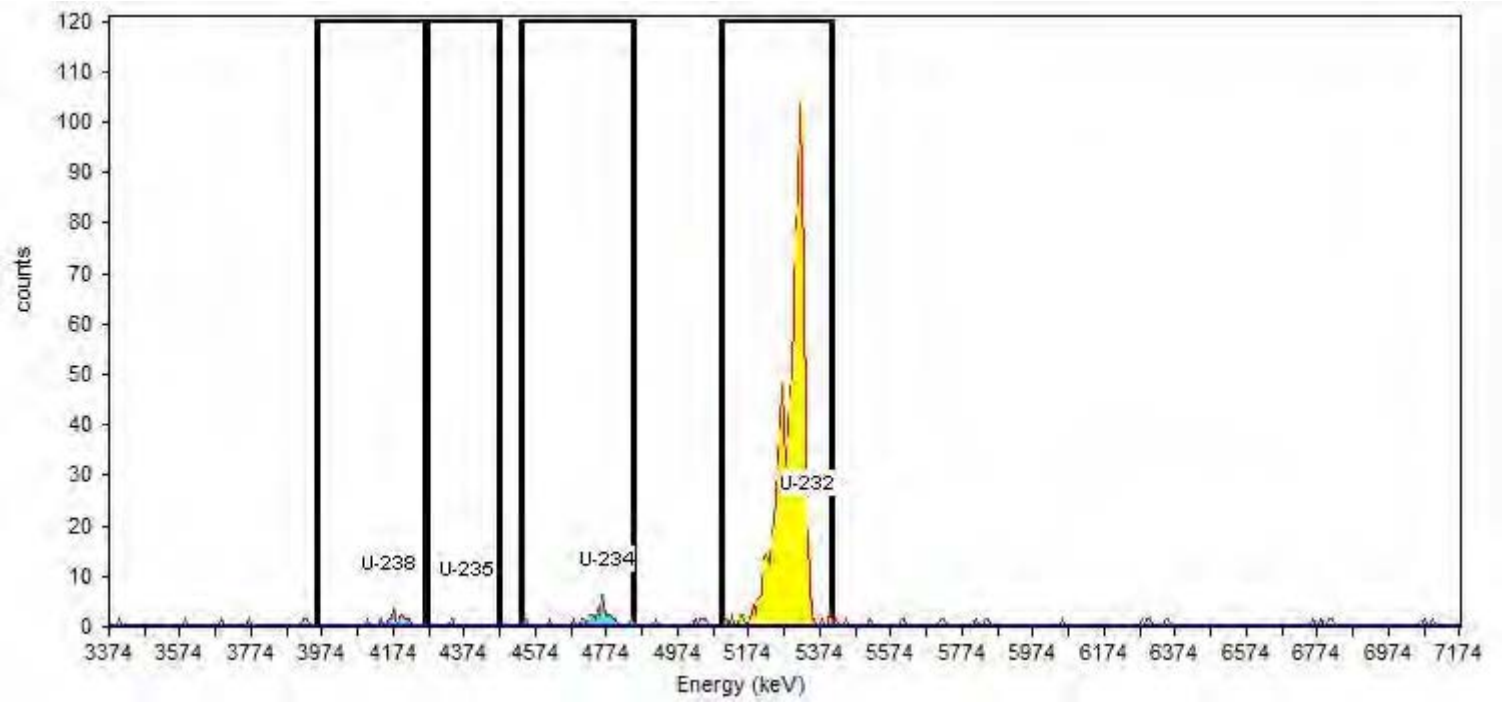
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 99.28%

Acquisition

Detector: AV218 SN: 50-117Z7
Acquisition Start Date: 8/28/2018 3:26:37AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:53PM
Bkgd Info: Sample: ICB;AV218; Det: AV218; Spectrum #1; 8/21/2018 1:34:53 PM

Energy Calibration: IC-8876;AV218-20171114a
Efficiency Calibration:IC-8876;AV218-20171114a
Calibration Date: 11/14/2017 3:23:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.31% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	67.8	100.0	13	0.0000	13.00	1.154E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.0000	1.00	1.107E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	59.1	99.8	30	0.2500	29.75	2.647E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	61.1	100.1	783	1.7500	781.25	7.361E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:29:46AM 8/28/2018

Sample

Sample Name: 160-29881-A-14-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-14-D
Sample Collection Date: 7/26/2018 11:20:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226798
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

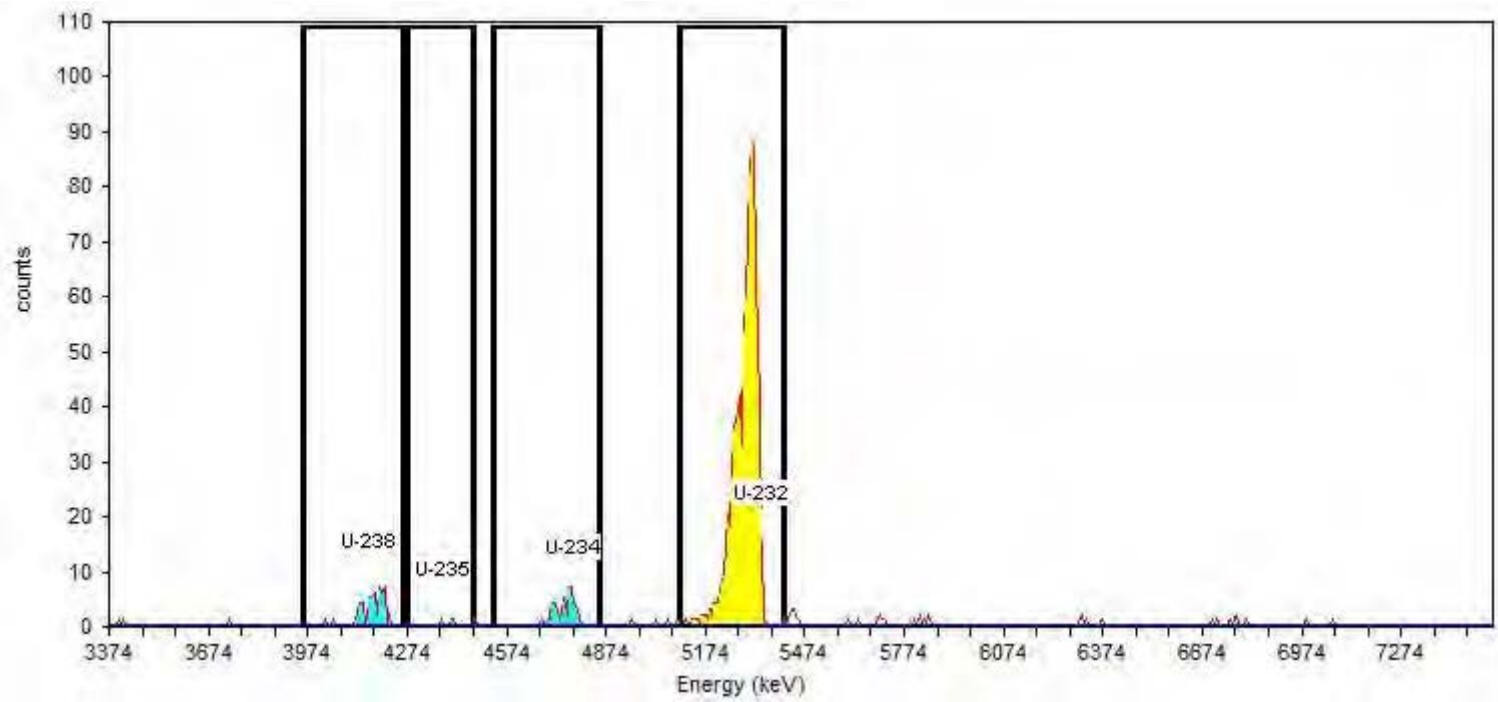
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 83.80%

Acquisition

Detector: AV219 SN: 50-112Z5
Acquisition Start Date: 8/28/2018 3:26:38AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:48PM
Bkgd Info: Sample: ICB;AV219; Det: AV219; Spectrum #1; 8/20/2018 5:49:48 PM

Energy Calibration: IC-8877;AV219-20171114
Efficiency Calibration:IC-8877;AV219-20171114
Calibration Date: 11/14/2017 3:23:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.32% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	69.9	100.0	54	0.5000	53.50	4.925E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	64.7	80.2	4	0.0000	4.00	4.592E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	74.3	99.8	46	0.7500	45.25	4.174E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	61.3	100.1	754	1.2500	752.75	6.208E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:22AM 8/28/2018

Sample

Sample Name: 160-29881-A-15-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-15-D
Sample Collection Date: 7/26/2018 12:10:00PM
Comment:

Sample Weight : 1.01 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226804
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

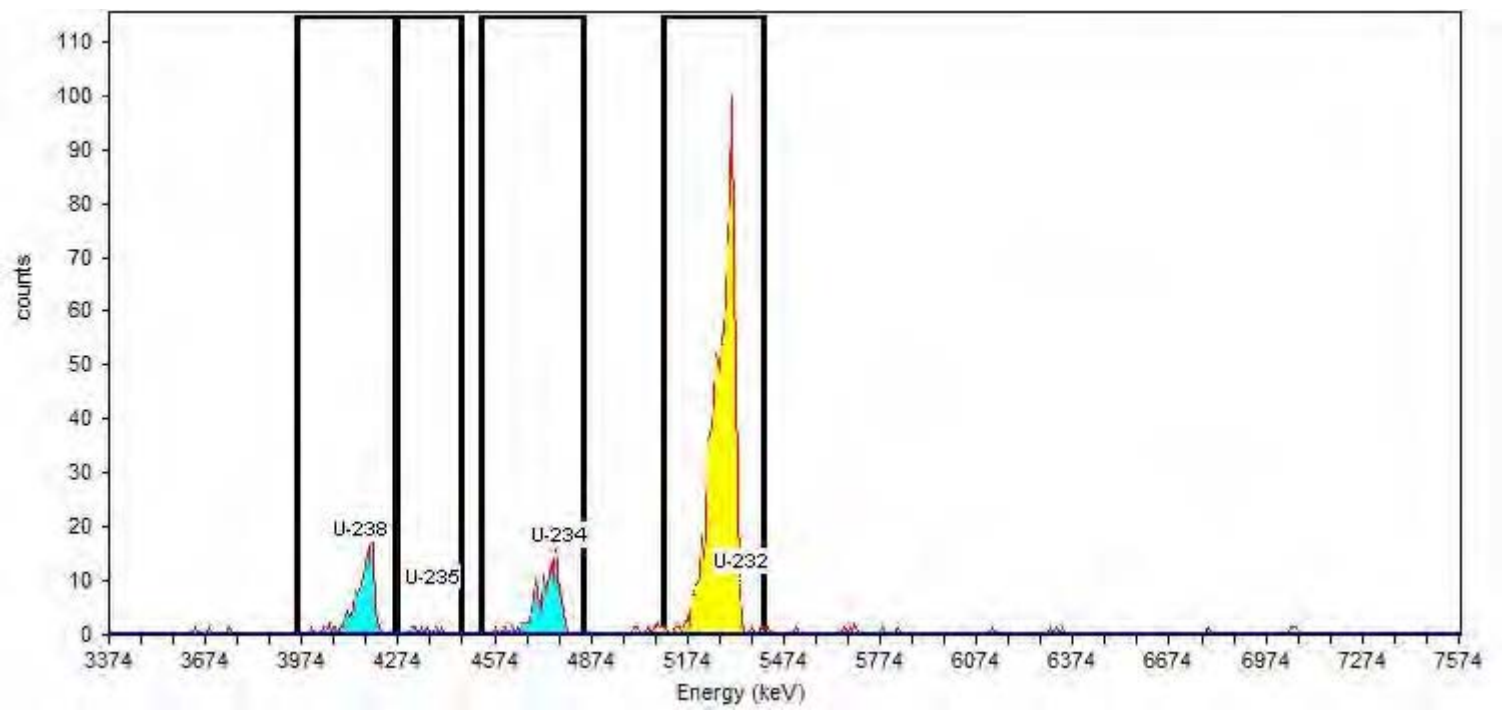
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 96.23%

Acquisition

Detector: AV220 SN: 50-119AA3
Acquisition Start Date: 8/28/2018 3:26:38AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:49PM
Bkgd Info: Sample: ICB;AV220; Det: AV220; Spectrum #1; 8/20/2018 5:49:49 PM

Energy Calibration: IC-9520;AV220-20171114a
Efficiency Calibration:IC-9520;AV220-20171114a
Calibration Date: 11/14/2017 3:23:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.50% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	59.2	100.0	134	1.0000	133.00	1.096E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	16.1	80.2	6	0.2500	5.75	5.907E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	75.1	99.8	136	0.2500	135.75	1.121E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	81.6	100.1	837	1.7500	835.25	7.079E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:35AM 8/28/2018

Sample

Sample Name: 160-29881-A-16-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-16-D
Sample Collection Date: 7/26/2018 12:20:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226806
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

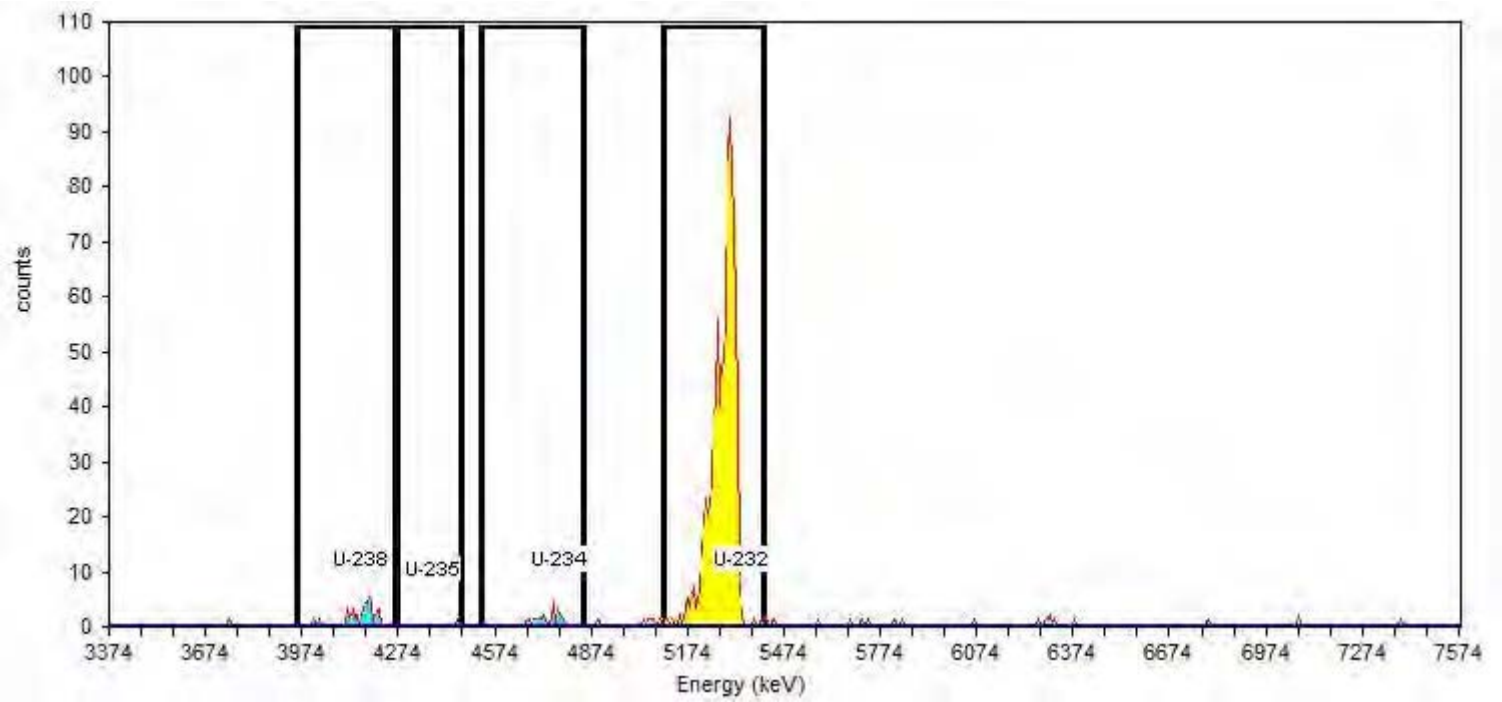
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 90.02%

Acquisition

Detector: AV222 SN: 50-117J2
Acquisition Start Date: 8/28/2018 3:26:38AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:53PM
Bkgd Info: Sample: ICB;AV222; Det: AV222; Spectrum #1; 8/21/2018 1:34:53 PM

Energy Calibration: IC-9792;AV222-20171114a
Efficiency Calibration:IC-9792;AV222-20171114a
Calibration Date: 11/14/2017 3:23:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.87% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	53.7	100.0	36	0.2500	35.75	3.108E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	11.0	80.2	1	0.0000	1.00	1.084E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	90.3	99.8	20	0.5000	19.50	1.699E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	65.3	100.1	797	3.5000	793.50	6.638E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:33:49AM 8/28/2018

Sample

Sample Name: 160-29881-B-17-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-17-E
Sample Collection Date: 7/26/2018 12:30:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380661
AnalysisResultsID: 226808
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

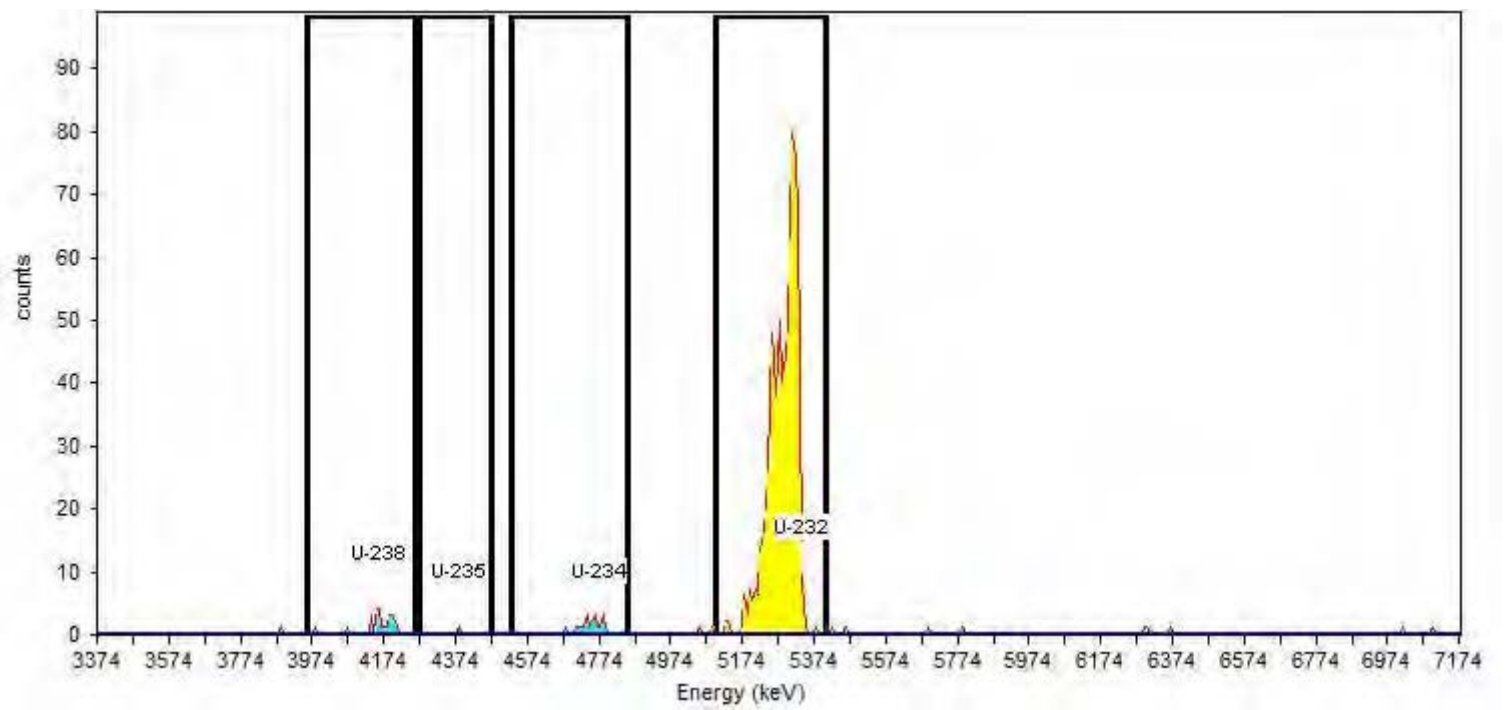
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 80.40%

Acquisition

Detector: AV225 SN: 50-117J7
Acquisition Start Date: 8/28/2018 3:26:38AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:50PM
Bkgd Info: Sample: ICB;AV225; Det: AV225; Spectrum #1; 8/20/2018 5:49:50 PM

Energy Calibration: IC-9795;AV225-20171114
Efficiency Calibration:IC-9795;AV225-20171114
Calibration Date: 11/14/2017 3:22:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.63% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:22:53AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	82.4	100.0	25	0.2500	24.75	2.248E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.2500	0.75	8.494E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	67.4	99.8	20	0.2500	19.75	1.798E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	89.5	100.1	764	3.0000	761.00	5.941E+000	pCi/g

Prep Batch: 380693

Preparation, Extraction Chromatography Resin Actinide Separation

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Lab ID: MB 160-380693/1-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV148
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	-0.002202	0.0202	0.0202	U	pCi/g	1.00	0.0627	385871
Uranium-235	0.0000	0.00548	0.00548	U	pCi/g	1.00	0.0329	385871
Uranium-238	0.03297	0.0354	0.0355	U	pCi/g	1.00	0.0425	385871

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.607	0.401	0.618		pCi/g	0.0768	6.91	81.0	30 - 110

Lab ID: LCS 160-380693/2-A
Client ID:
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV151
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	6.822	0.508	0.766		pCi/g	1.00	0.0585	385873
Uranium-238	6.984	0.514	0.780		pCi/g	1.00	0.0457	385873

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.527	0.409	0.619		pCi/g	0.0762	6.91	79.8	30 - 110

Lab ID: 160-29881-27
Client ID: CRC-B4-2628
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV152
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.389	0.118	0.122		pCi/g	1.00	0.0694	385874
Uranium-235	0.0421	0.0421	0.0423		pCi/g	1.00	0.0316	385874
Uranium-238	0.454	0.124	0.130		pCi/g	1.00	0.0409	385874

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.61	0.463	0.723		pCi/g	0.0635	6.89	95.7	30 - 110

Lab ID: 160-29881-27 DU
Client ID: CRC-B4-2628
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV153
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.3668	0.119	0.123		pCi/g	1.00	0.0534	385875
Uranium-235	0.03557	0.0411	0.0412	U	pCi/g	1.00	0.0356	385875
Uranium-238	0.5824	0.150	0.158		pCi/g	1.00	0.0588	385875

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	5.820	0.433	0.653		pCi/g	0.0659	6.86	84.6	30 - 110

Lab ID: 160-29881-28
Client ID: CRC-B14-0608
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV154
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.144	0.0724	0.0734		pCi/g	1.00	0.0617	385876
Uranium-235	0.0102	0.0205	0.0205	U	pCi/g	1.00	0.0307	385876
Uranium-238	0.154	0.0717	0.0728		pCi/g	1.00	0.0397	385876

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.61	0.457	0.719		pCi/g	0.0619	6.87	96.0	30 - 110

Lab ID: 160-29881-29
Client ID: CRC-B14-1012
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV156
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.205	0.0850	0.0867		pCi/g	1.00	0.0524	385877
Uranium-235	0.00790	0.0217	0.0217	U	pCi/g	1.00	0.0510	385877
Uranium-238	0.167	0.0757	0.0770		pCi/g	1.00	0.0409	385877

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.12	0.499	0.779		pCi/g	0.0767	6.89	103	30 - 110

Lab ID: 160-29881-30
Client ID: CRC-B14-1618
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV158
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.313	0.107	0.110		pCi/g	1.00	0.0549	385879
Uranium-235	0.00552	0.0234	0.0234	U	pCi/g	1.00	0.0619	385879
Uranium-238	0.370	0.115	0.119		pCi/g	1.00	0.0429	385879

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.38	0.457	0.704		pCi/g	0.0719	6.90	92.2	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Lab ID: 160-29881-31 | Analyzed: 08/28/18 03:30 | Decay Corrected: No
Client ID: CRC-B14-2426 | Detector: AV159 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.281	0.0965	0.0993		pCi/g	1.00	0.0456	385880
Uranium-235	0.0278	0.0354	0.0355	U	pCi/g	1.00	0.0490	385880
Uranium-238	0.331	0.104	0.108		pCi/g	1.00	0.0393	385880

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.40	0.508	0.803		pCi/g	0.0653	6.88	107	30 - 110

Lab ID: 160-29881-32 | Analyzed: 08/28/18 03:30 | Decay Corrected: No
Client ID: CRC-B17-0406 | Detector: AV160 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	13.1	0.664	1.28		pCi/g	1.00	0.0599	385881
Uranium-235	0.807	0.184	0.196		pCi/g	1.00	0.0314	385881
Uranium-238	12.8	0.656	1.26		pCi/g	1.00	0.0471	385881

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.46	0.450	0.705		pCi/g	0.0615	6.91	93.2	30 - 110

Lab ID: 160-29881-33 | Analyzed: 08/28/18 03:30 | Decay Corrected: No
Client ID: CRC-B17-0810 | Detector: AV161 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	4.46	0.410	0.555		pCi/g	1.00	0.0626	385882
Uranium-235	0.216	0.102	0.104		pCi/g	1.00	0.0653	385882
Uranium-238	4.37	0.405	0.546		pCi/g	1.00	0.0665	385882

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.32	0.466	0.707		pCi/g	0.0824	6.88	91.5	30 - 110

Lab ID: 160-29881-34 | Analyzed: 08/28/18 03:30 | Decay Corrected: No
Client ID: CRC-B17-1820 | Detector: AV164 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.440	0.134	0.139		pCi/g	1.00	0.0566	385885
Uranium-235	0.0503	0.0503	0.0505		pCi/g	1.00	0.0377	385885

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Lab ID: 160-29881-34
Client ID: CRC-B17-1820
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV164
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	0.429	0.132	0.137		pCi/g	1.00	0.0565	385885

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.10	0.467	0.693		pCi/g	0.0878	6.90	88.2	30 - 110

Lab ID: 160-29881-35
Client ID: CRC-B17-2628
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV165
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.462	0.131	0.137		pCi/g	1.00	0.0673	385886
Uranium-235	0.0307	0.0391	0.0391	U	pCi/g	1.00	0.0540	385886
Uranium-238	0.403	0.120	0.125		pCi/g	1.00	0.0269	385886

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.65	0.479	0.736		pCi/g	0.0705	6.89	96.1	30 - 110

Lab ID: 160-29881-36
Client ID: CRC-B5-1214
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV166
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.277	0.0988	0.101		pCi/g	1.00	0.0422	385887
Uranium-235	-0.00271	0.00543	0.00543	U	pCi/g	1.00	0.0525	385887
Uranium-238	0.215	0.0872	0.0890		pCi/g	1.00	0.0421	385887

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.14	0.436	0.675		pCi/g	0.0579	6.90	88.7	30 - 110

Lab ID: 160-29881-37
Client ID: CRC-B5-1618
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV167
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.294	0.0968	0.0999		pCi/g	1.00	0.0439	385888
Uranium-235	0.00975	0.0195	0.0195	U	pCi/g	1.00	0.0293	385888
Uranium-238	0.422	0.115	0.120		pCi/g	1.00	0.0235	385888

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.25	0.489	0.781		pCi/g	0.0828	6.91	105	30 - 110

Lab ID: 160-29881-38
Client ID: CRC-B5-2224
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV171
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.310	0.111	0.114		pCi/g	1.00	0.0473	385890
Uranium-235	0.0182	0.0355	0.0355	U	pCi/g	1.00	0.0681	385890
Uranium-238	0.261	0.101	0.104		pCi/g	1.00	0.0472	385890

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.10	0.459	0.688		pCi/g	0.0534	6.87	88.5	30 - 110

Lab ID: 160-29881-39
Client ID: CRC-B5-2830
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV172
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.489	0.126	0.132		pCi/g	1.00	0.0494	385891
Uranium-235	0.0298	0.0344	0.0345		pCi/g	1.00	0.0298	385891
Uranium-238	0.382	0.110	0.115		pCi/g	1.00	0.0239	385891

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.40	0.435	0.692		pCi/g	0.0493	6.88	92.7	30 - 110

Lab ID: 160-29881-40
Client ID: CRC-B11-1214
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV173
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.296	0.105	0.108		pCi/g	1.00	0.0510	385892
Uranium-235	0.00850	0.0234	0.0234	U	pCi/g	1.00	0.0548	385892
Uranium-238	0.264	0.0979	0.100		pCi/g	1.00	0.0273	385892

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.15	0.447	0.683		pCi/g	0.0689	6.88	89.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 380693

Lab ID: 160-29881-41
Client ID: CRC-B11-2022
Sigma: 2

Analyzed: 08/28/18 03:30
Detector: AV174
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.351	0.110	0.114		pCi/g	1.00	0.0473	385893
Uranium-235	0.0736	0.0556	0.0560		pCi/g	1.00	0.0315	385893
Uranium-238	0.371	0.112	0.116		pCi/g	1.00	0.0253	385893

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	7.03	0.491	0.768		pCi/g	0.0701	6.90	101	30 - 110

Lab ID: 160-29881-42
Client ID: CRC-B11-2628
Sigma: 2

Analyzed: 08/28/18 18:11
Detector: AV161
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 240

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-234	0.334	0.110	0.114		pCi/g	1.00	0.0587	385882
Uranium-235	0.00547	0.0232	0.0232	U	pCi/g	1.00	0.0613	385882
Uranium-238	0.270	0.0998	0.102		pCi/g	1.00	0.0624	385882

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Uranium-232	6.73	0.481	0.742		pCi/g	0.0823	6.88	97.5	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-380693/1-A	Uranium-234			-0.002202	U	pCi/g							-.21820873
MB 160-380693/1-A	Uranium-235			0.0000	U	pCi/g							.
MB 160-380693/1-A	Uranium-238			0.03297	U	pCi/g							1.85486659

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-380693/2-A	Uranium-234		6.37	6.822		pCi/g	107	84 - 120					.8666335132
LCS 160-380693/2-A	Uranium-238		6.51	6.984		pCi/g	107	82 - 122					.8877359582

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-27	Uranium-234	0.389		0.3668		pCi/g			6	0.09	0.26	1	
160-29881-27	Uranium-235	0.0421		0.03557	U	pCi/g			17	0.08	0.22	1	
160-29881-27	Uranium-238	0.454		0.5824		pCi/g			25	0.45	1.26	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380693 Batch Start Date: 08/06/18 15:28 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:35

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	U-232 00040	UNAT 00014			
MB 160-380693/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-380693/2		ExtChrom, A-01-R		1.0 g	0.2 mL	0.2 mL			
160-29881-A-27-B	CRC-B4-2628	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-A-27-B DU	CRC-B4-2628	ExtChrom, A-01-R	T	1.0068 g	0.2 mL				
160-29881-B-28-B	CRC-B14-0608	ExtChrom, A-01-R	T	1.0053 g	0.2 mL				
160-29881-B-29-A	CRC-B14-1012	ExtChrom, A-01-R	T	1.0020 g	0.2 mL				
160-29881-B-30-B	CRC-B14-1618	ExtChrom, A-01-R	T	1.0014 g	0.2 mL				
160-29881-A-31-A	CRC-B14-2426	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
160-29881-A-32-B	CRC-B17-0406	ExtChrom, A-01-R	T	0.9995 g	0.2 mL				
160-29881-A-33-B	CRC-B17-0810	ExtChrom, A-01-R	T	1.0031 g	0.2 mL				
160-29881-A-34-A	CRC-B17-1820	ExtChrom, A-01-R	T	1.0012 g	0.2 mL				
160-29881-B-35-B	CRC-B17-2628	ExtChrom, A-01-R	T	1.0018 g	0.2 mL				
160-29881-B-36-A	CRC-B5-1214	ExtChrom, A-01-R	T	1.0009 g	0.2 mL				
160-29881-A-37-A	CRC-B5-1618	ExtChrom, A-01-R	T	0.9998 g	0.2 mL				
160-29881-B-38-B	CRC-B5-2224	ExtChrom, A-01-R	T	1.0047 g	0.2 mL				
160-29881-B-39-B	CRC-B5-2830	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
160-29881-A-40-B	CRC-B11-1214	ExtChrom, A-01-R	T	1.0040 g	0.2 mL				
160-29881-B-41-A	CRC-B11-2022	ExtChrom, A-01-R	T	1.0001 g	0.2 mL				
160-29881-A-42-B	CRC-B11-2628	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 380693 Batch Start Date: 08/06/18 15:28 Batch Analyst: Turley, Taylor A

Batch Method: ExtChrom Batch End Date: 08/24/18 19:35

Batch Notes	
Balance ID	1123433897
Analyst ID - Column	NMN per CMM
Column Date	08/23/2018
Analyst ID - CoPrecipitation	CMM
CoPrecipitation Date	08/24/2018
Pipette ID	RAD117
Analyst ID - Reagent Drop Witness	TAT
Analyst ID - Reagent Drop	KNF per TAT
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:22AM 8/28/2018

Sample

Sample Name: MB 160-380693/1-A Type: Blank
Spectrum #1 Analysis #1
: MB 160-380693/1-A
Sample Collection Date: 8/24/2018 7:36:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226827
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

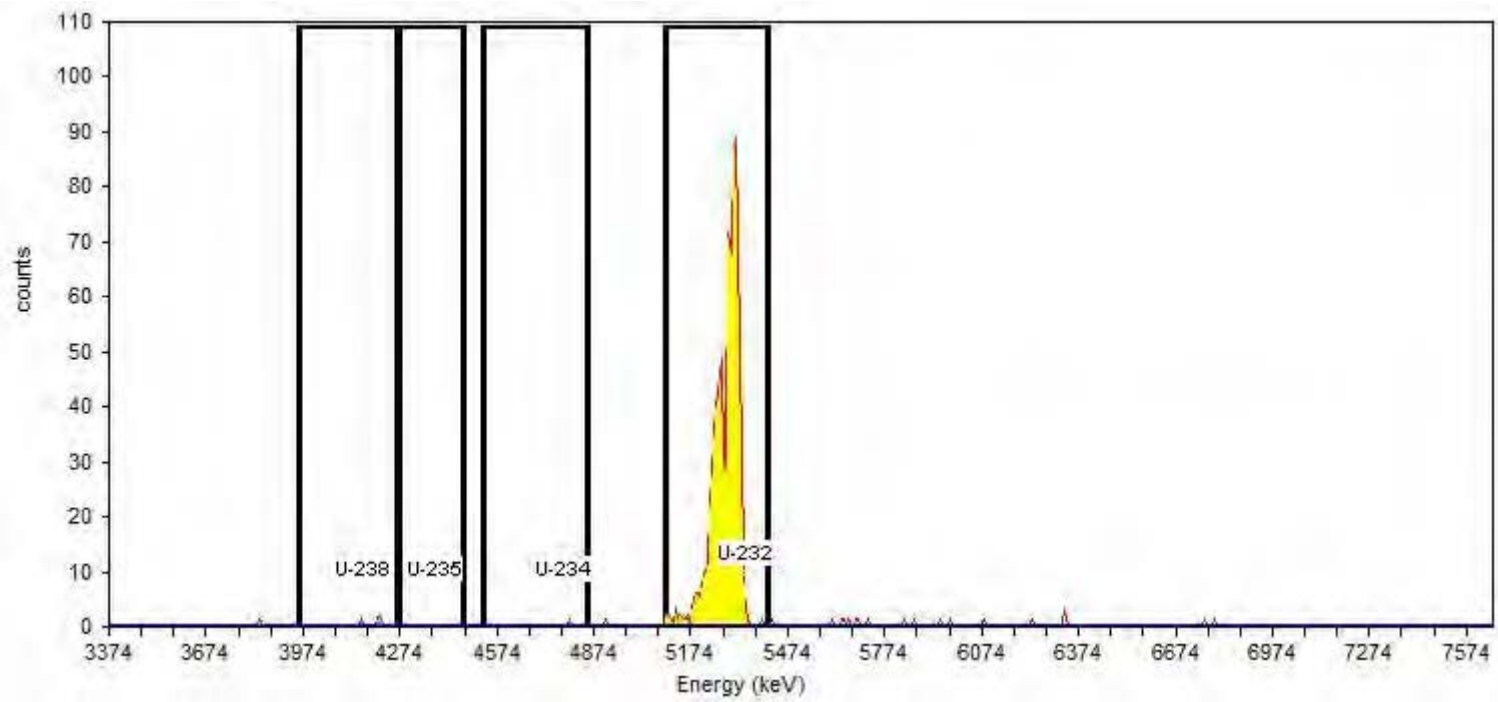
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 80.96%

Acquisition

Detector: AV148 SN: 50-05/R2
Acquisition Start Date: 8/28/2018 3:30:19AM
Live Time: 240.00 min.
Real Time: 240.04 min.
Background Date: 8/20/2018 5:49:58PM
Bkgd Info: Sample: ICB;AV148; Det: AV148; Spectrum #1; 8/20/2018 5:49:58 PM

Energy Calibration: IC-8874;AV148-20171113a
Efficiency Calibration:IC-8874;AV148-20171113a
Calibration Date: 11/13/2017 12:24:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.37% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:09AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	39.8	100.0	4	0.2500	3.75	3.297E-002	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.0000	0.00	0.000E+000	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	42.4	99.8	1	1.2500	-0.25	-2.202E-003	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.0	100.1	793	4.5000	788.50	5.999E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:10AM 8/28/2018

Sample

Sample Name: LCS 160-380693/2-A Type: Control
Spectrum #1 Analysis #1
: LCS 160-380693/2-A
Sample Collection Date: 8/24/2018 7:36:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226811
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

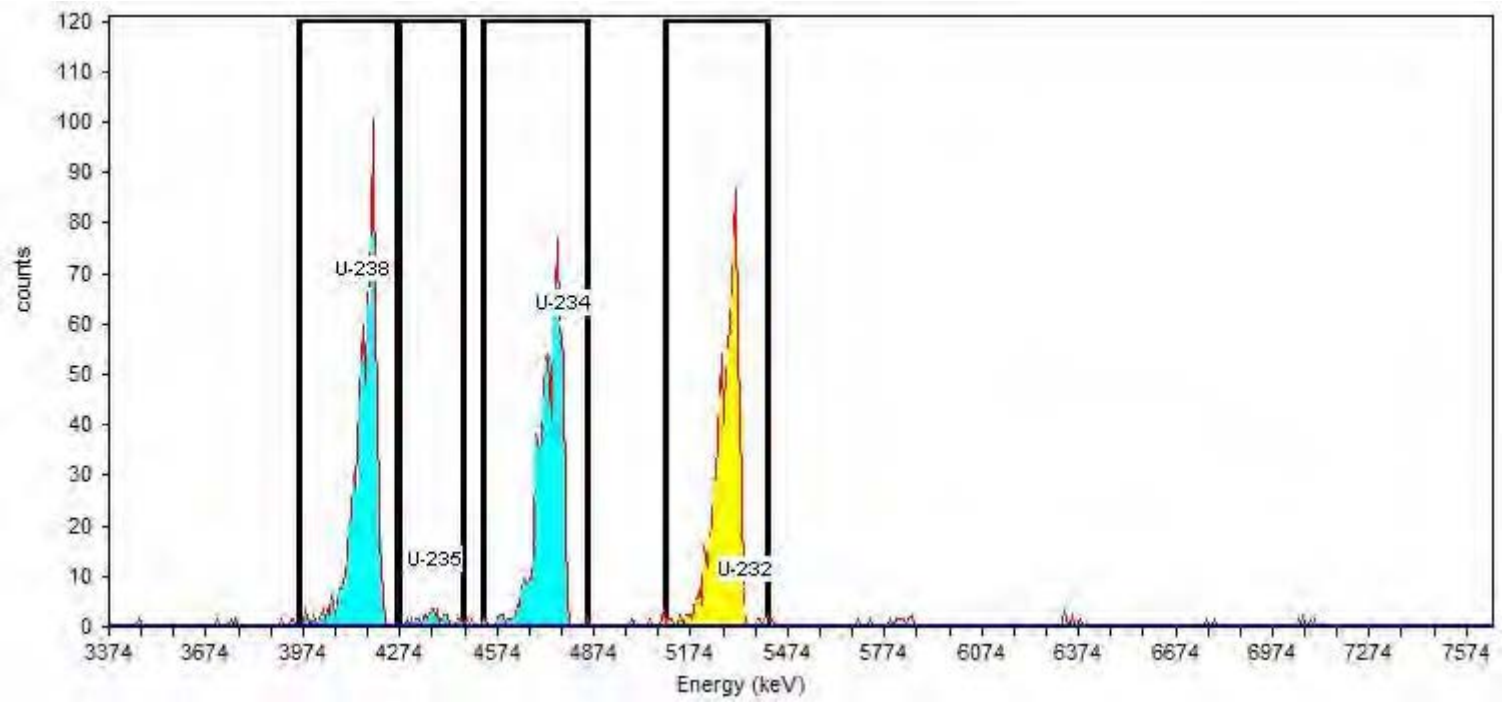
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 79.80%

Acquisition

Detector: AV151 SN: 50-05/R5
Acquisition Start Date: 8/28/2018 3:30:20AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:56PM
Bkgd Info: Sample: ICB;AV151; Det: AV151; Spectrum #1; 8/21/2018 1:34:56 PM

Energy Calibration: IC-8877;AV151-20171113
Efficiency Calibration:IC-8877;AV151-20171113
Calibration Date: 11/13/2017 12:21:30PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	69.5	100.0	740	0.2500	739.75	6.984E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	40.8	80.2	28	0.2500	27.75	3.266E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	82.1	99.8	722	0.7500	721.25	6.823E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	75.2	100.1	738	3.7500	734.25	5.913E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:03AM 8/28/2018

Sample

Sample Name: 160-29881-A-27-F Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-27-F
Sample Collection Date: 7/27/2018 9:20:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226810
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

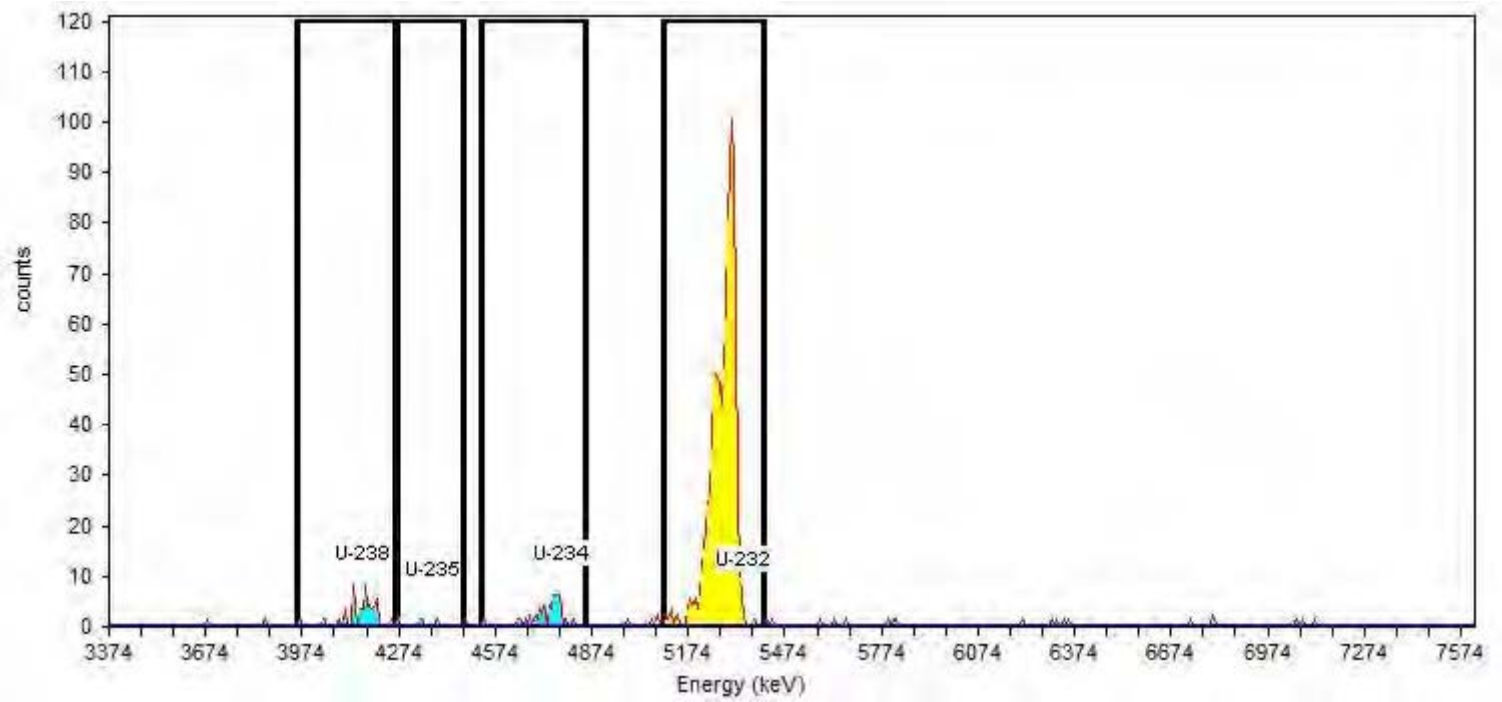
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 95.67%

Acquisition

Detector: AV152 SN: 50-05/R6
Acquisition Start Date: 8/28/2018 3:30:20AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:47PM
Bkgd Info: Sample: ICB;AV152; Det: AV152; Spectrum #1; 8/21/2018 1:34:47 PM

Energy Calibration: IC-9520;AV152-20171113
Efficiency Calibration:IC-9520;AV152-20171113
Calibration Date: 11/13/2017 12:21:36PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.19% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:07AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	70.7	100.0	54	0.2500	53.75	4.540E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	4	0.0000	4.00	4.212E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	59.4	99.8	48	2.0000	46.00	3.893E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	77.8	100.1	821	1.7500	819.25	7.076E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:31AM 8/28/2018

Sample

Sample Name: 160-29881-A-27-G DU Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-27-G DU
Sample Collection Date: 7/27/2018 9:20:00AM
Comment:

Sample Weight : 1.01 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226828
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

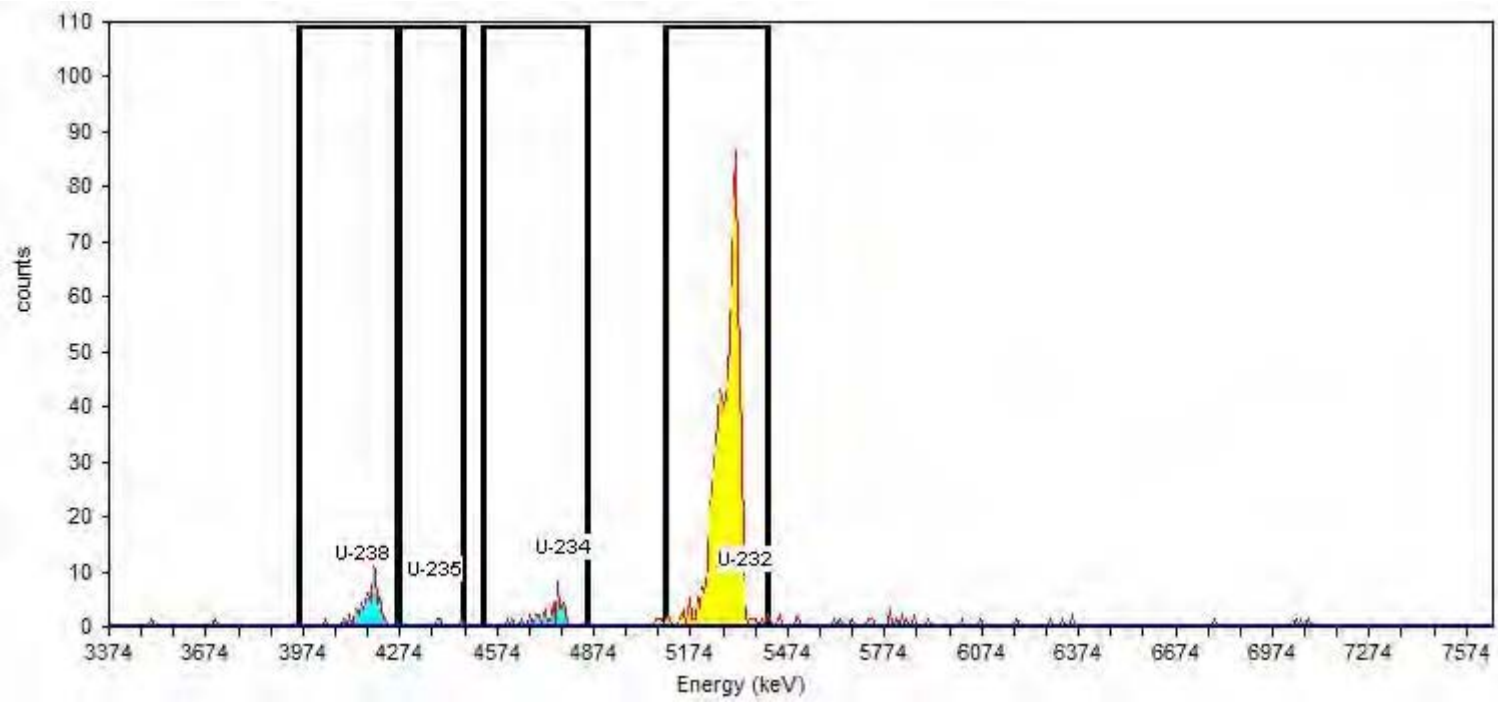
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 84.61%

Acquisition

Detector: AV153 SN: 54-011 Y6
Acquisition Start Date: 8/28/2018 3:30:20AM
Live Time: 240.00 min.
Real Time: 240.07 min.
Background Date: 8/20/2018 5:49:46PM
Bkgd Info: Sample: ICB;AV153; Det: AV153; Spectrum #1; 8/20/2018 5:49:46 PM

Energy Calibration: IC-8879;AV153-20171113
Efficiency Calibration:IC-8879;AV153-20171113
Calibration Date: 11/13/2017 12:21:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.17% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:07AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	55.9	100.0	62	0.7500	61.25	5.824E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	80.3	80.2	3	0.0000	3.00	3.557E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	54.3	99.8	39	0.5000	38.50	3.668E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	79.2	100.1	726	2.0000	724.00	6.227E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:33AM 8/28/2018

Sample

Sample Name: 160-29881-B-28-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-28-E
Sample Collection Date: 7/27/2018 12:15:00PM
Comment:

Sample Weight : 1.01 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226814
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

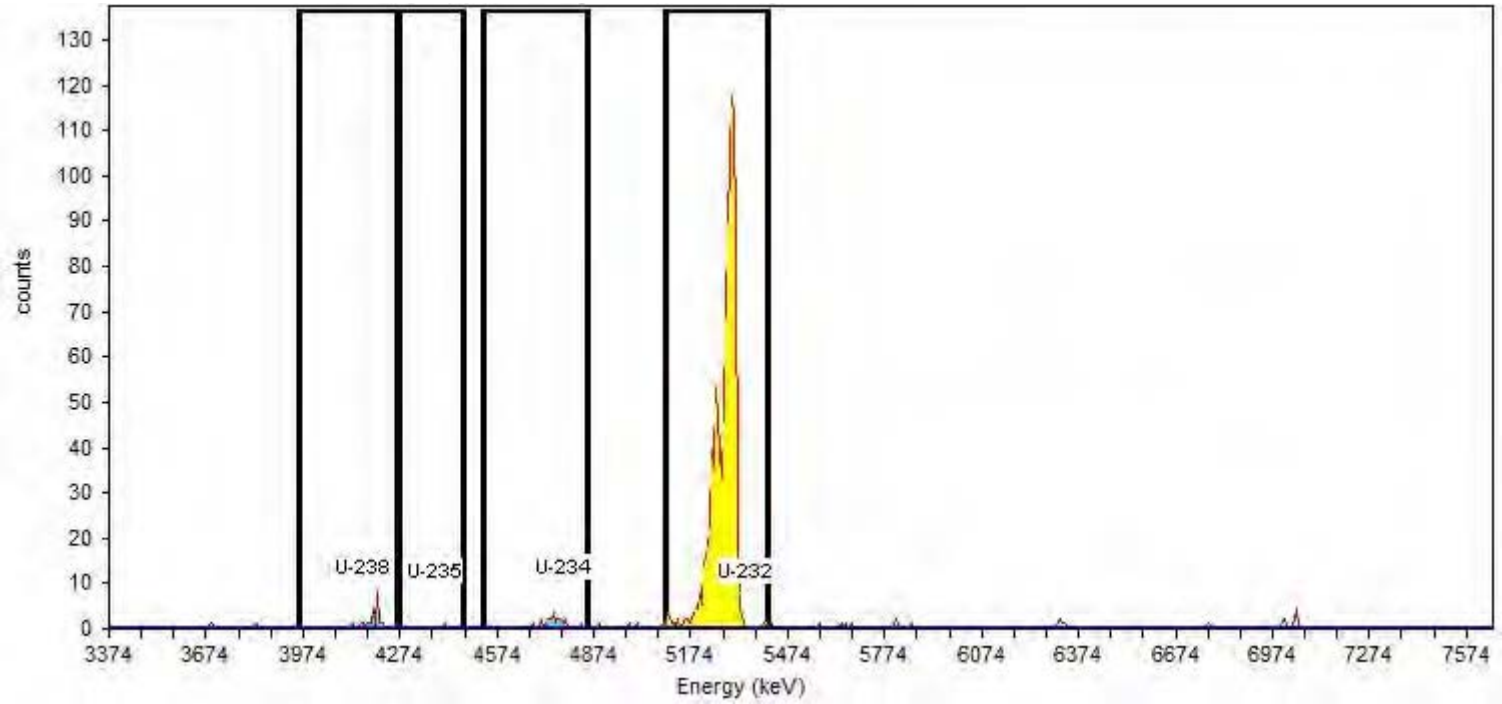
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 95.95%

Acquisition

Detector: AV154 SN: 50-05/JJ7
Acquisition Start Date: 8/28/2018 3:30:20AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV154; Det: AV154; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9792;AV154-20171113
Efficiency Calibration:IC-9792;AV154-20171113
Calibration Date: 11/13/2017 12:21:47PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.71% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	47.0	100.0	19	0.2500	18.75	1.539E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.0000	1.00	1.023E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	55.5	99.8	19	1.5000	17.50	1.439E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	53.7	100.1	842	1.7500	840.25	7.072E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:25AM 8/28/2018

Sample

Sample Name: 160-29881-B-29-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-29-D
Sample Collection Date: 7/27/2018 12:20:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226813
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

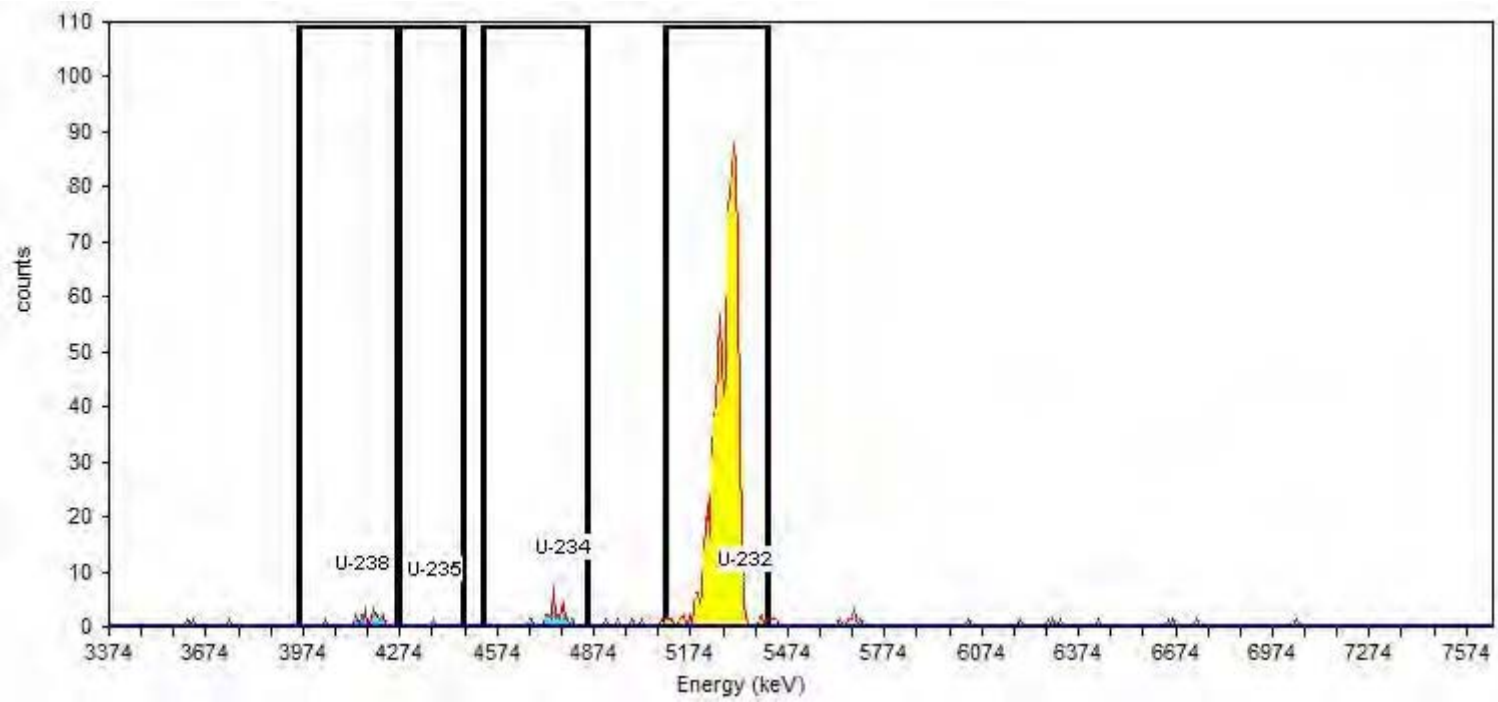
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 102.99%

Acquisition

Detector: AV156 SN: 49-155n4
Acquisition Start Date: 8/28/2018 3:30:20AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV156; Det: AV156; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9794;AV156-20171113a
Efficiency Calibration:IC-9794;AV156-20171113a
Calibration Date: 11/13/2017 12:25:07PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.52% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	83.0	100.0	20	0.2500	19.75	1.669E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.2500	0.75	7.904E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	56.7	99.8	25	0.7500	24.25	2.054E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	74.2	100.1	821	2.5000	818.50	7.616E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:18AM 8/28/2018

Sample

Sample Name: 160-29881-B-30-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-30-E
Sample Collection Date: 7/27/2018 12:25:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226812
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

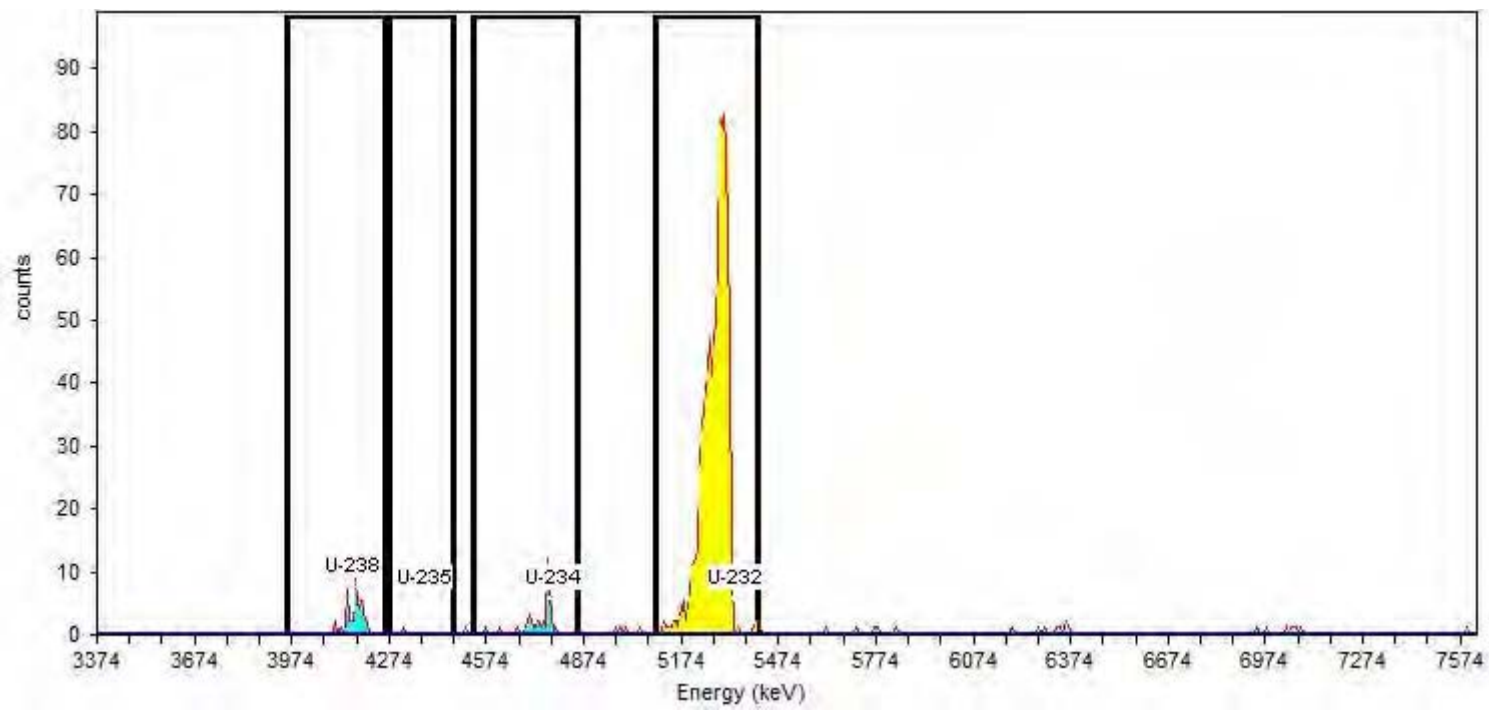
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 92.20%

Acquisition

Detector: AV158 SN: 50-05/II4
Acquisition Start Date: 8/28/2018 3:30:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:47PM
Bkgd Info: Sample: ICB;AV158; Det: AV158; Spectrum #1; 8/20/2018 5:49:47 PM

Energy Calibration: IC-9817;AV158-20171115
Efficiency Calibration:IC-9817;AV158-20171115
Calibration Date: 11/15/2017 11:00:01AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.95% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	55.8	100.0	42	0.2500	41.75	3.698E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.5000	0.50	5.522E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	47.5	99.8	36	0.7500	35.25	3.128E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.2	100.1	784	2.5000	781.50	6.822E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:48AM 8/28/2018

Sample

Sample Name: 160-29881-A-31-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-31-D
Sample Collection Date: 7/27/2018 12:30:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226816
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

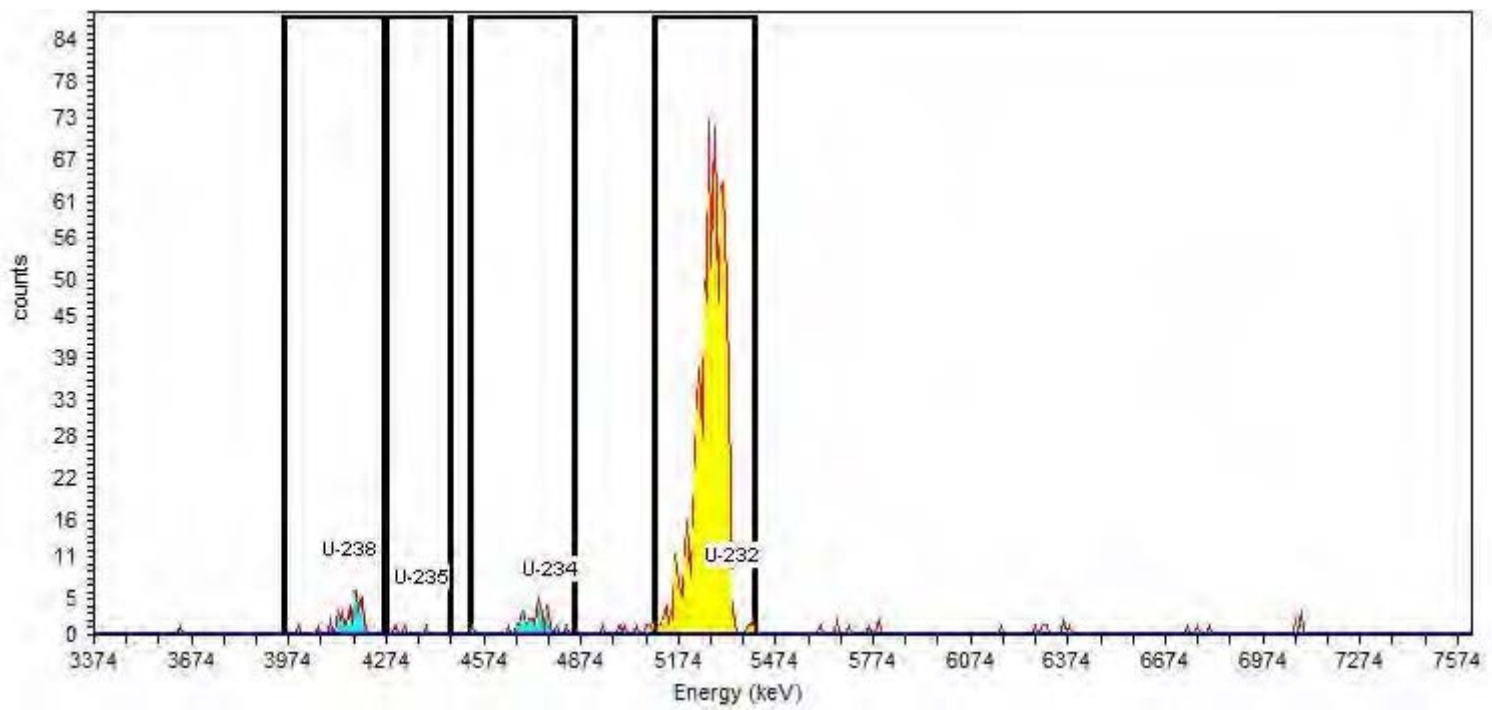
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 107.18%

Acquisition

Detector: AV159 SN: 50-05/II5
Acquisition Start Date: 8/28/2018 3:30:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV159; Det: AV159; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9884;AV159-20171113a
Efficiency Calibration:IC-9884;AV159-20171113a
Calibration Date: 11/13/2017 12:26:23PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.49% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:07AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	59.0	100.0	41	0.2500	40.75	3.310E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	17.8	80.2	3	0.2500	2.75	2.785E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	87.3	99.8	35	0.5000	34.50	2.808E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	93.1	100.1	852	1.5000	850.50	7.914E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:57AM 8/28/2018

Sample

Sample Name: 160-29881-A-32-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-32-E
Sample Collection Date: 7/27/2018 4:20:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226817
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

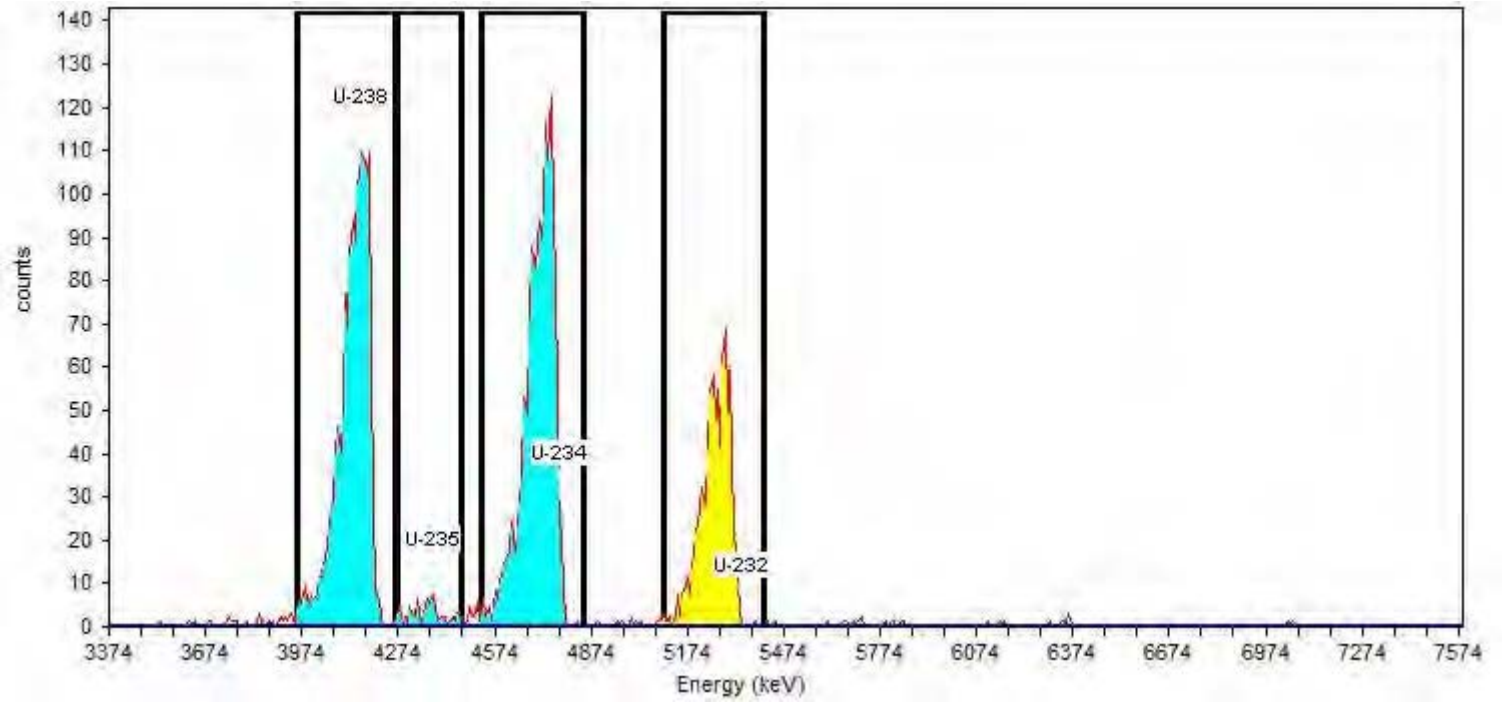
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 93.18%

Acquisition

Detector: AV160 SN: 50-05/II6
Acquisition Start Date: 8/28/2018 3:30:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV160; Det: AV160; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9885;AV160-20171113
Efficiency Calibration:IC-9885;AV160-20171113
Calibration Date: 11/13/2017 12:24:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.98% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:07AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	93.2	100.0	1522	0.5000	1521.50	1.279E+001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	71.5	80.2	77	0.0000	77.00	8.068E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	98.2	99.8	1555	1.2500	1553.75	1.308E+001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	99.8	100.1	827	1.7500	825.25	6.908E+000	pCi/g

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:41AM 8/28/2018

Sample

Sample Name: 160-29881-A-33-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-33-E
Sample Collection Date: 7/27/2018 4:25:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226815
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

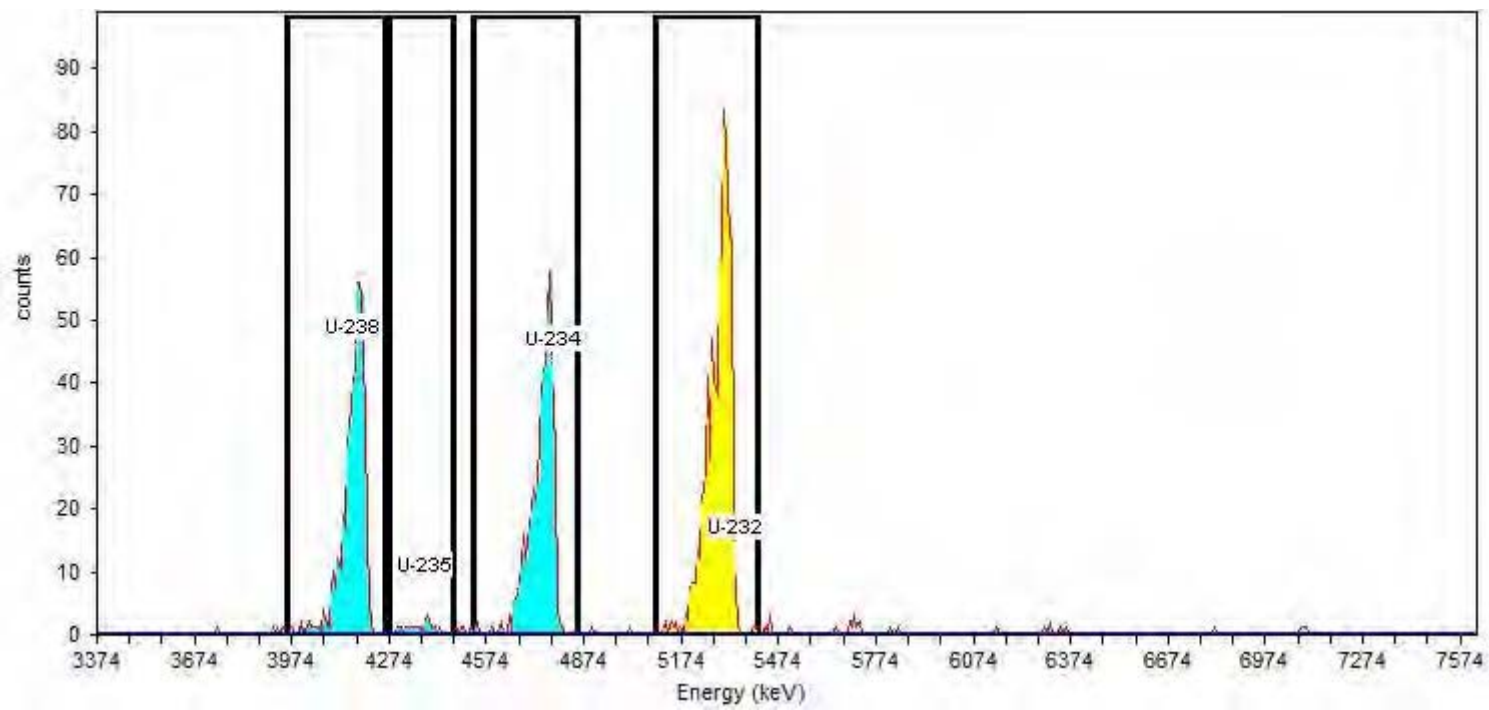
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 91.53%

Acquisition

Detector: AV161 SN: 50-05/II7
Acquisition Start Date: 8/28/2018 3:30:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV161; Det: AV161; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9886;AV161-20171113
Efficiency Calibration:IC-9886;AV161-20171113
Calibration Date: 11/13/2017 12:24:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.86% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	59.1	100.0	468	1.2500	466.75	4.366E+000	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	23.5	80.2	19	0.5000	18.50	2.158E-001	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	61.1	99.8	477	1.0000	476.00	4.461E+000	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	71.7	100.1	742	3.2500	738.75	6.761E+000	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:05AM 8/28/2018

Sample

Sample Name: 160-29881-A-34-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-34-D
Sample Collection Date: 7/27/2018 4:30:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226818
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

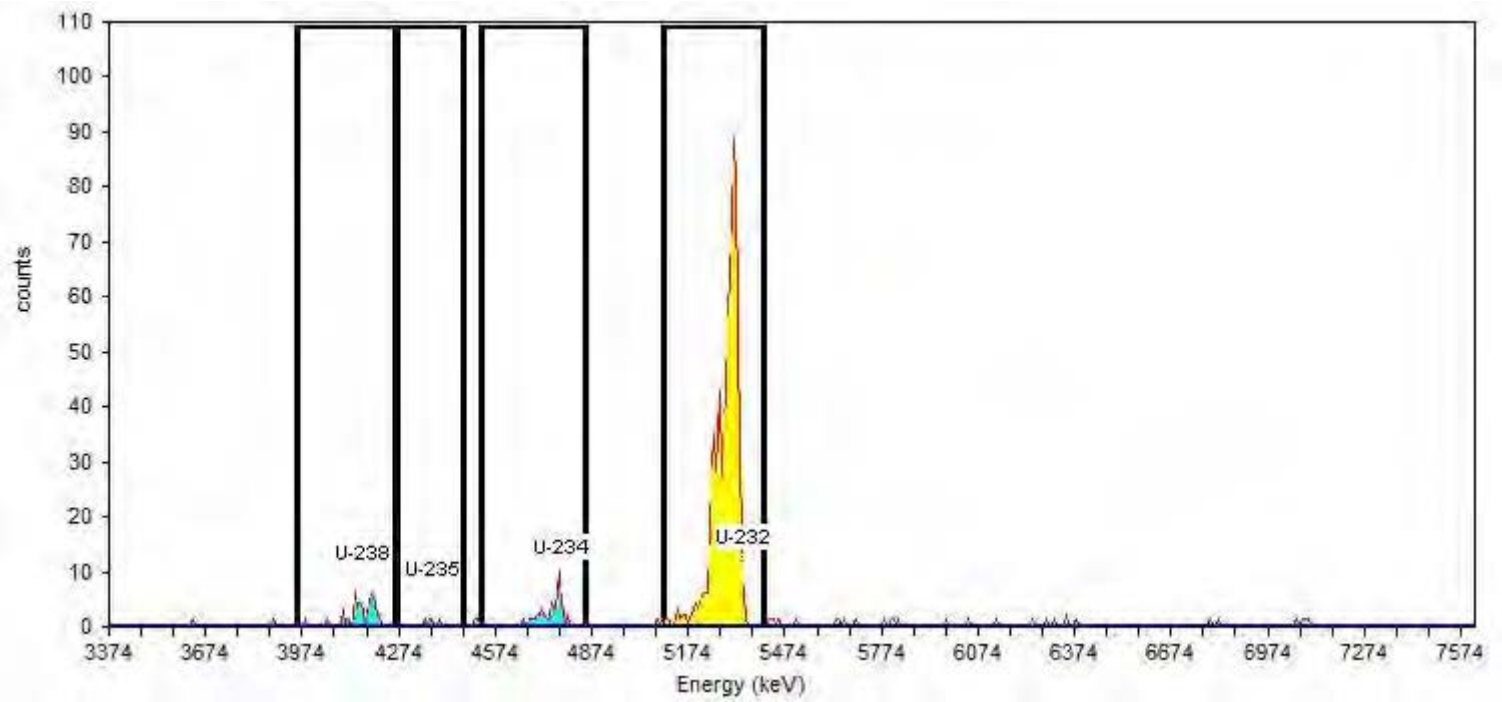
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 88.18%

Acquisition

Detector: AV164 SN: 50-112 A1
Acquisition Start Date: 8/28/2018 3:30:21AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:49PM
Bkgd Info: Sample: ICB;AV164; Det: AV164; Spectrum #1; 8/21/2018 1:34:49 PM

Energy Calibration: IC-8875;AV164-20171113
Efficiency Calibration:IC-8875;AV164-20171113
Calibration Date: 11/13/2017 3:16:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.08% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	91.7	100.0	43	0.5000	42.50	4.286E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	24.6	80.2	4	0.0000	4.00	5.030E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	52.3	99.8	44	0.5000	43.50	4.396E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	58.4	100.1	690	3.5000	686.50	6.526E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:46AM 8/28/2018

Sample

Sample Name: 160-29881-B-35-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-35-E
Sample Collection Date: 7/30/2018 8:45:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226823
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

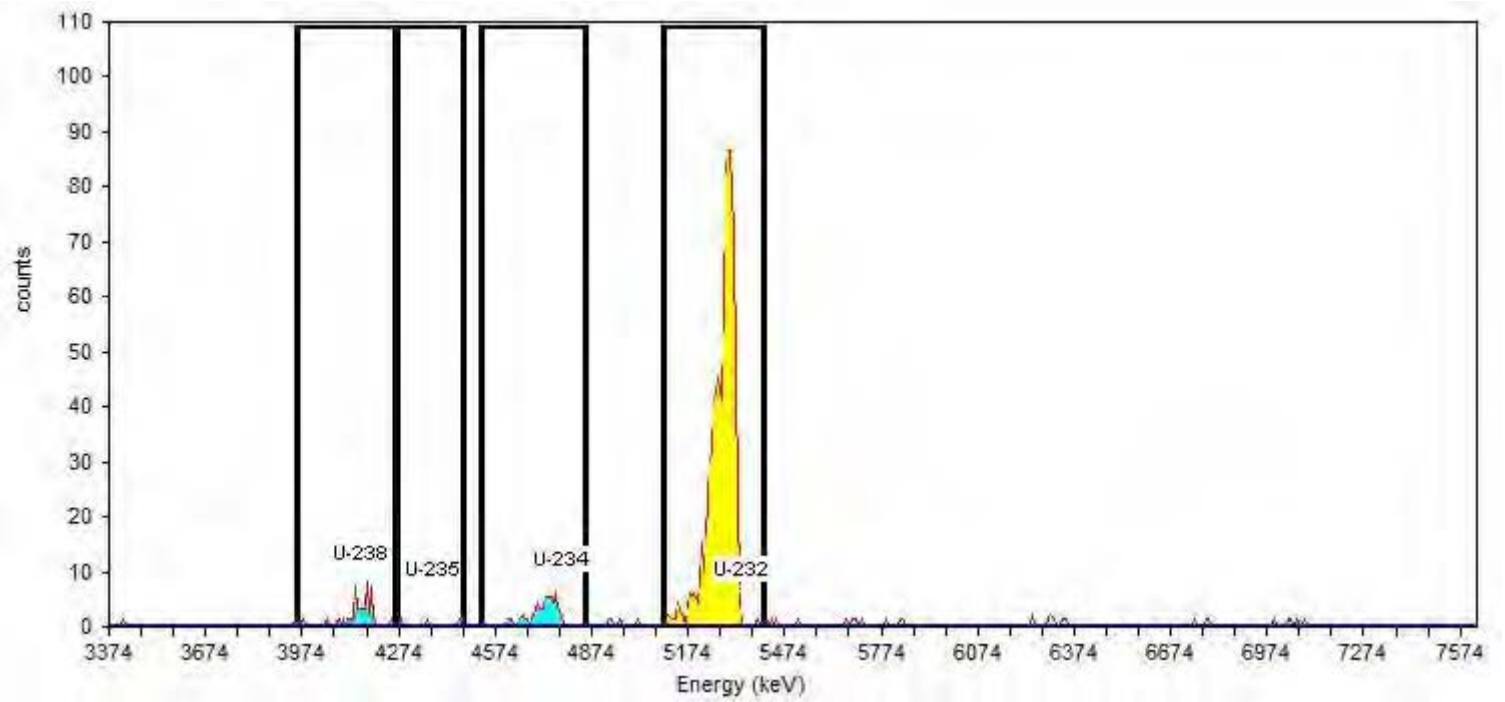
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 96.14%

Acquisition

Detector: AV165 SN: 50-112F7
Acquisition Start Date: 8/28/2018 3:30:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:49PM
Bkgd Info: Sample: ICB;AV165; Det: AV165; Spectrum #1; 8/20/2018 5:49:49 PM

Energy Calibration: IC-8876;AV165-20171113
Efficiency Calibration:IC-8876;AV165-20171113
Calibration Date: 11/13/2017 3:16:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.77% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	71.1	100.0	45	0.0000	45.00	4.028E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	10.1	80.2	3	0.2500	2.75	3.069E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	69.2	99.8	53	1.5000	51.50	4.619E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	64.5	100.1	775	2.0000	773.00	7.110E+000	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:13AM 8/28/2018

Sample

Sample Name: 160-29881-B-36-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-36-D
Sample Collection Date: 7/30/2018 11:45:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226819
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

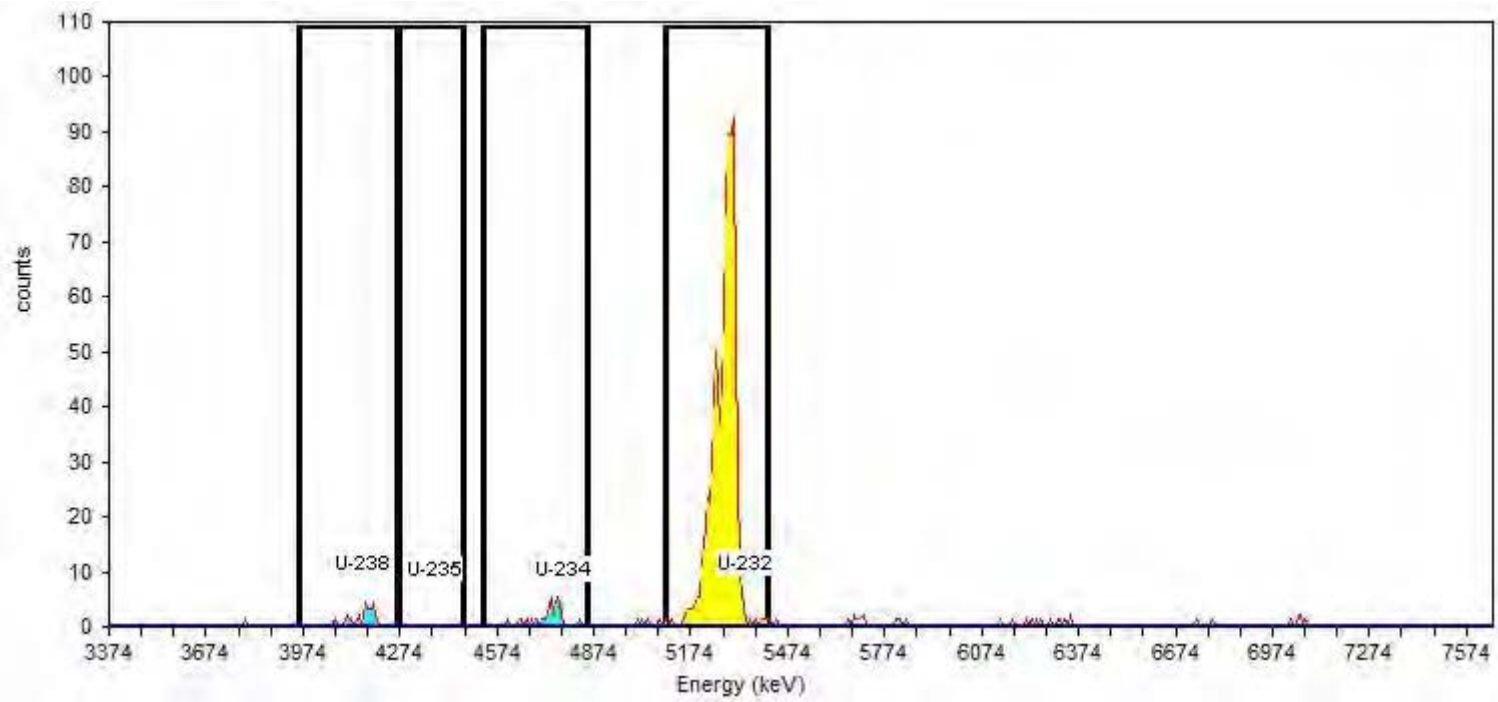
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 88.70%

Acquisition

Detector: AV166 SN: 50-112 G1
Acquisition Start Date: 8/28/2018 3:30:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:49PM
Bkgd Info: Sample: ICB;AV166; Det: AV166; Spectrum #1; 8/20/2018 5:49:49 PM

Energy Calibration: IC-8877;AV166-20171113
Efficiency Calibration:IC-8877;AV166-20171113
Calibration Date: 11/13/2017 3:16:45PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.28% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	46.3	100.0	25	0.2500	24.75	2.155E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	.0	80.2	0	0.2500	-0.25	-2.714E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	46.0	99.8	32	0.2500	31.75	2.770E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	62.1	100.1	797	1.5000	795.50	6.567E+000	pCi/g

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:29AM 8/28/2018

Sample

Sample Name: 160-29881-A-37-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-37-E
Sample Collection Date: 7/30/2018 11:50:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226821
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

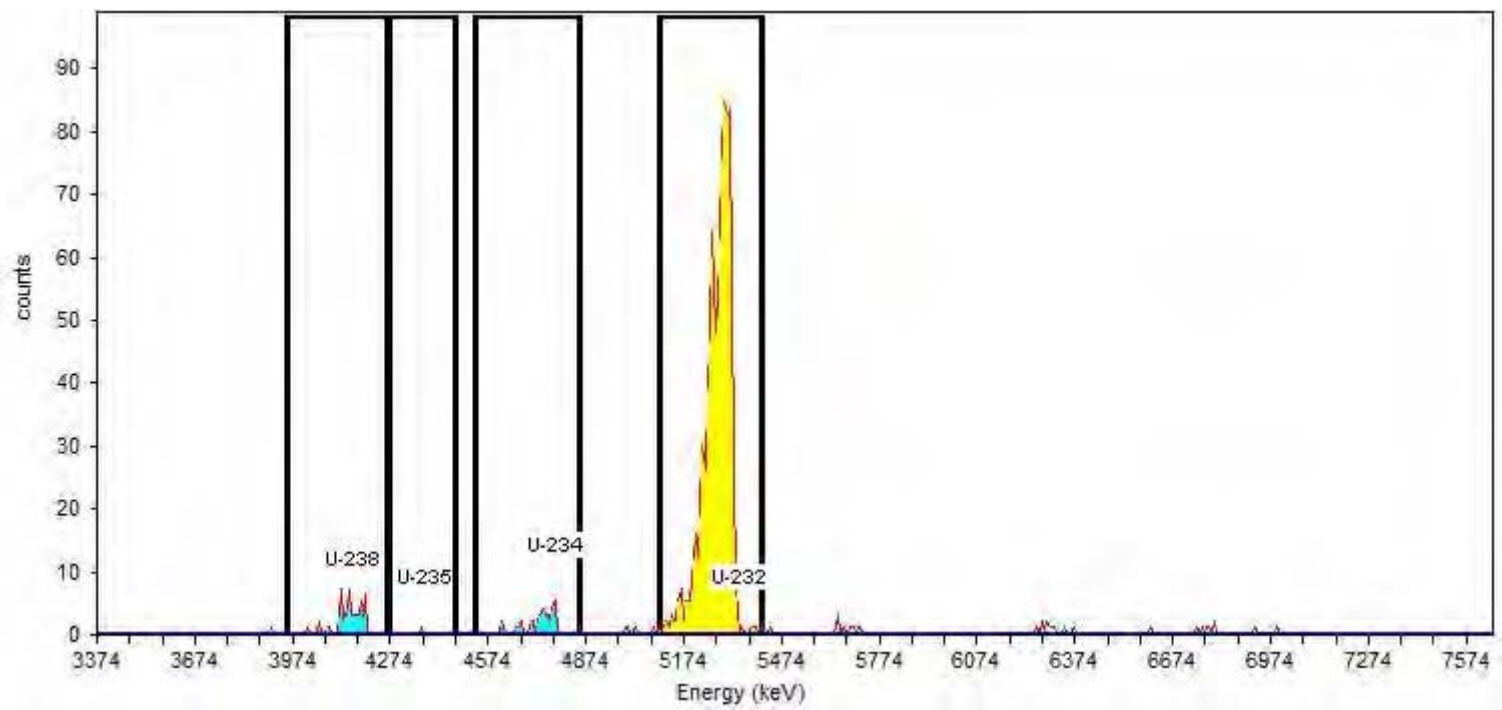
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 104.70%

Acquisition

Detector: AV167 SN: 50-112 G3
Acquisition Start Date: 8/28/2018 3:30:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:49PM
Bkgd Info: Sample: ICB;AV167; Det: AV167; Spectrum #1; 8/21/2018 1:34:49 PM

Energy Calibration: IC-9520;AV167-20171113
Efficiency Calibration:IC-9520;AV167-20171113
Calibration Date: 11/13/2017 3:16:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 22.92% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	87.9	100.0	54	0.0000	54.00	4.224E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.0000	1.00	9.754E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	63.1	99.8	38	0.5000	37.50	2.939E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	79.5	100.1	890	3.7500	886.25	7.759E+000	pCi/g

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:38AM 8/28/2018

Sample

Sample Name: 160-29881-B-38-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-38-E
Sample Collection Date: 7/30/2018 11:55:00AM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226822
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

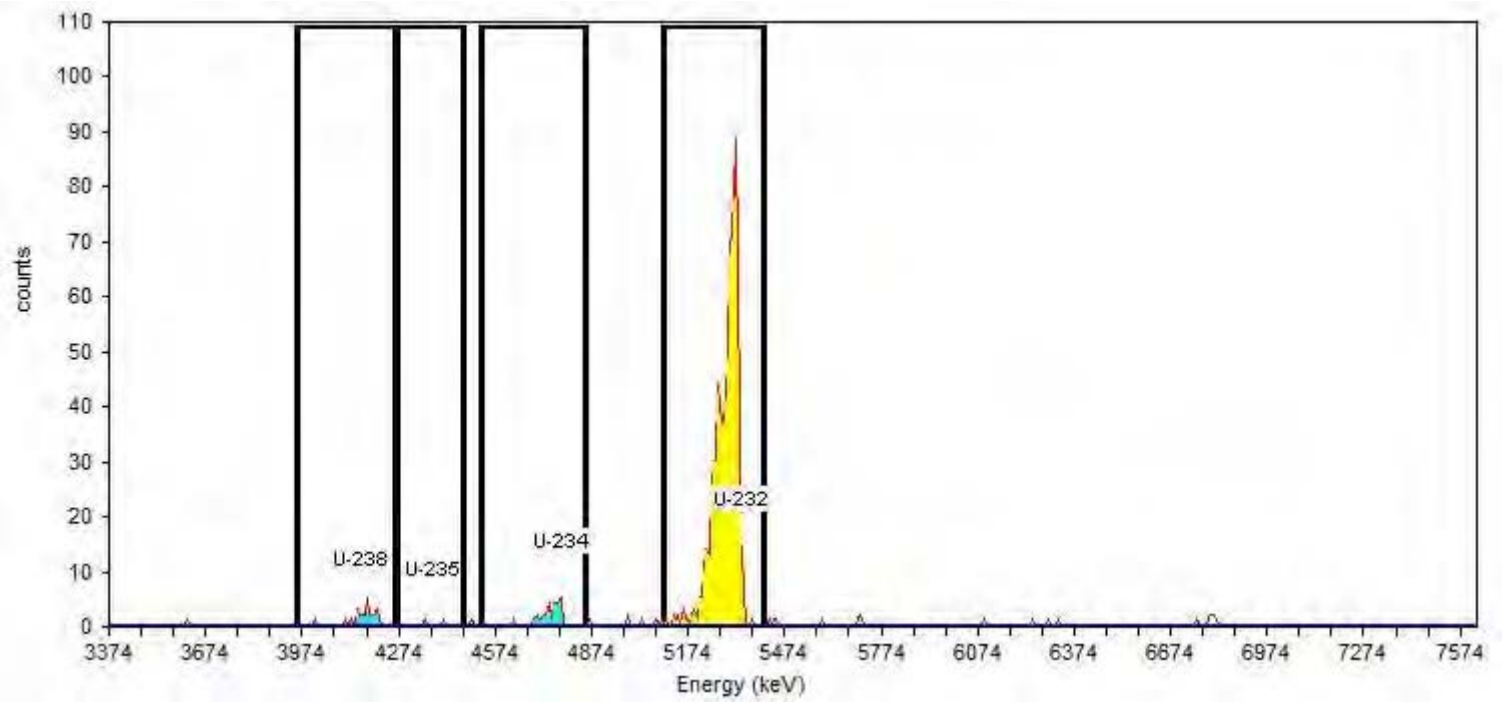
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 88.49%

Acquisition

Detector: AV171 SN: 50-112 Y2
Acquisition Start Date: 8/28/2018 3:30:22AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:50PM
Bkgd Info: Sample: ICB;AV171; Det: AV171; Spectrum #1; 8/21/2018 1:34:50 PM

Energy Calibration: IC-9794;AV171-20171113
Efficiency Calibration:IC-9794;AV171-20171113
Calibration Date: 11/13/2017 3:17:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.64% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	62.1	100.0	27	0.2500	26.75	2.609E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	2	0.5000	1.50	1.824E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	60.8	99.8	32	0.2500	31.75	3.103E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	66.8	100.1	708	0.7500	707.25	6.526E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:21AM 8/28/2018

Sample

Sample Name: 160-29881-B-39-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-39-E
Sample Collection Date: 7/30/2018 12:00:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226820
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

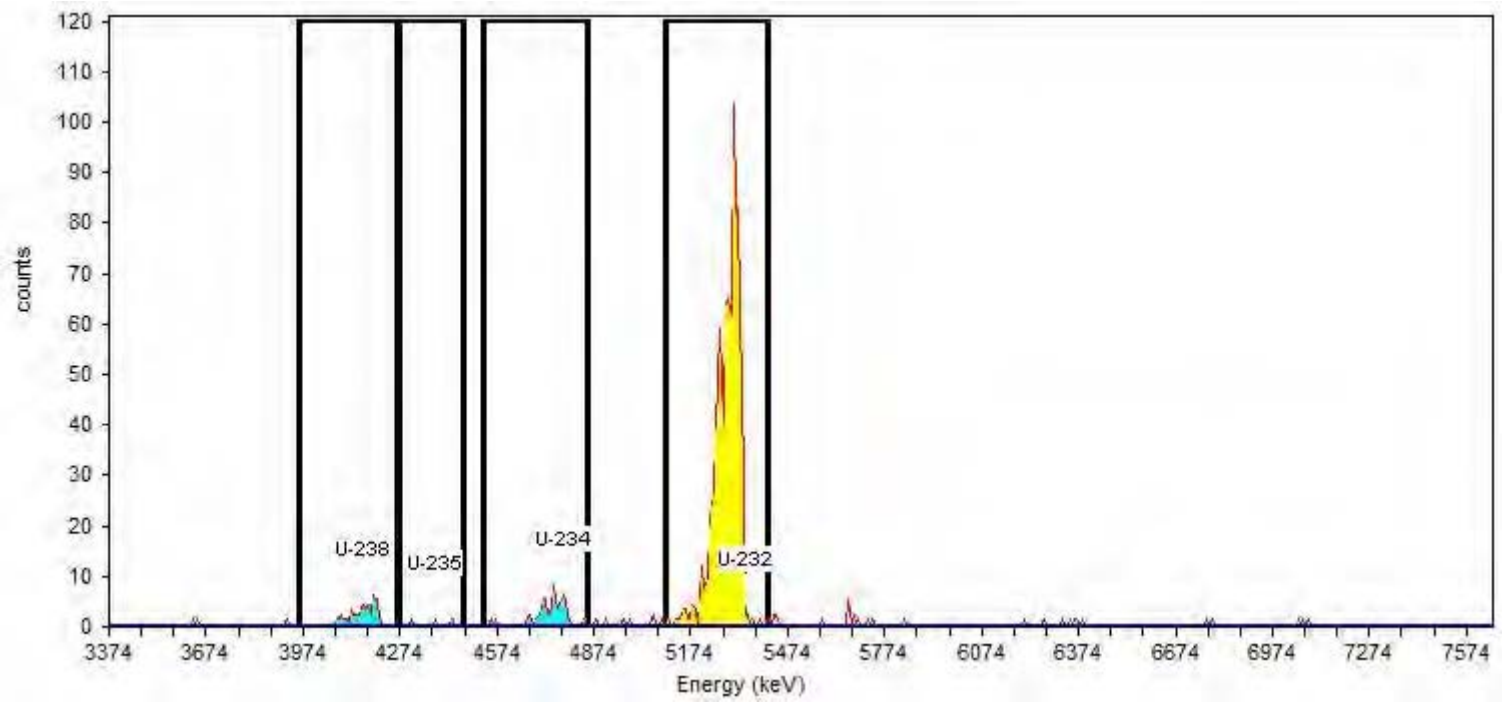
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 92.73%

Acquisition

Detector: AV172 SN: 50-112 Y3
Acquisition Start Date: 8/28/2018 3:30:23AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:50PM
Bkgd Info: Sample: ICB;AV172; Det: AV172; Spectrum #1; 8/21/2018 1:34:50 PM

Energy Calibration: IC-9795;AV172-20171113
Efficiency Calibration:IC-9795;AV172-20171113
Calibration Date: 11/13/2017 3:17:19PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.32% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	75.0	100.0	48	0.0000	48.00	3.824E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	3	0.0000	3.00	2.980E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	80.1	99.8	62	0.7500	61.25	4.890E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	76.7	100.1	868	1.0000	867.00	6.847E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:55AM 8/28/2018

Sample

Sample Name: 160-29881-A-40-E Type: Sample
Spectrum #1 Analysis #1
: 160-29881-A-40-E
Sample Collection Date: 7/30/2018 2:20:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226824
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

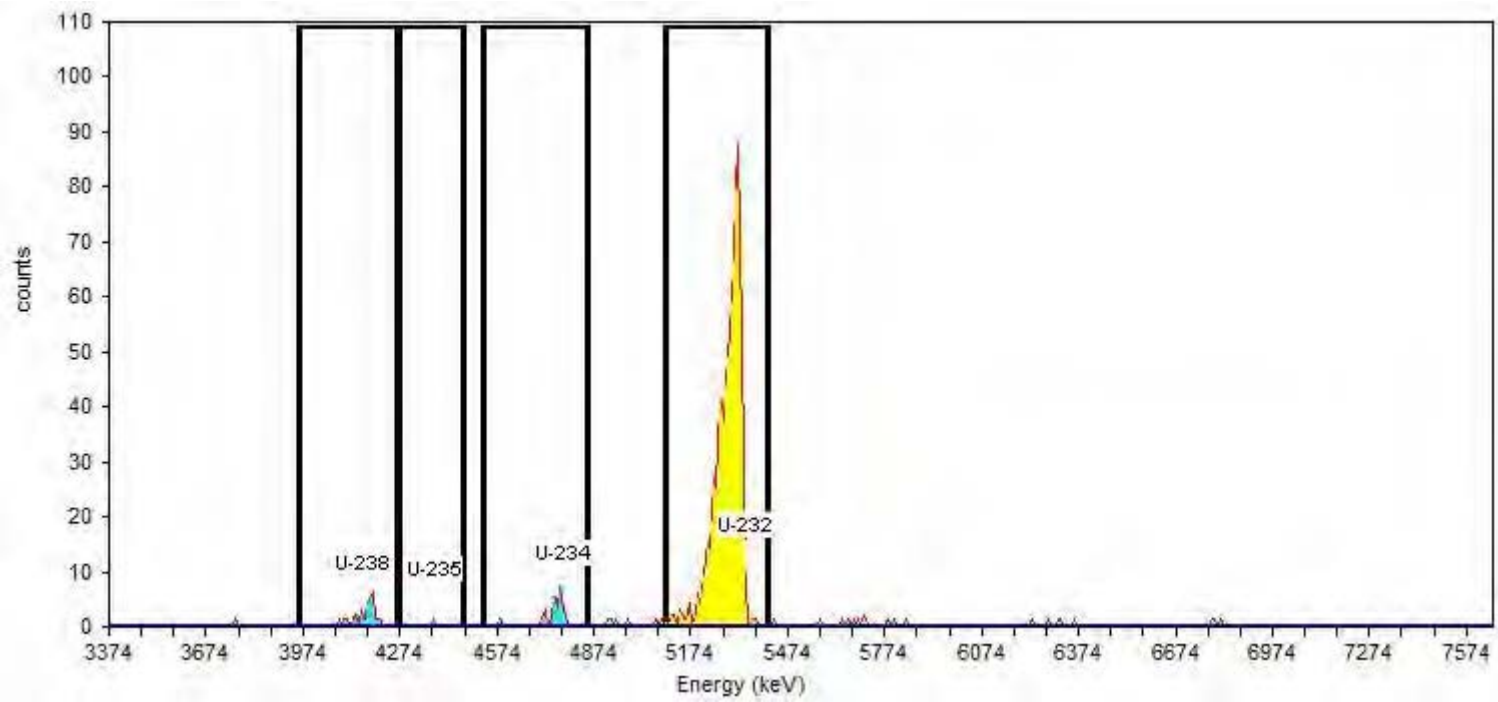
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 89.12%

Acquisition

Detector: AV173 SN: 50-112 Y4
Acquisition Start Date: 8/28/2018 3:30:23AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:50PM
Bkgd Info: Sample: ICB;AV173; Det: AV173; Spectrum #1; 8/21/2018 1:34:50 PM

Energy Calibration: IC-9817;AV173-20171113b
Efficiency Calibration:IC-9817;AV173-20171113b
Calibration Date: 11/13/2017 3:17:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 23.08% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	51.0	100.0	29	0.0000	29.00	2.635E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.2500	0.75	8.498E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	49.9	99.8	33	0.5000	32.50	2.959E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.2	100.1	762	2.2500	759.75	6.577E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:13AM 8/28/2018

Sample

Sample Name: 160-29881-B-41-D Type: Sample
Spectrum #1 Analysis #1
: 160-29881-B-41-D
Sample Collection Date: 7/30/2018 2:35:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226826
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

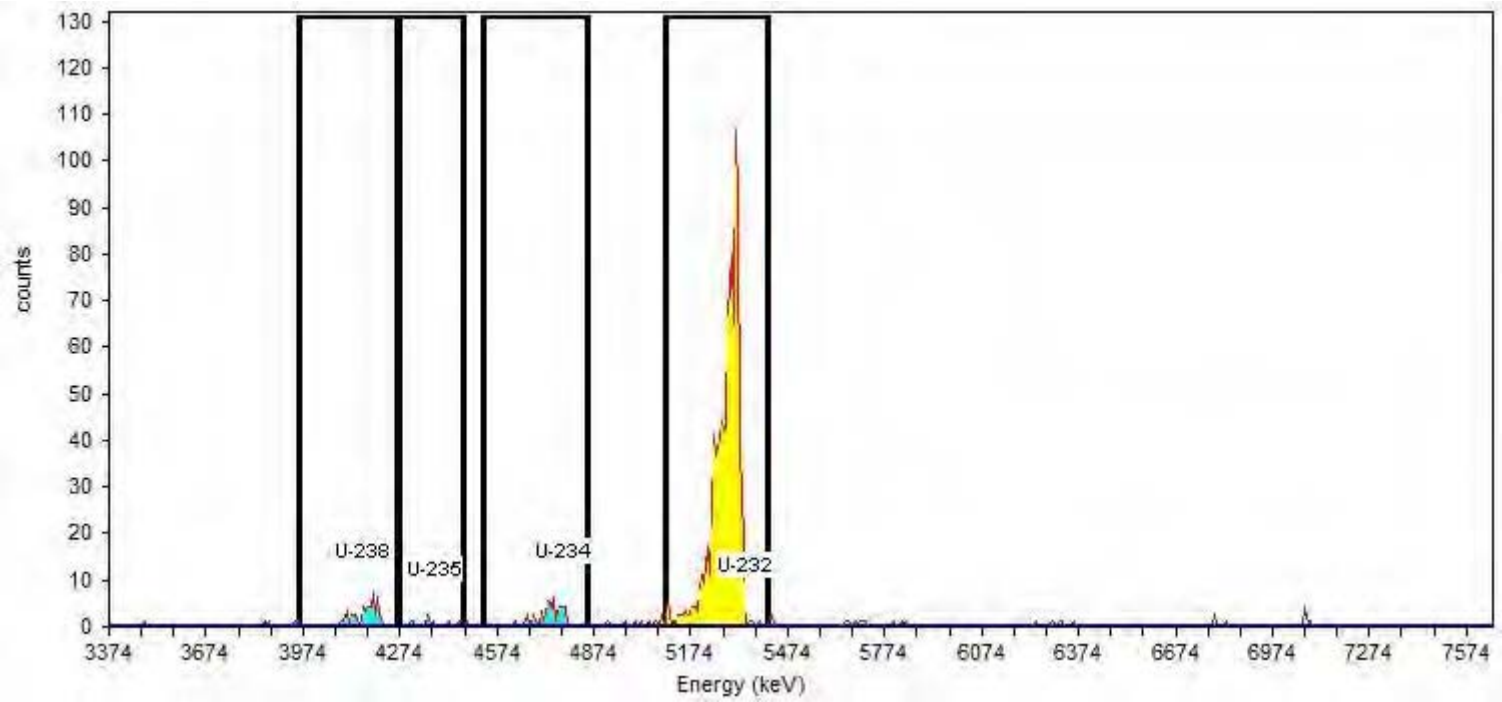
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 101.46%

Acquisition

Detector: AV174 SN: 50-112Y5
Acquisition Start Date: 8/28/2018 3:30:23AM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/20/2018 5:49:51PM
Bkgd Info: Sample: ICB;AV174; Det: AV174; Spectrum #1; 8/20/2018 5:49:51 PM

Energy Calibration: IC-9884;AV174-20171113b
Efficiency Calibration:IC-9884;AV174-20171113b
Calibration Date: 11/13/2017 3:17:39PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.94% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	54.3	100.0	44	0.0000	44.00	3.710E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	156.3	80.2	7	0.0000	7.00	7.359E-002	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	70.6	99.8	42	0.5000	41.50	3.506E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	67.5	100.1	824	2.0000	822.00	7.517E+000	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:11:46PM 8/28/2018

Sample

Sample Name: 160-29881-A-42-E Type: Sample
Spectrum #2 Analysis #1
: 160-29881-A-42-E
Sample Collection Date: 7/30/2018 2:50:00PM
Comment:

Sample Weight : 1.00 Sample Units: g
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: 380693
AnalysisResultsID: 226845
Description:

Client Name: Undefined
Client Contact:
Analyst: 60040

Tracer

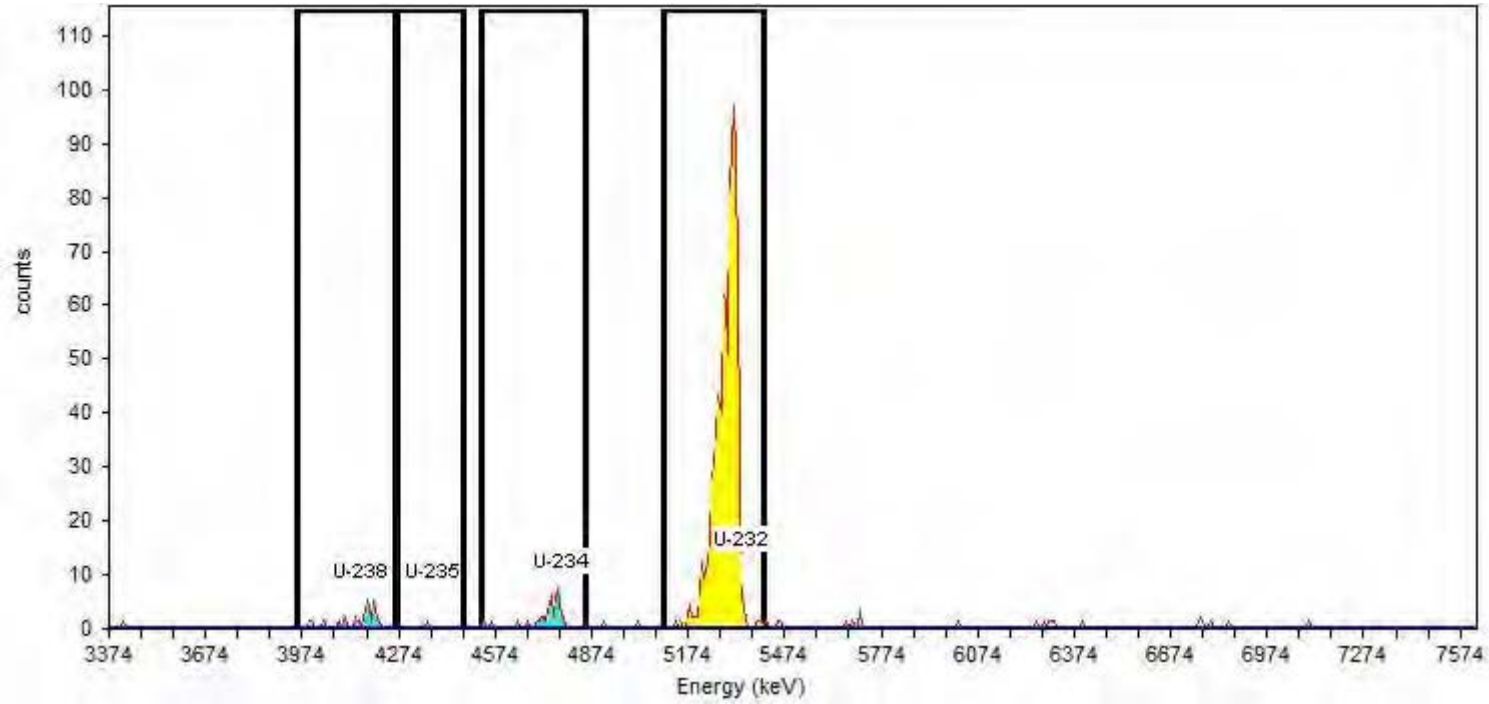
Tracer Name: U-232_00040
Tracer Activity: 82.25 DPM / mL x (Vol.) 0.20 mL = 16.45 DPM
Tracer Ref. Date: 8/25/2011 11:47:15AM

Tracer Nuclide: U-232
Tracer Recovery: 97.47%

Acquisition

Detector: AV161 SN: 50-05/II7
Acquisition Start Date: 8/28/2018 6:11:38PM
Live Time: 240.00 min.
Real Time: 240.00 min.
Background Date: 8/21/2018 1:34:48PM
Bkgd Info: Sample: ICB;AV161; Det: AV161; Spectrum #1; 8/21/2018 1:34:48 PM

Energy Calibration: IC-9886;AV161-20171113
Efficiency Calibration:IC-9886;AV161-20171113
Calibration Date: 11/13/2017 12:24:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 21.86% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction:8/28/2018 3:27:08AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
U-238	4157.5	4,196.0	-38.5	3956.1	4261.9	53.7	100.0	32	1.2500	30.75	2.699E-001	pCi/g
U-235	4381.2	4,396.0	-14.8	4269.3	4470.7	18.3	80.2	1	0.5000	0.50	5.473E-003	pCi/g
U-234	4776.4	4,775.8	0.6	4530.3	4851.0	52.4	99.8	39	1.0000	38.00	3.343E-001	pCi/g
U-232	5343.2	5,320.3	22.9	5097.1	5410.3	69.2	100.1	790	3.2500	786.75	7.196E+000	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 08/28/18

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV8	08/28/18 00:17	7359	7015.5 - 7753.9	Pass	15.1	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.4 - 5077.4	Pass
AV24	08/28/18 00:17	7639	7289.7 - 8057.0	Pass	15.2	10 - 20	Pass	217.1	214.6 - 224.6	Pass	4986	4964.4 - 5044.4	Pass
AV44	08/28/18 00:26	7507	7181.1 - 7937.1	Pass	12.1	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4974.9 - 5054.9	Pass
AV45	08/28/18 00:26	7638	7277.0 - 8043.0	Pass	18.7	10 - 20	Pass	209.8	205.9 - 215.9	Pass	4932	4900.0 - 4980.0	Pass
AV47	08/28/18 00:26	7626	7271.8 - 8037.2	Pass	14.7	10 - 20	Pass	217.9	214.0 - 224.0	Pass	4992	4960.2 - 5040.2	Pass
AV48	08/28/18 00:26	7592	7259.1 - 8023.2	Pass	16.0	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4974.9 - 5054.9	Pass
AV54	08/28/18 00:26	7277	6952.1 - 7683.9	Pass	15.1	10 - 20	Pass	223.9	218.0 - 228.0	Pass	5037	4989.7 - 5069.7	Pass
AV55	08/28/18 00:26	7228	6908.9 - 7636.1	Pass	11.4	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5052	5004.9 - 5084.9	Pass
AV56	08/28/18 00:26	7279	6947.0 - 7678.3	Pass	14.4	10 - 20	Pass	219.9	218.0 - 228.0	Pass	5007	4989.8 - 5069.8	Pass
AV58	08/28/18 00:26	7062	6730.3 - 7438.7	Pass	13.1	10 - 20	Pass	223.0	215.0 - 225.0	Pass	5030	4967.9 - 5047.9	Pass
AV62	08/28/18 00:26	7193	6804.7 - 7521.0	Pass	17.4	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5023	4982.0 - 5062.0	Pass
AV64	08/28/18 00:26	7203	6826.0 - 7544.6	Pass	16.1	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.2 - 5085.2	Pass
AV65	08/28/18 00:26	7186	6826.8 - 7545.4	Pass	16.1	10 - 20	Pass	224.0	218.0 - 228.0	Pass	5037	4989.8 - 5069.8	Pass
AV66	08/28/18 00:26	7198	6829.7 - 7548.6	Pass	15.5	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5037	4997.4 - 5077.4	Pass
AV69	08/28/18 00:26	7460	7056.8 - 7799.6	Pass	15.7	10 - 20	Pass	212.9	212.0 - 222.0	Pass	4955	4945.5 - 5025.5	Pass
AV70	08/28/18 00:26	7465	6984.2 - 7719.3	Pass	18.6	10 - 20	Pass	216.1	209.9 - 219.9	Pass	4979	4929.5 - 5009.5	Pass
AV71	08/28/18 00:26	7466	7058.3 - 7801.3	Pass	13.7	10 - 20	Pass	215.0	212.0 - 222.0	Pass	4971	4945.1 - 5025.1	Pass
AV72	08/28/18 00:26	7465	6951.5 - 7683.3	Pass	13.6	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5052	5004.8 - 5084.8	Pass
AV73	08/28/18 00:26	7462	6887.6 - 7612.7	Pass	13.5	10 - 20	Pass	224.0	218.0 - 228.0	Pass	5037	4990.1 - 5070.1	Pass
AV74	08/28/18 00:26	7154	6886.5 - 7611.4	Pass	13.1	10 - 20	Pass	225.1	219.0 - 229.0	Pass	5045	4997.3 - 5077.3	Pass
AV75	08/28/18 00:39	7478	7158.0 - 7911.5	Pass	17.9	10 - 20	Pass	220.9	215.9 - 225.9	Pass	5014	4974.6 - 5054.6	Pass
AV77	08/28/18 00:39	7560	7182.7 - 7938.8	Pass	15.1	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV78	08/28/18 00:39	7366	7017.9 - 7756.6	Pass	13.0	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV79	08/28/18 00:39	7516	7159.9 - 7913.5	Pass	13.8	10 - 20	Pass	219.0	214.1 - 224.1	Pass	5000	4960.6 - 5040.6	Pass
AV80	08/28/18 00:39	7488	7169.7 - 7924.4	Pass	14.2	10 - 20	Pass	220.9	216.1 - 226.1	Pass	5015	4975.5 - 5055.5	Pass
AV81	08/28/18 00:39	7489	6867.2 - 7590.1	Pass	13.5	10 - 20	Pass	218.0	213.0 - 223.0	Pass	4992	4953.0 - 5033.0	Pass
AV82	08/28/18 00:39	7474	7163.4 - 7917.5	Pass	15.3	10 - 20	Pass	219.9	215.0 - 225.0	Pass	5007	4967.9 - 5047.9	Pass
AV83	08/28/18 00:39	7664	7282.5 - 8049.1	Pass	14.7	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5053	5012.1 - 5092.1	Pass
AV85	08/28/18 00:39	7667	7284.7 - 8051.5	Pass	14.7	10 - 20	Pass	210.9	206.0 - 216.0	Pass	4940	4900.8 - 4980.8	Pass
AV86	08/28/18 00:39	7663	7273.3 - 8039.0	Pass	14.8	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.4 - 5069.4	Pass
AV88	08/28/18 00:39	7641	7242.3 - 8004.7	Pass	15.3	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV91	08/28/18 00:39	7249	7035.0 - 7775.5	Pass	13.2	10 - 20	Pass	233.1	227.0 - 237.0	Pass	5106	5057.1 - 5137.1	Pass
AV148	08/28/18 00:14	5992	5703.5 - 6303.9	Pass	19.0	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5022	4981.7 - 5061.7	Pass
AV151	08/28/18 00:14	5959	5405.9 - 5974.9	Pass	16.6	10 - 20	Pass	223.1	217.2 - 227.2	Pass	5031	4984.2 - 5064.2	Pass
AV152	08/28/18 00:14	5996	5697.8 - 6297.5	Pass	15.1	10 - 20	Pass	224.1	219.1 - 229.1	Pass	5038	4998.0 - 5078.0	Pass
AV153	08/28/18 00:14	5994	5695.9 - 6295.5	Pass	15.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.8 - 5069.8	Pass
AV154	08/28/18 00:14	5831	5390.7 - 5958.1	Pass	13.3	10 - 20	Pass	220.9	216.8 - 226.8	Pass	5015	4980.8 - 5060.8	Pass
AV156	08/28/18 00:14	6010	5607.0 - 6197.2	Pass	13.5	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.3 - 5077.3	Pass
AV158	08/28/18 00:14	5902	5609.7 - 6200.2	Pass	12.6	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.2 - 5092.2	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 08/28/18

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV159	08/28/18 00:14	5760	5600.8 - 6190.4	Pass	12.9	10 - 20	Pass	228.0	223.0 - 233.0	Pass	5068	5027.3 - 5107.3	Pass
AV160	08/28/18 00:14	6007	5663.8 - 6260.0	Pass	18.2	10 - 20	Pass	222.0	218.1 - 228.1	Pass	5023	4990.9 - 5070.9	Pass
AV161	08/28/18 00:14	6026	5572.0 - 6158.6	Pass	13.7	10 - 20	Pass	230.0	226.0 - 236.0	Pass	5082	5050.0 - 5130.0	Pass
AV164	08/28/18 00:14	5882	5571.3 - 6157.7	Pass	13.0	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.4 - 5062.4	Pass
AV165	08/28/18 00:14	5698	5506.8 - 6086.4	Pass	13.3	10 - 20	Pass	222.9	218.5 - 228.5	Pass	5029	4993.5 - 5073.5	Pass
AV166	08/28/18 00:14	6008	5712.2 - 6313.5	Pass	17.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.0 - 5070.0	Pass
AV167	08/28/18 00:14	5740	5597.5 - 6186.7	Pass	13.3	10 - 20	Pass	225.1	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV171	08/28/18 00:14	5762	5618.6 - 6210.1	Pass	12.9	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.6 - 5077.6	Pass
AV172	08/28/18 00:14	6037	5582.8 - 6170.4	Pass	13.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.8 - 5069.8	Pass
AV173	08/28/18 00:14	5856	5624.6 - 6216.6	Pass	12.5	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV174	08/28/18 00:14	6033	5725.8 - 6328.5	Pass	13.3	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.2 - 5077.2	Pass
AV187	08/28/18 00:13	5842	5591.4 - 6180.0	Pass	12.5	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.8 - 5069.8	Pass
AV188	08/28/18 00:13	6027	5524.8 - 6106.3	Pass	13.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV189	08/28/18 00:13	5849	5591.3 - 6179.9	Pass	13.1	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV190	08/28/18 00:13	6014	5645.8 - 6240.1	Pass	15.0	10 - 20	Pass	222.9	218.5 - 228.5	Pass	5030	4993.4 - 5073.4	Pass
AV191	08/28/18 00:13	6024	5597.2 - 6186.4	Pass	14.1	10 - 20	Pass	220.9	217.0 - 227.0	Pass	5014	4982.7 - 5062.7	Pass
AV192	08/28/18 00:14	6012	5693.0 - 6292.3	Pass	14.4	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5022	4982.2 - 5062.2	Pass
AV206	08/28/18 00:14	6005	5668.1 - 6264.7	Pass	18.0	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4974.9 - 5054.9	Pass
AV208	08/28/18 00:14	6000	5565.4 - 6151.3	Pass	15.5	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.5 - 5077.5	Pass
AV211	08/28/18 00:13	6024	5629.3 - 6221.9	Pass	15.7	10 - 20	Pass	222.1	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV212	08/28/18 00:13	5965	5733.2 - 6336.7	Pass	16.9	10 - 20	Pass	219.1	214.3 - 224.3	Pass	5001	4962.1 - 5042.1	Pass
AV213	08/28/18 00:13	6009	5673.7 - 6271.0	Pass	15.2	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.2 - 5070.2	Pass
AV215	08/28/18 00:13	6011	5713.8 - 6315.3	Pass	14.9	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.2 - 5077.2	Pass
AV216	08/28/18 00:13	6026	5667.3 - 6263.8	Pass	13.7	10 - 20	Pass	224.0	219.6 - 229.6	Pass	5038	5002.2 - 5082.2	Pass
AV217	08/28/18 00:13	5894	5516.4 - 6097.1	Pass	13.1	10 - 20	Pass	217.0	212.4 - 222.4	Pass	4985	4948.4 - 5028.4	Pass
AV218	08/28/18 00:13	6009	5693.0 - 6292.2	Pass	15.3	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV219	08/28/18 00:13	6016	5716.0 - 6317.7	Pass	15.0	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.3 - 5070.3	Pass
AV220	08/28/18 00:13	6008	5692.6 - 6291.8	Pass	19.0	10 - 20	Pass	220.9	216.8 - 226.8	Pass	5014	4980.7 - 5060.7	Pass
AV222	08/28/18 00:13	6025	5699.4 - 6299.3	Pass	13.8	10 - 20	Pass	223.0	217.4 - 227.4	Pass	5030	4985.5 - 5065.5	Pass
AV225	08/28/18 00:13	5771	5641.5 - 6235.3	Pass	13.2	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.6 - 5077.6	Pass

Analysis Date: 08/31/18

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV1	08/31/18 00:02	7316	6961.0 - 7693.7	Pass	17.0	10 - 20	Pass	222.9	218.5 - 228.5	Pass	5029	4993.7 - 5073.7	Pass
AV3	08/31/18 00:02	7183	6900.2 - 7626.5	Pass	12.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV4	08/31/18 00:02	7371	7013.8 - 7752.1	Pass	13.7	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV7	08/31/18 00:02	7315	6979.5 - 7714.2	Pass	16.8	10 - 20	Pass	234.0	226.3 - 236.3	Pass	5112	5052.3 - 5132.3	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:09:42AM 8/31/2018

Sample

Sample Name: Pulser;AV1
Comment:

Spectrum #15 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

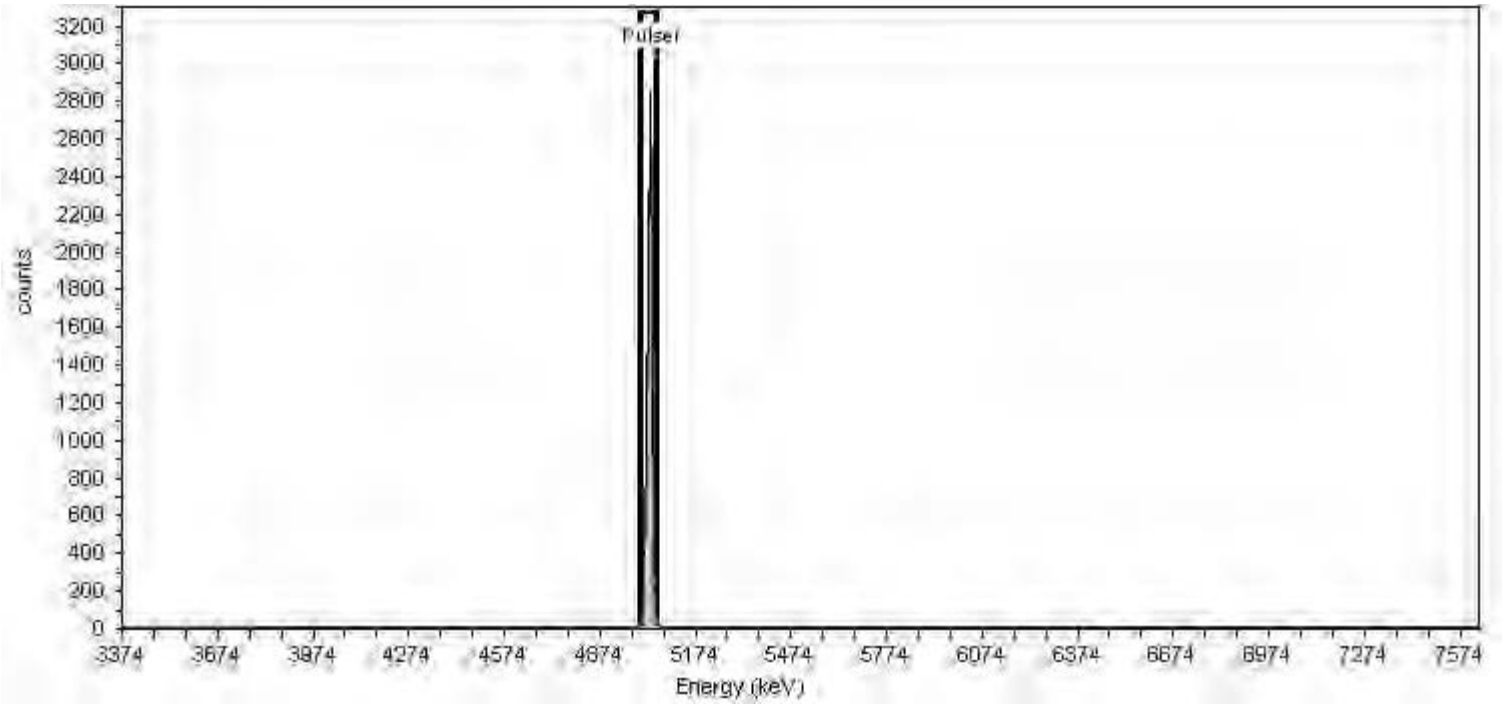
Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 8/31/2018 12:02:04AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.416	5000.550	5058.281	16.96	6,933.65	7,315.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:09:51AM 8/31/2018

Sample

Sample Name: Pulser;AV3
Comment:

Spectrum #15 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

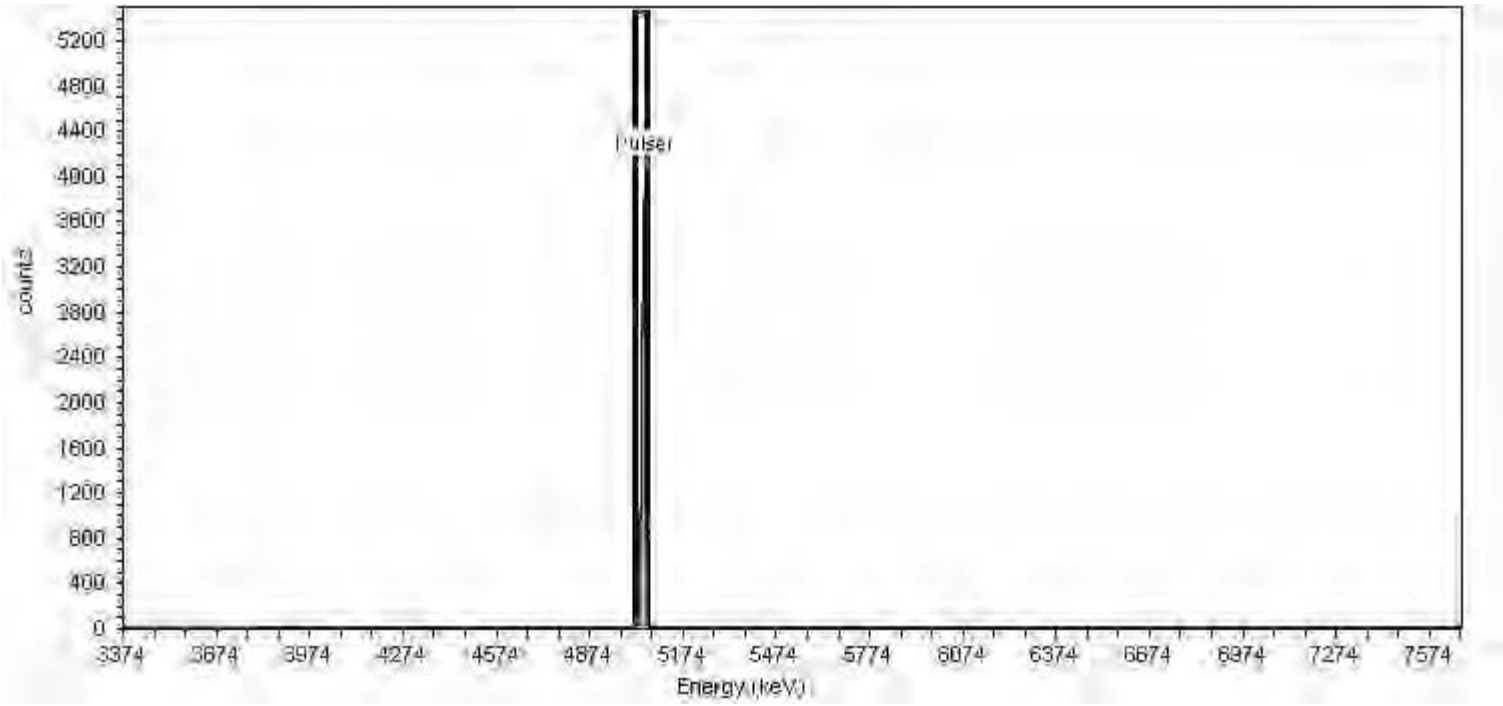
Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 8/31/2018 12:02:06AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV3-05142018
Calibration Date: 5/14/2018 6:25:15PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.44% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.051	5023.012	5067.090	12.95	7,067.74	7,183.29

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:10:09AM 8/31/2018

Sample

Sample Name: Pulser;AV4
Comment:

Spectrum #15 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

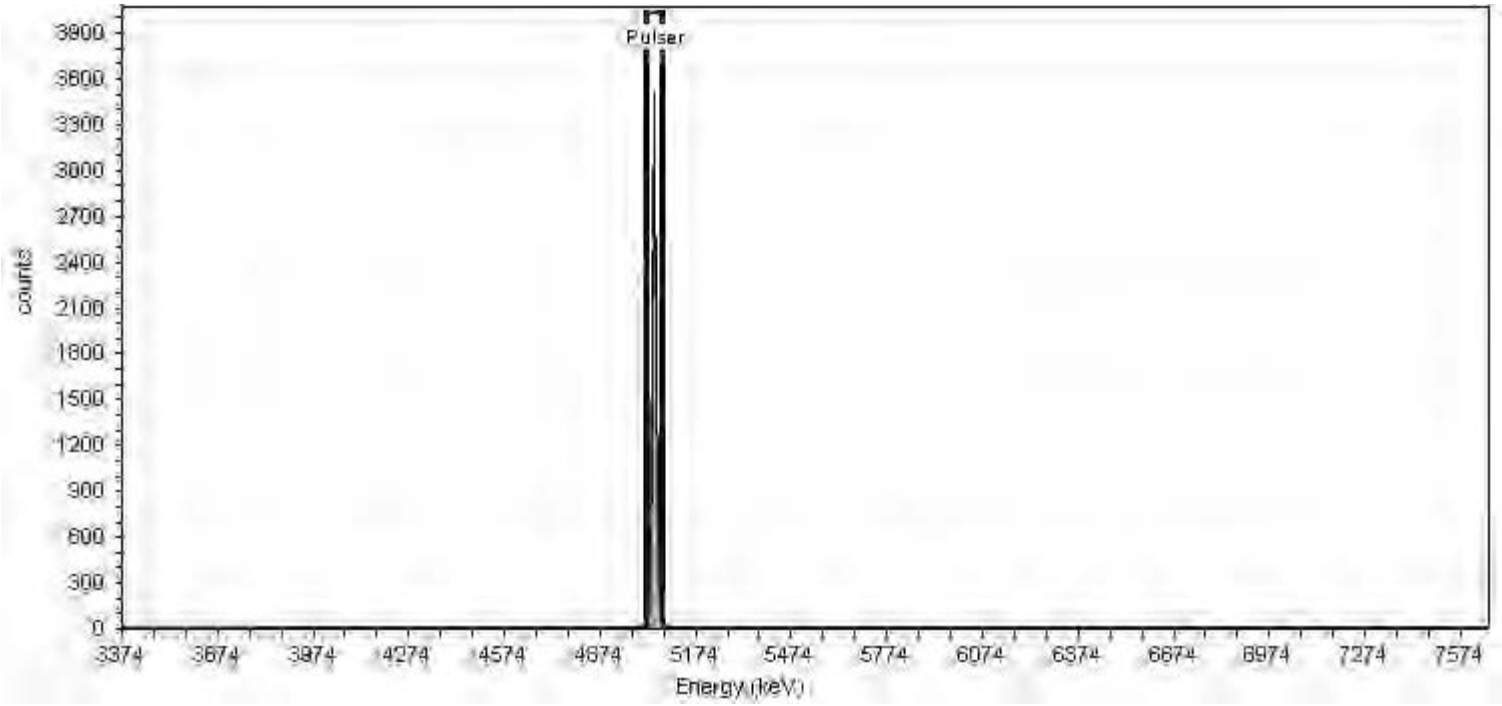
Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 8/31/2018 12:02:08AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9520;AV4-05142018
Calibration Date: 5/14/2018 6:25:34PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.79% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.176	5021.816	5068.536	13.72	6,890.69	7,370.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:10:17AM 8/31/2018

Sample

Sample Name: Pulser;AV7
Comment:

Spectrum #15 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

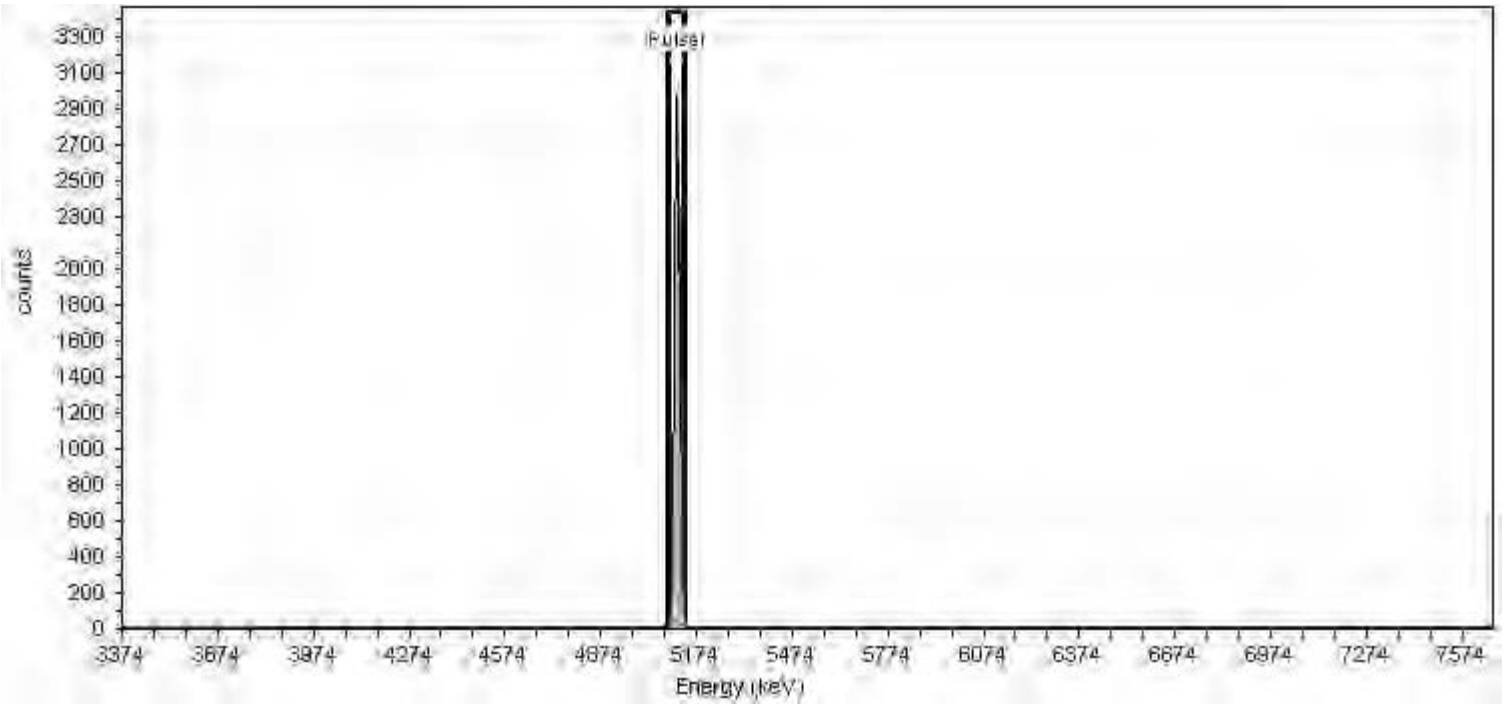
Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 8/31/2018 12:02:09AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9793;AV7-05142018
Calibration Date: 5/14/2018 6:26:13PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.98% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5111.716	5083.070	5140.363	16.83	7,169.80	7,314.63

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:23:04AM 8/28/2018

Sample

Sample Name: Pulser;AV8
Comment:

Spectrum #12 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

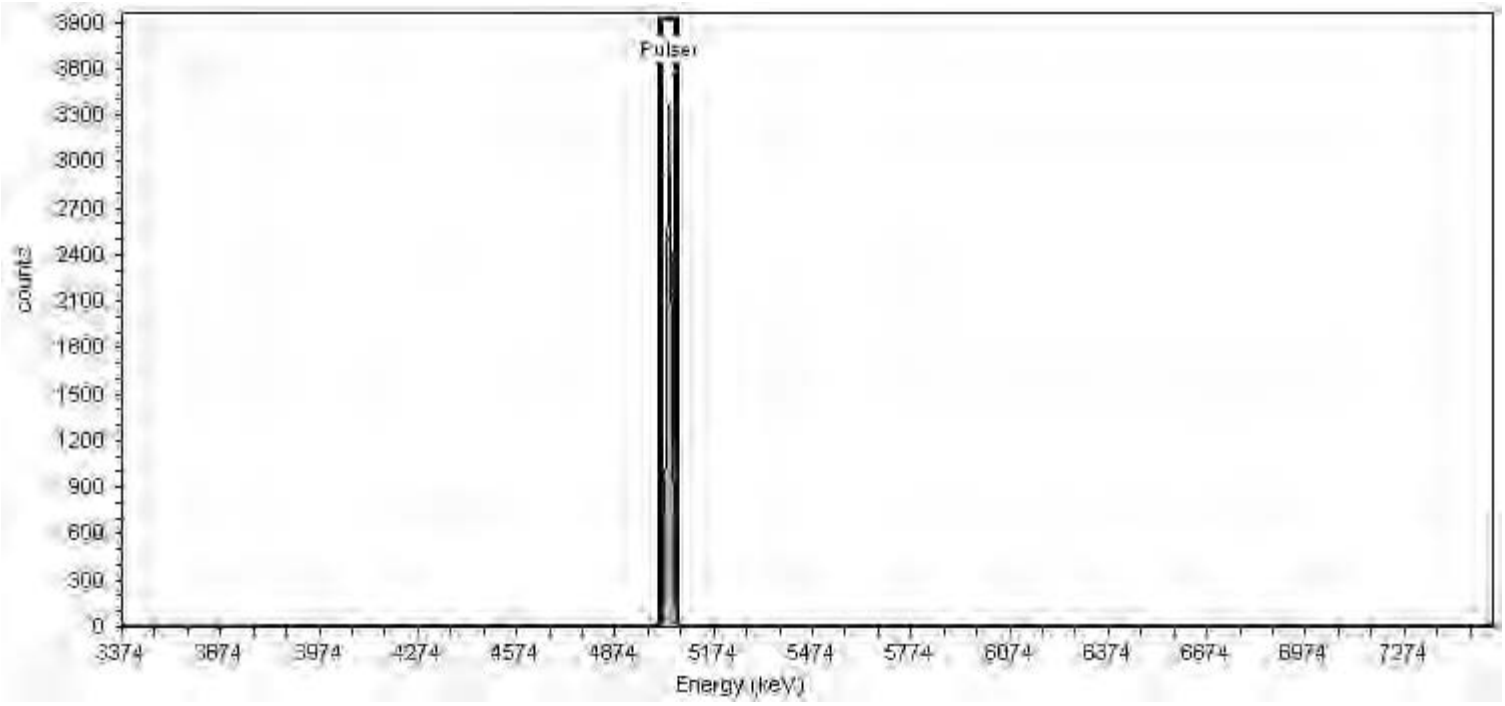
Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 8/28/2018 12:17:14AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9795;AV8-05142018
Calibration Date: 5/14/2018 6:26:27PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.96% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.250	5011.579	5062.920	15.08	7,281.32	7,359.38

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:31AM 8/28/2018

Sample

Sample Name: Pulser;AV24
Comment:

Spectrum #12 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

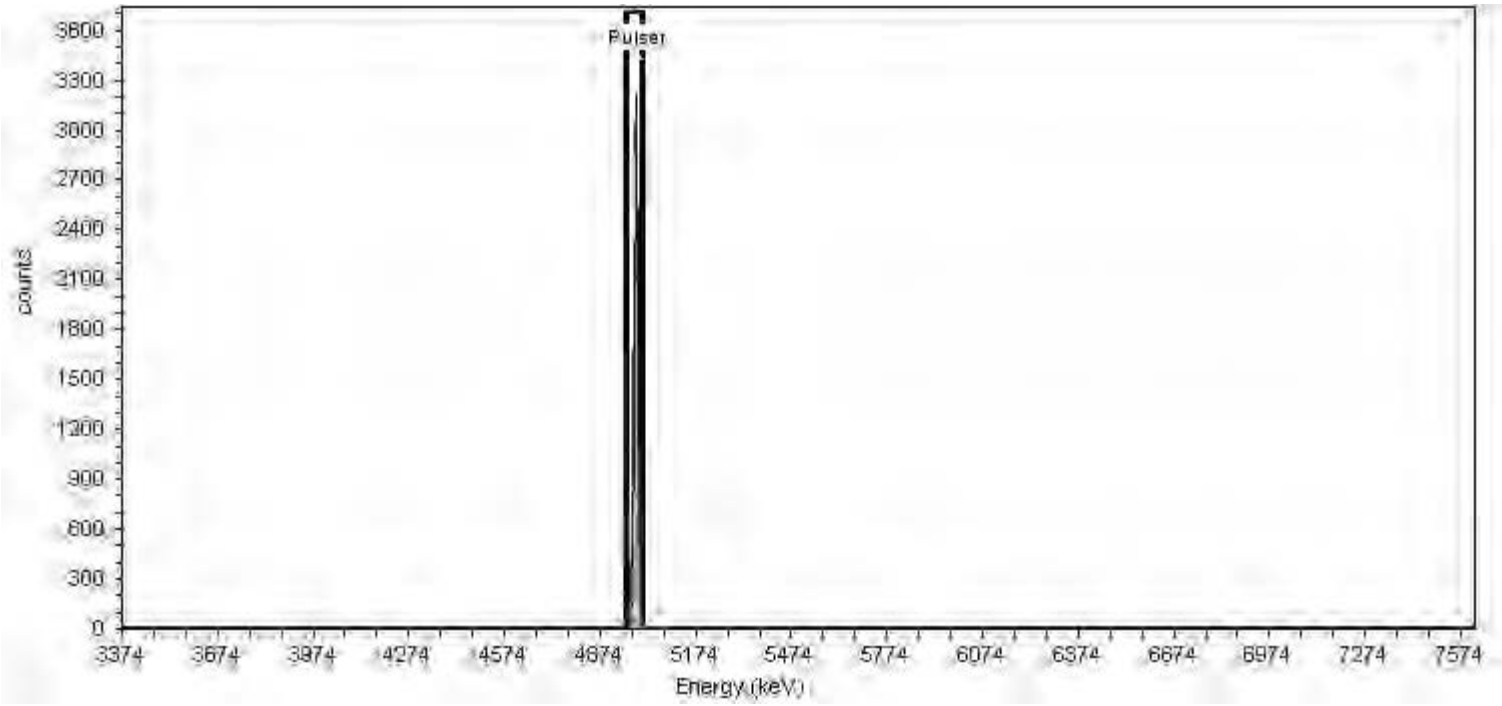
Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 8/28/2018 12:17:38AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV24-05142018
Calibration Date: 5/15/2018 12:28:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.21% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4985.973	4960.065	5011.882	15.22	7,037.41	7,638.90

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:46AM 8/28/2018

Sample

Sample Name: Pulser;AV44
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

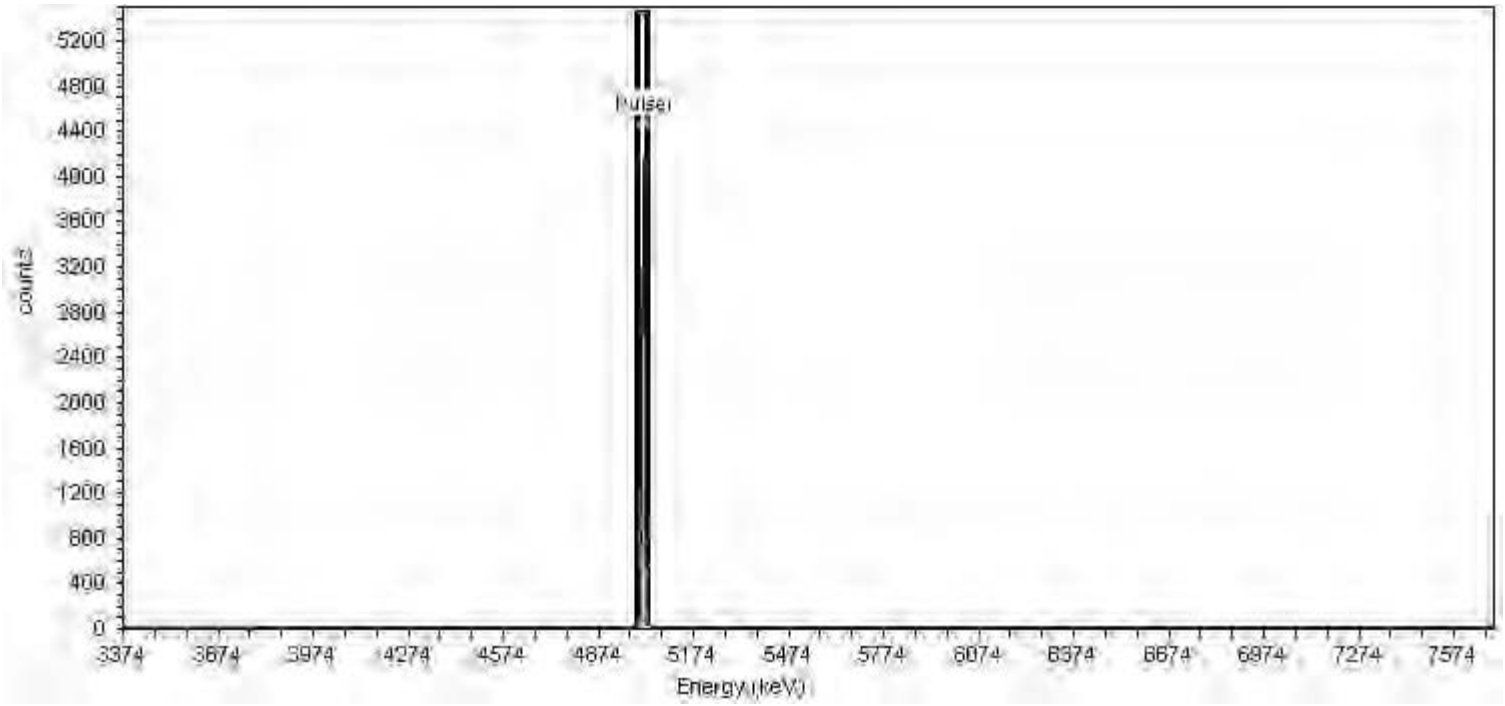
Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 8/28/2018 12:26:04AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1368446;AV44-05142018
Calibration Date: 5/15/2018 12:26:50PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.49% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.243	4994.714	5035.771	12.06	7,183.50	7,507.36

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:55AM 8/28/2018

Sample

Sample Name: Pulser;AV45
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

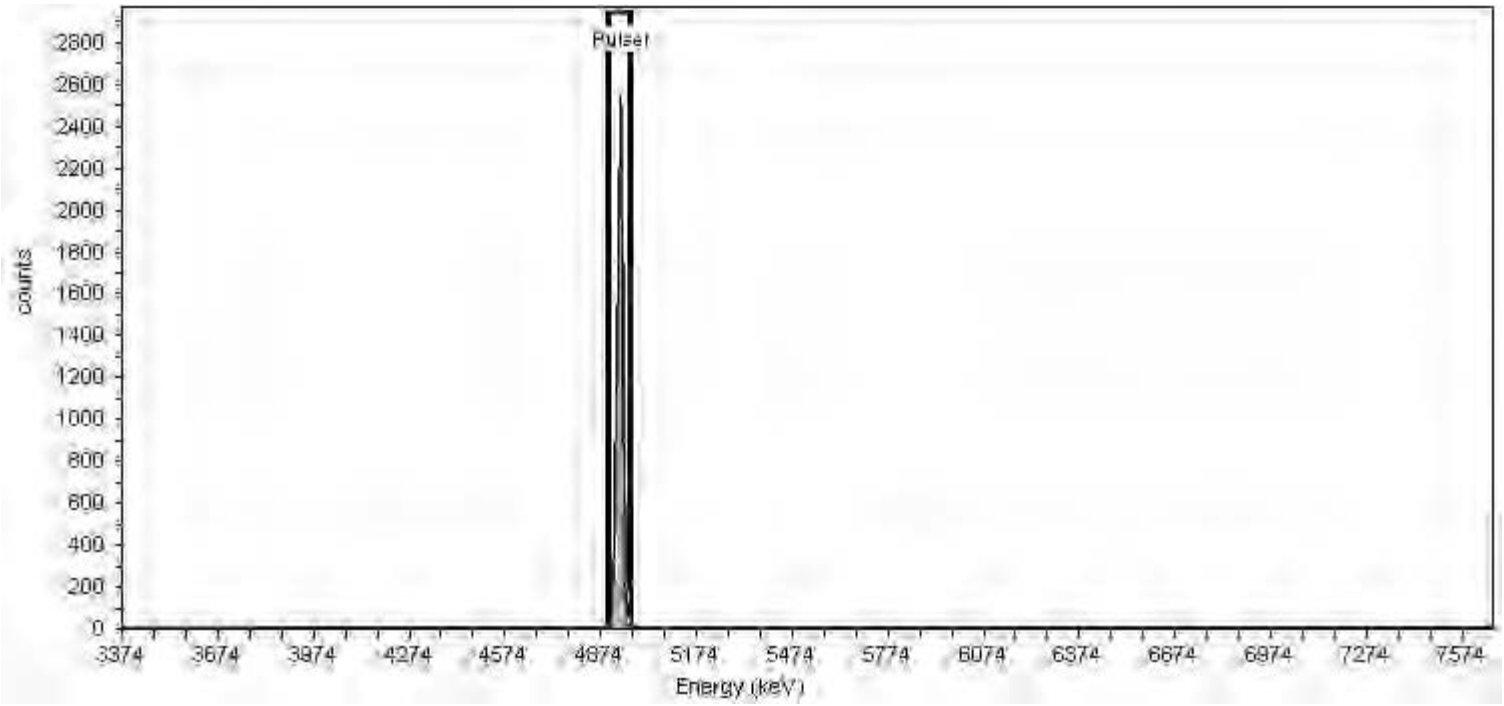
Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 8/28/2018 12:26:06AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1368447;AV45-05142018a
Calibration Date: 5/15/2018 12:29:34PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.95% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4931.830	4899.998	4963.663	18.70	6,827.93	7,637.82

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:13AM 8/28/2018

Sample

Sample Name: Pulser;AV47
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

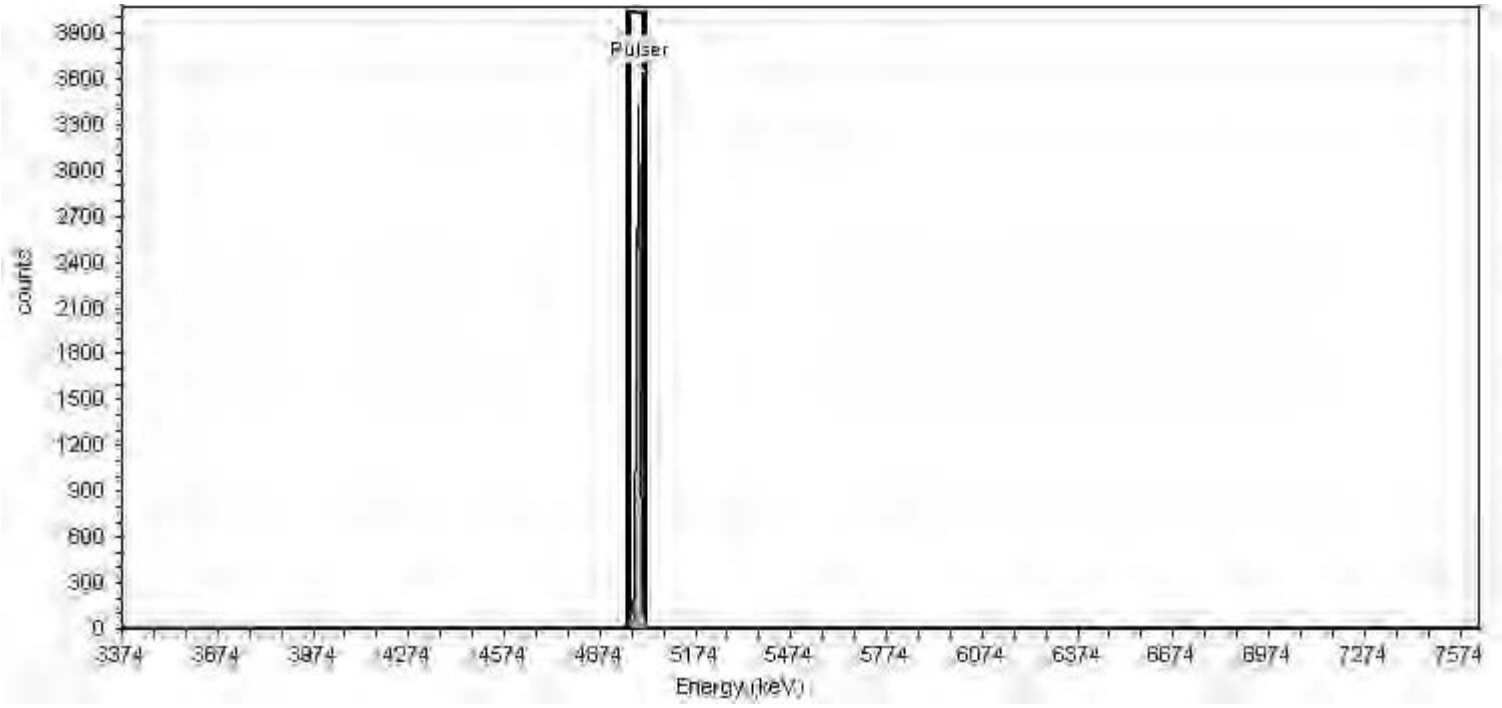
Acquisition

Detector: AV47 , SN: 46-032336
Acquisition Start Date: 8/28/2018 12:26:10AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1370622;AV47-05142018
Calibration Date: 5/15/2018 12:27:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.02% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.249	4967.218	5017.279	14.71	7,223.69	7,625.74

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:21AM 8/28/2018

Sample

Sample Name: Pulser;AV48
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

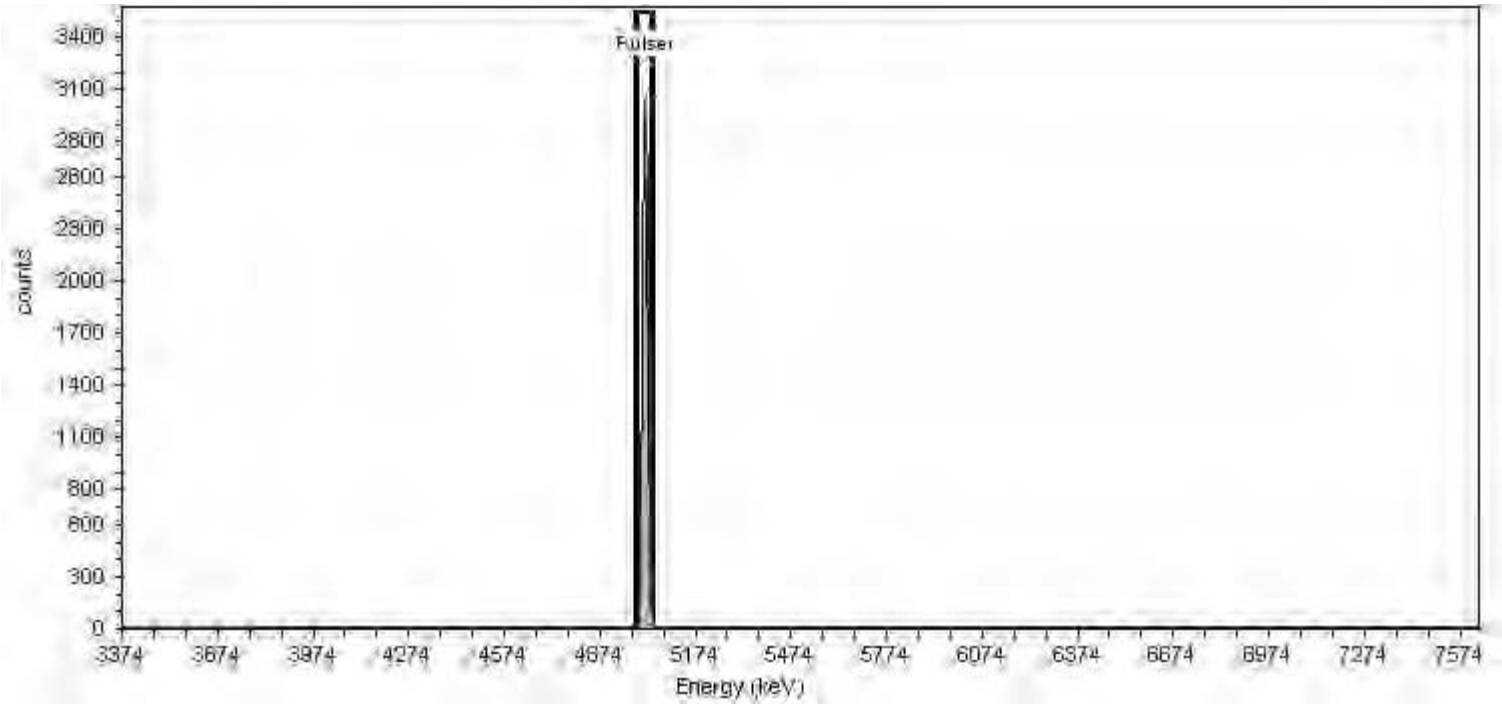
Acquisition

Detector: AV48 , SN: 46-033P6
Acquisition Start Date: 8/28/2018 12:26:12AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1370619;AV48-05142018
Calibration Date: 5/15/2018 12:27:25PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.06% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.266	4987.100	5041.432	15.96	6,977.26	7,592.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:03AM 8/28/2018

Sample

Sample Name: Pulser;AV54
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

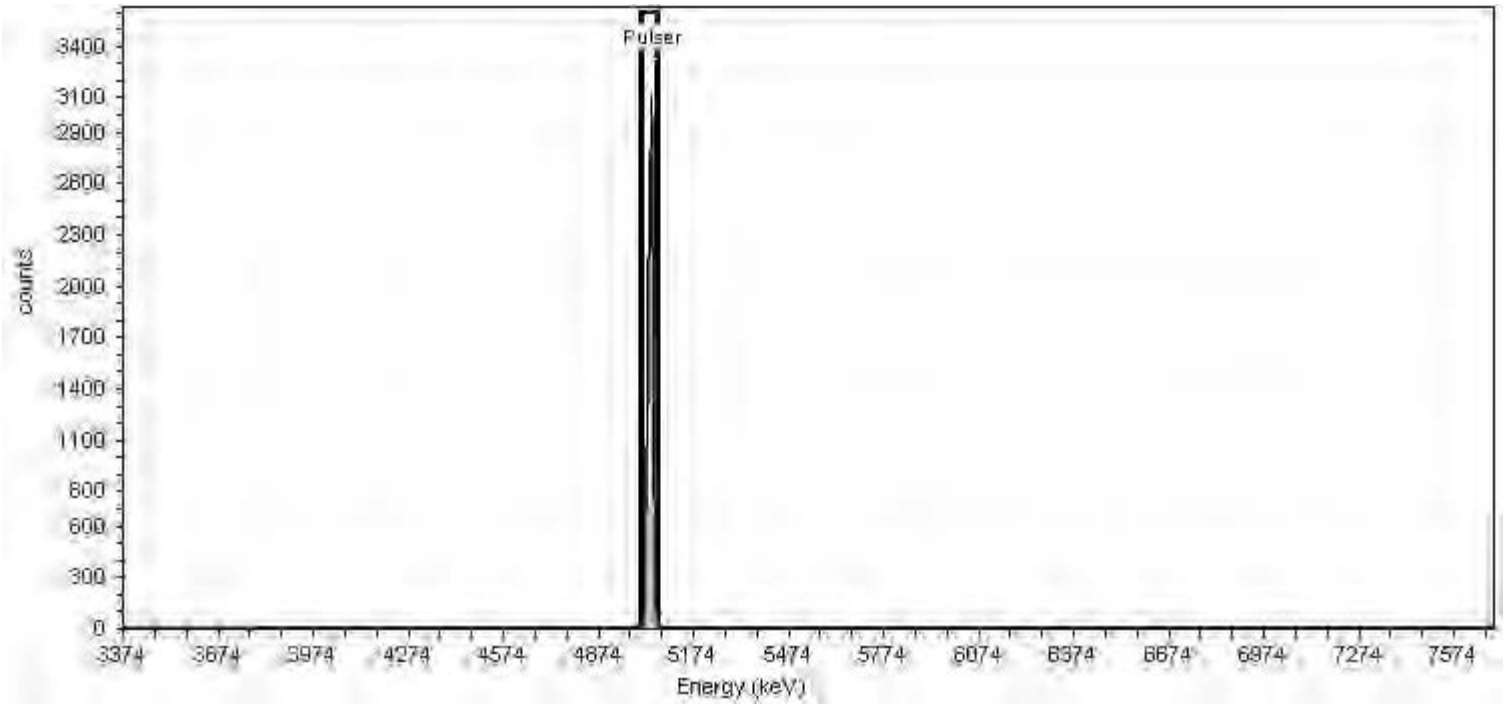
Acquisition

Detector: AV54 , SN: 46-033P4
Acquisition Start Date: 8/28/2018 12:26:13AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV54-05152018
Calibration Date: 5/15/2018 3:37:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.62% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.583	5010.922	5062.243	15.08	6,767.46	7,277.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:21AM 8/28/2018

Sample

Sample Name: Pulser;AV55
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

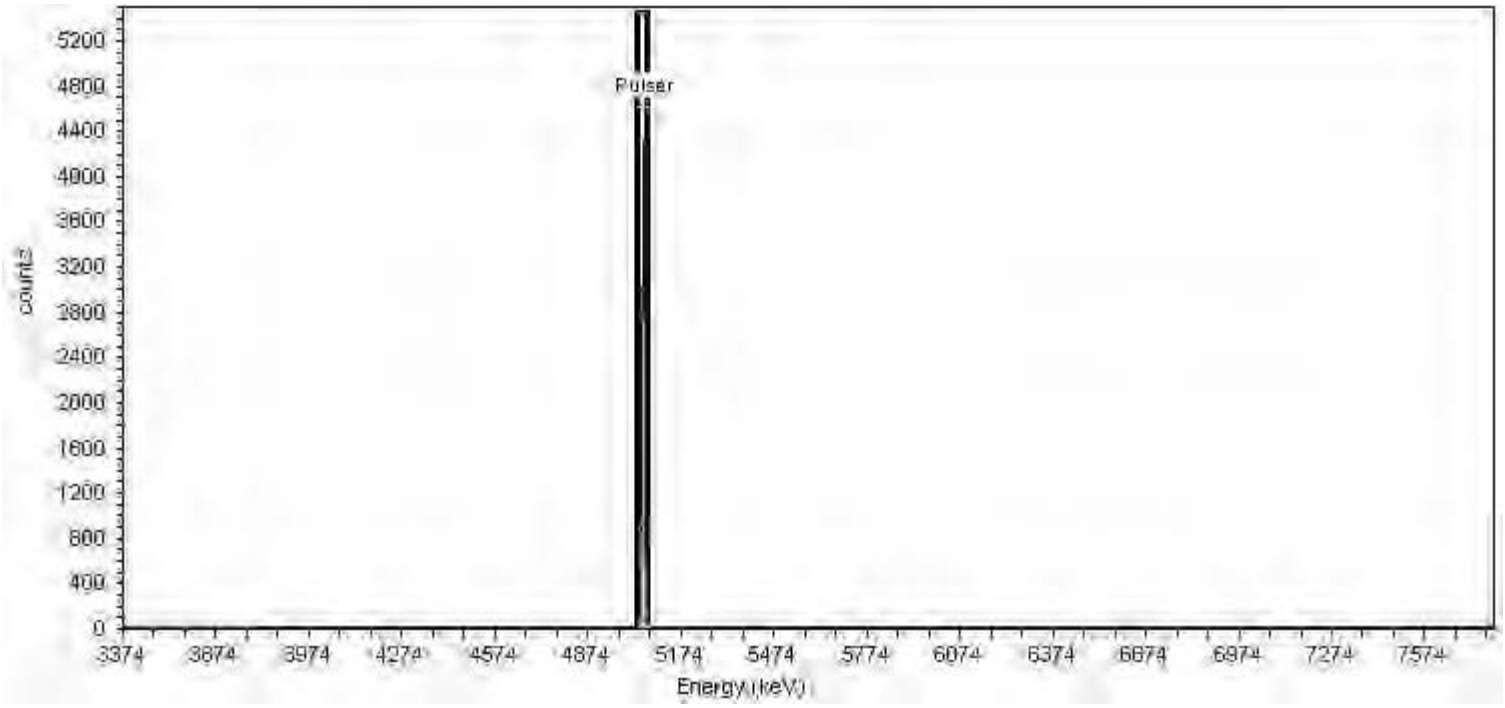
Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 8/28/2018 12:26:15AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9793;AV55-05152018
Calibration Date: 5/15/2018 3:38:17PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.96% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.442	5033.072	5071.812	11.38	7,051.46	7,228.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:30AM 8/28/2018

Sample

Sample Name: Pulser;AV56
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

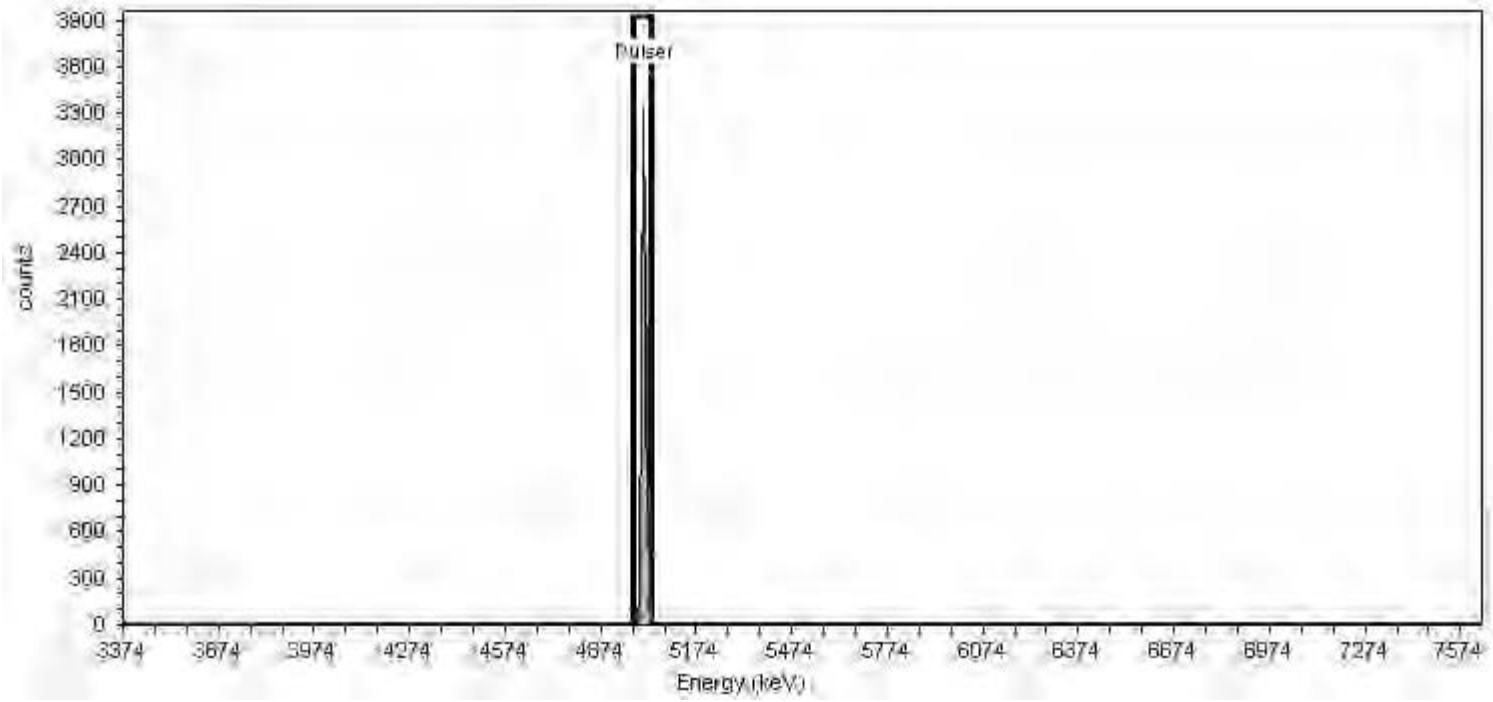
Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 8/28/2018 12:26:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9795;AV56-05152018
Calibration Date: 5/15/2018 3:38:31PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.25% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5007.218	4982.739	5031.698	14.38	6,883.70	7,279.16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:39AM 8/28/2018

Sample

Sample Name: Pulser;AV58
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

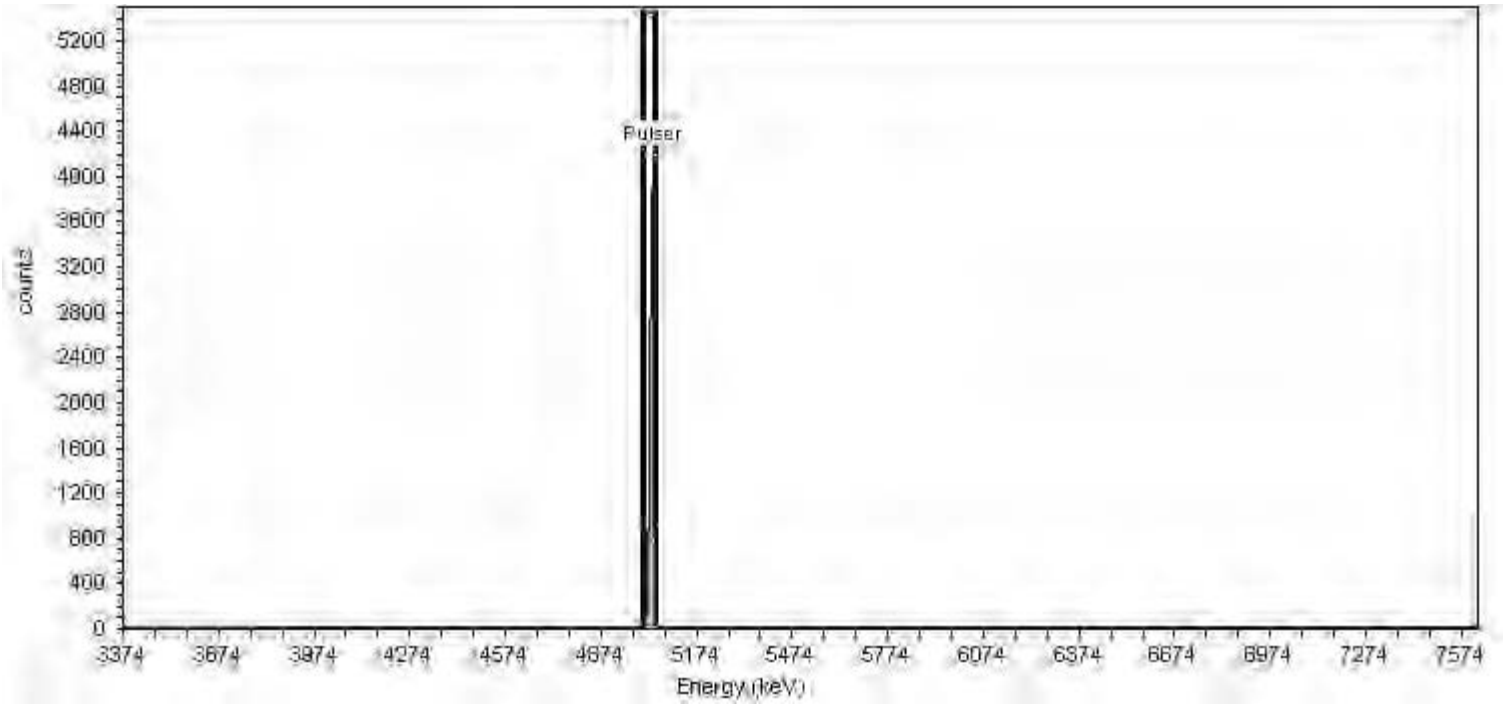
Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 8/28/2018 12:26:18AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9885;AV58-05152018
Calibration Date: 5/15/2018 3:38:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.05% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.954	5007.668	5052.240	13.09	7,294.82	7,062.34

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:31:48AM 8/28/2018

Sample

Sample Name: Pulser;AV62
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

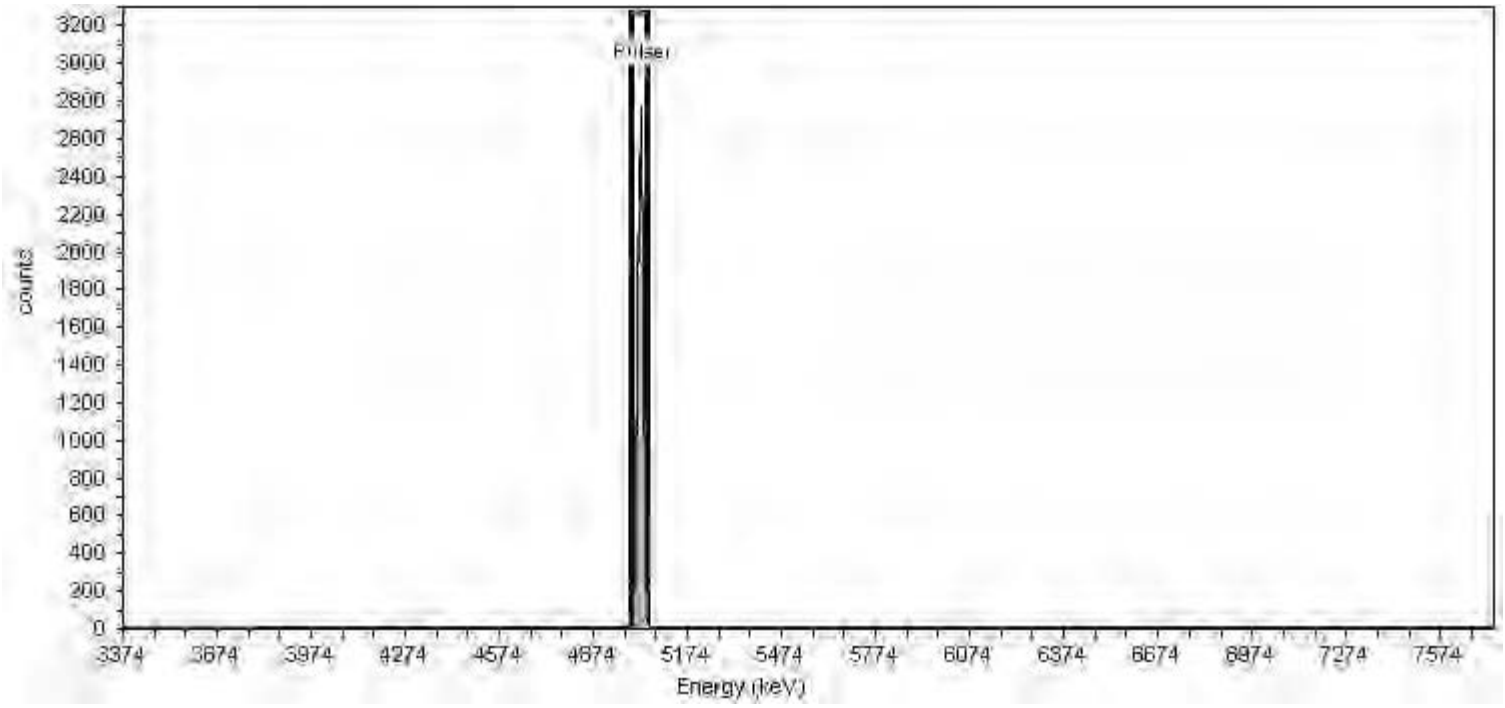
Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 8/28/2018 12:26:19AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.554	4992.972	5052.136	17.38	6,889.51	7,192.85

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:05AM 8/28/2018

Sample

Sample Name: Pulser;AV64
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

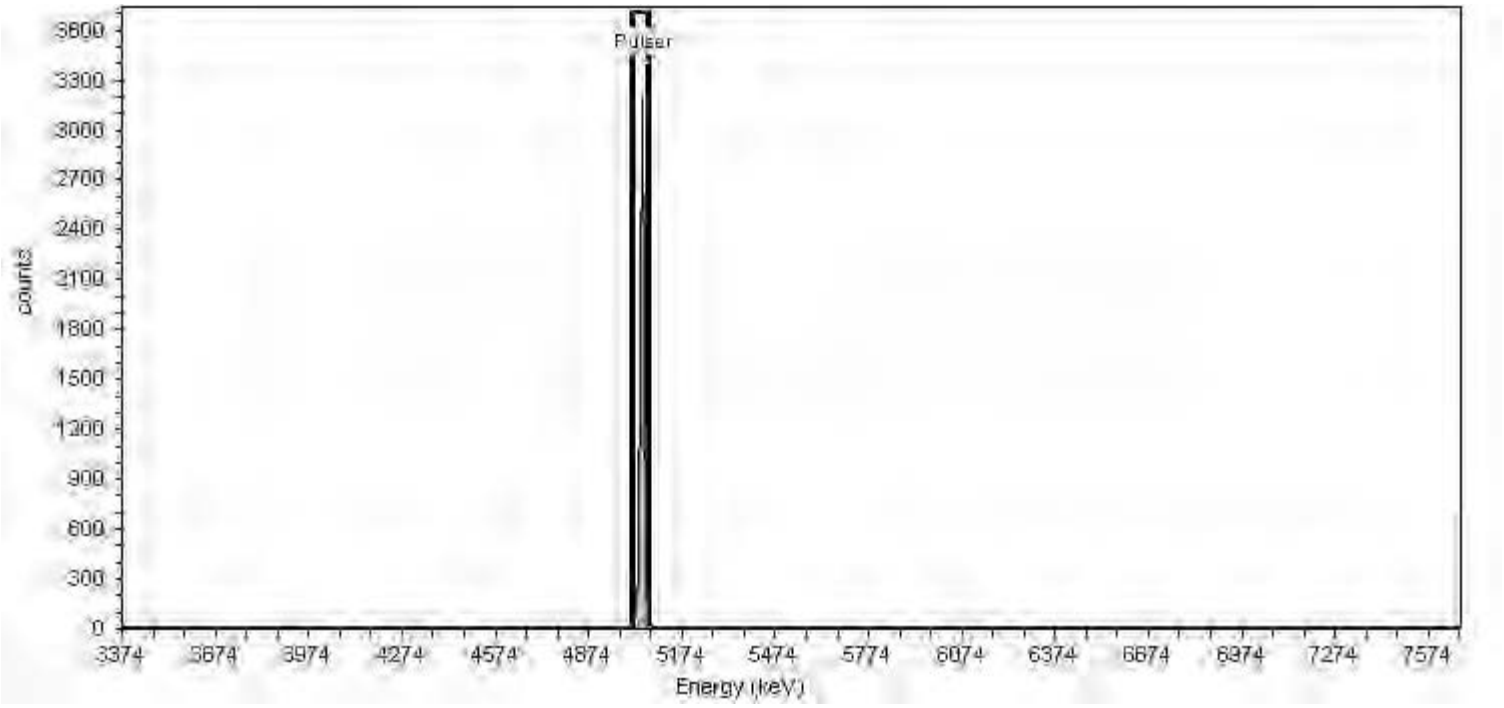
Acquisition

Detector: AV64 , SN: 43-028v3
Acquisition Start Date: 8/28/2018 12:26:22AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.668	5017.281	5072.055	16.09	7,379.24	7,203.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:14AM 8/28/2018

Sample

Sample Name: Pulser;AV65
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

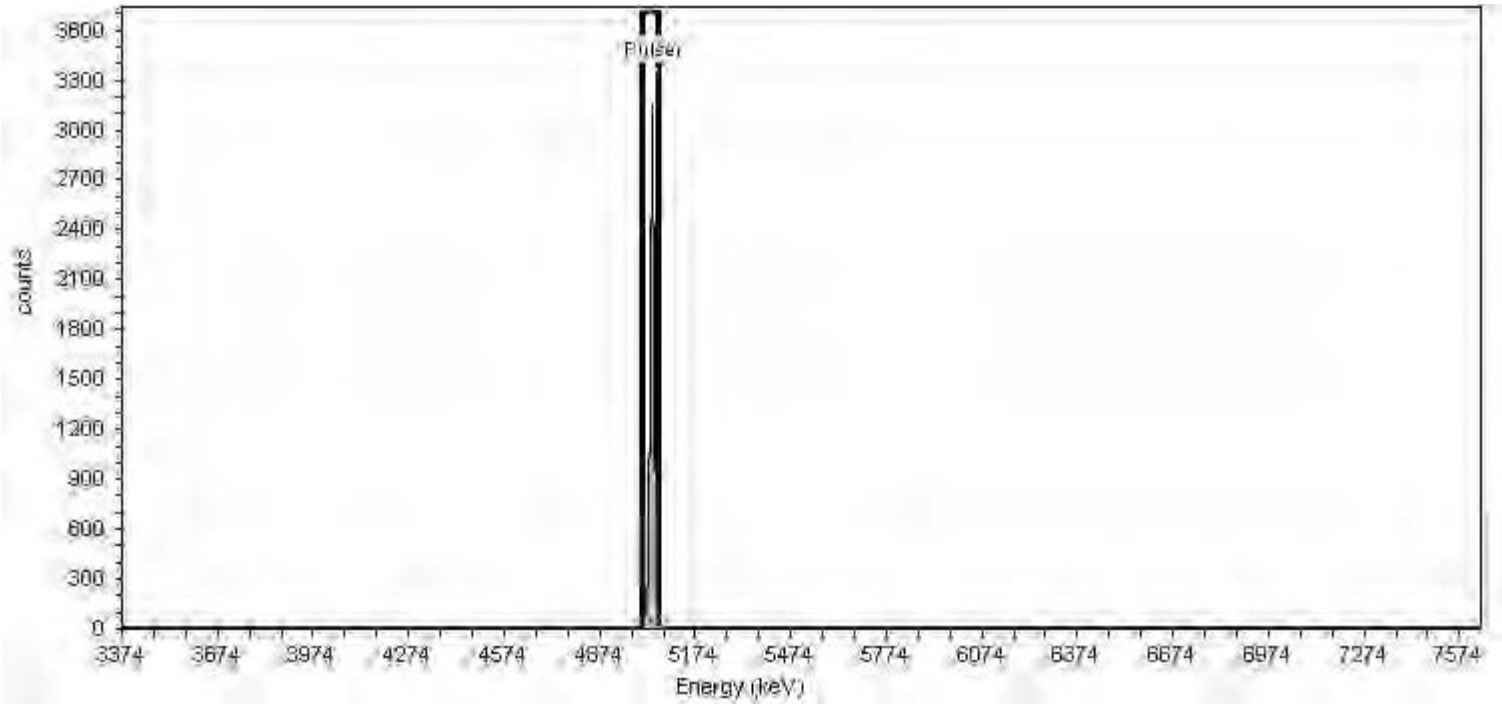
Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 8/28/2018 12:26:23AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.461	5010.132	5064.792	16.06	7,260.49	7,186.44

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:27AM 8/28/2018

Sample

Sample Name: Pulser;AV66
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

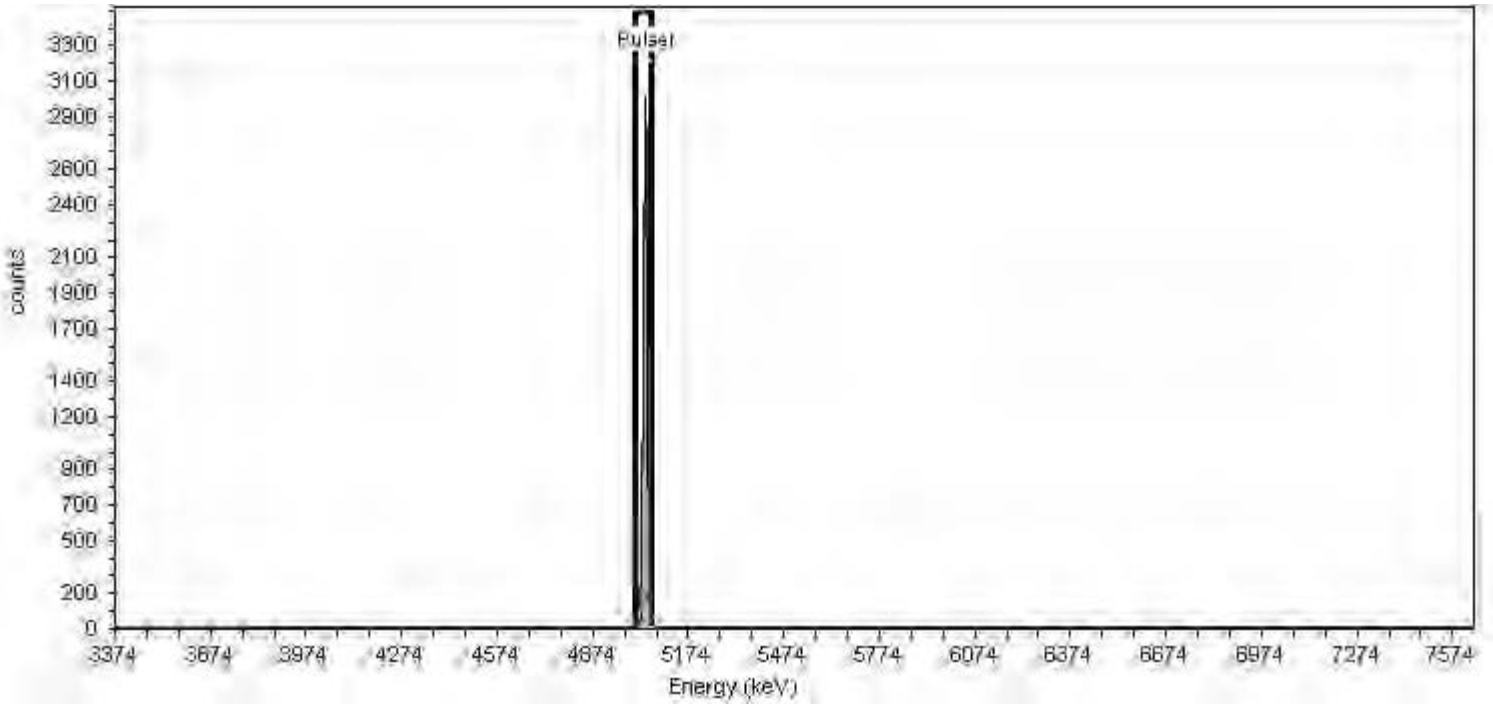
Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 8/28/2018 12:26:25AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-1370620;AV66-05152018
Calibration Date: 5/15/2018 3:40:08PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.12% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.742	5010.316	5063.167	15.52	6,735.97	7,198.32

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:44AM 8/28/2018

Sample

Sample Name: Pulser;AV69
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

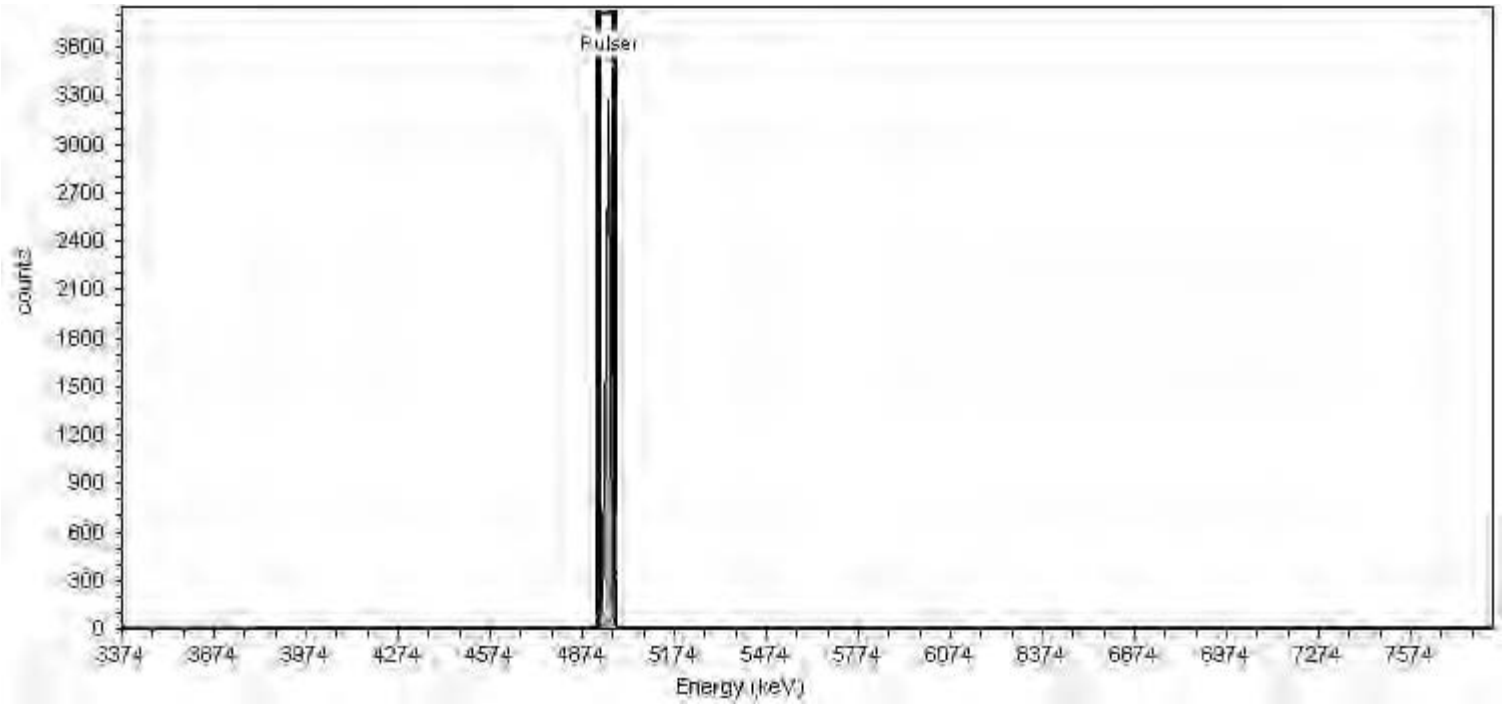
Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 8/28/2018 12:26:28AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4954.858	4928.126	4981.589	15.70	7,397.86	7,460.10

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:53AM 8/28/2018

Sample

Sample Name: Pulser;AV70
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

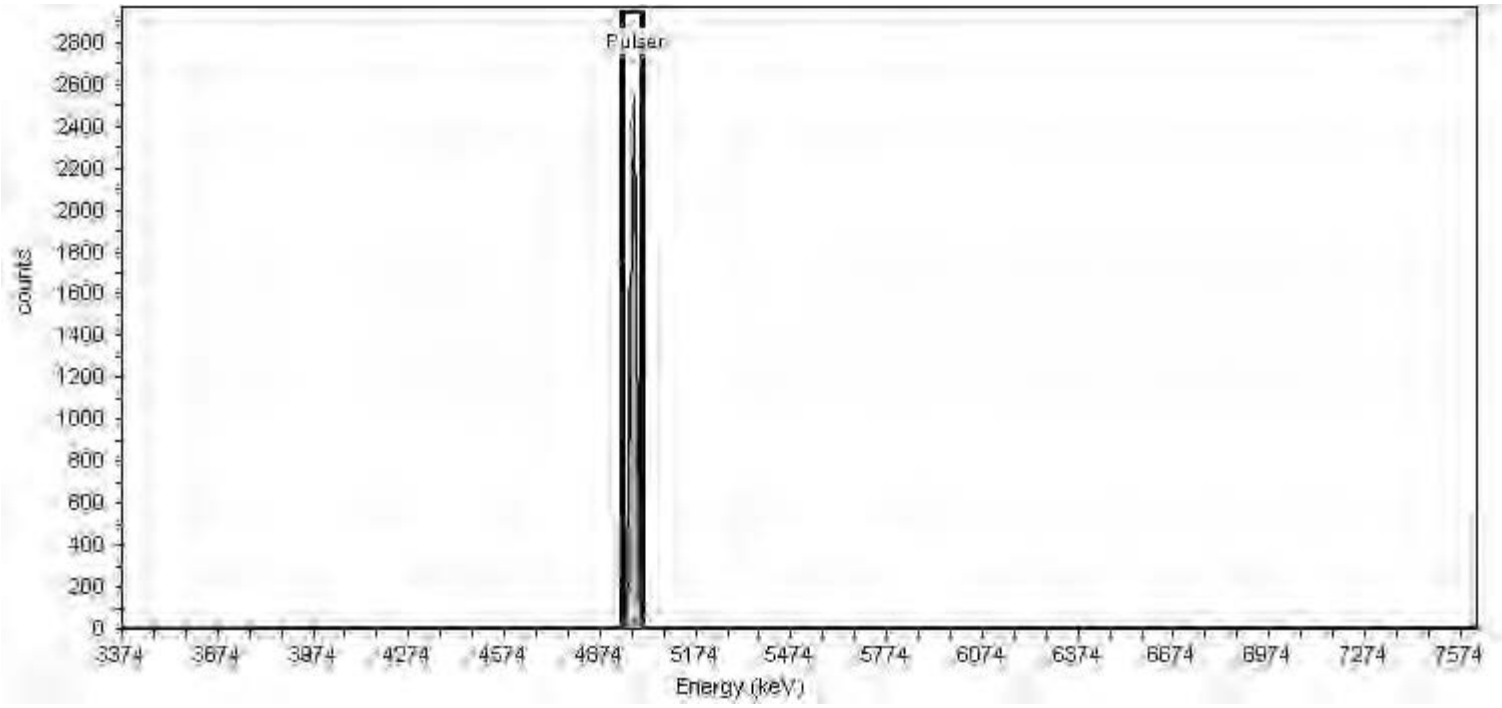
Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 8/28/2018 12:26:28AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV70-05152018
Calibration Date: 5/15/2018 6:36:23PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.40% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4978.810	4947.189	5010.431	18.58	6,771.91	7,465.29

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:02AM 8/28/2018

Sample

Sample Name: Pulser;AV71
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

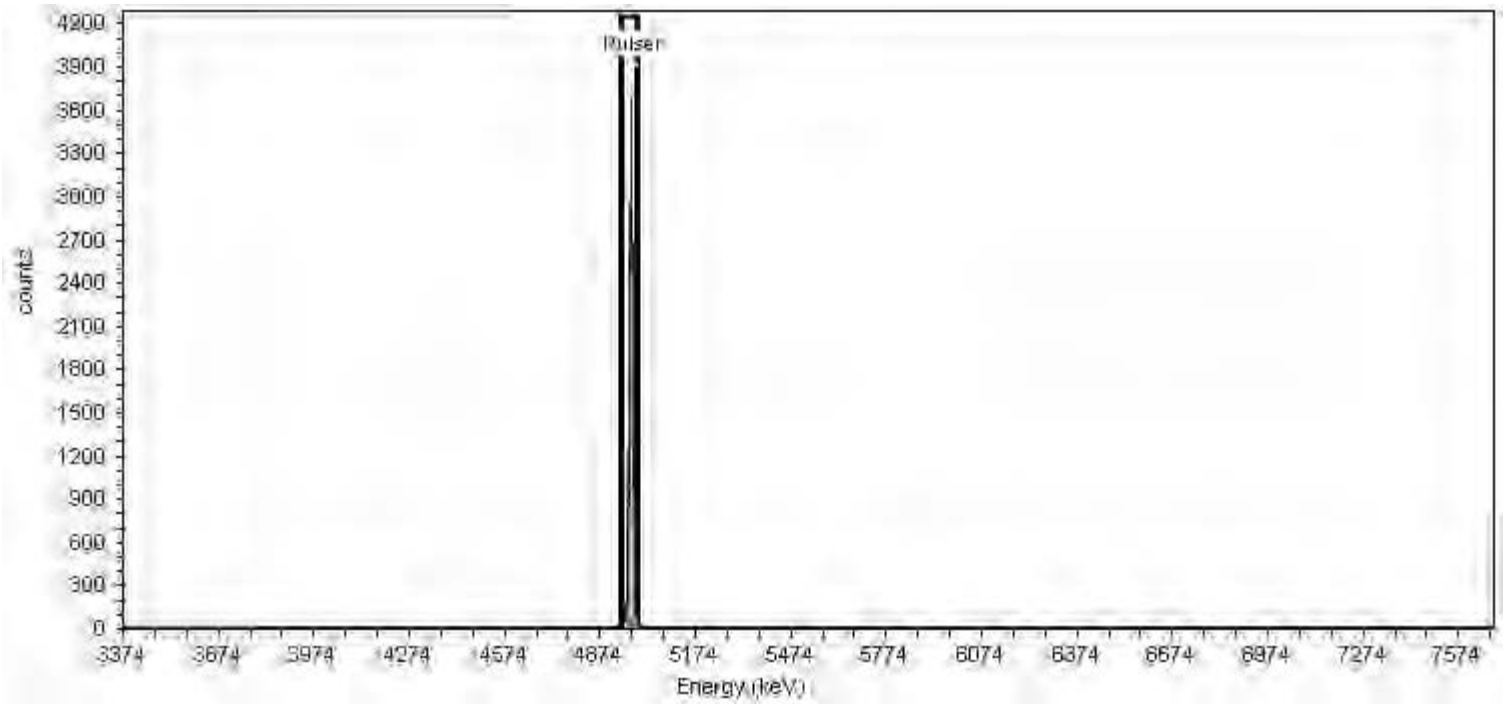
Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 8/28/2018 12:26:29AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV71-05152018
Calibration Date: 5/15/2018 6:36:40PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.00% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4970.596	4947.312	4993.880	13.68	7,204.98	7,466.08

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:11AM 8/28/2018

Sample

Sample Name: Pulser;AV72
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

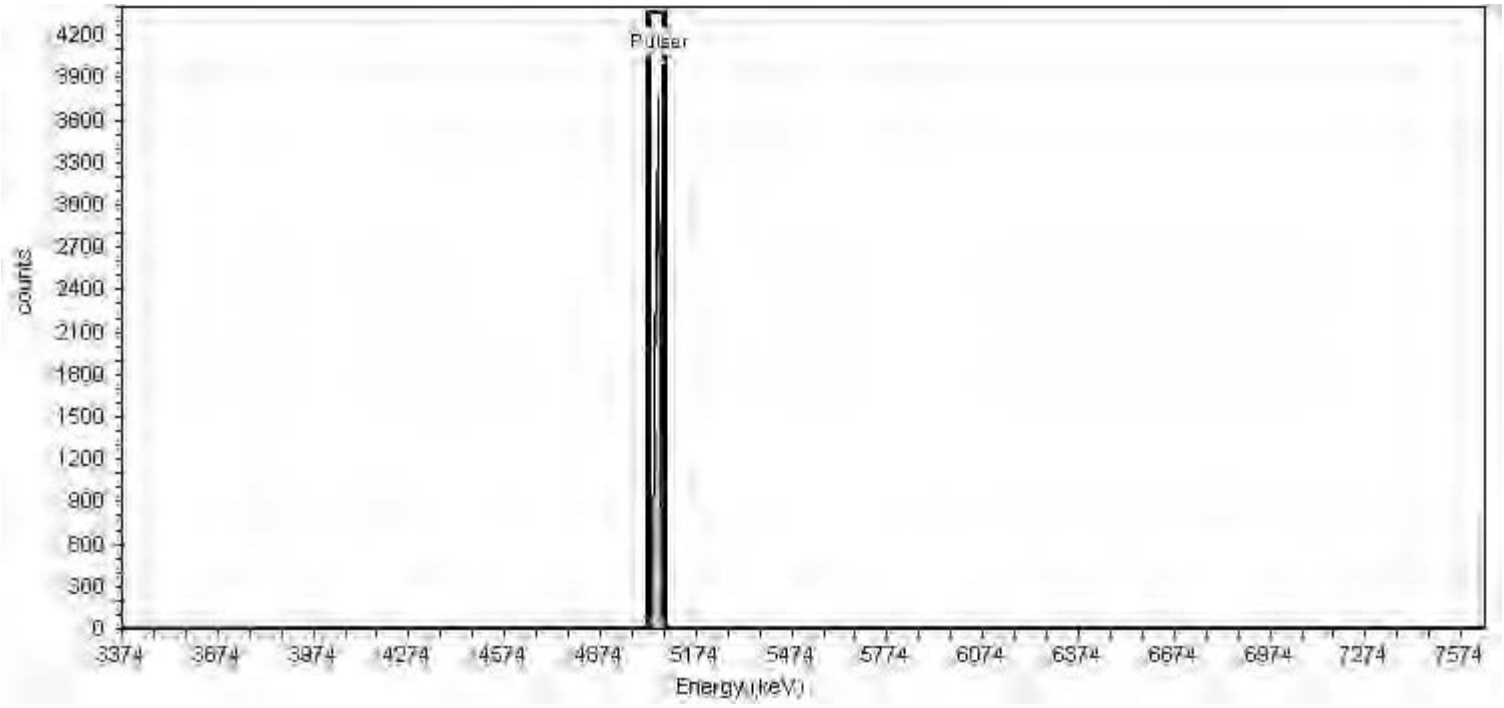
Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 8/28/2018 12:26:30AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV72-05152018
Calibration Date: 5/15/2018 6:36:51PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.58% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.172	5029.030	5075.315	13.60	7,339.90	7,464.84

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:20AM 8/28/2018

Sample

Sample Name: Pulser;AV73
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

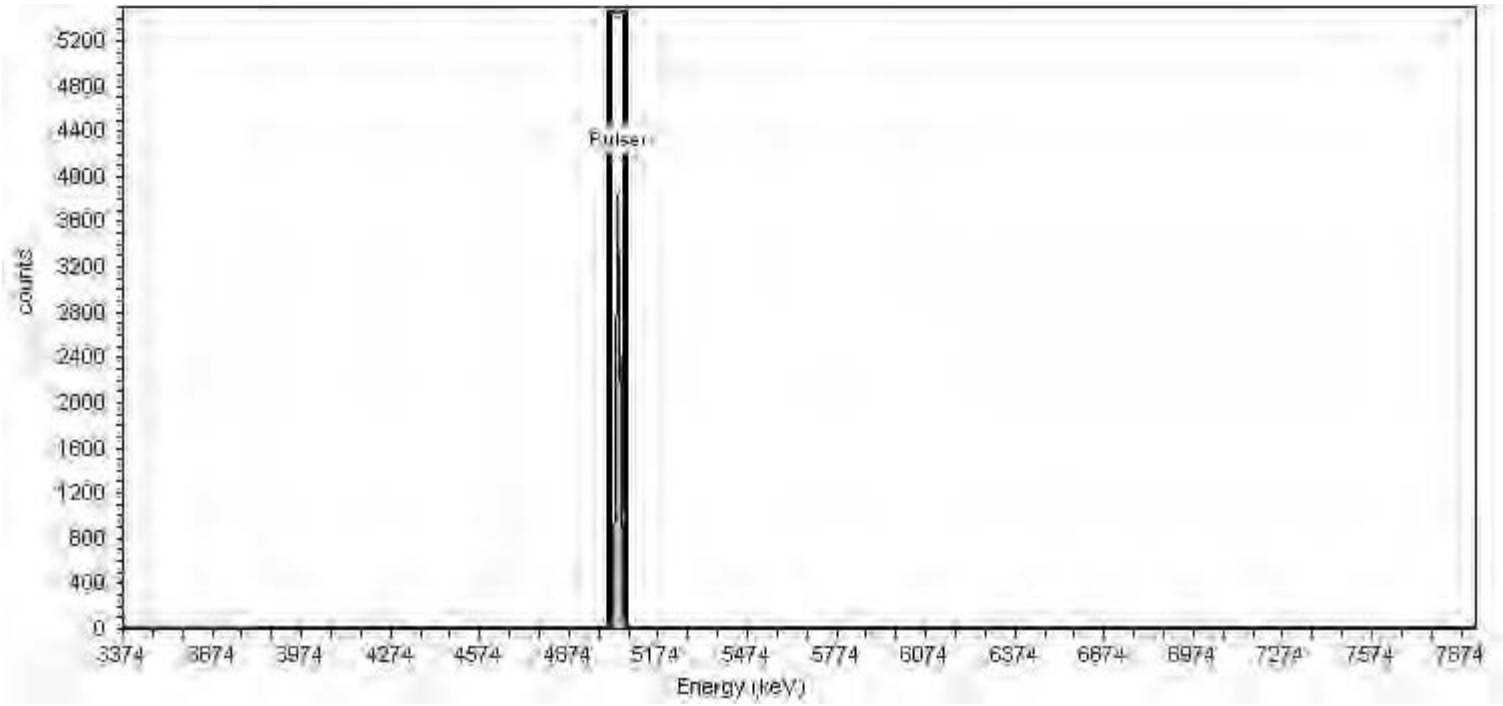
Acquisition

Detector: AV73 , SN: 46-03321
Acquisition Start Date: 8/28/2018 12:26:31AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.347	5014.453	5060.242	13.45	7,409.38	7,461.94

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:37AM 8/28/2018

Sample

Sample Name: Pulser;AV74
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

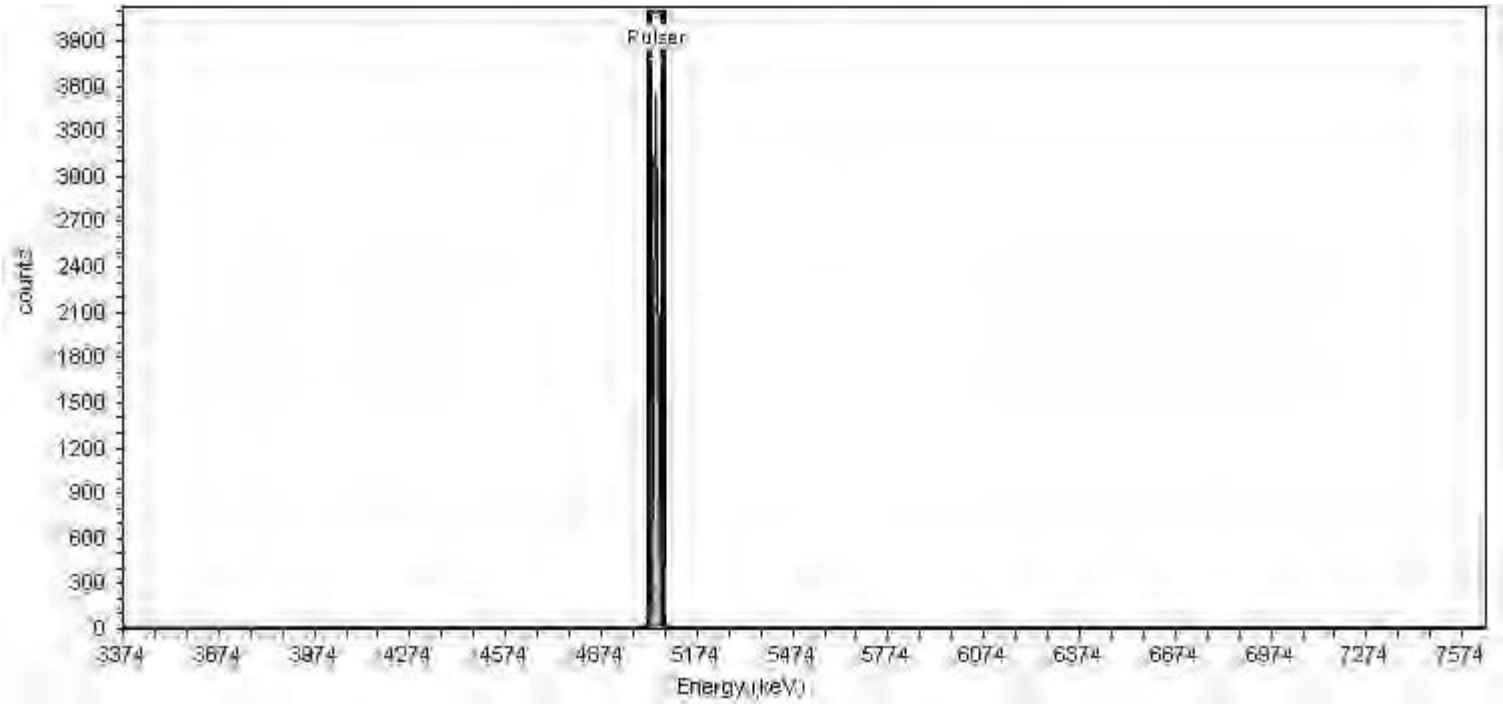
Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 8/28/2018 12:26:32AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV74-05152018
Calibration Date: 5/15/2018 6:37:13PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.68% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.312	5023.035	5067.590	13.09	6,680.11	7,153.64

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:47:44AM 8/28/2018

Sample

Sample Name: Pulser;AV75
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

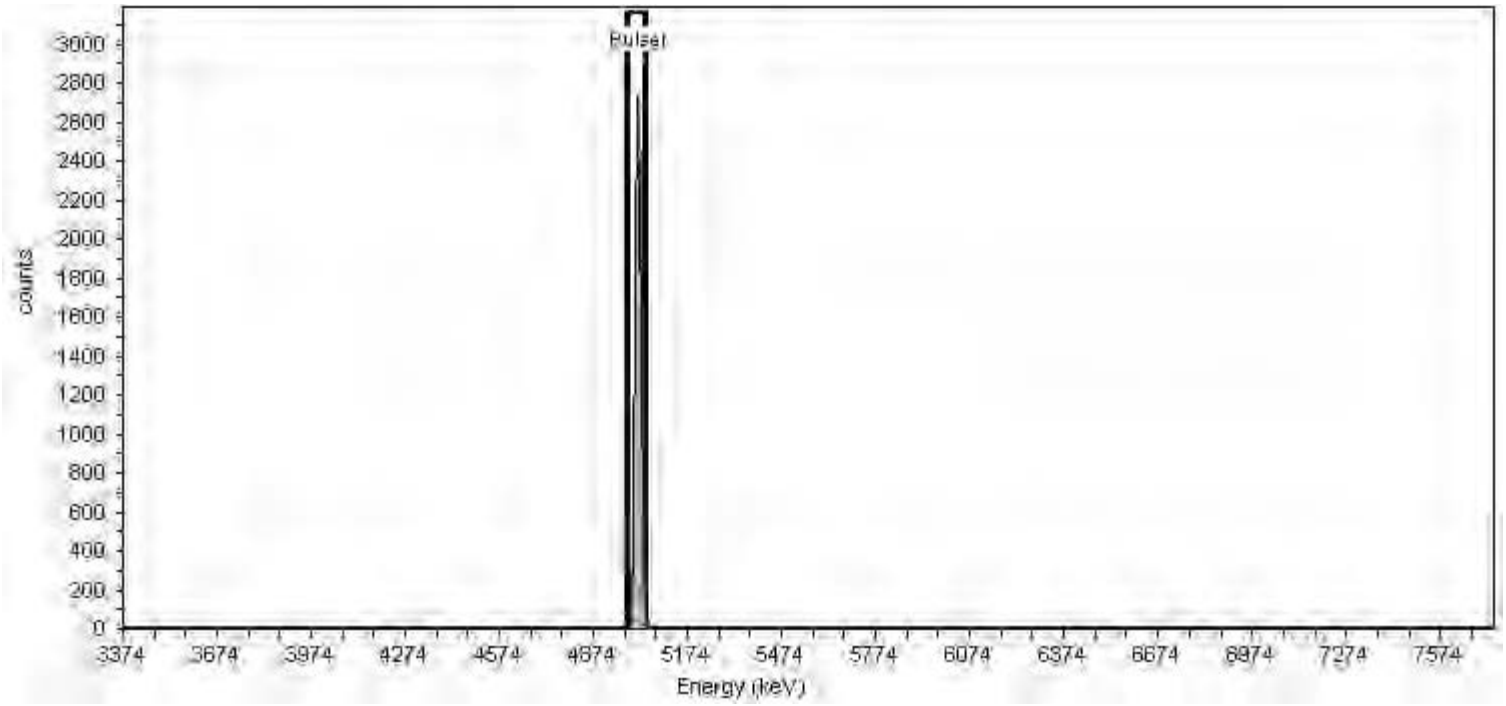
Acquisition

Detector: AV75 , SN: 51-082B4
Acquisition Start Date: 8/28/2018 12:39:19AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV75-05152018
Calibration Date: 5/15/2018 6:37:33PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.76% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.252	4983.765	5044.739	17.91	7,043.98	7,477.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:47:55AM 8/28/2018

Sample

Sample Name: Pulser;AV77
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

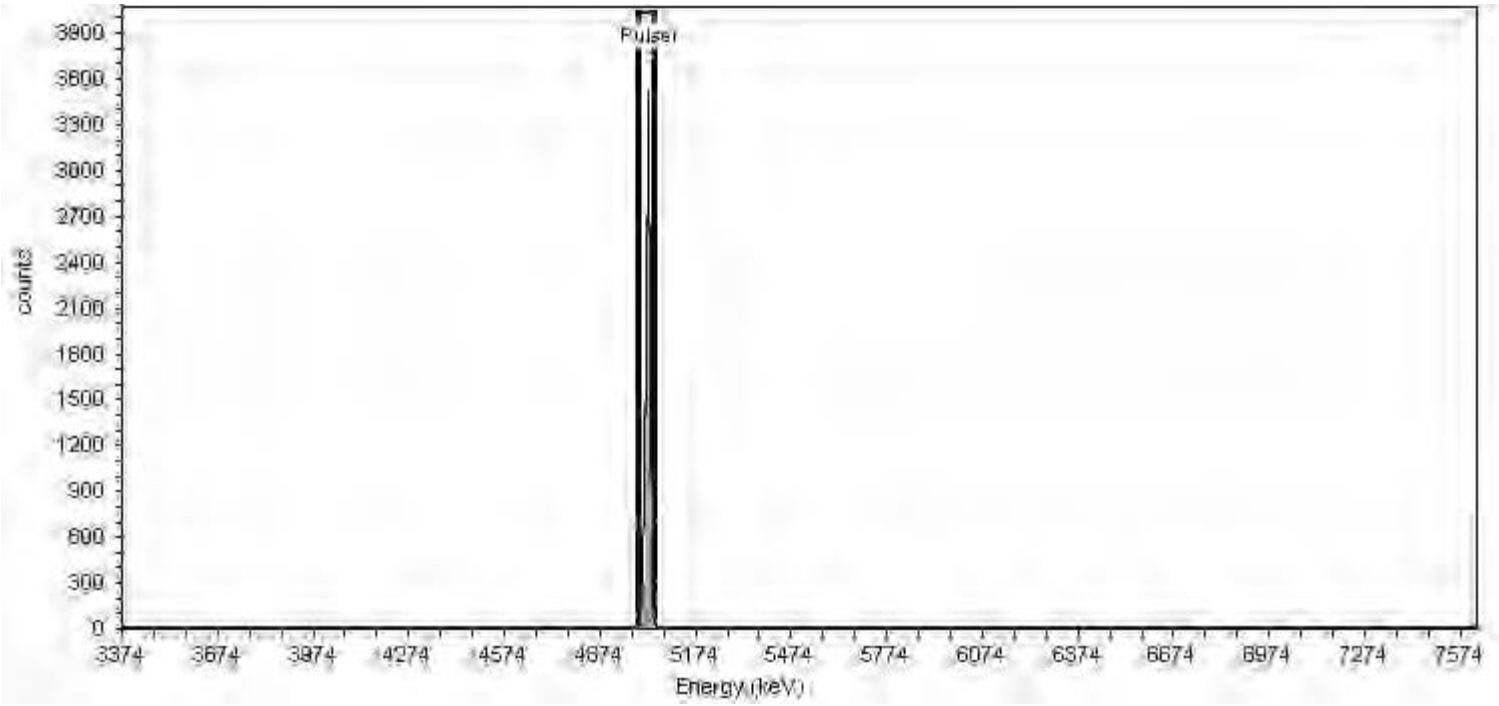
Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 8/28/2018 12:39:21AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-138446;AV77-05152018a
Calibration Date: 5/15/2018 6:39:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.42% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.590	4996.829	5048.351	15.13	7,629.32	7,560.11

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:48:03AM 8/28/2018

Sample

Sample Name: Pulser;AV78
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

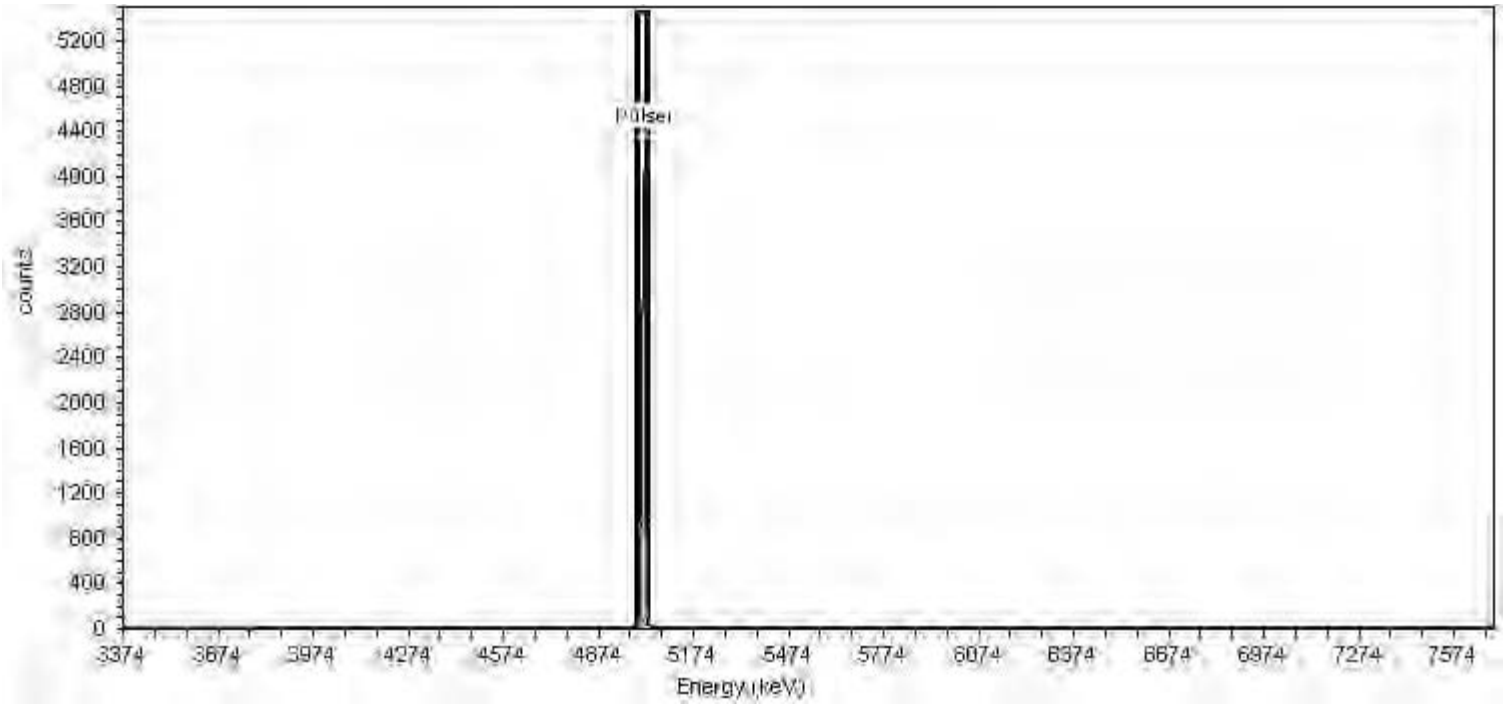
Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 8/28/2018 12:39:22AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-1368447;AV78-05152018
Calibration Date: 5/15/2018 6:37:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.77% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.116	4993.040	5037.191	12.97	7,524.58	7,366.42

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:48:12AM 8/28/2018

Sample

Sample Name: Pulser;AV79
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

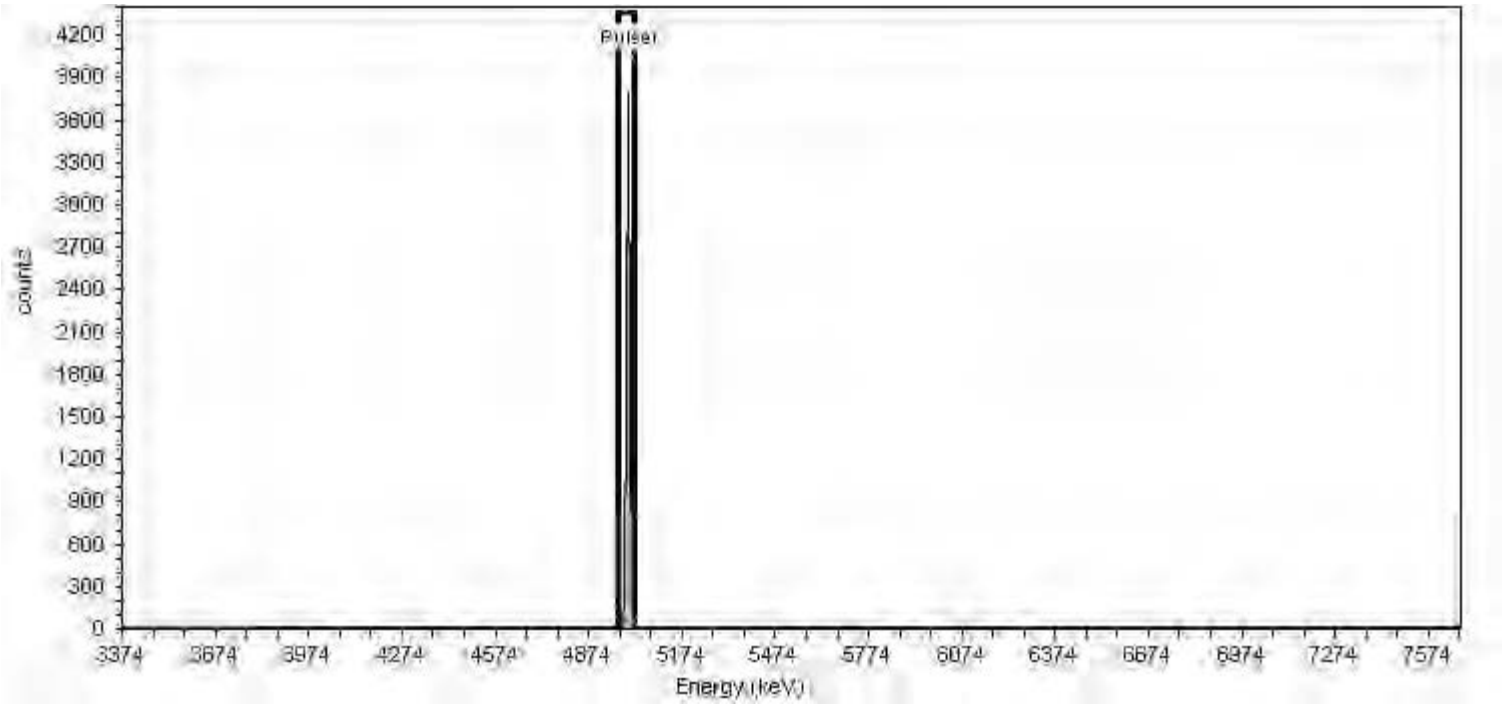
Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 8/28/2018 12:39:24AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-1370621;AV79-05152018
Calibration Date: 5/15/2018 6:38:06PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.16% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5000.129	4976.619	5023.640	13.81	7,500.21	7,515.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:48:21AM 8/28/2018

Sample

Sample Name: Pulser;AV80
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

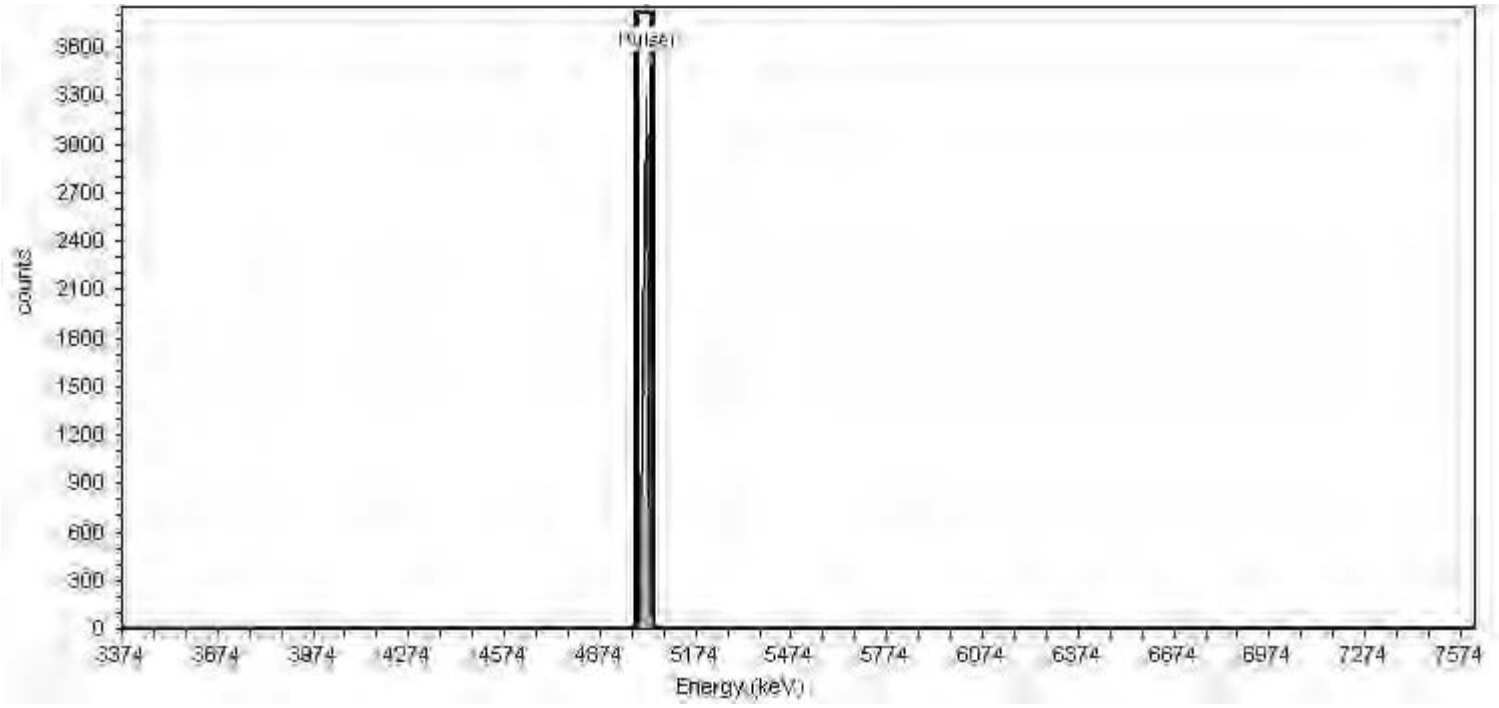
Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 8/28/2018 12:39:25AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-1370622;AV80-05152018
Calibration Date: 5/15/2018 6:38:17PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.537	4990.438	5038.635	14.16	6,707.69	7,488.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:19AM 8/28/2018

Sample

Sample Name: Pulser;AV81
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

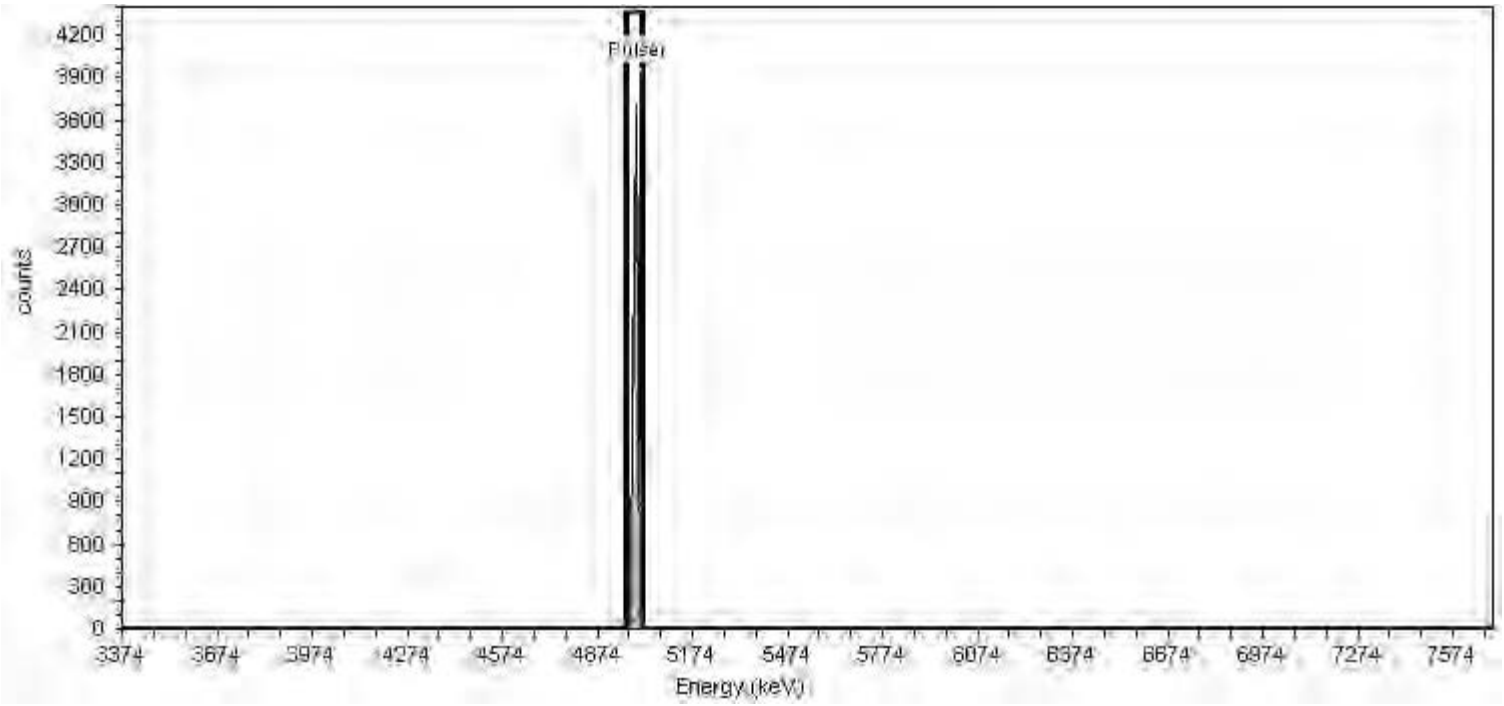
Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 8/28/2018 12:39:28AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-1370619;AV81-05152018
Calibration Date: 5/15/2018 6:38:28PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.25% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.396	4969.453	5015.339	13.48	7,170.74	7,488.86

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:05AM 8/28/2018

Sample

Sample Name: Pulser;AV82
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

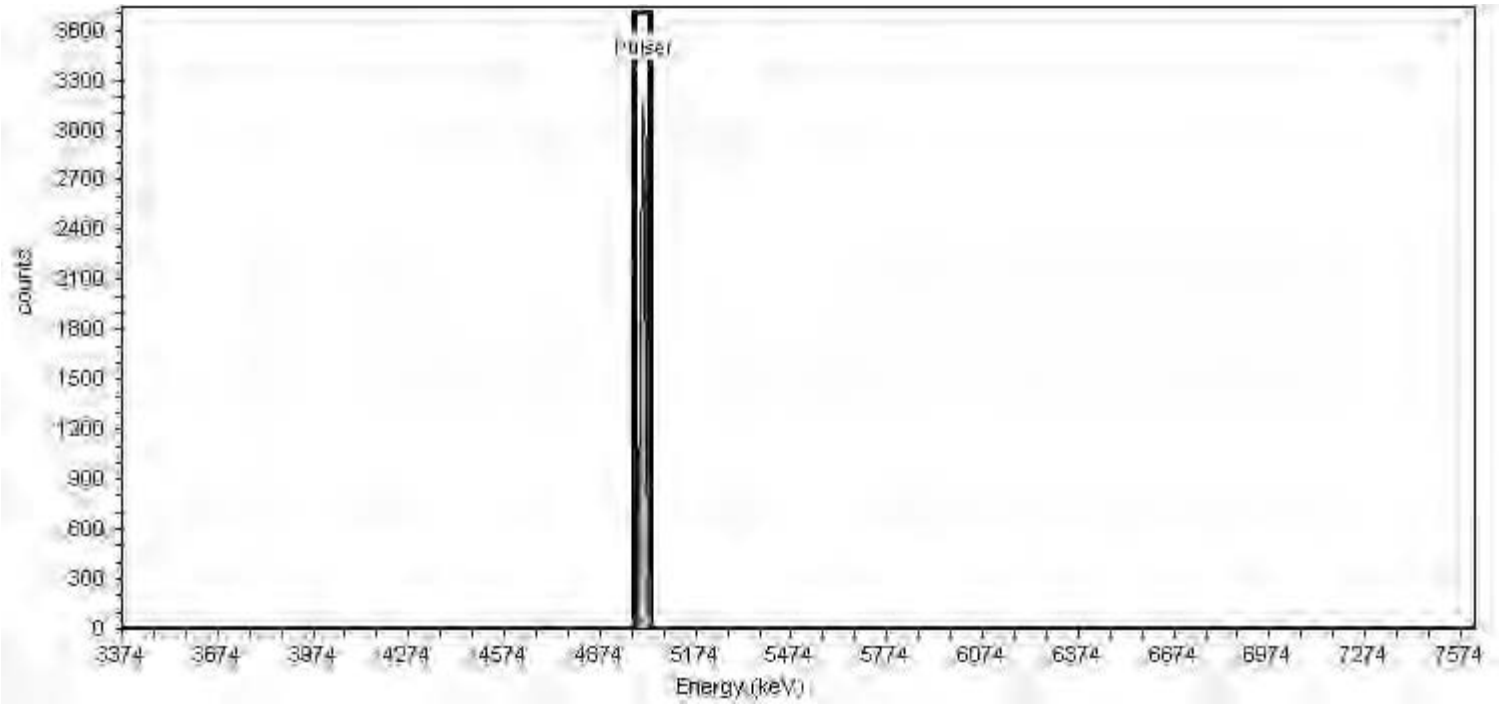
Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 8/28/2018 12:39:30AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-1370620;AV82-05152018
Calibration Date: 5/15/2018 6:38:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.51% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5006.791	4980.754	5032.827	15.30	6,934.31	7,474.10

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:28AM 8/28/2018

Sample

Sample Name: Pulser;AV83
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

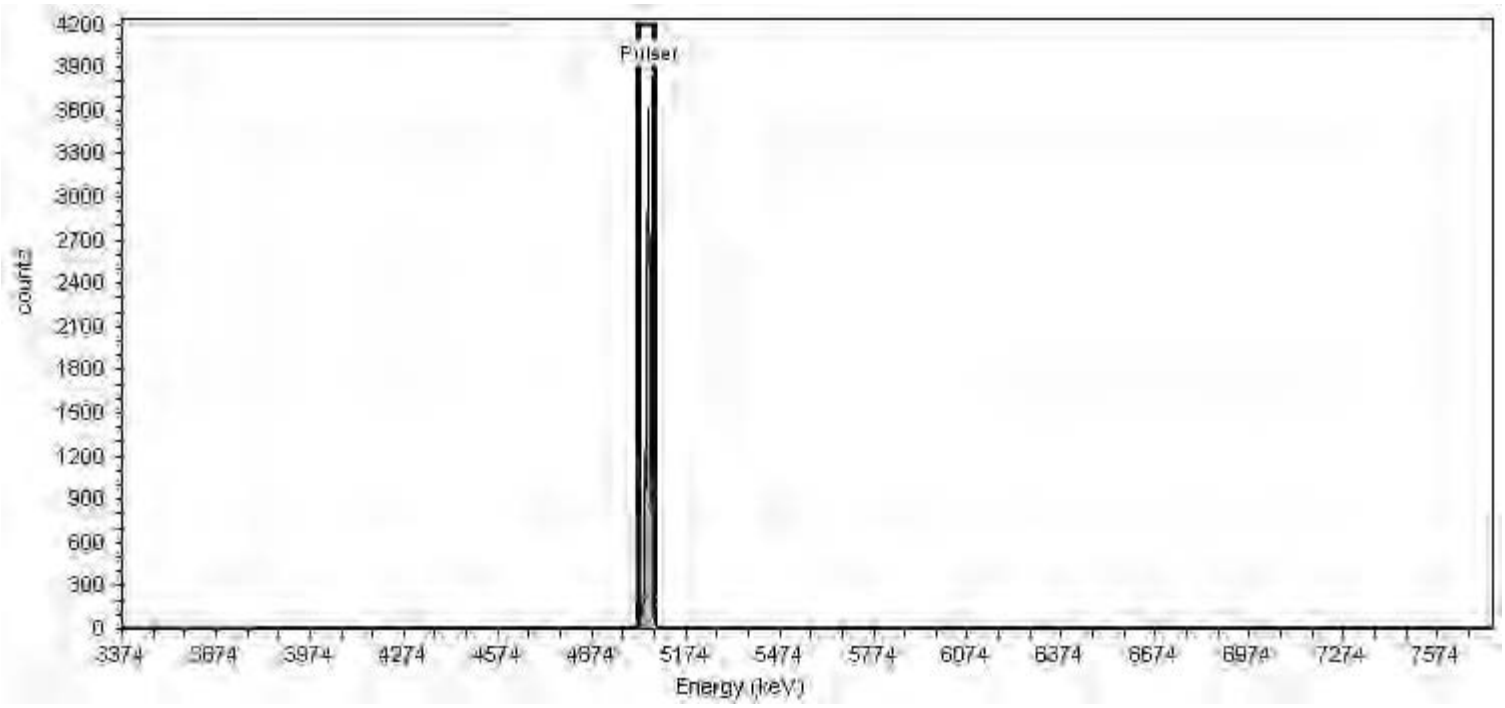
Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 8/28/2018 12:39:30AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV83-05162018a
Calibration Date: 5/17/2018 6:13:48AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.89% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.605	5027.525	5077.686	14.73	7,634.21	7,664.18

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:46AM 8/28/2018

Sample

Sample Name: Pulser;AV85
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

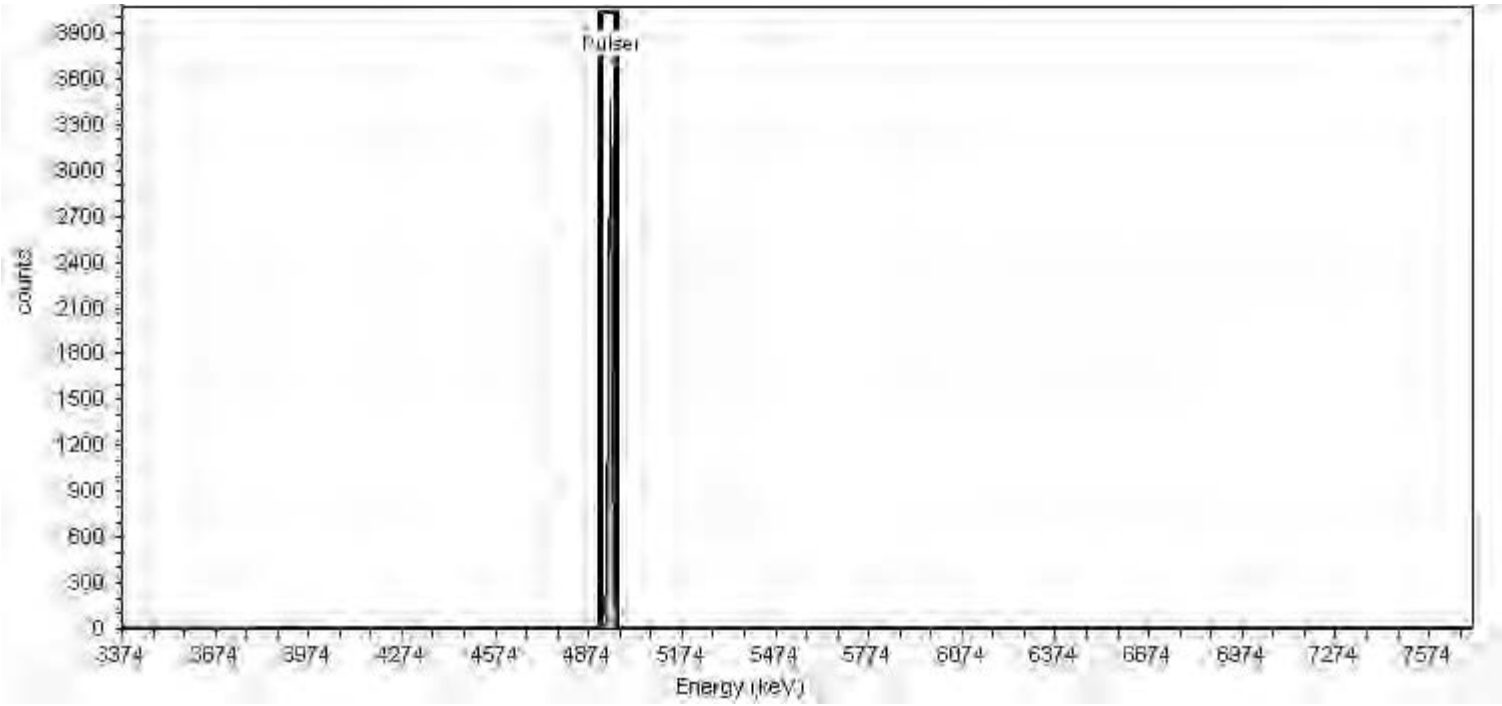
Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 8/28/2018 12:39:34AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV85-05162018a
Calibration Date: 5/17/2018 6:14:11AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.22% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4939.826	4914.785	4964.868	14.71	7,311.09	7,666.78

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:54AM 8/28/2018

Sample

Sample Name: Pulser;AV86
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

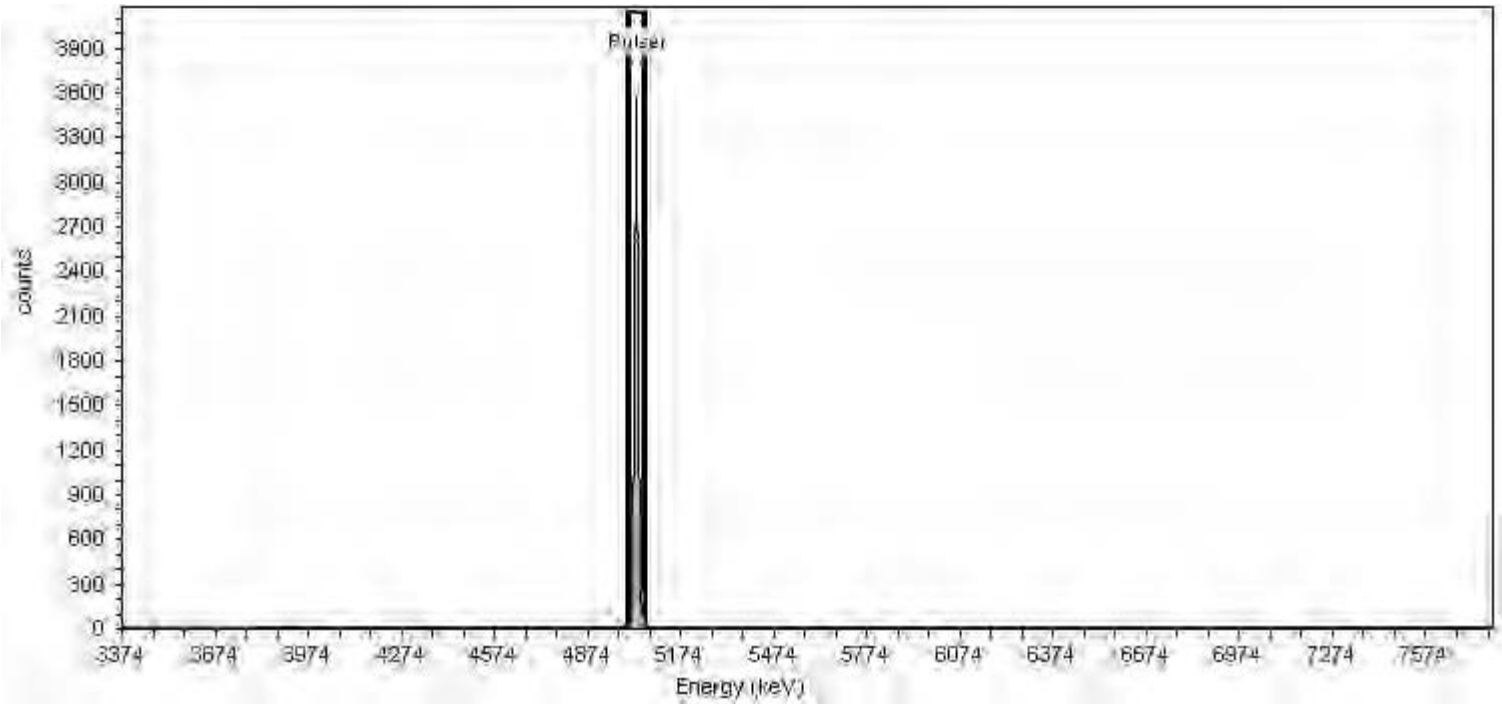
Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 8/28/2018 12:39:36AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV86-05162018a
Calibration Date: 5/17/2018 6:14:27AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.68% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.058	5004.951	5055.165	14.75	7,551.70	7,663.31

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:46:03AM 8/28/2018

Sample

Sample Name: Pulser;AV88
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

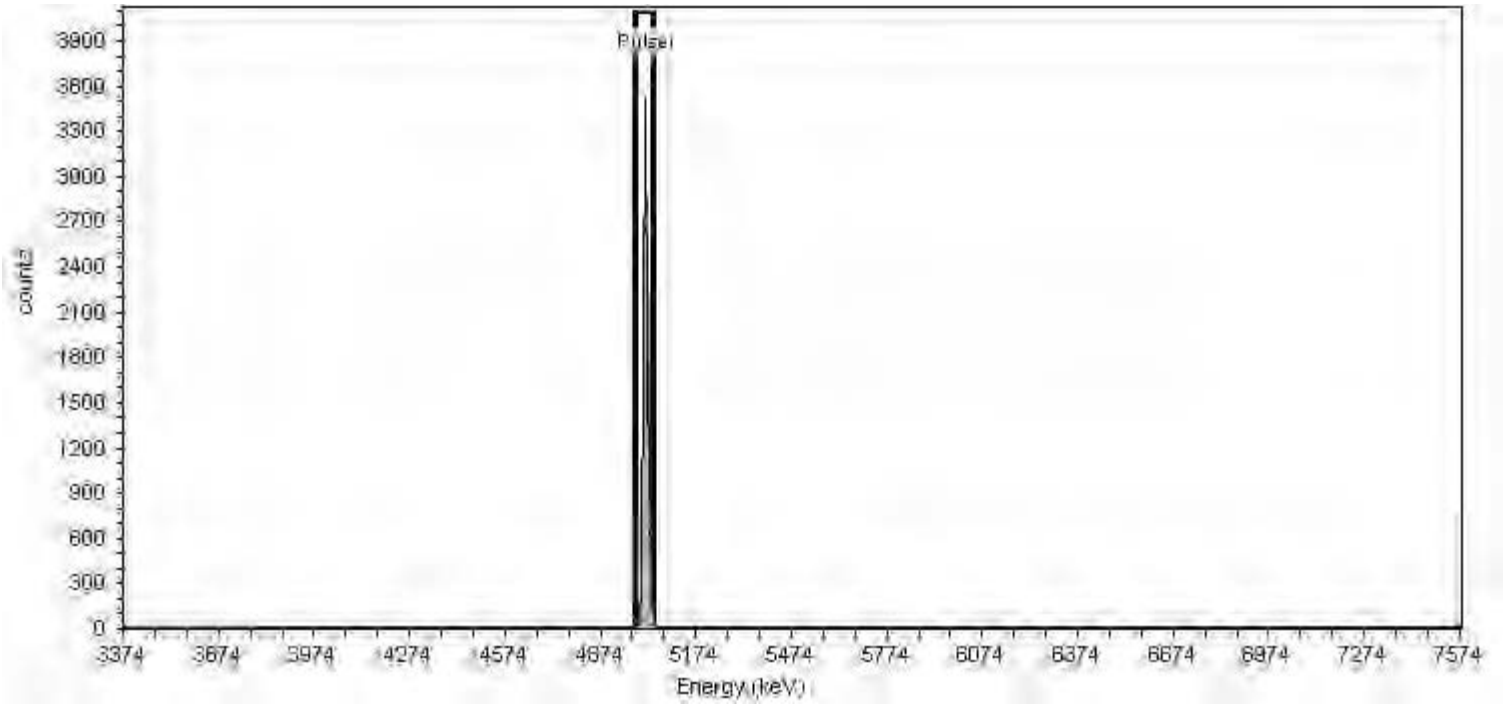
Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 8/28/2018 12:39:37AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV88-05162018a
Calibration Date: 5/17/2018 6:14:39AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.712	4988.630	5040.794	15.32	7,737.52	7,641.15

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:46:25AM 8/28/2018

Sample

Sample Name: Pulser;AV91
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: August2018c
Description:

Analyst: 60040

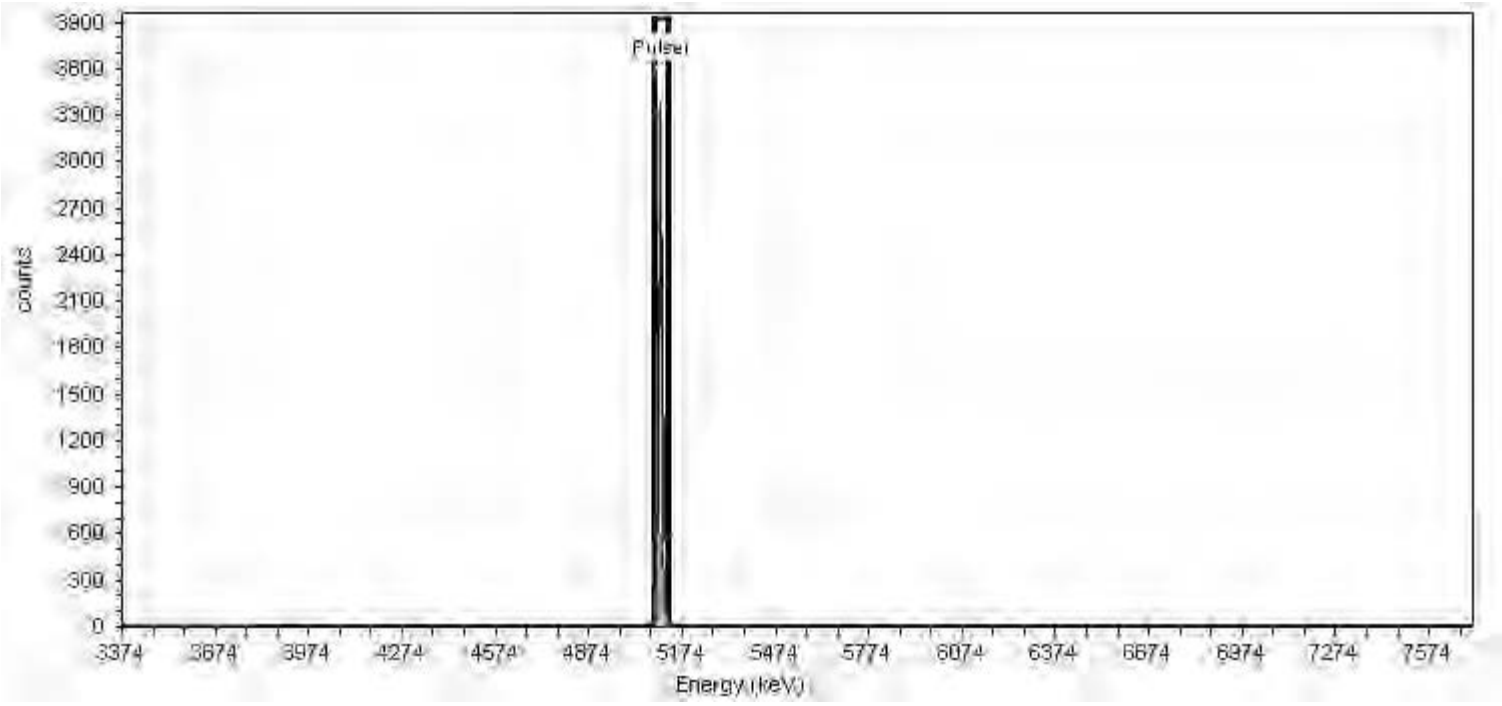
Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 8/28/2018 12:39:40AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV91-05162018
Calibration Date: 5/17/2018 6:11:48AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.75% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5105.561	5083.088	5128.034	13.20	6,394.99	7,248.73

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:48AM 8/28/2018

Sample

Sample Name: Pulser;AV148
Comment:

Spectrum #3 Analysis #1

Batch

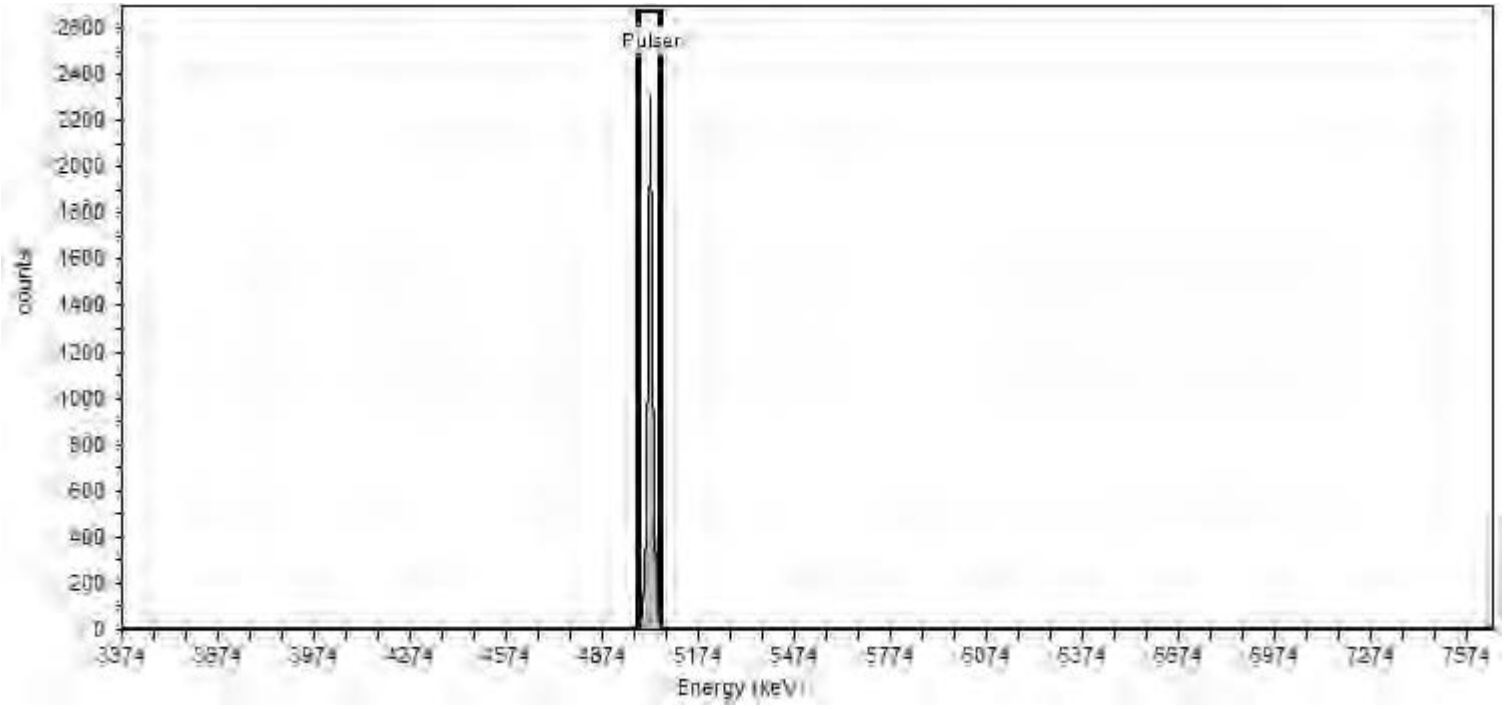
Batch Name: August2018a
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 8/28/2018 12:14:11AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV148-20171113a
Calibration Date: 11/13/2017 12:24:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.455	4990.032	5054.878	19.05	6,289.92	5,992.44

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:08AM 8/28/2018

Sample

Sample Name: Pulser;AV151
Comment:

Spectrum #3 Analysis #1

Batch

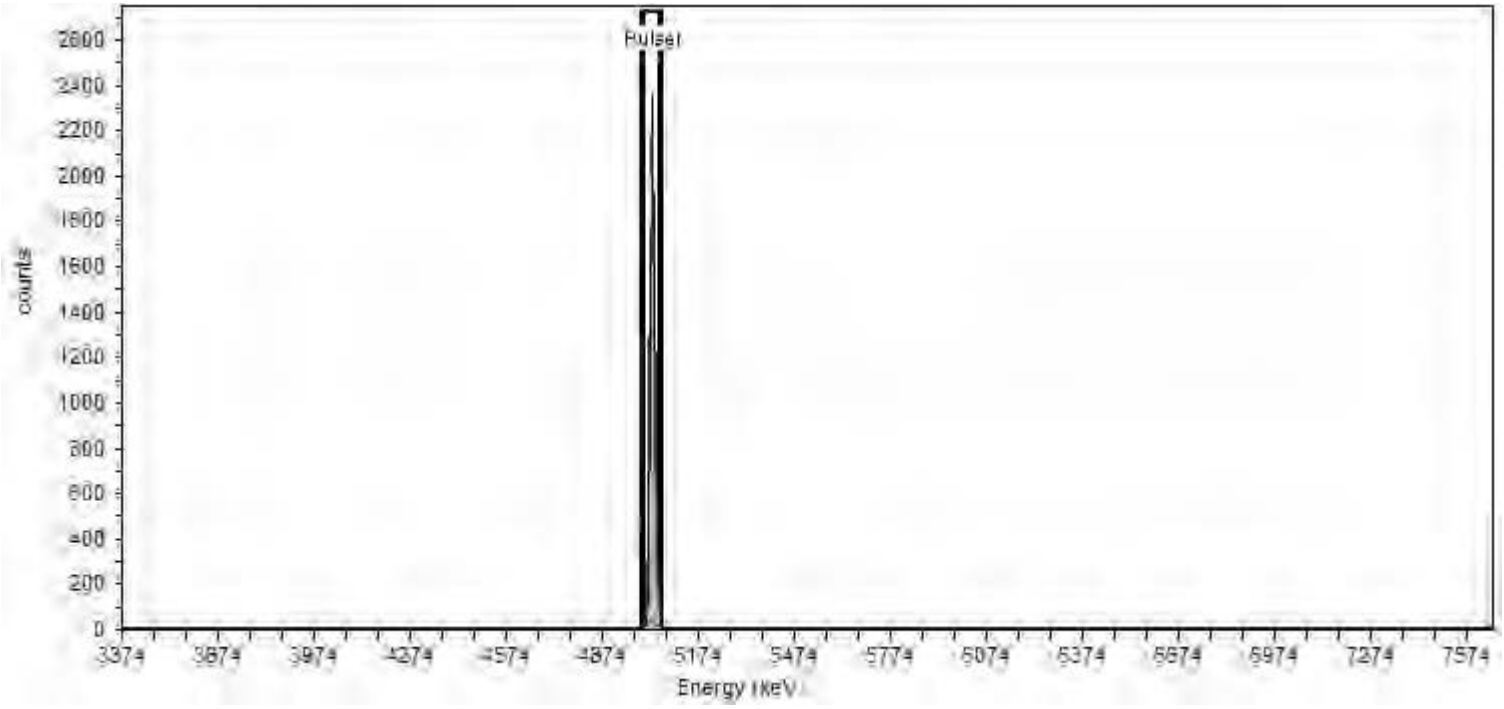
Batch Name: August2018a
Description:

Acquisition

Detector: AV151 , SN: 50-05/R5
Acquisition Start Date: 8/28/2018 12:14:12AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV151-20171113
Calibration Date: 11/13/2017 12:21:30PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.803	5002.553	5059.054	16.60	5,615.69	5,959.50

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:00AM 8/28/2018

Sample

Sample Name: Pulser;AV152
Comment:

Spectrum #3 Analysis #1

Batch

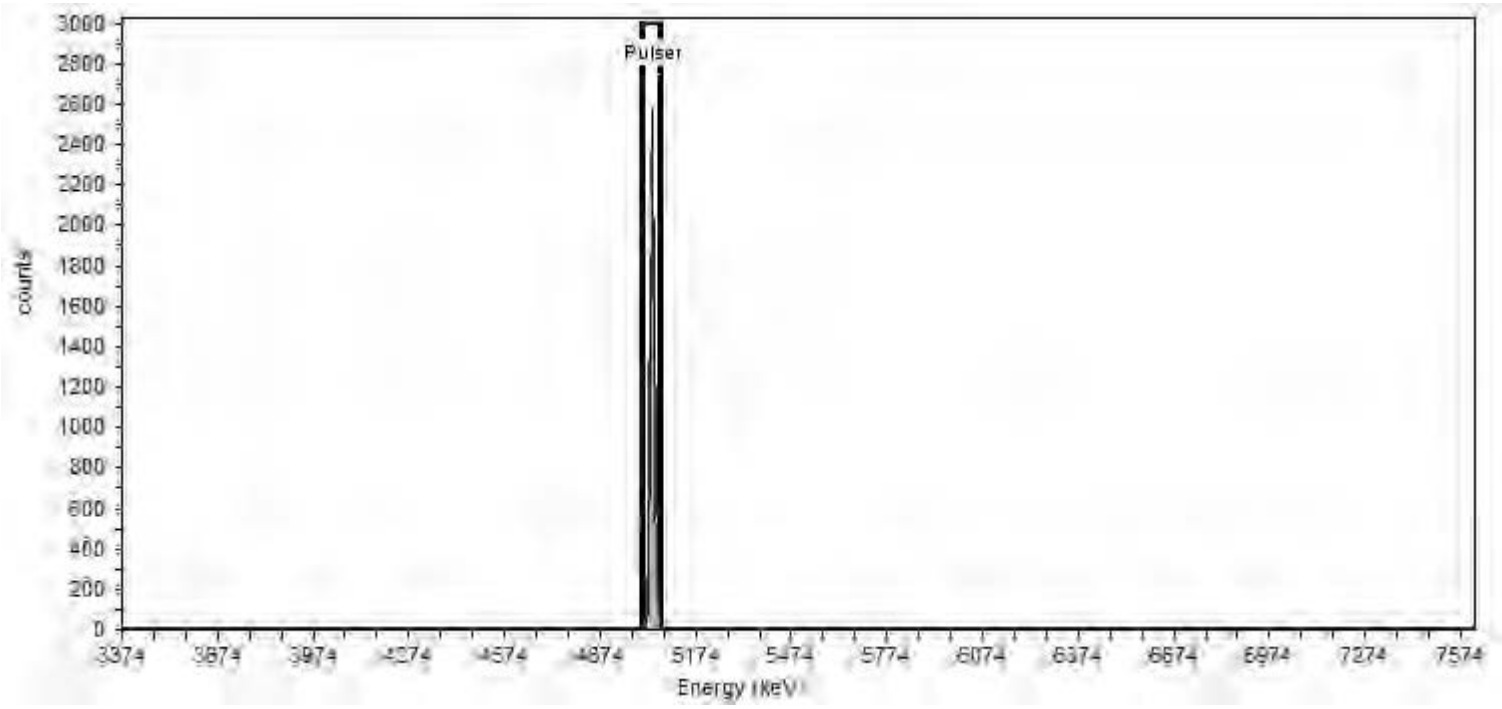
Batch Name: August2018a
Description:

Acquisition

Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 8/28/2018 12:14:12AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV152-20171113
Calibration Date: 11/13/2017 12:21:36PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.300	5012.519	5064.082	15.15	5,599.33	5,996.19

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:05AM 8/28/2018

Sample

Sample Name: Pulser;AV153
Comment:

Spectrum #3 Analysis #1

Batch

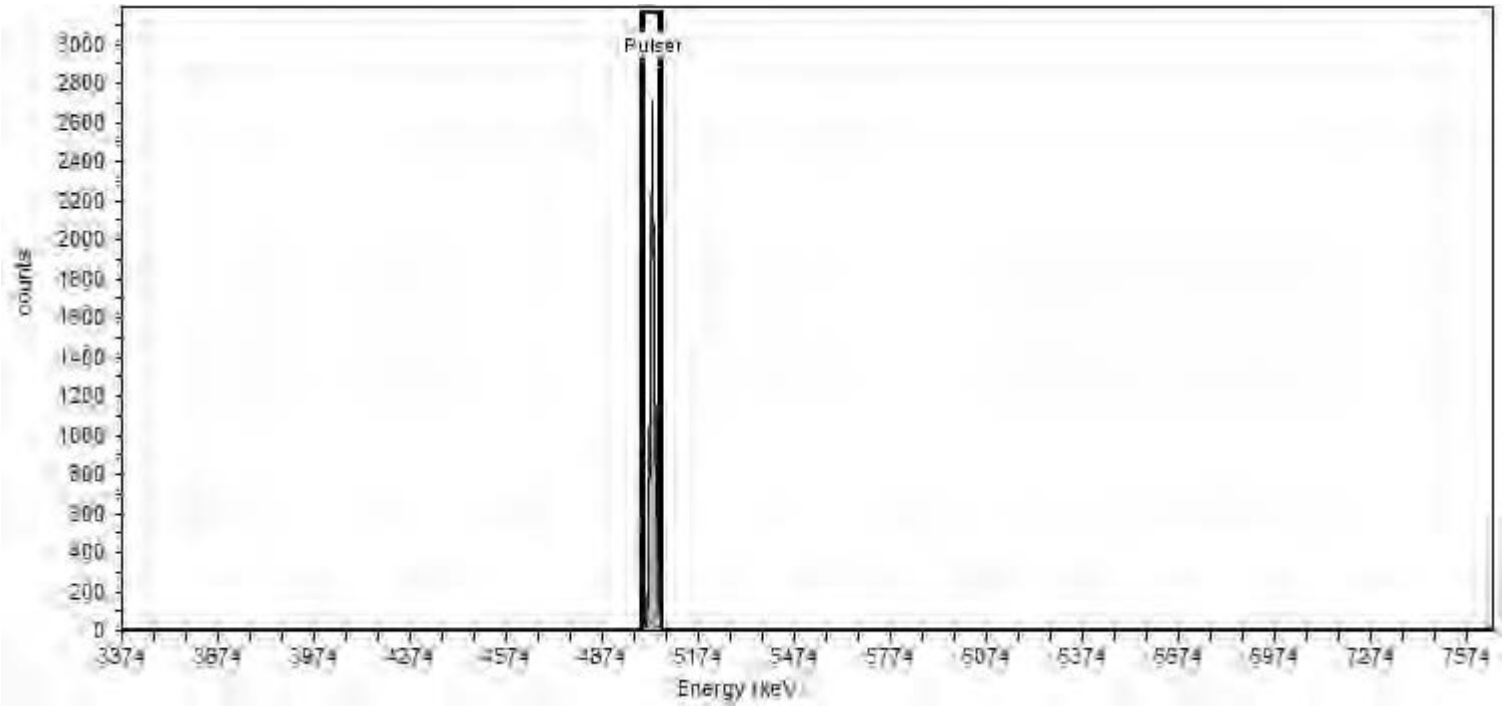
Batch Name: August2018a
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 8/28/2018 12:14:12AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8879;AV153-20171113
Calibration Date: 11/13/2017 12:21:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.183	5003.995	5056.372	15.39	5,980.32	5,994.32

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:03AM 8/28/2018

Sample

Sample Name: Pulser;AV154
Comment:

Spectrum #3 Analysis #1

Batch

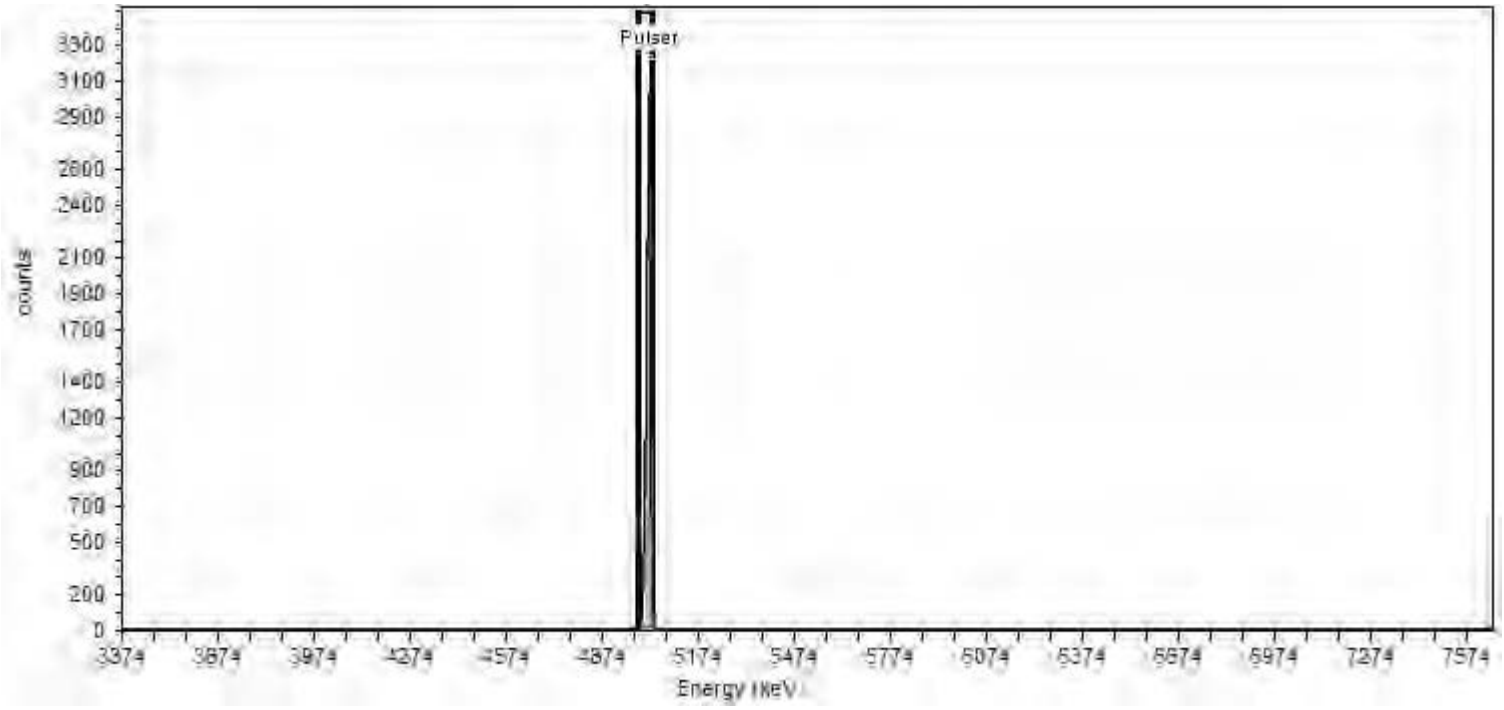
Batch Name: August2018a
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 8/28/2018 12:14:12AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV154-20171113
Calibration Date: 11/13/2017 12:21:47PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.688	4992.127	5037.250	13.25	5,775.68	5,830.99

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:13AM 8/28/2018

Sample

Sample Name: Pulser;AV156
Comment:

Spectrum #3 Analysis #1

Batch

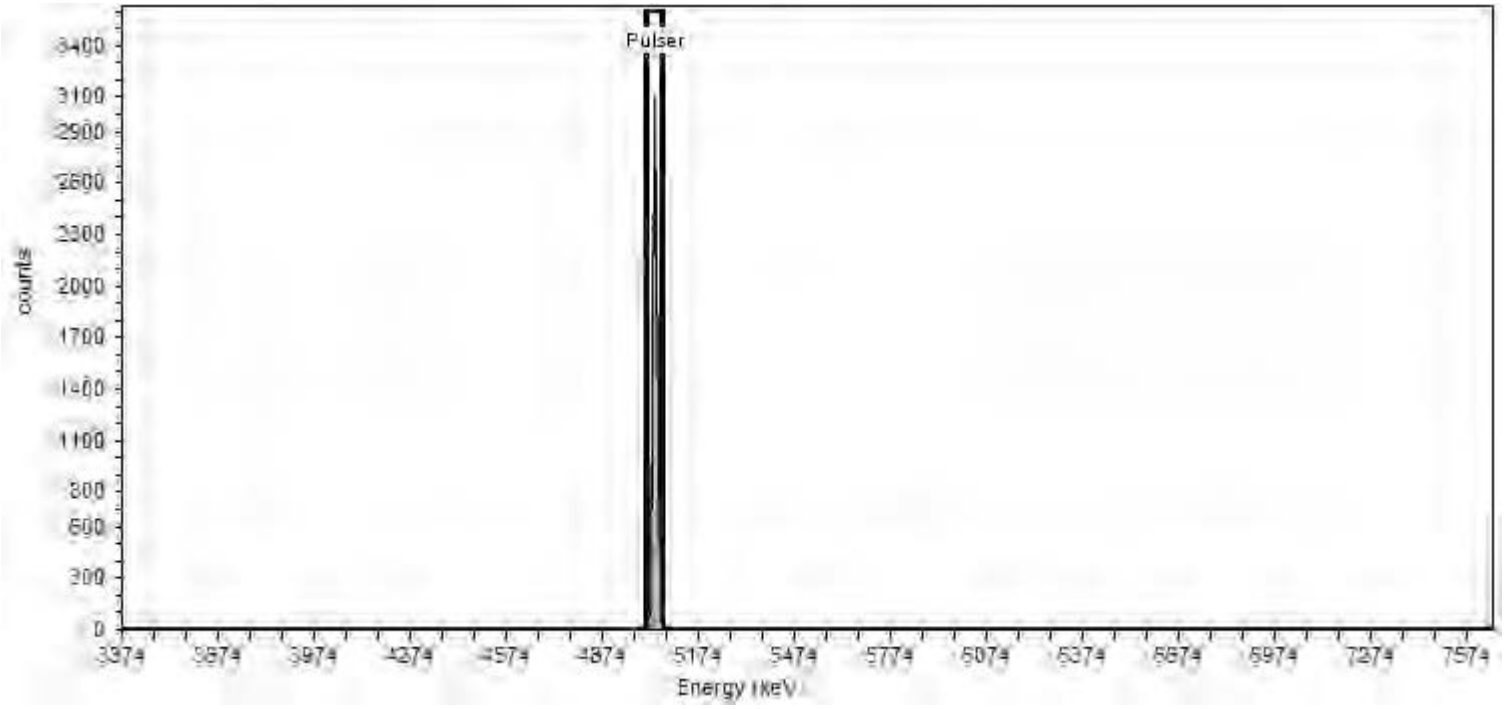
Batch Name: August2018a
Description:

Acquisition

Detector: AV156 , SN: 49-155n4
Acquisition Start Date: 8/28/2018 12:14:13AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV156-20171113a
Calibration Date: 11/13/2017 12:25:07PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.669	5014.752	5060.585	13.46	5,985.92	6,009.67

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:18AM 8/28/2018

Sample

Sample Name: Pulser;AV158
Comment:

Spectrum #3 Analysis #1

Batch

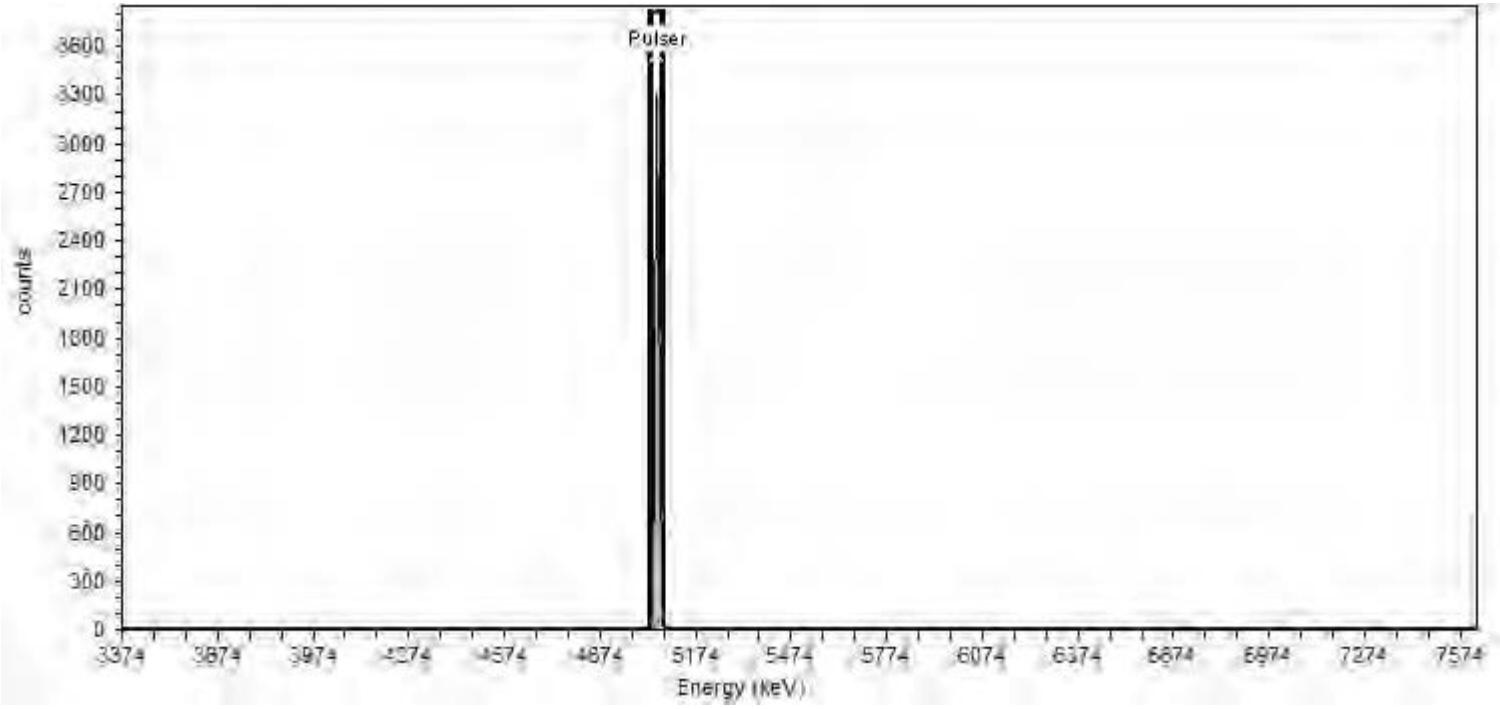
Batch Name: August2018a
Description:

Acquisition

Detector: AV158 , SN: 50-05/II4
Acquisition Start Date: 8/28/2018 12:14:13AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV158-20171115
Calibration Date: 11/15/2017 11:00:01AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.328	5030.920	5073.735	12.58	5,957.03	5,901.67

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:16AM 8/28/2018

Sample

Sample Name: Pulser;AV159
Comment:

Spectrum #3 Analysis #1

Batch

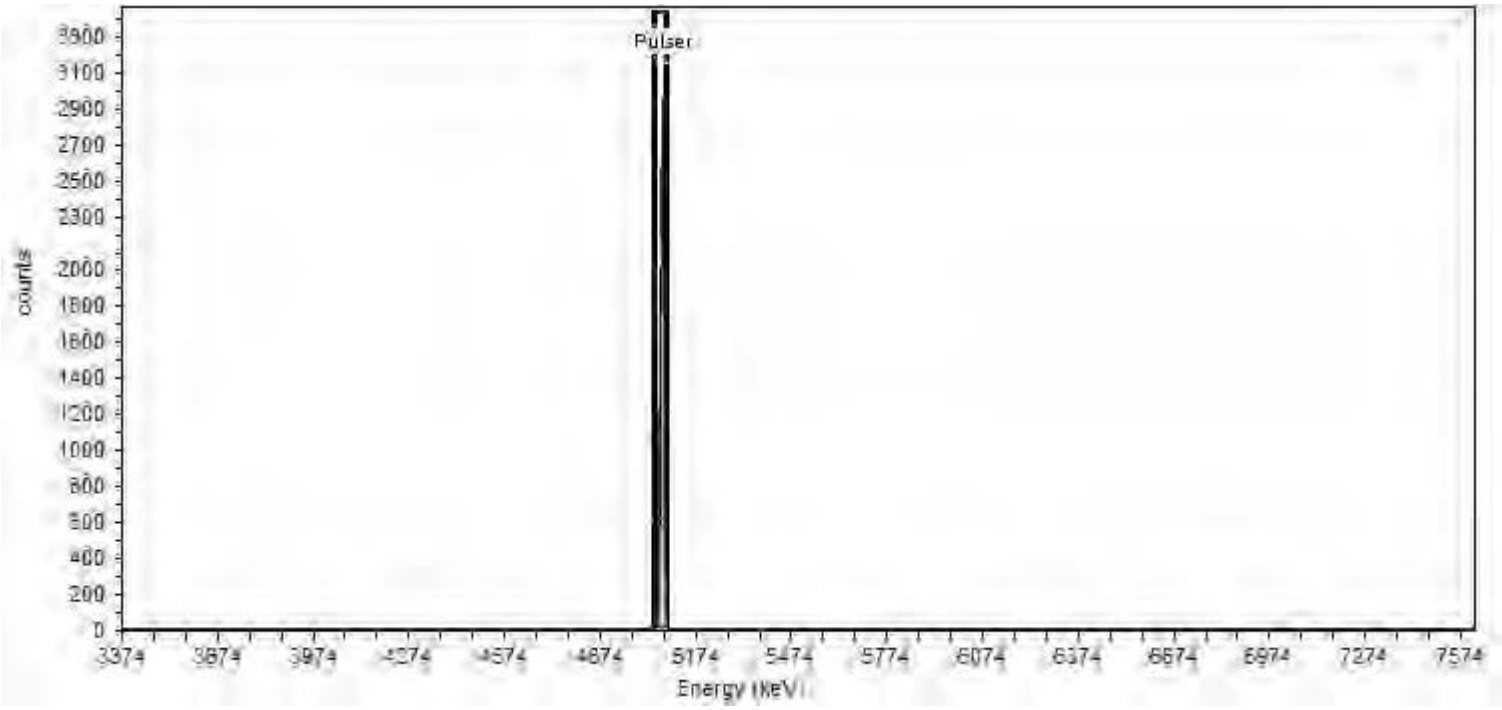
Batch Name: August2018a
Description:

Acquisition

Detector: AV159 , SN: 50-05/II5
Acquisition Start Date: 8/28/2018 12:14:13AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV159-20171113a
Calibration Date: 11/13/2017 12:26:23PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5067.620	5045.711	5089.528	12.87	5,479.72	5,759.66

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:29AM 8/28/2018

Sample

Sample Name: Pulser;AV160
Comment:

Spectrum #3 Analysis #1

Batch

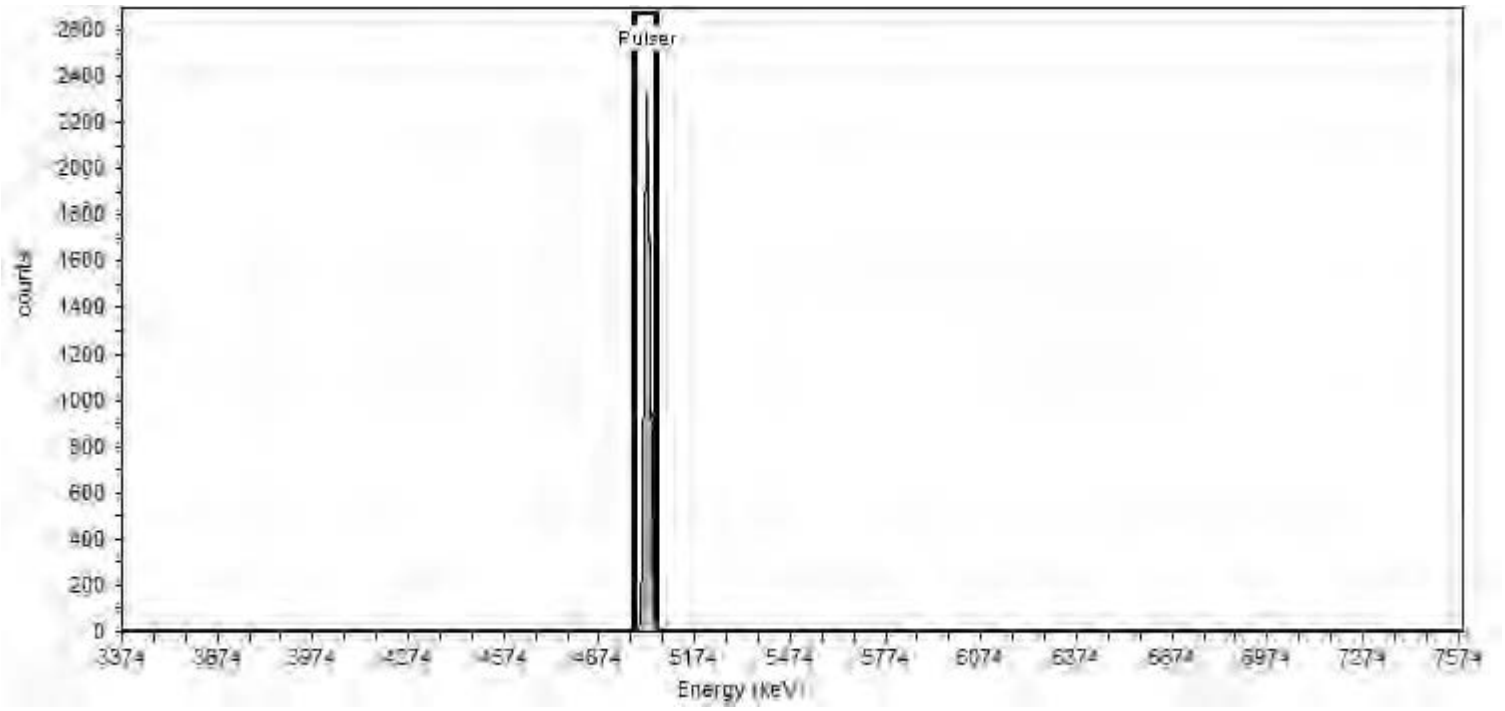
Batch Name: August2018a
Description:

Acquisition

Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 8/28/2018 12:14:14AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV160-20171113
Calibration Date: 11/13/2017 12:24:43PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.511	4991.516	5053.505	18.21	6,075.28	6,007.07

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:21AM 8/28/2018

Sample

Sample Name: Pulser;AV161
Comment:

Spectrum #3 Analysis #1

Batch

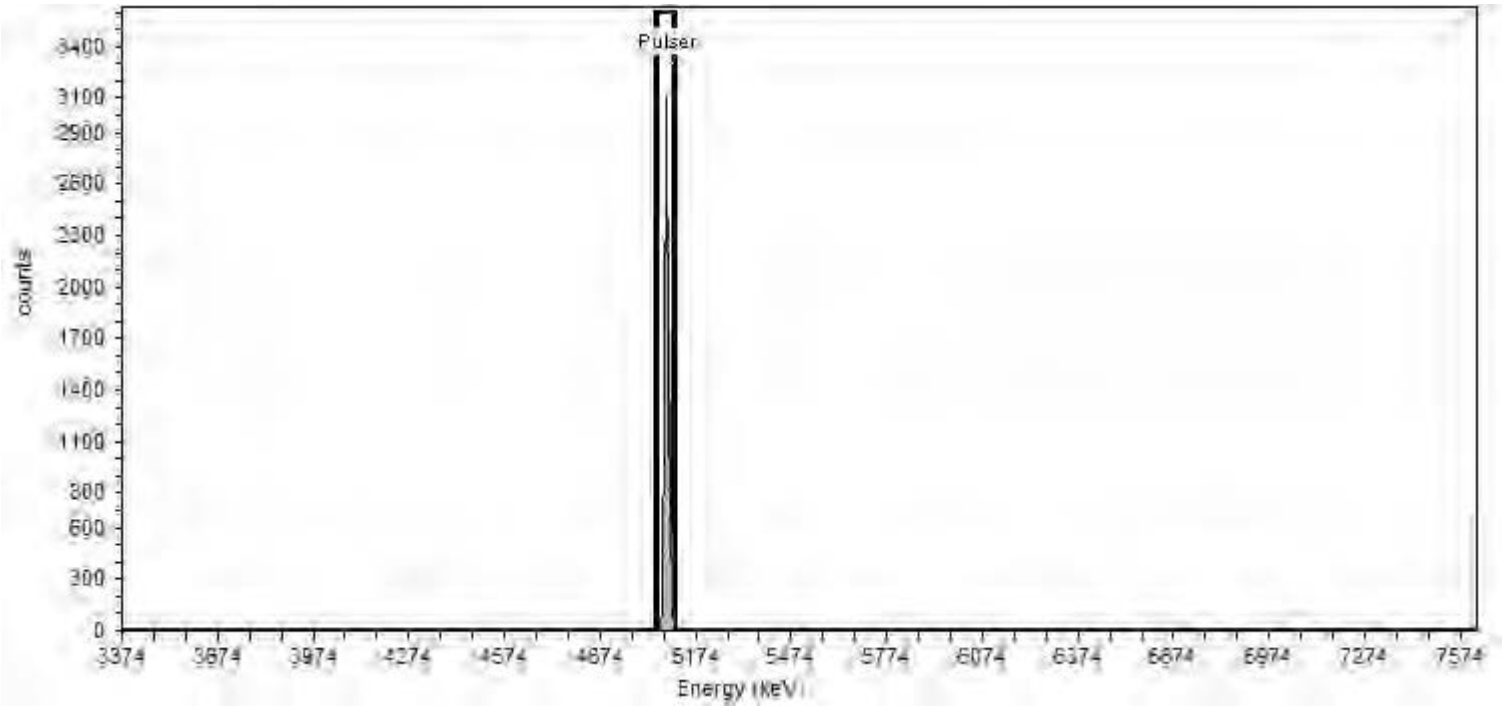
Batch Name: August2018a
Description:

Acquisition

Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 8/28/2018 12:14:14AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9886;AV161-20171113
Calibration Date: 11/13/2017 12:24:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5081.967	5058.662	5105.272	13.69	6,091.34	6,026.33

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:33AM 8/28/2018

Sample

Sample Name: Pulser;AV164
Comment:

Spectrum #3 Analysis #1

Batch

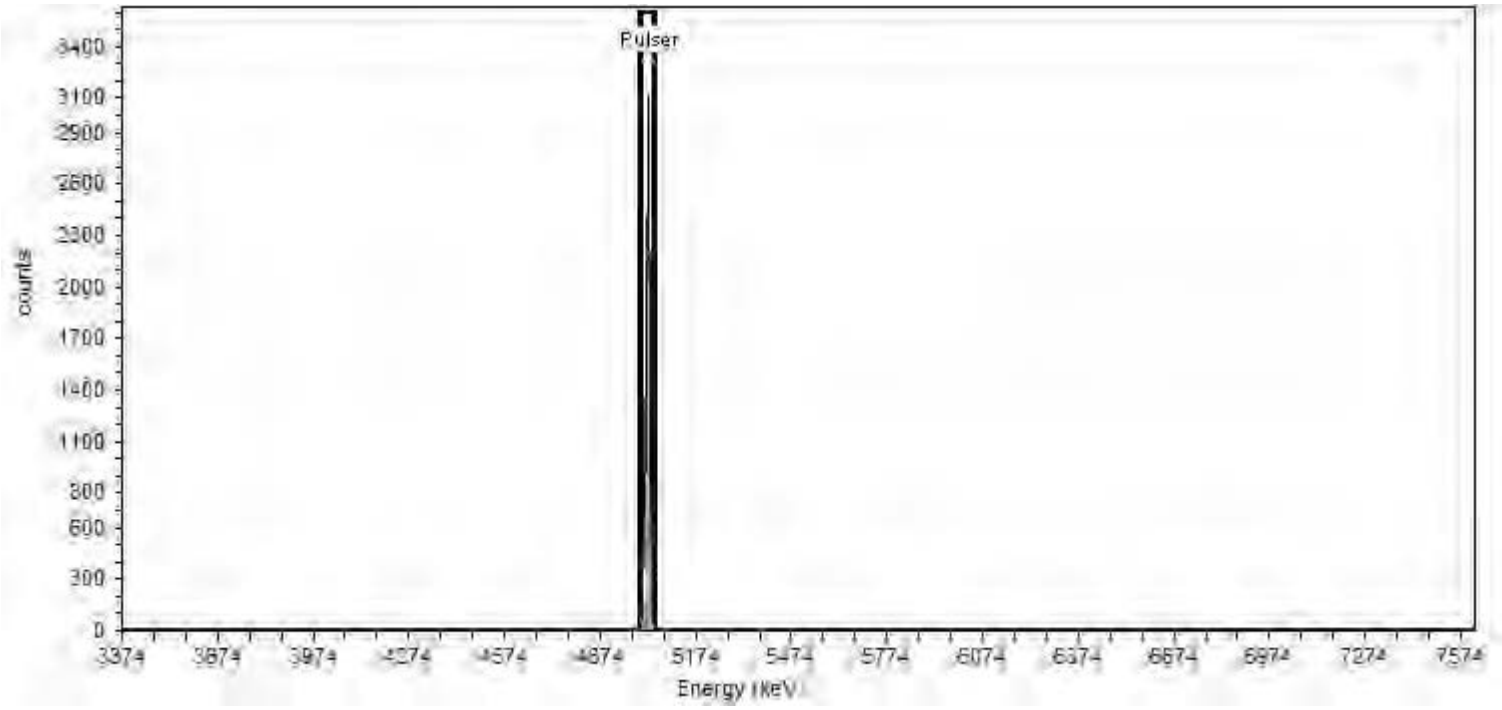
Batch Name: August2018a
Description:

Acquisition

Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 8/28/2018 12:14:14AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV164-20171113
Calibration Date: 11/13/2017 3:16:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.744	5000.553	5044.935	13.04	5,815.13	5,881.77

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:28AM 8/28/2018

Sample

Sample Name: Pulser;AV165
Comment:

Spectrum #3 Analysis #1

Batch

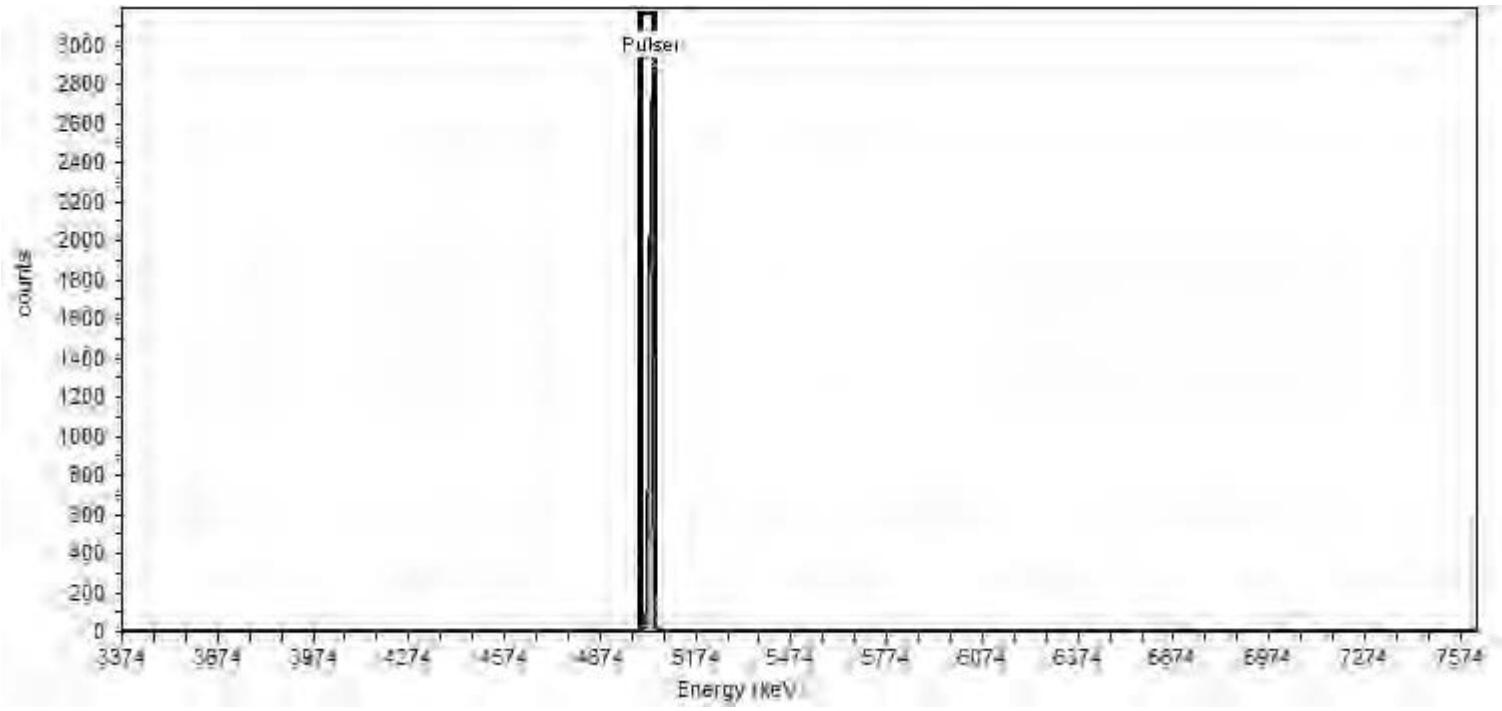
Batch Name: August2018a
Description:

Acquisition

Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 8/28/2018 12:14:15AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV165-20171113
Calibration Date: 11/13/2017 3:16:40PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.313	5006.629	5051.998	13.33	5,203.04	5,698.26

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:31AM 8/28/2018

Sample

Sample Name: Pulser;AV166
Comment:

Spectrum #3 Analysis #1

Batch

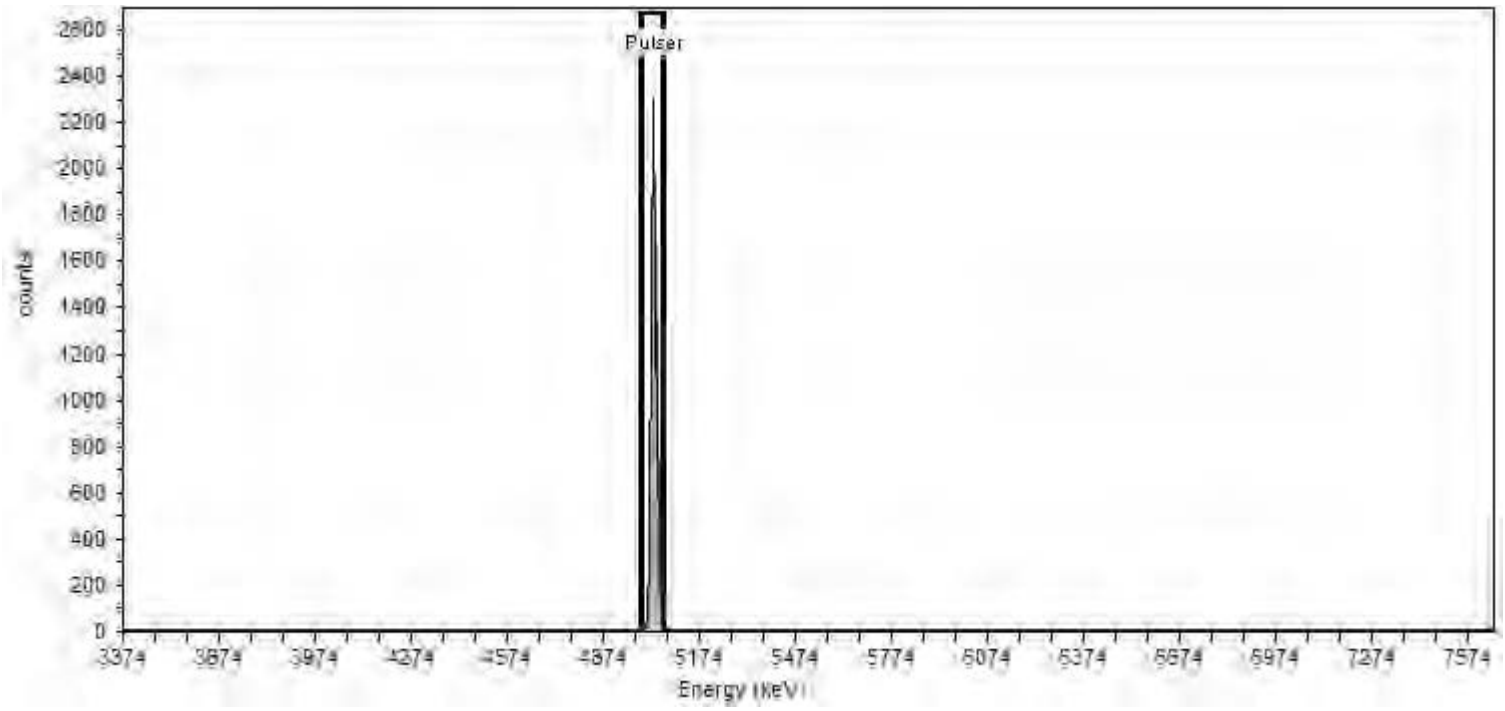
Batch Name: August2018a
Description:

Acquisition

Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 8/28/2018 12:14:15AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV166-20171113
Calibration Date: 11/13/2017 3:16:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.735	4999.511	5059.959	17.76	5,858.21	6,007.92

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:38AM 8/28/2018

Sample

Sample Name: Pulser;AV167
Comment:

Spectrum #3 Analysis #1

Batch

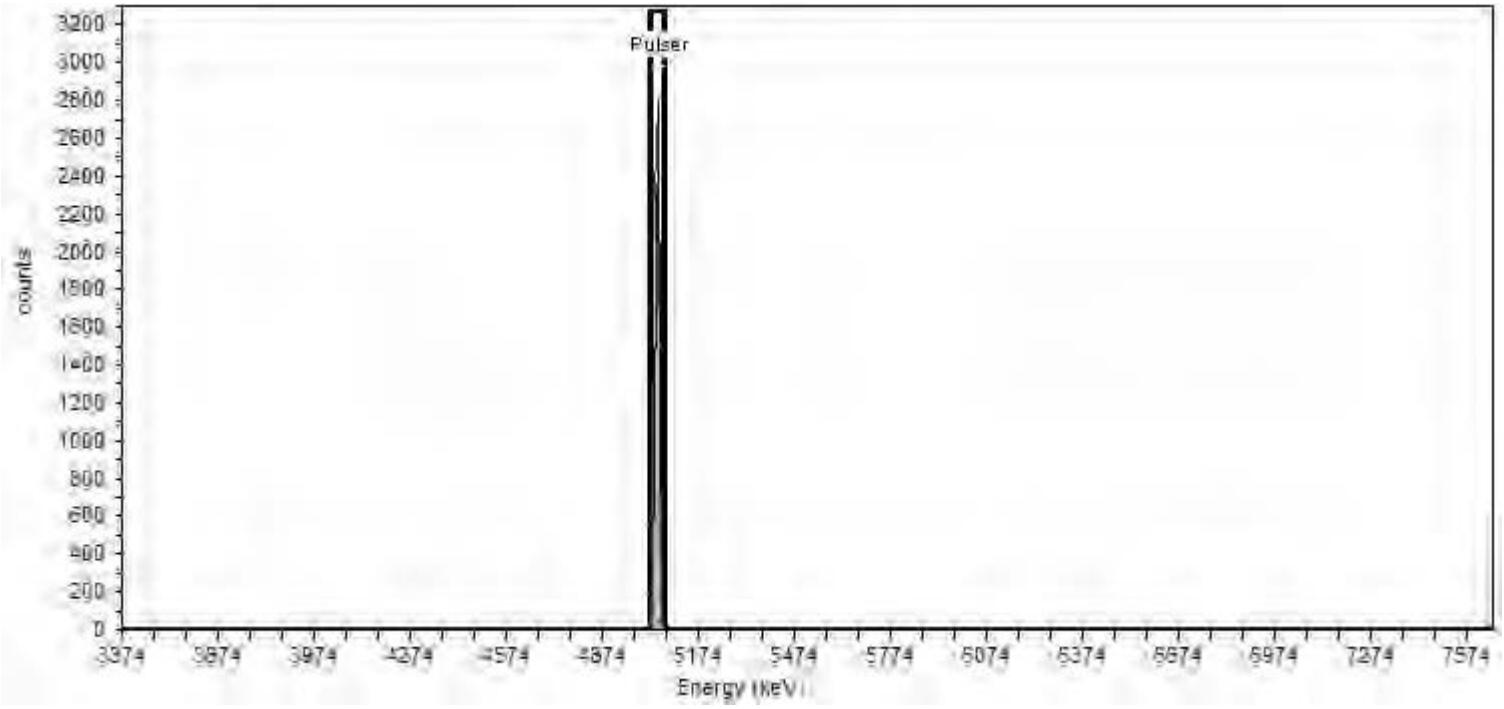
Batch Name: August2018a
Description:

Acquisition

Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 8/28/2018 12:14:15AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9520;AV167-20171113
Calibration Date: 11/13/2017 3:16:50PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.396	5022.733	5068.059	13.31	5,350.41	5,740.19

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:36AM 8/28/2018

Sample

Sample Name: Pulser;AV171
Comment:

Spectrum #3 Analysis #1

Batch

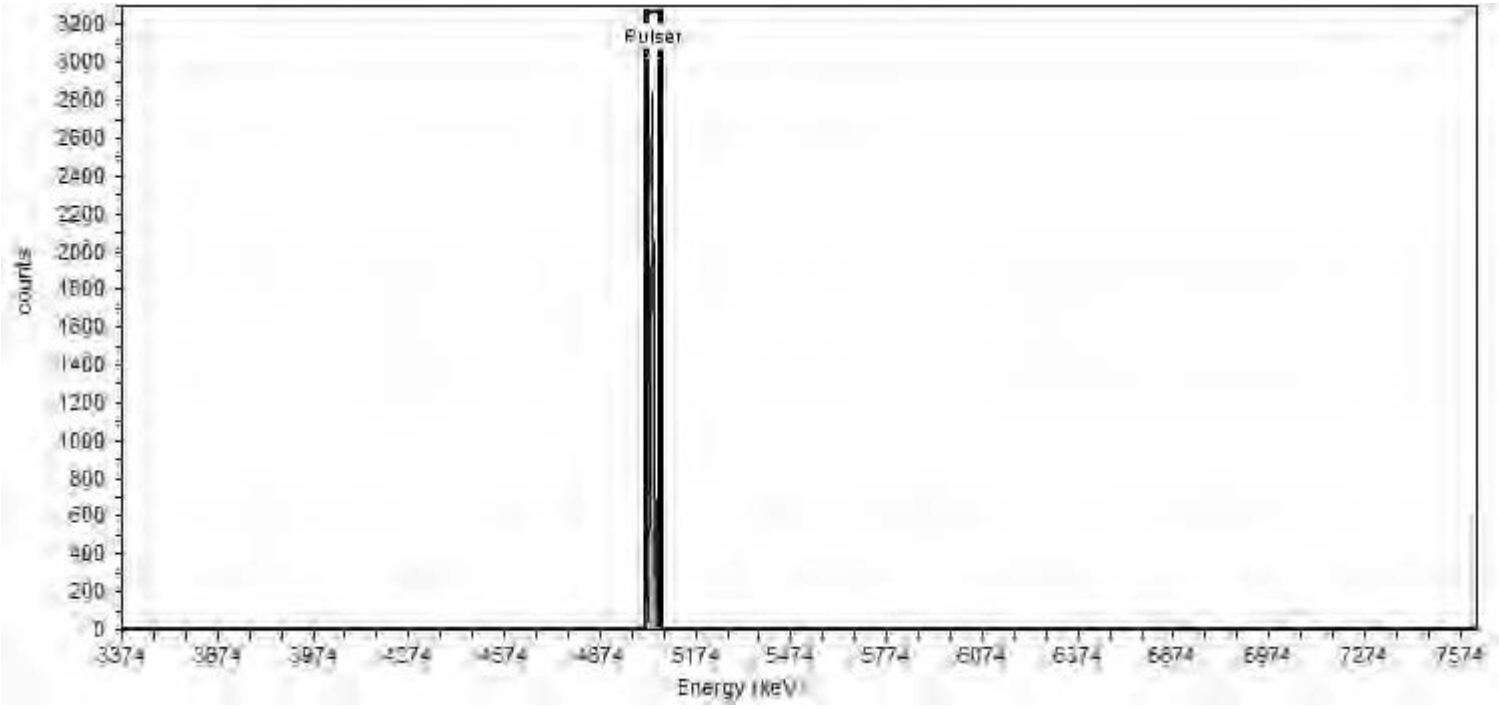
Batch Name: August2018a
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 8/28/2018 12:14:16AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9794;AV171-20171113
Calibration Date: 11/13/2017 3:17:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.966	5015.944	5059.987	12.94	5,276.66	5,761.96

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:46AM 8/28/2018

Sample

Sample Name: Pulser;AV172
Comment:

Spectrum #3 Analysis #1

Batch

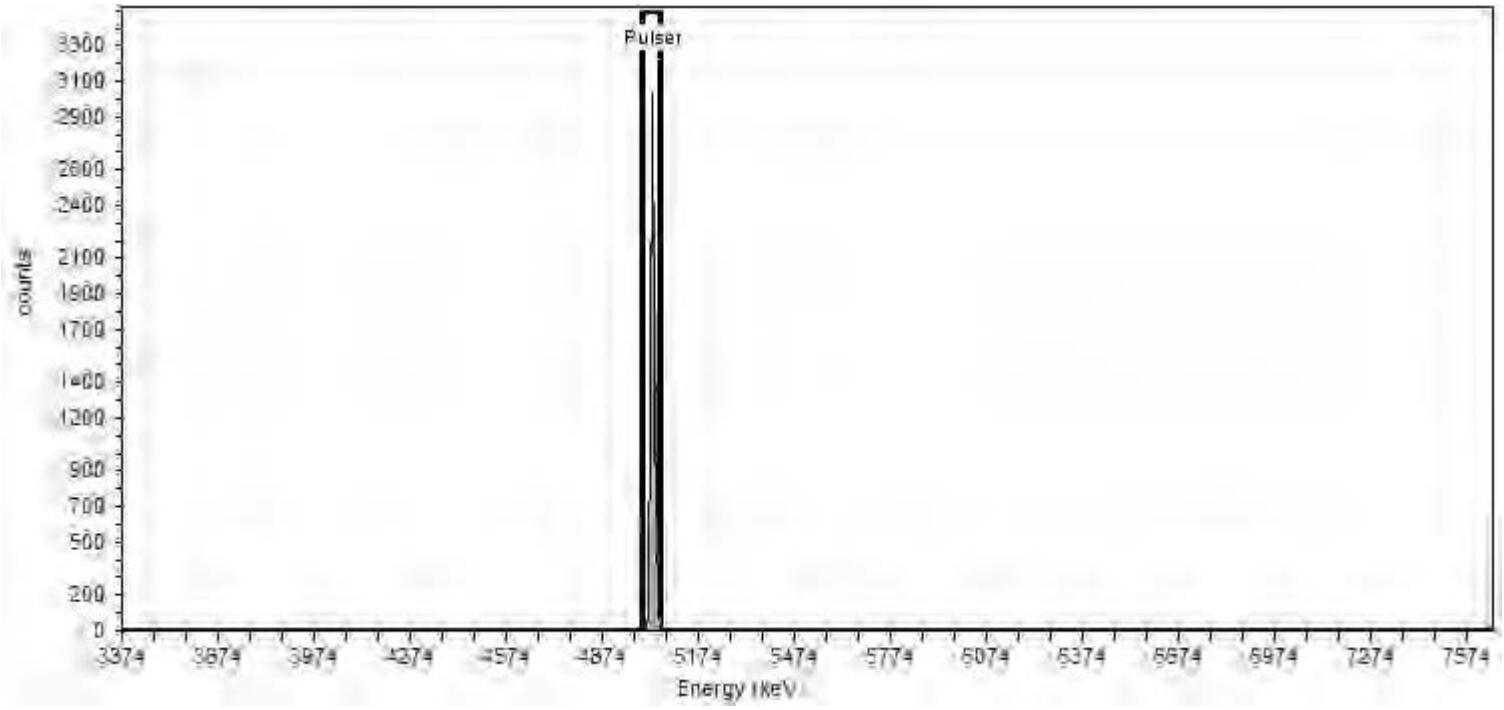
Batch Name: August2018a
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 8/28/2018 12:14:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9795;AV172-20171113
Calibration Date: 11/13/2017 3:17:19PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.764	5007.073	5052.455	13.33	5,787.86	6,036.94

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:43AM 8/28/2018

Sample

Sample Name: Pulser;AV173
Comment:

Spectrum #3 Analysis #1

Batch

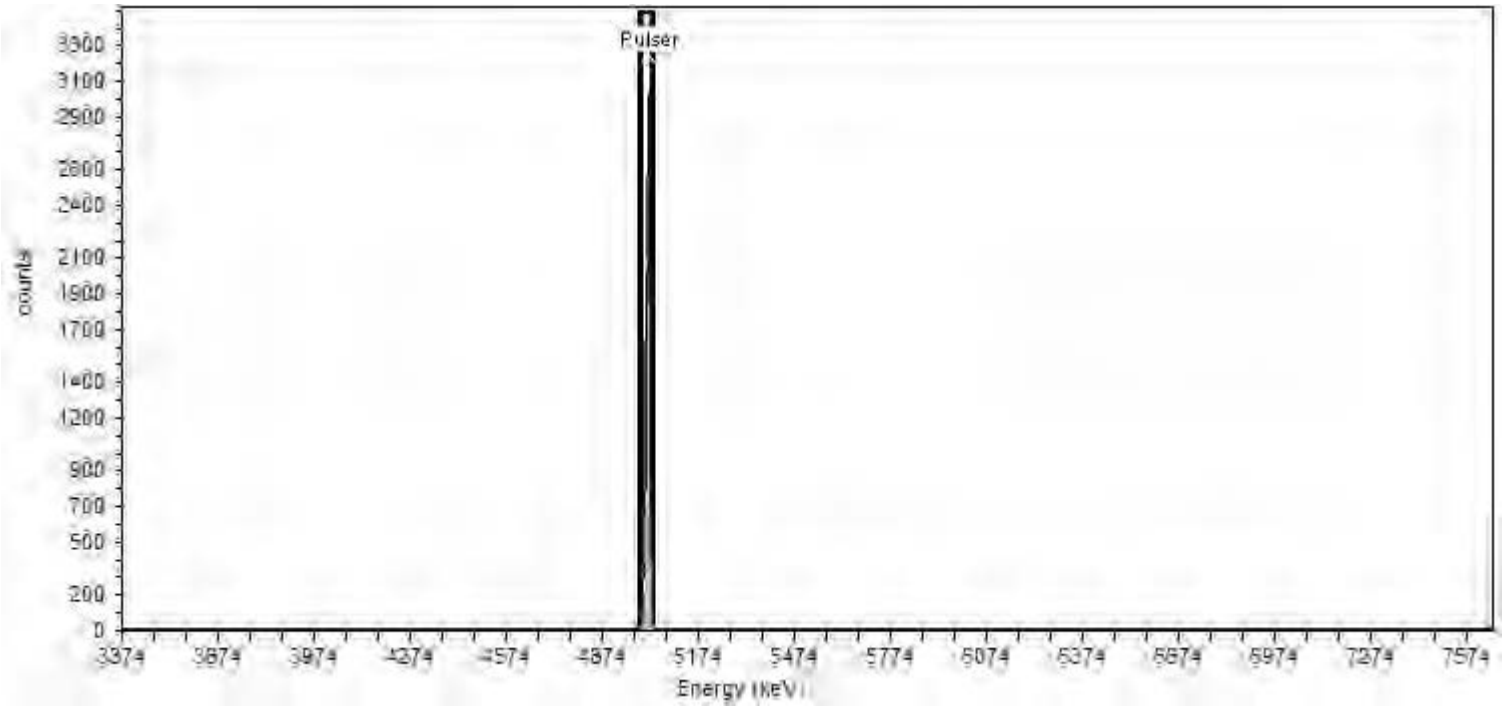
Batch Name: August2018a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 8/28/2018 12:14:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9817;AV173-20171113b
Calibration Date: 11/13/2017 3:17:34PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.410	4994.082	5036.739	12.53	5,431.44	5,855.70

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Alpha-Spectroscopy Pulser Report

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12:34:53AM 8/28/2018

Sample

Sample Name: Pulser;AV174
Comment:

Spectrum #3 Analysis #1

Batch

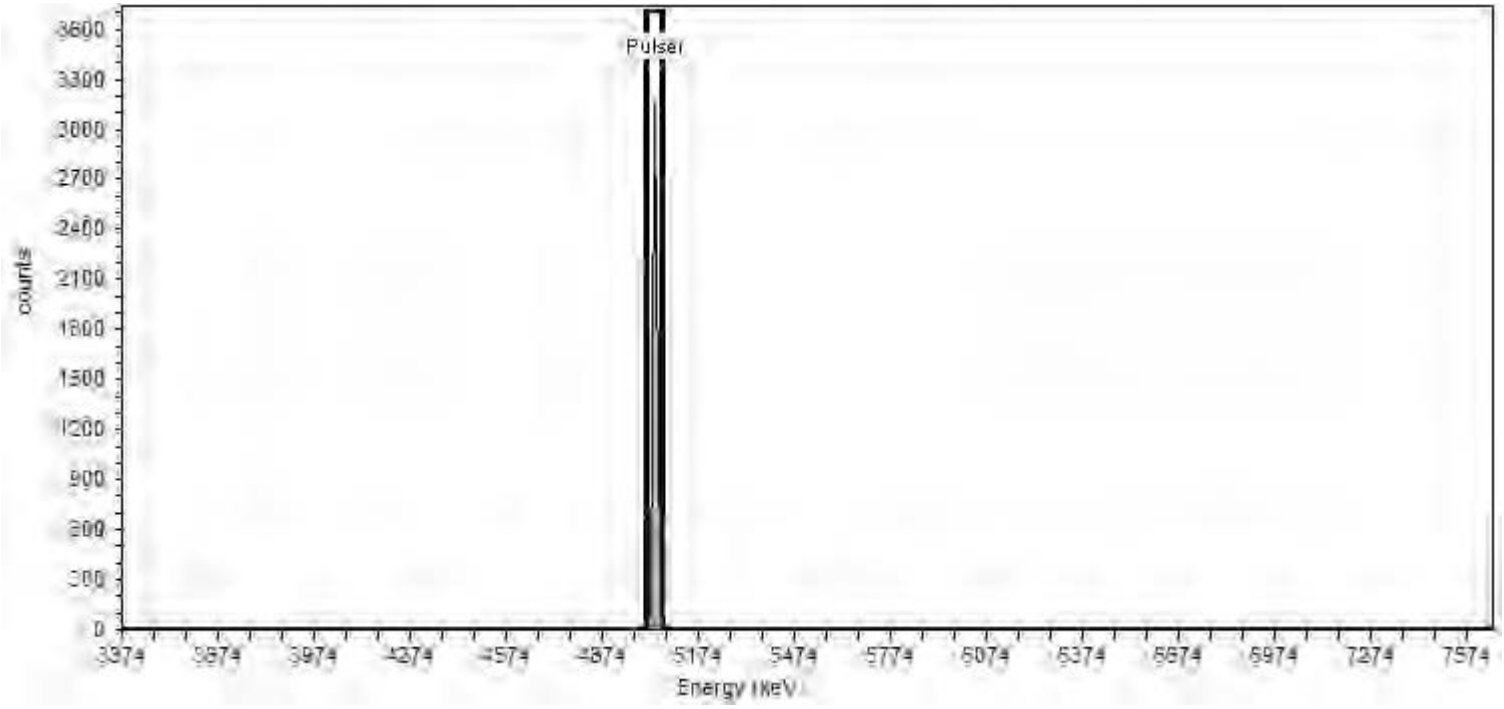
Batch Name: August2018a
Description:

Acquisition

Detector: AV174 , SN: 50-112Y5
Acquisition Start Date: 8/28/2018 12:14:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9884;AV174-20171113b
Calibration Date: 11/13/2017 3:17:39PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.466	5014.786	5060.147	13.32	6,050.09	6,032.79

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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Earth City, MO 63045
12:33:52AM 8/28/2018

Sample

Sample Name: Pulser;AV187
Comment:

Spectrum #3 Analysis #1

Batch

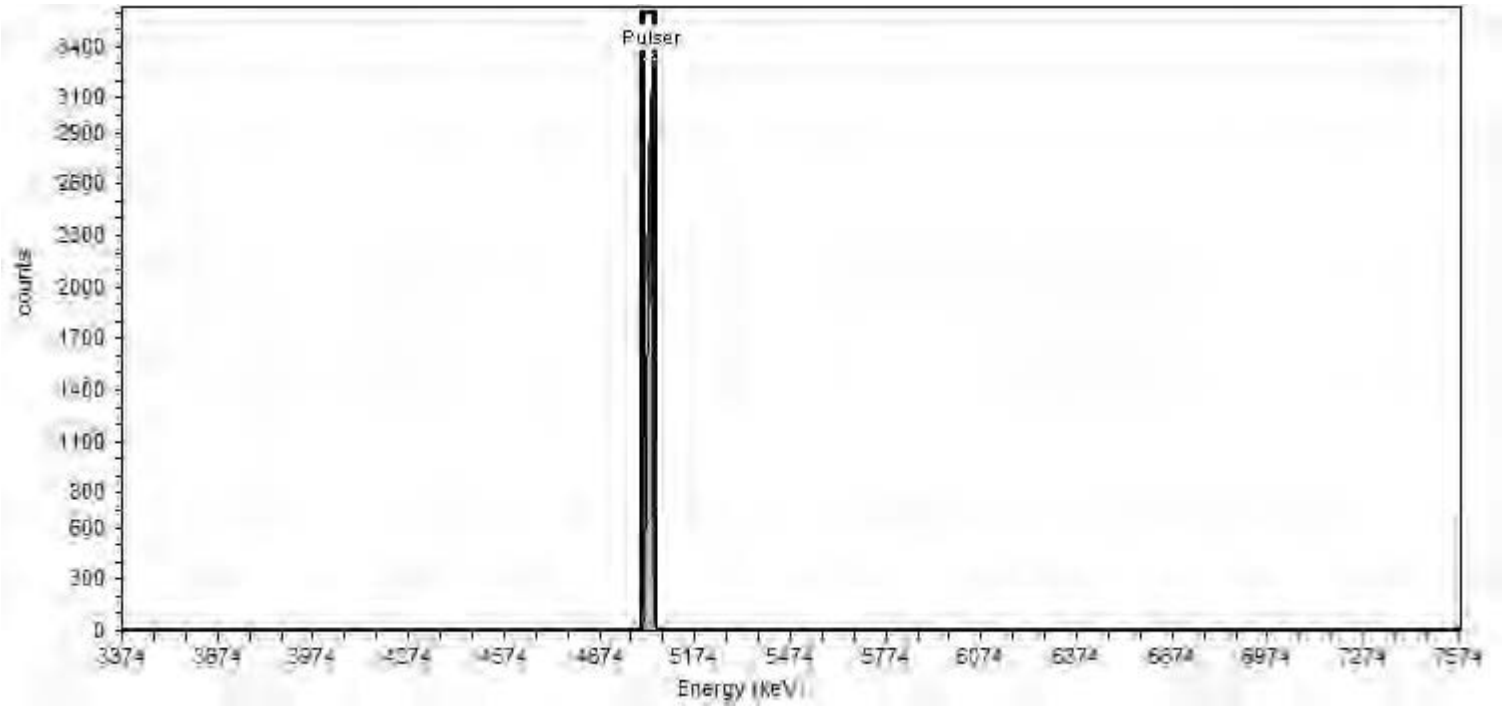
Batch Name: August2018b
Description:

Acquisition

Detector: AV187 , SN: 50-119I2
Acquisition Start Date: 8/28/2018 12:13:59AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV187-20171113
Calibration Date: 11/14/2017 8:46:54AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.233	5009.033	5051.434	12.46	5,576.88	5,842.08

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Alpha-Spectroscopy Pulser Report

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12:33:50AM 8/28/2018

Sample

Sample Name: Pulser;AV188
Comment:

Spectrum #3 Analysis #1

Batch

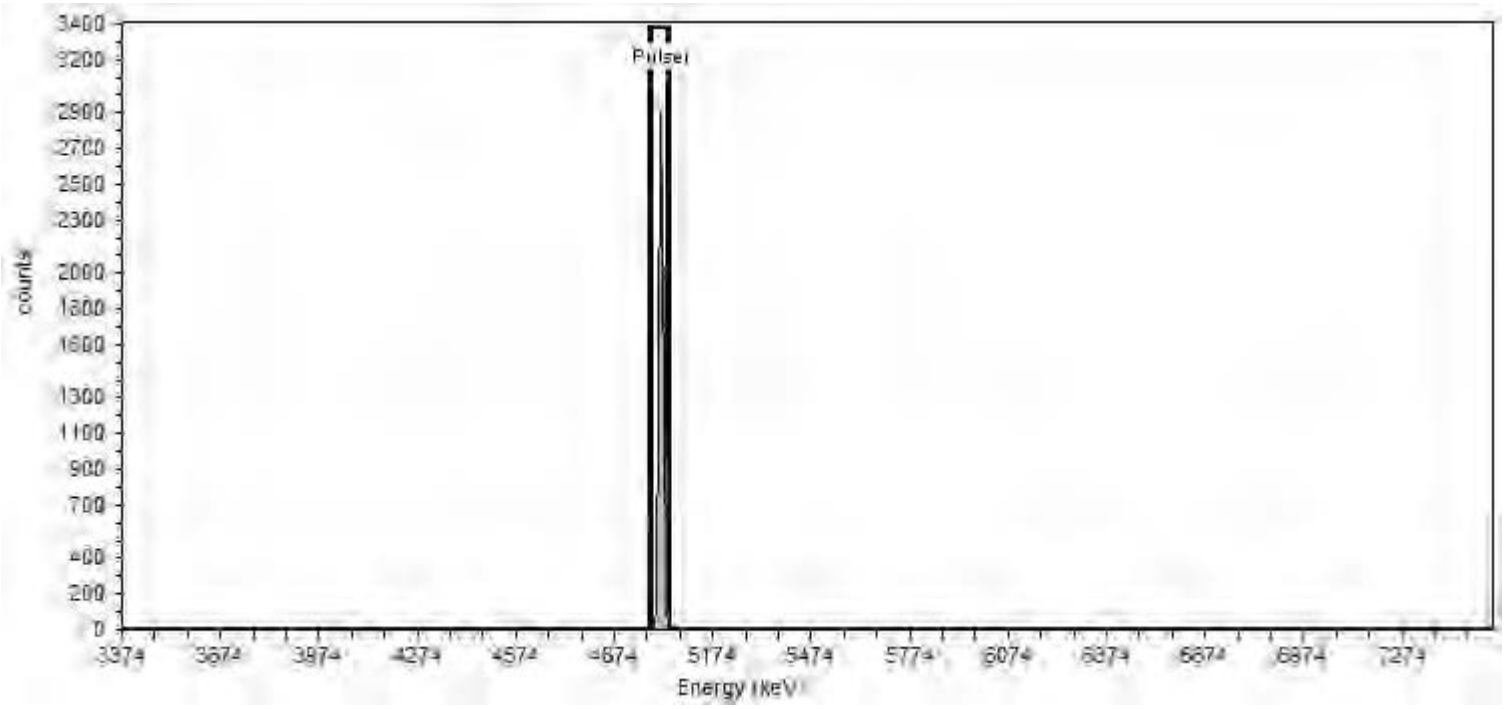
Batch Name: August2018b
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 8/28/2018 12:13:59AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV188-20171113a
Calibration Date: 11/14/2017 8:47:31AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.864	4991.215	5038.512	13.89	5,787.74	6,026.51

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
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12:33:57AM 8/28/2018

Sample

Sample Name: Pulser;AV189
Comment:

Spectrum #3 Analysis #1

Batch

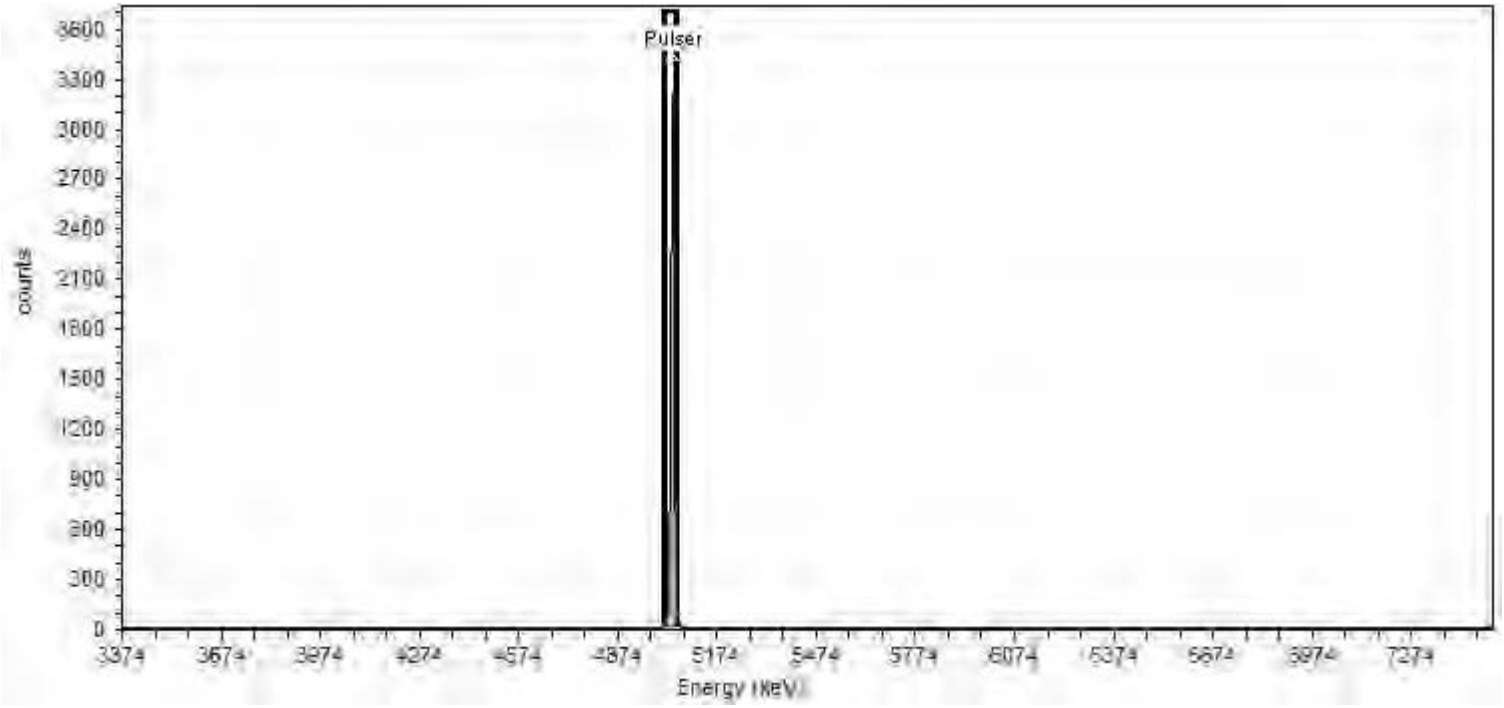
Batch Name: August2018b
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 8/28/2018 12:13:59AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV189-20171113
Calibration Date: 11/14/2017 8:46:59AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.442	5015.221	5059.663	13.05	6,015.34	5,848.63

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:59AM 8/28/2018

Sample

Sample Name: Pulser;AV190
Comment:

Spectrum #3 Analysis #1

Batch

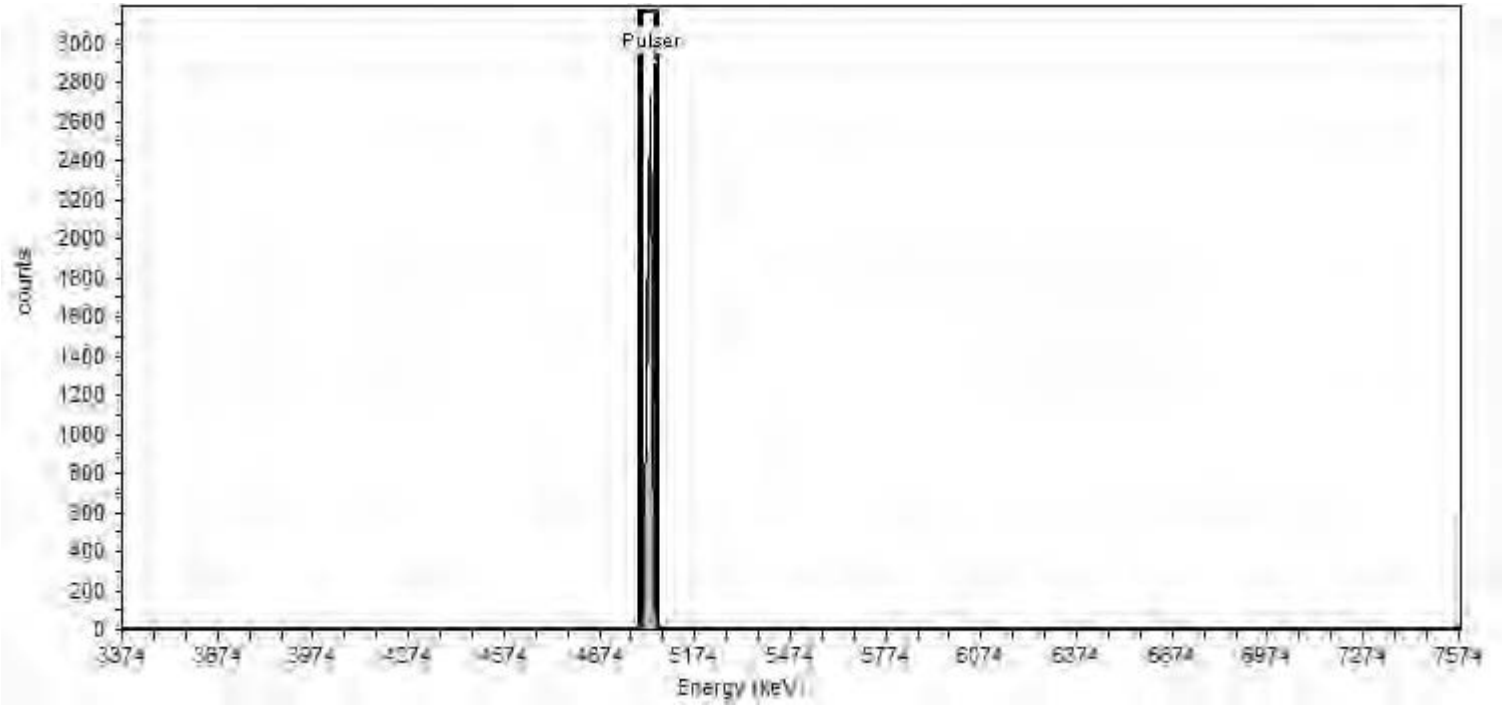
Batch Name: August2018b
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 8/28/2018 12:13:59AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV190-20171113
Calibration Date: 11/14/2017 8:47:05AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.603	5004.007	5055.198	15.04	5,883.69	6,013.81

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
Earth City, MO 63045
12:33:54AM 8/28/2018

Sample

Sample Name: Pulser;AV191
Comment:

Spectrum #3 Analysis #1

Batch

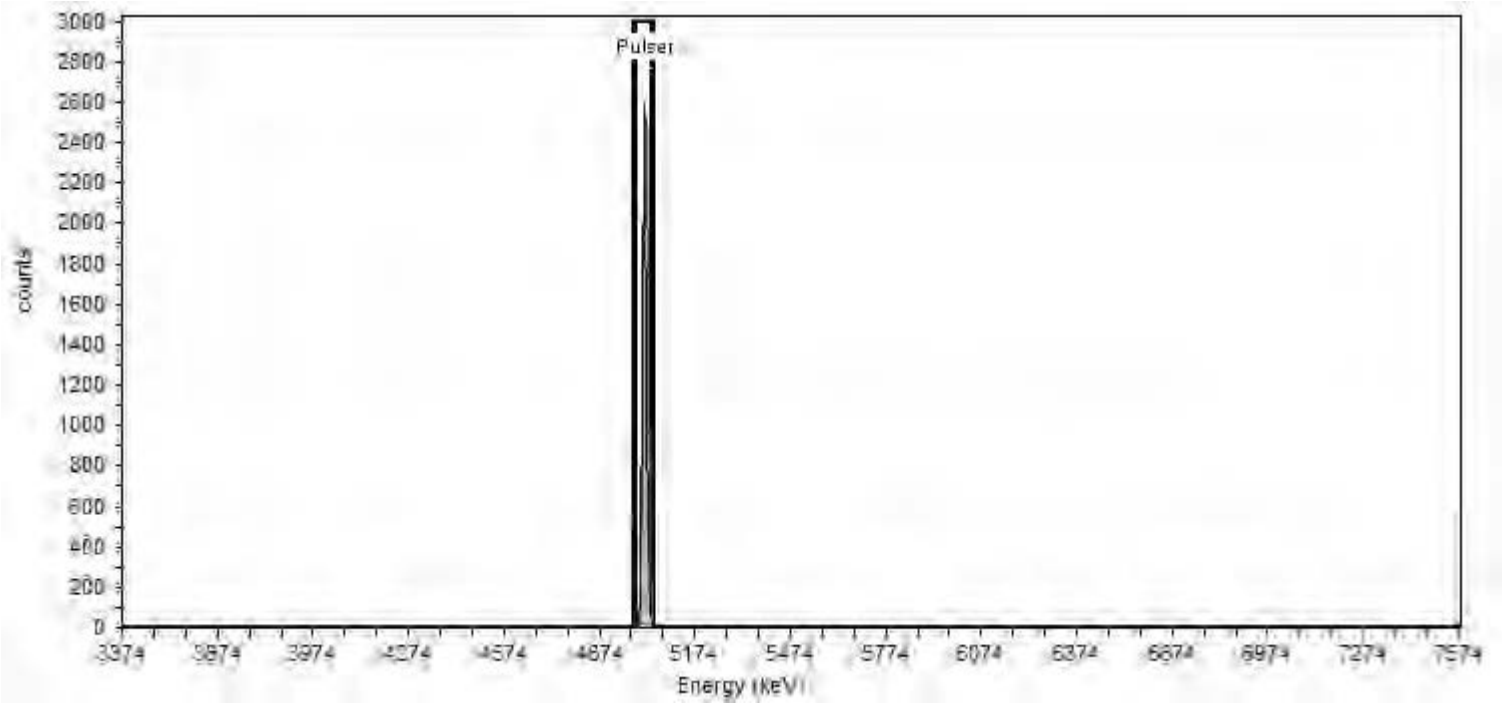
Batch Name: August2018b
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 8/28/2018 12:13:59AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8879;AV191-20171113
Calibration Date: 11/14/2017 8:47:10AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.236	4990.237	5038.235	14.10	5,246.45	6,023.82

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:01AM 8/28/2018

Sample

Sample Name: Pulser;AV192
Comment:

Spectrum #3 Analysis #1

Batch

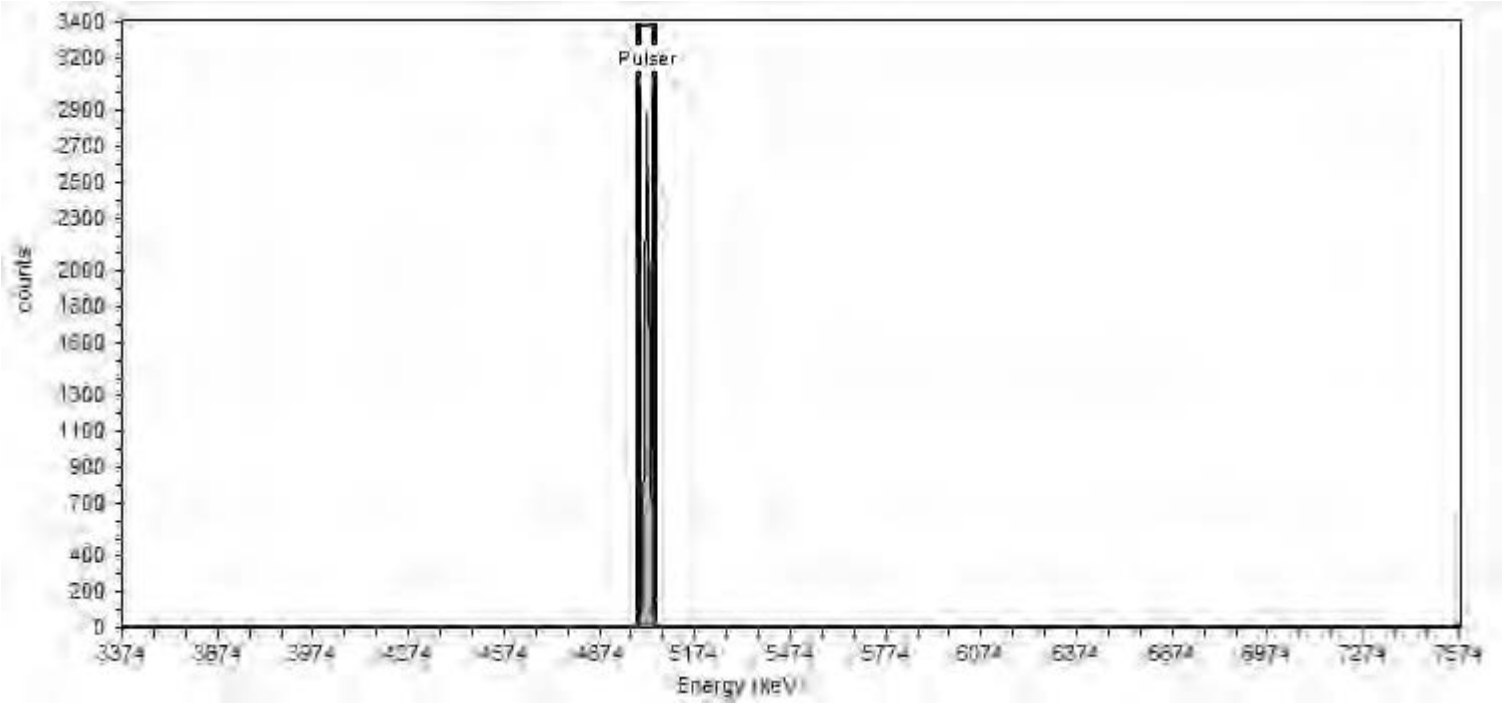
Batch Name: August2018b
Description:

Acquisition

Detector: AV192 , SN: 50-119J7
Acquisition Start Date: 8/28/2018 12:14:00AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV192-20171113
Calibration Date: 11/14/2017 8:47:16AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.258	4997.740	5046.776	14.40	5,947.00	6,012.35

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:17AM 8/28/2018

Sample

Sample Name: Pulser;AV206
Comment:

Spectrum #3 Analysis #1

Batch

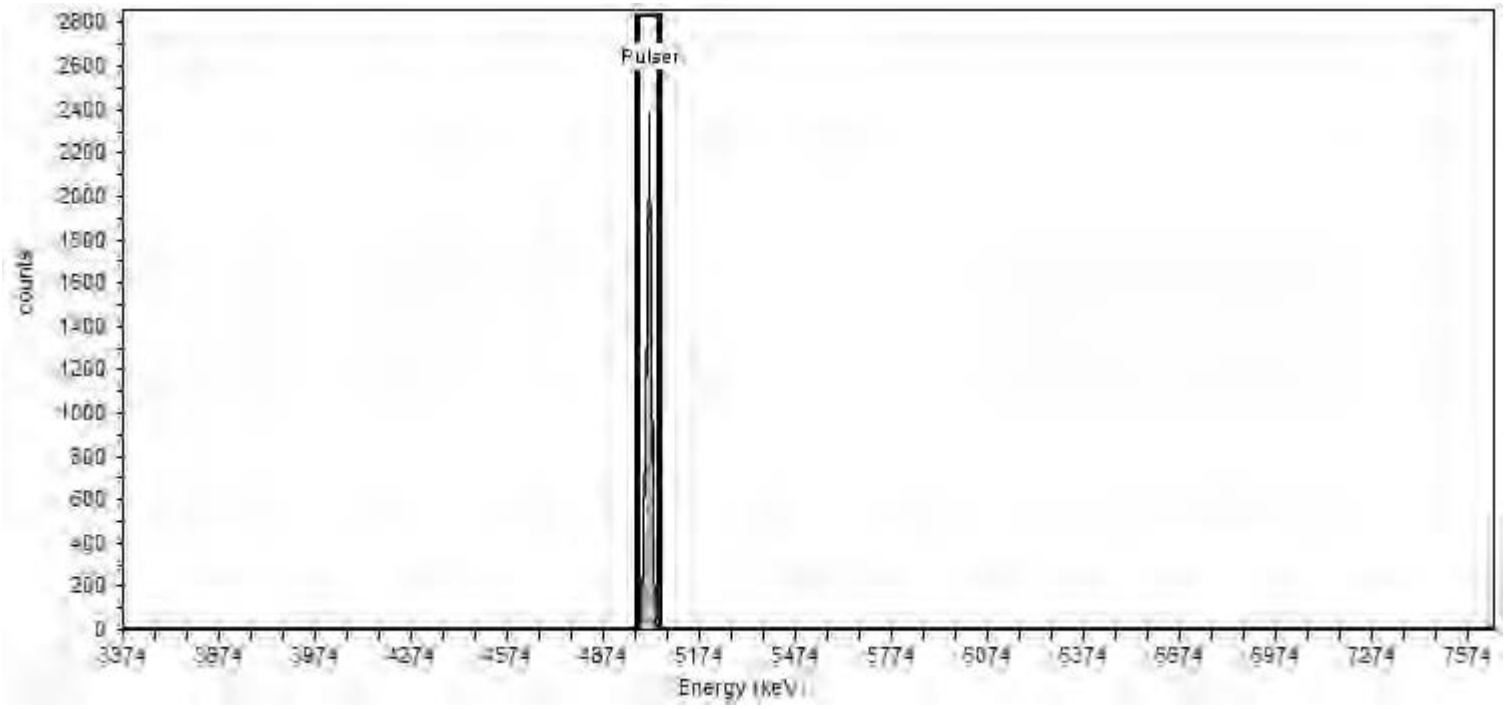
Batch Name: August2018b
Description:

Acquisition

Detector: AV206 , SN: 5604420
Acquisition Start Date: 8/28/2018 12:14:01AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8879;AV206-20171114
Calibration Date: 11/14/2017 12:00:54PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.352	4984.663	5046.040	18.03	6,167.42	6,005.46

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:24AM 8/28/2018

Sample

Sample Name: Pulser;AV208
Comment:

Spectrum #3 Analysis #1

Batch

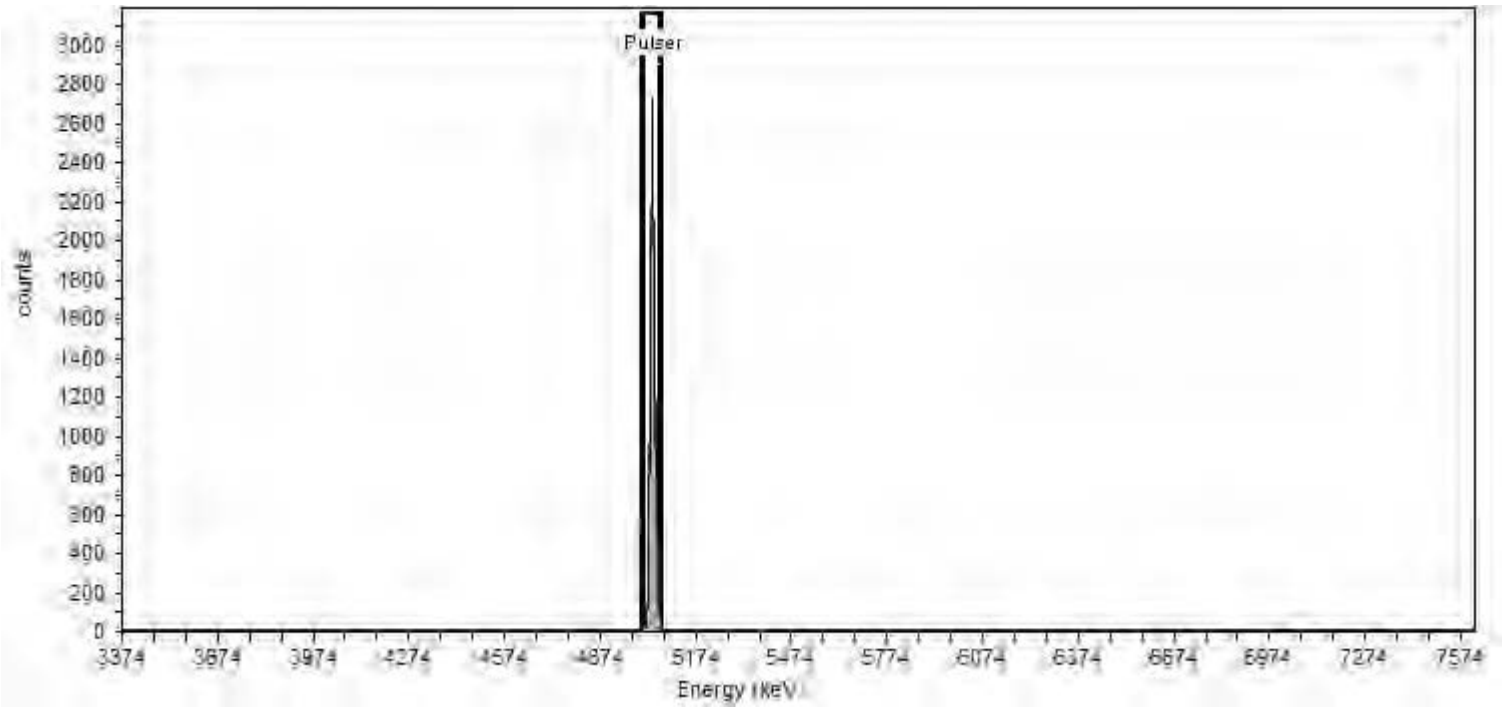
Batch Name: August2018b
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 8/28/2018 12:14:02AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9793;AV208-20171114
Calibration Date: 11/14/2017 12:00:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.594	5011.218	5063.970	15.50	6,067.55	6,000.43

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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12:33:48AM 8/28/2018

Sample

Sample Name: Pulser;AV211
Comment:

Spectrum #3 Analysis #1

Batch

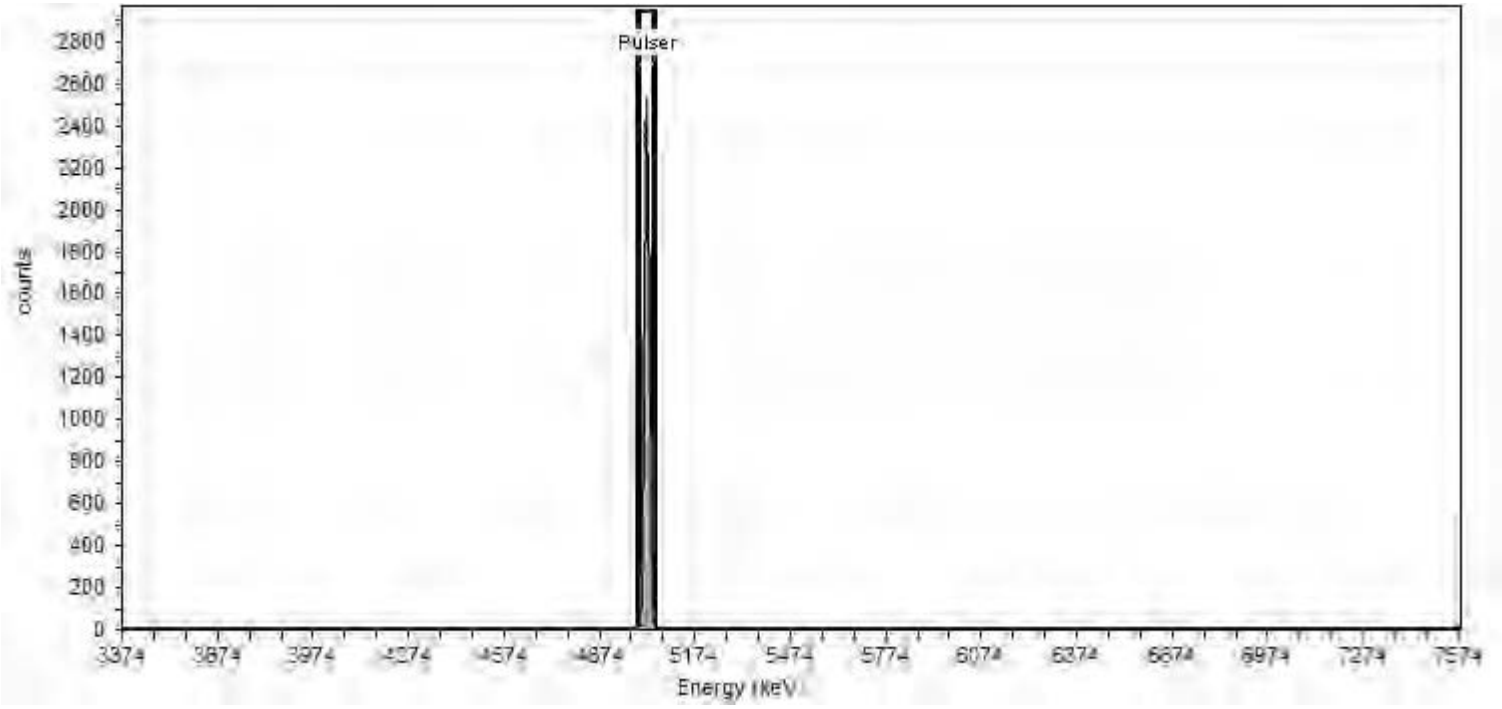
Batch Name: August2018c
Description:

Acquisition

Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 8/28/2018 12:13:50AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9817;AV211-20171114a
Calibration Date: 11/14/2017 12:01:51PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5023.351	4996.667	5050.034	15.68	5,685.38	6,023.92

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:46AM 8/28/2018

Sample

Sample Name: Pulser;AV212
Comment:

Spectrum #3 Analysis #1

Batch

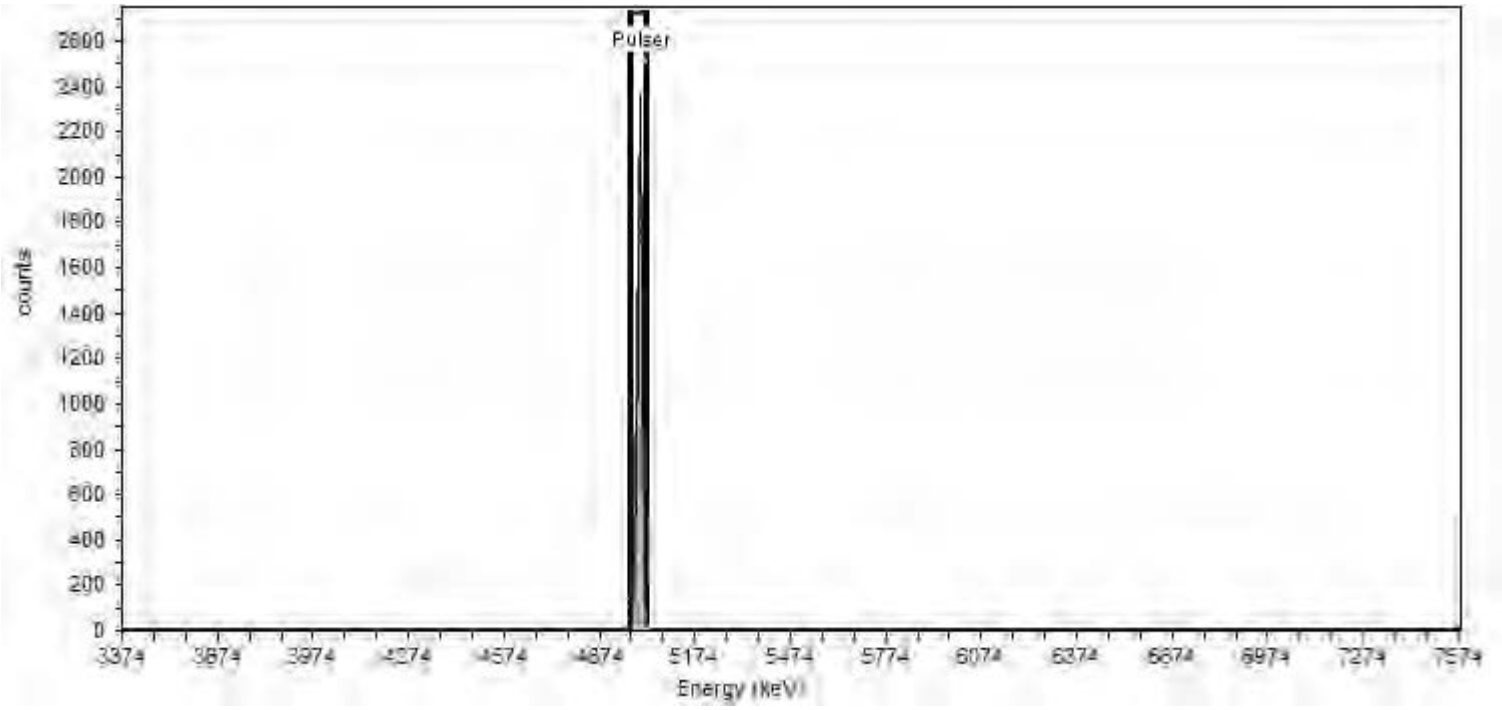
Batch Name: August2018c
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 8/28/2018 12:13:43AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV212-20171114
Calibration Date: 11/14/2017 12:01:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5000.676	4971.832	5029.521	16.95	5,745.94	5,964.93

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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12:32:46AM 8/28/2018

Sample

Sample Name: Pulser;AV213
Comment:

Spectrum #3 Analysis #1

Batch

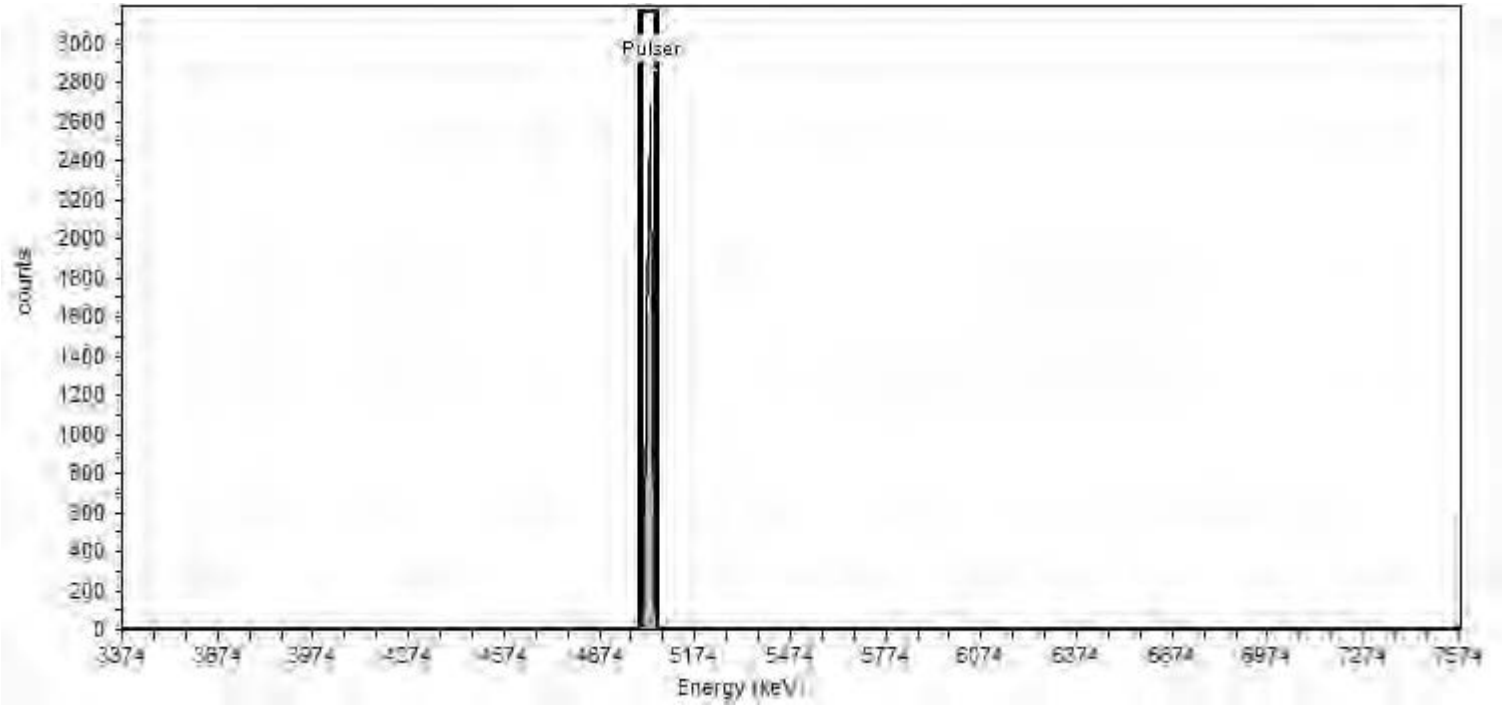
Batch Name: August2018c
Description:

Acquisition

Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 8/28/2018 12:13:44AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9885;AV213-20171114
Calibration Date: 11/14/2017 12:01:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.066	5004.161	5055.972	15.22	5,863.51	6,009.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:57AM 8/28/2018

Sample

Sample Name: Pulser;AV215
Comment:

Spectrum #3 Analysis #1

Batch

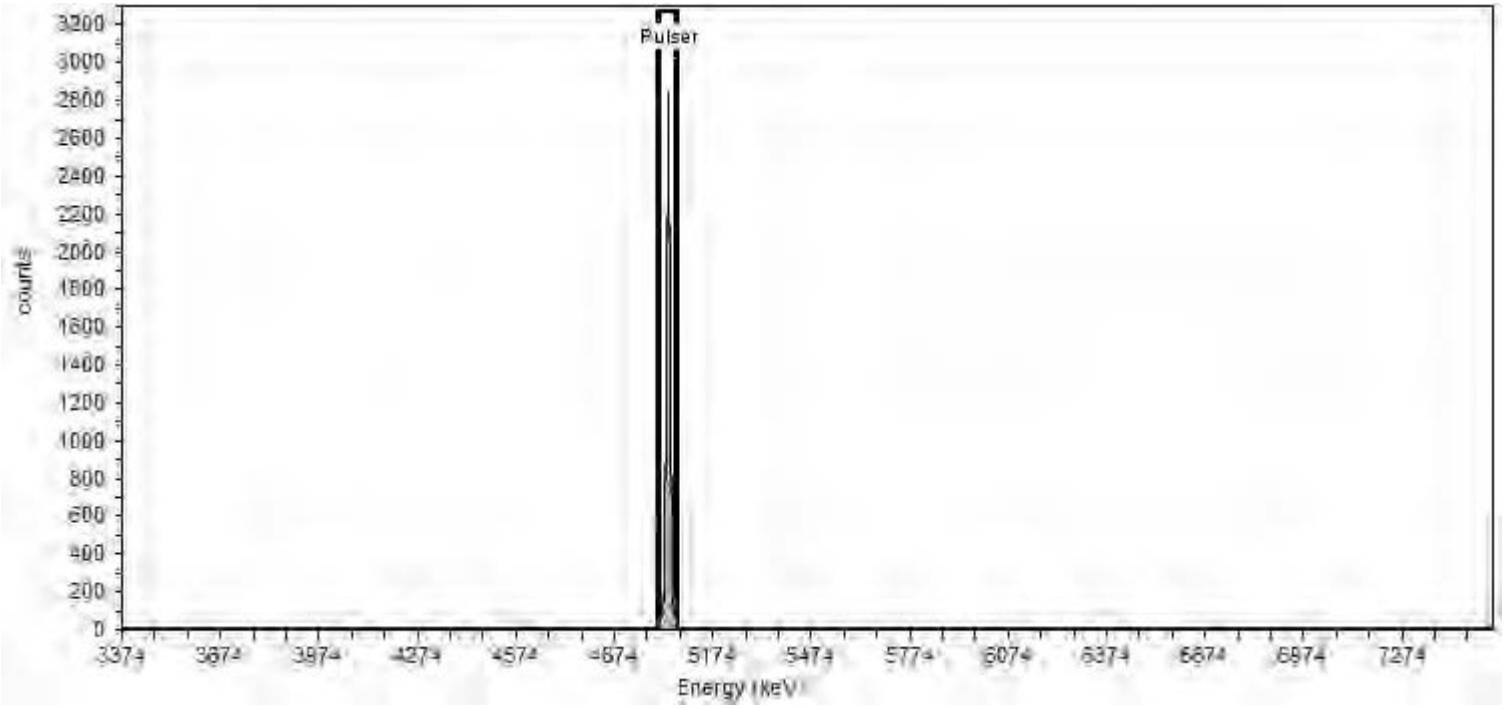
Batch Name: August2018c
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 8/28/2018 12:13:44AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-7107;AV215-20171114
Calibration Date: 11/14/2017 3:23:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.545	5012.240	5062.851	14.87	6,057.20	6,011.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:47AM 8/28/2018

Sample

Sample Name: Pulser;AV216
Comment:

Spectrum #3 Analysis #1

Batch

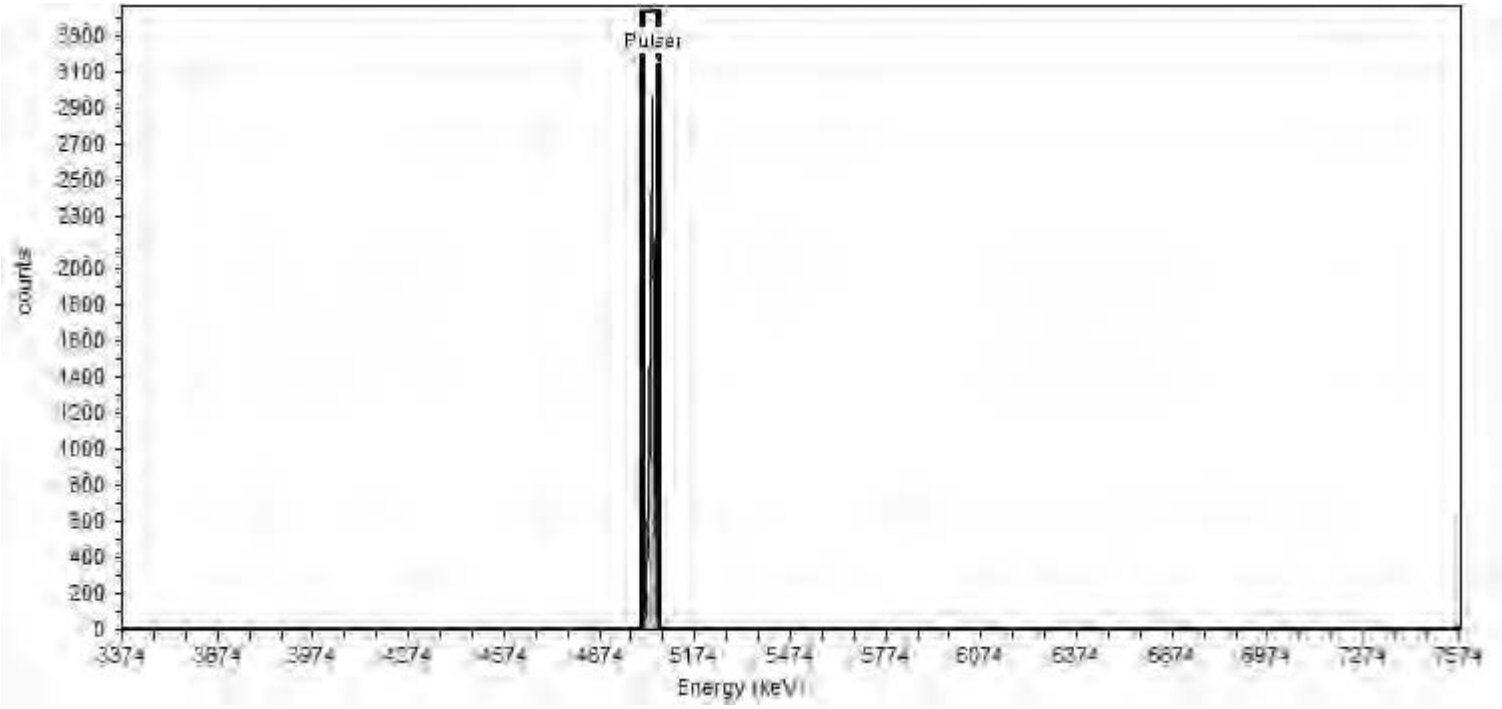
Batch Name: August2018c
Description:

Acquisition

Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 8/28/2018 12:13:44AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8874;AV216-20171114
Calibration Date: 11/14/2017 3:23:21PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.774	5014.527	5061.021	13.66	5,804.71	6,025.71

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:32:59AM 8/28/2018

Sample

Sample Name: Pulser;AV217
Comment:

Spectrum #3 Analysis #1

Batch

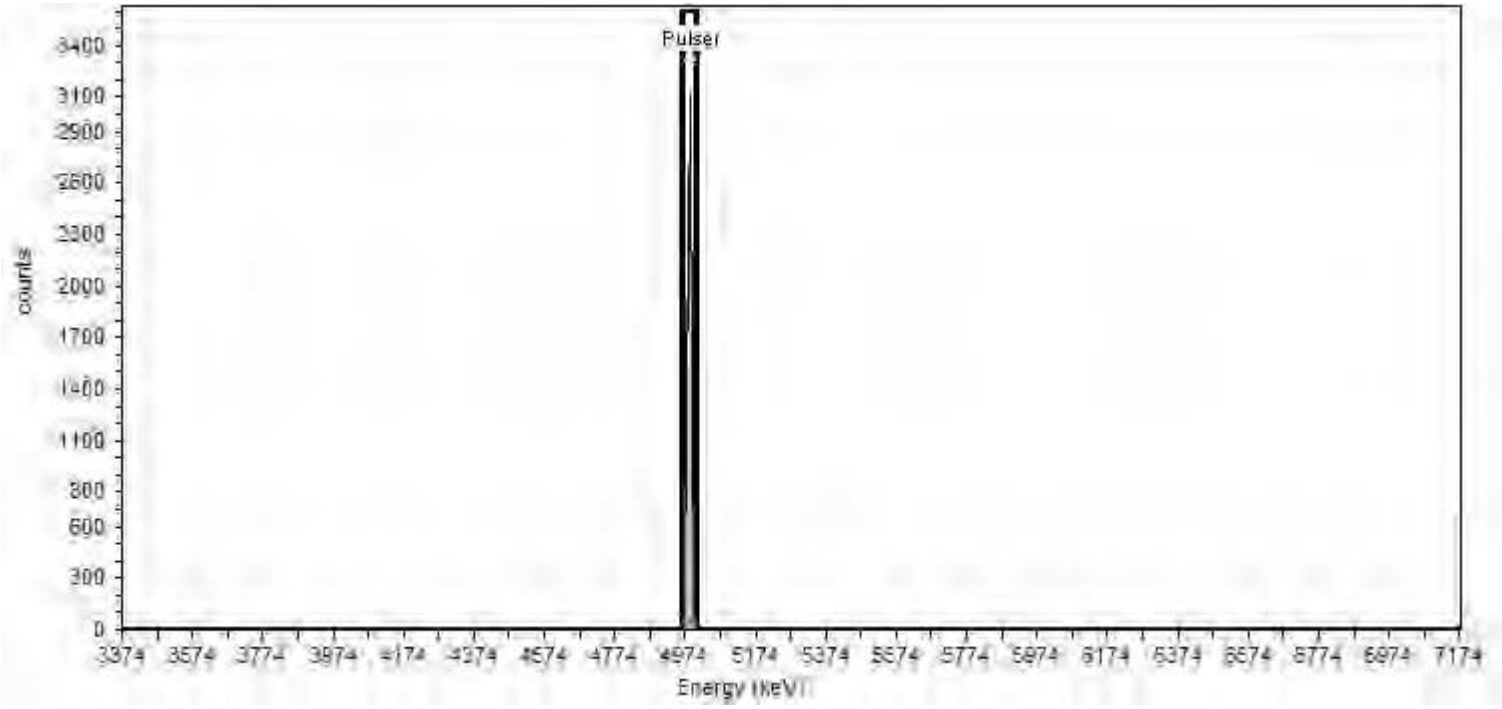
Batch Name: August2018c
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 8/28/2018 12:13:45AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8875;AV217-20171114
Calibration Date: 11/14/2017 3:23:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4985.286	4962.912	5007.659	13.14	5,866.70	5,893.73

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:01AM 8/28/2018

Sample

Sample Name: Pulser;AV218
Comment:

Spectrum #3 Analysis #1

Batch

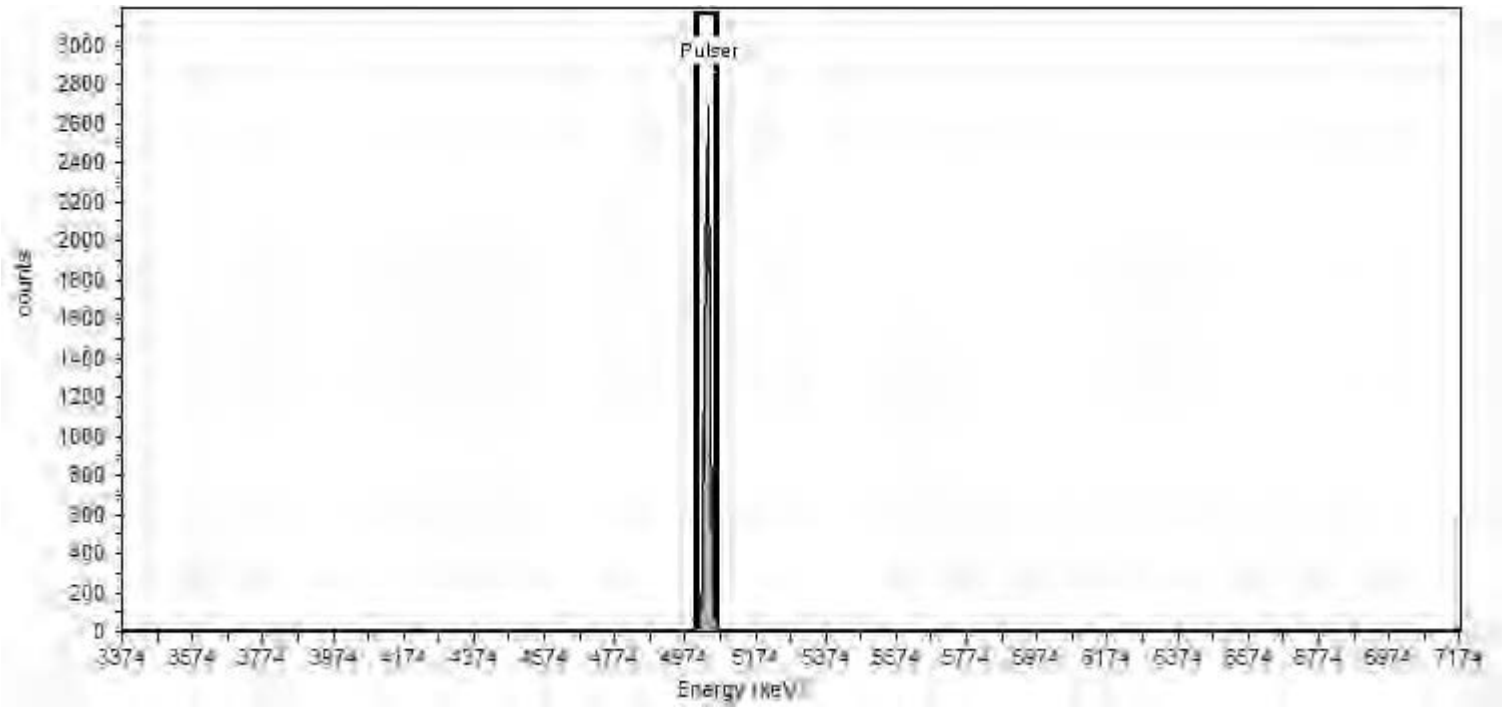
Batch Name: August2018c
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 8/28/2018 12:13:45AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8876;AV218-20171114a
Calibration Date: 11/14/2017 3:23:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.754	5011.644	5063.865	15.34	5,916.47	6,008.86

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:03AM 8/28/2018

Sample

Sample Name: Pulser;AV219
Comment:

Spectrum #3 Analysis #1

Batch

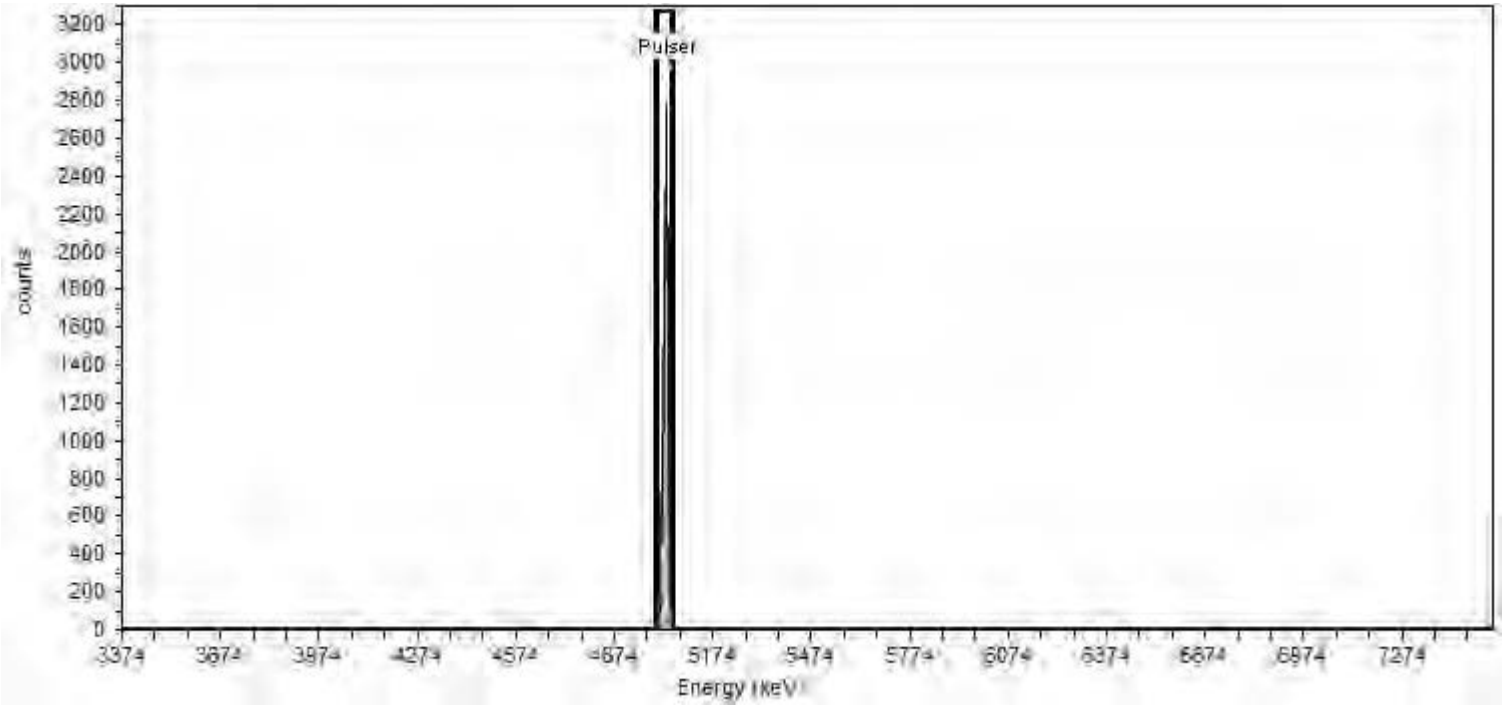
Batch Name: August2018c
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 8/28/2018 12:13:45AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-8877;AV219-20171114
Calibration Date: 11/14/2017 3:23:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.293	5004.803	5055.783	14.98	5,987.90	6,015.90

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:09AM 8/28/2018

Sample

Sample Name: Pulser;AV220
Comment:

Spectrum #3 Analysis #1

Batch

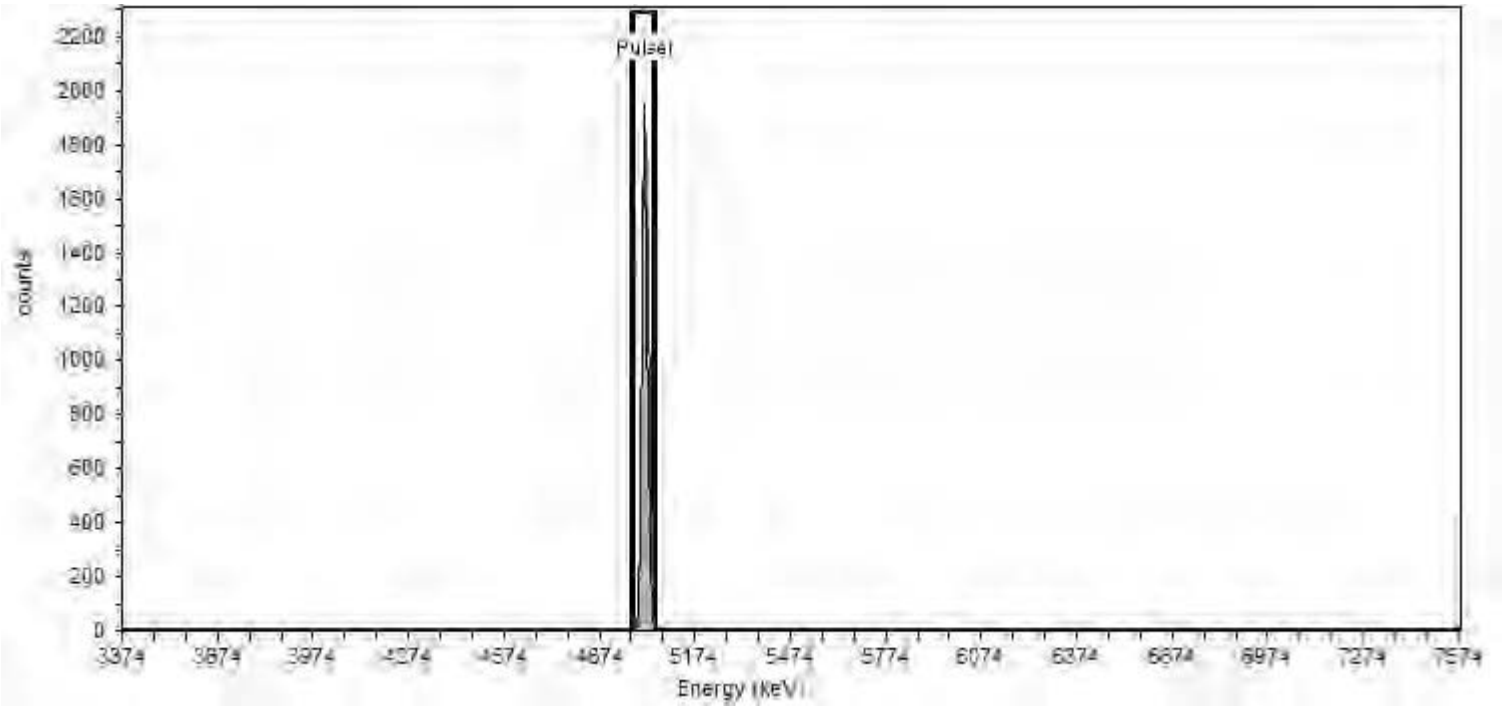
Batch Name: August2018c
Description:

Acquisition

Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 8/28/2018 12:13:45AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9520;AV220-20171114a
Calibration Date: 11/14/2017 3:23:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.423	4982.008	5046.838	19.04	5,343.34	6,007.74

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:13AM 8/28/2018

Sample

Sample Name: Pulser;AV222
Comment:

Spectrum #3 Analysis #1

Batch

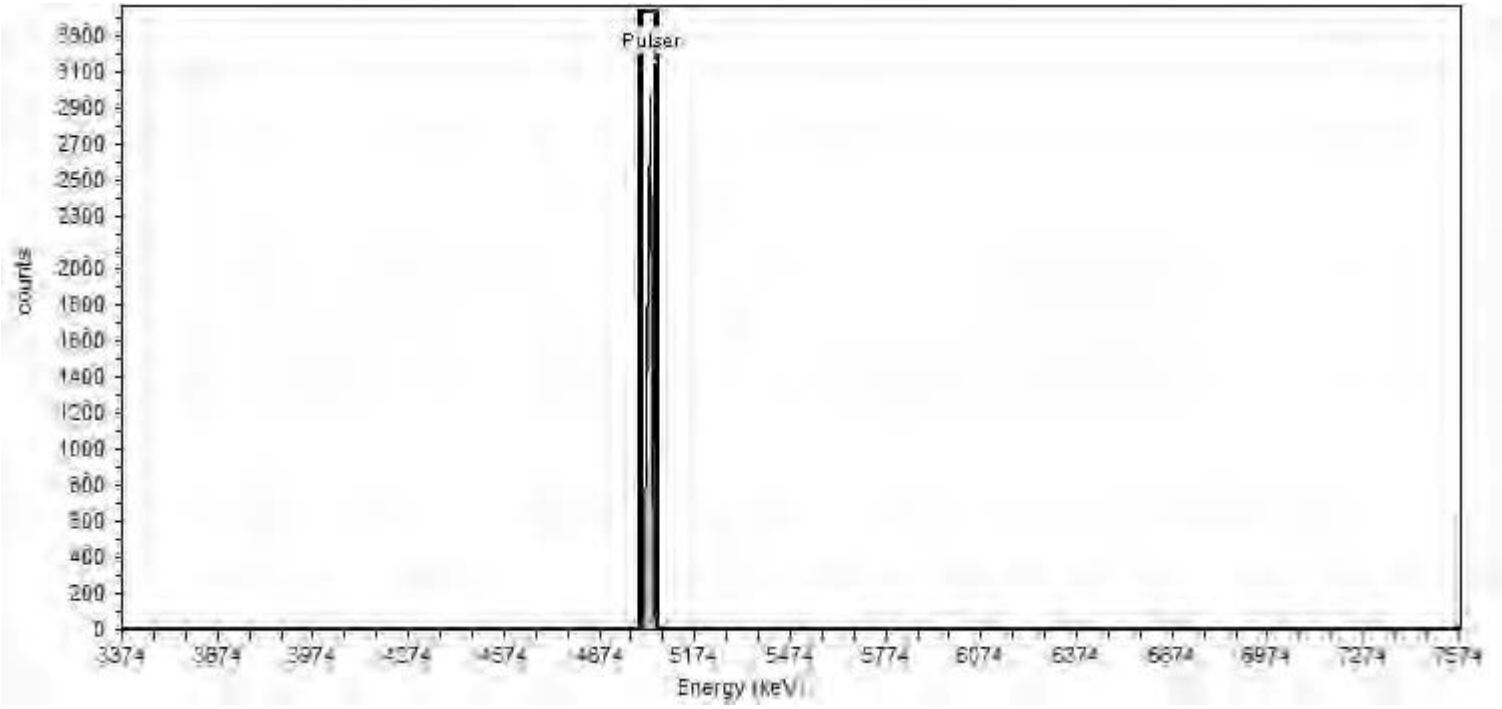
Batch Name: August2018c
Description:

Acquisition

Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 8/28/2018 12:13:46AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9792;AV222-20171114a
Calibration Date: 11/14/2017 3:23:48PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.684	5006.150	5053.217	13.83	5,876.17	6,025.26

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:33:18AM 8/28/2018

Sample

Sample Name: Pulser;AV225
Comment:

Spectrum #3 Analysis #1

Batch

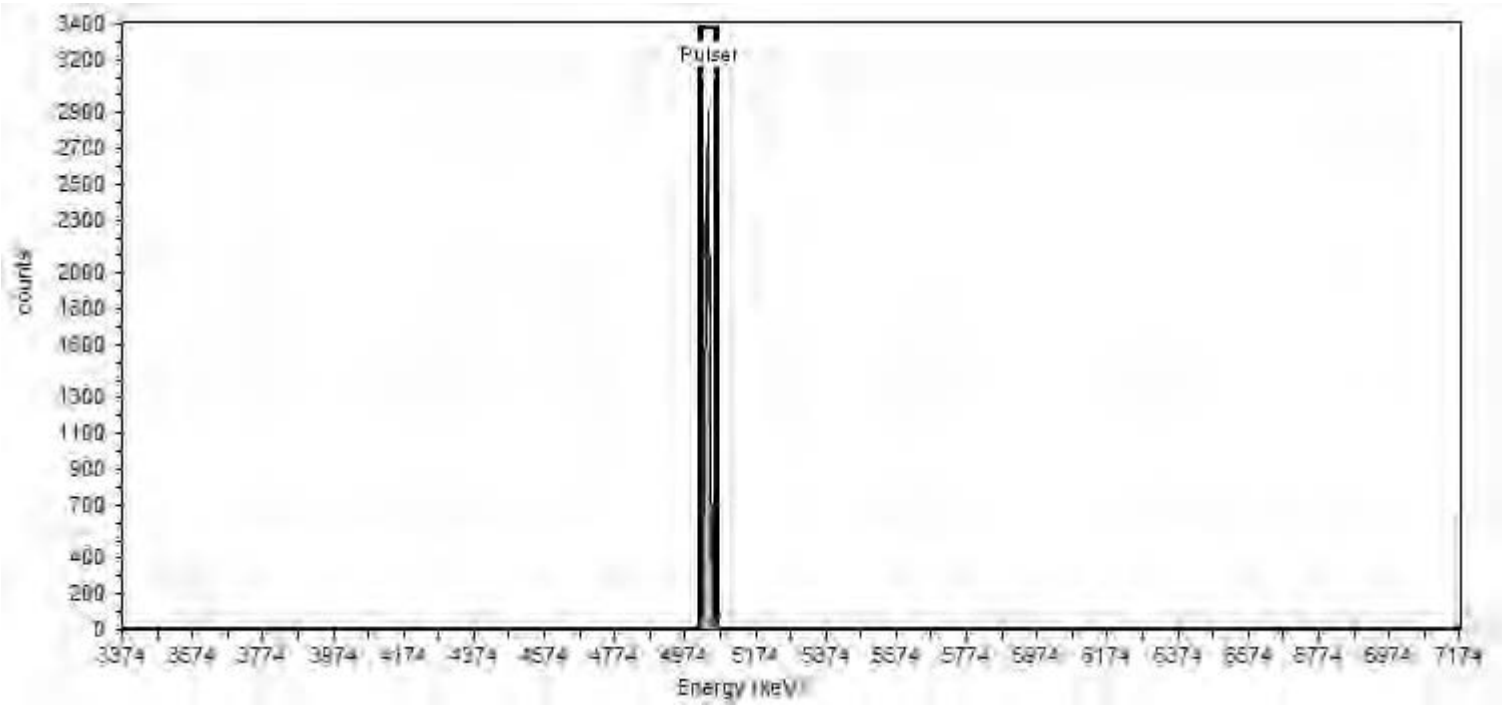
Batch Name: August2018c
Description:

Acquisition

Detector: AV225 , SN: 50-117J7
Acquisition Start Date: 8/28/2018 12:13:46AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9795;AV225-20171114
Calibration Date: 11/14/2017 3:22:43PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.753	5015.247	5060.260	13.22	5,529.10	5,770.98

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:23:49PM 5/14/2018

Calibration

Sample Name: IC-7107;AV1-05142018
Description:
Detector: AV1

Calibration Date: 5/14/2018 6:23:45PM
Analyst: 60040

Source Info

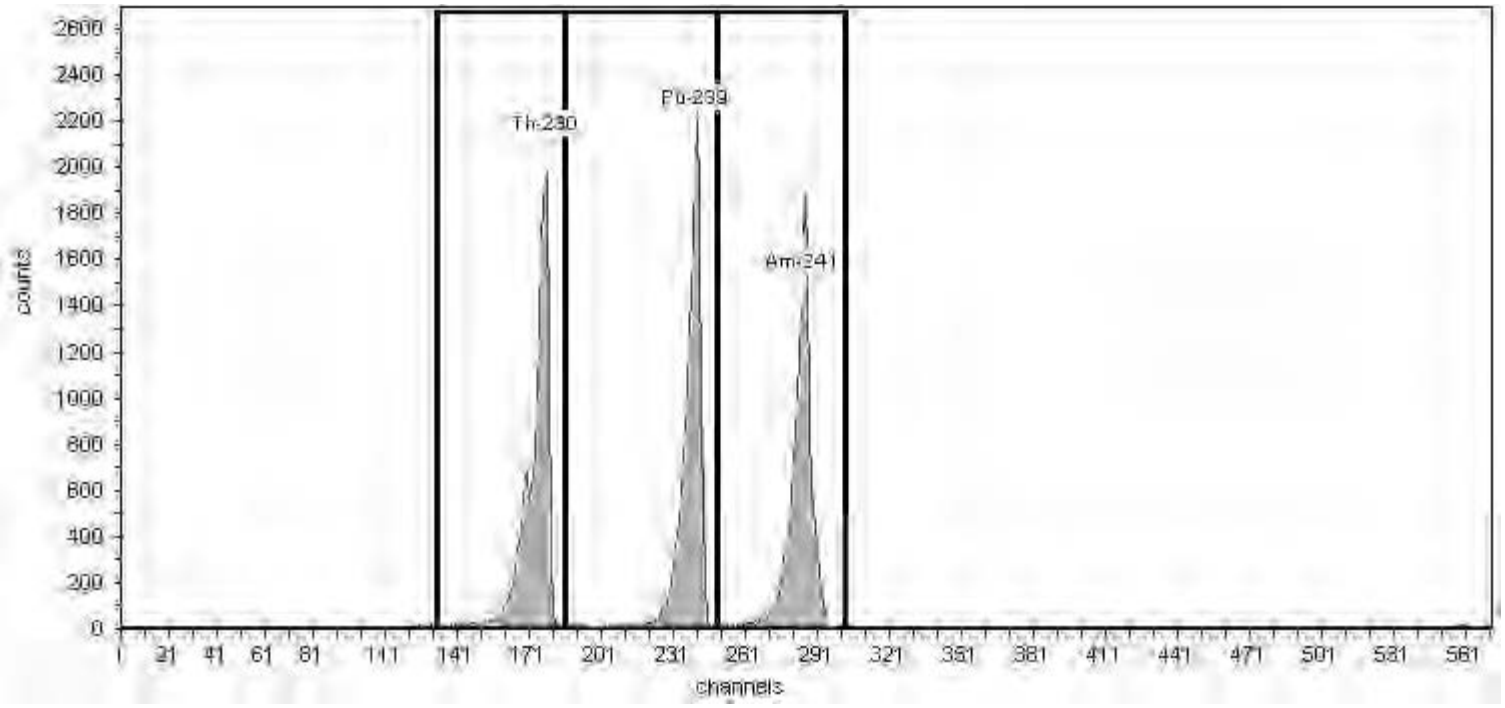
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/14/2018 3:44:27PM
Live Time: 140.00 min.
Real Time: 140.09 min.
Efficiency: 24.36% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	15,240.00	108.86
Pu-239	240	5.16	186	249	0.00	15,352.00	109.66
Am-241	284	5.49	249	303	0.00	14,427.00	103.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:25:19PM 5/14/2018

Calibration

Sample Name: IC-8877;AV3-05142018
Description:
Detector: AV3

Calibration Date: 5/14/2018 6:25:15PM
Analyst: 60040

Source Info

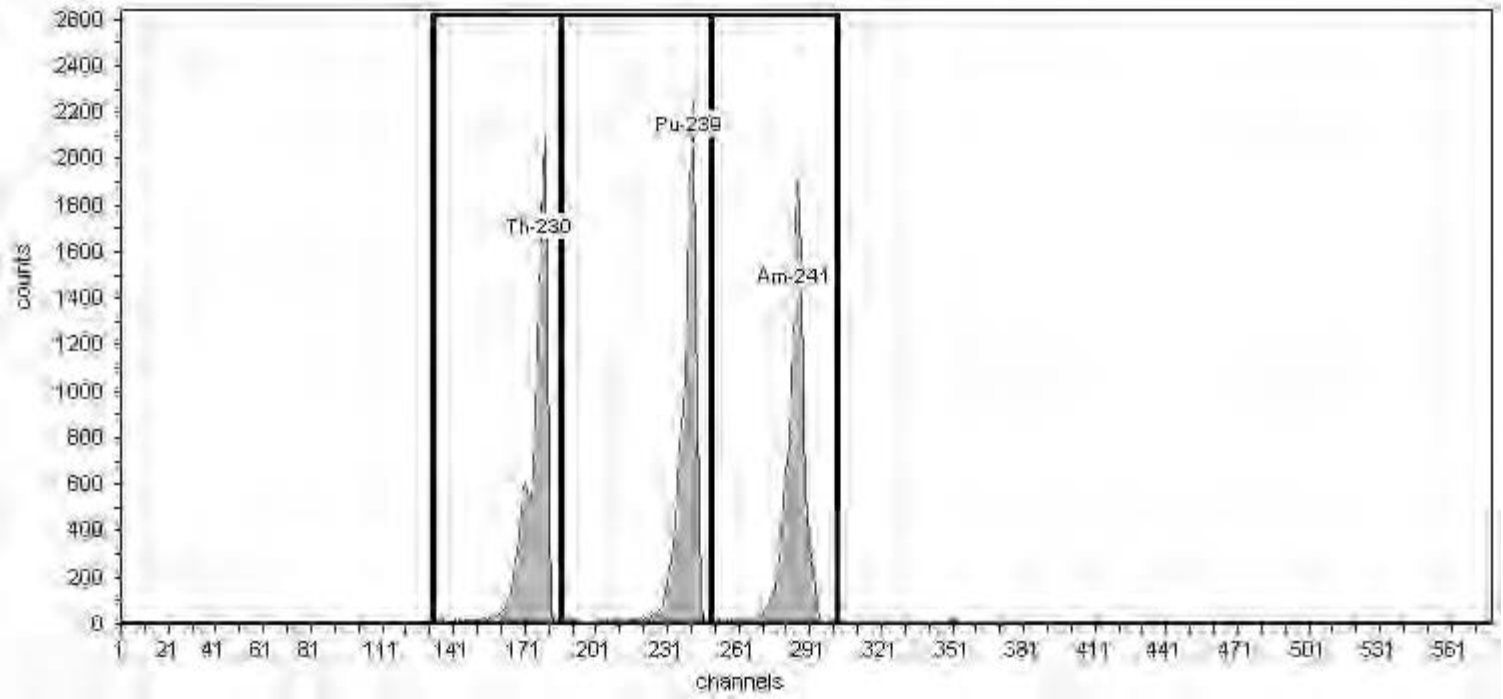
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/14/2018 3:46:06PM
Live Time: 140.00 min.
Real Time: 140.09 min.
Efficiency: 24.44% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	14,252.00	101.80
Pu-239	240	5.16	186	249	0.00	14,532.00	103.80
Am-241	284	5.49	249	303	0.00	13,591.00	97.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:25:38PM 5/14/2018

Calibration

Sample Name: IC-9520;AV4-05142018
Description:
Detector: AV4

Calibration Date: 5/14/2018 6:25:34PM
Analyst: 60040

Source Info

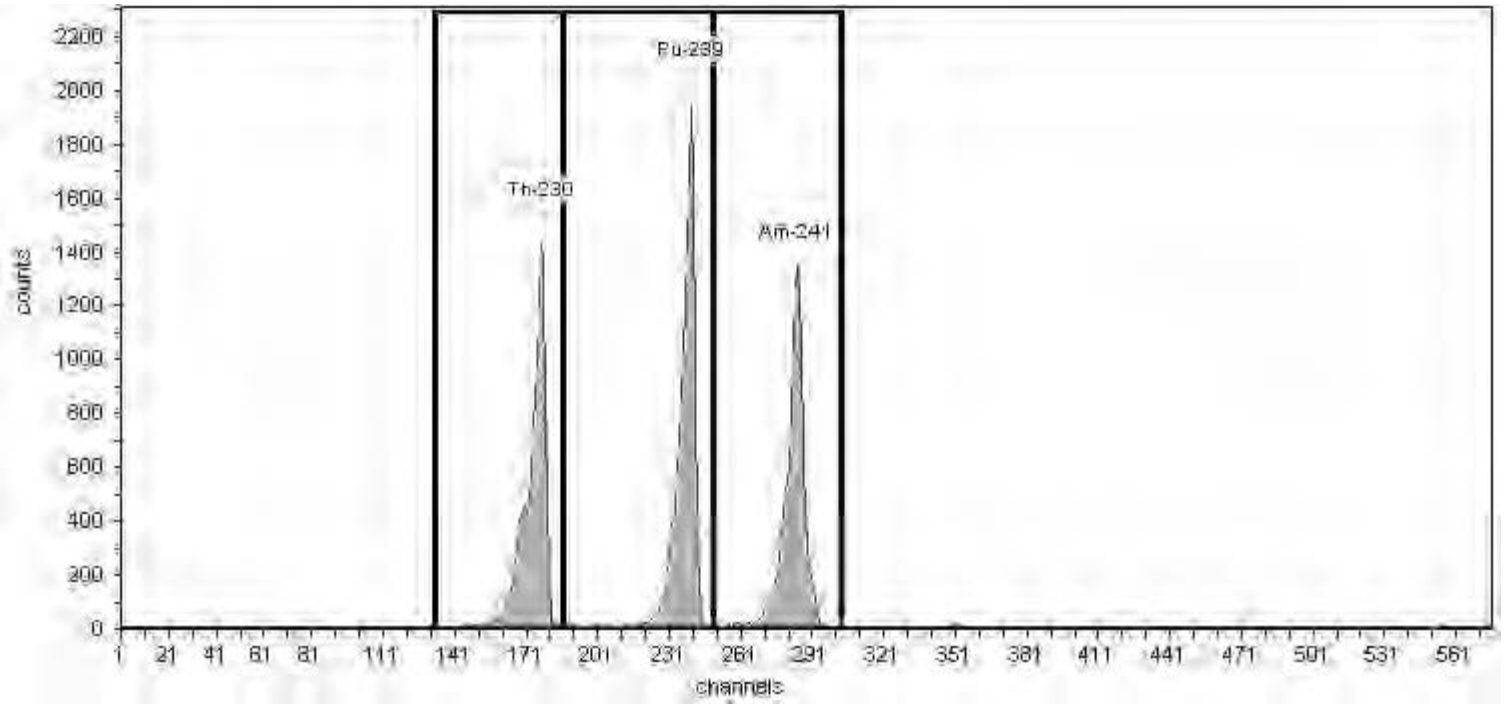
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/14/2018 3:46:19PM
Live Time: 140.00 min.
Real Time: 140.09 min.
Efficiency: 22.79% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	10,751.00	76.79
Pu-239	240	5.16	186	249	0.00	13,005.00	92.89
Am-241	284	5.49	249	303	0.00	10,380.00	74.14

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:26:17PM 5/14/2018

Calibration

Sample Name: IC-9793;AV7-05142018
Description:
Detector: AV7

Calibration Date: 5/14/2018 6:26:13PM
Analyst: 60040

Source Info

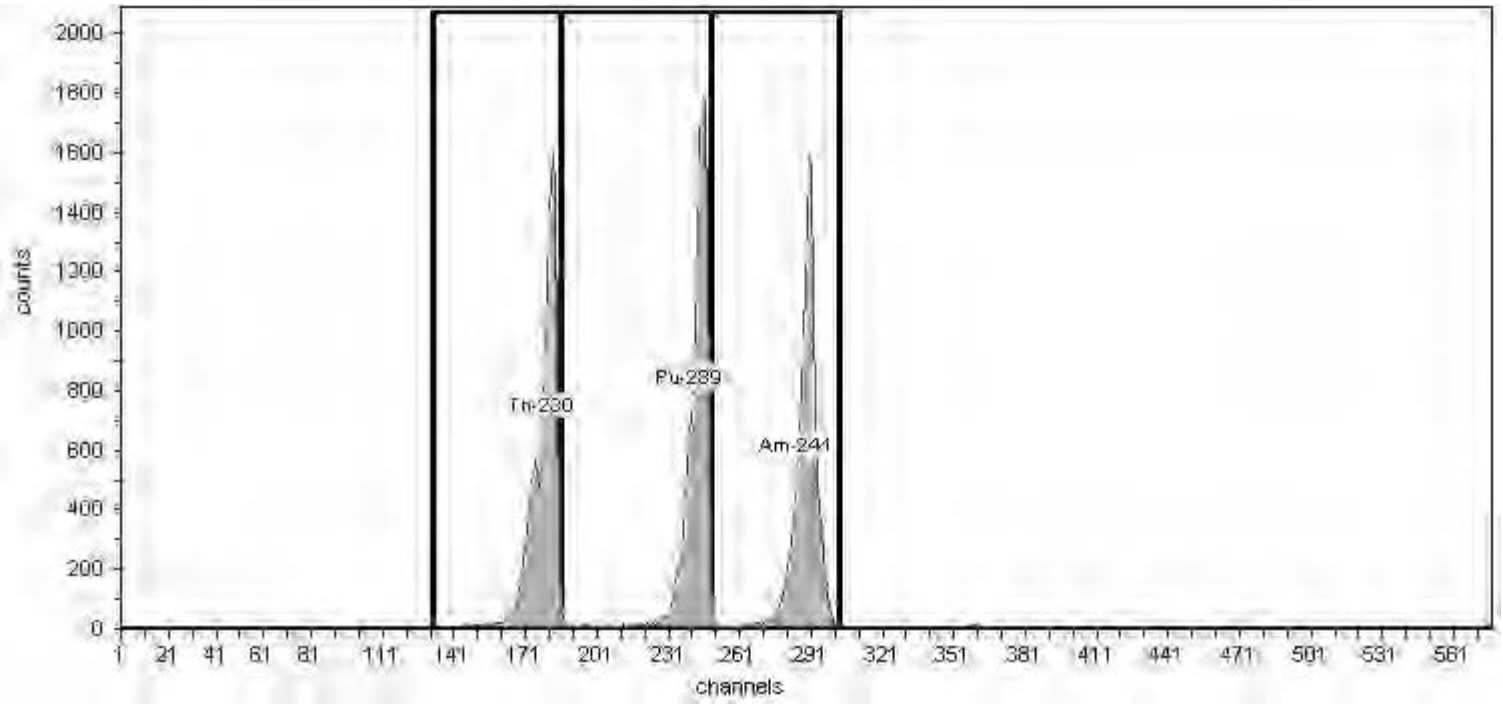
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/14/2018 3:47:01PM
Live Time: 140.00 min.
Real Time: 140.09 min.
Efficiency: 22.98% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,677.00	90.55
Pu-239	240	5.16	186	249	0.00	13,298.00	94.99
Am-241	284	5.49	249	303	0.00	12,604.00	90.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:26:31PM 5/14/2018

Calibration

Sample Name: IC-9795;AV8-05142018
Description:
Detector: AV8

Calibration Date: 5/14/2018 6:26:27PM
Analyst: 60040

Source Info

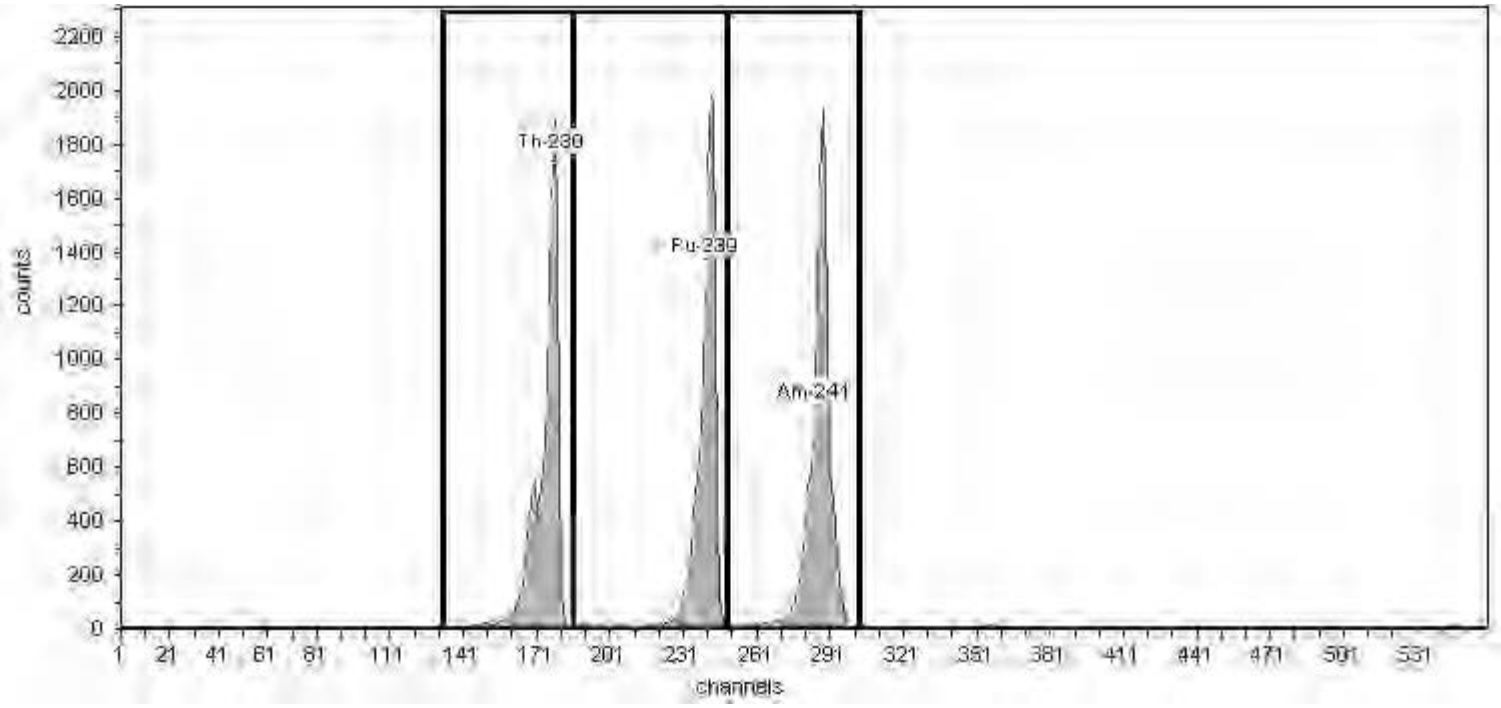
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/14/2018 3:47:39PM
Live Time: 140.00 min.
Real Time: 140.09 min.
Efficiency: 25.96% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,786.00	91.33
Pu-239	240	5.16	186	249	0.00	13,029.00	93.06
Am-241	284	5.49	249	303	0.00	13,761.00	98.29

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:29:00PM 5/15/2018

Calibration

Sample Name: IC-9817;AV24-05142018
Description:
Detector: AV24

Calibration Date: 5/15/2018 12:28:57PM
Analyst: 60040

Source Info

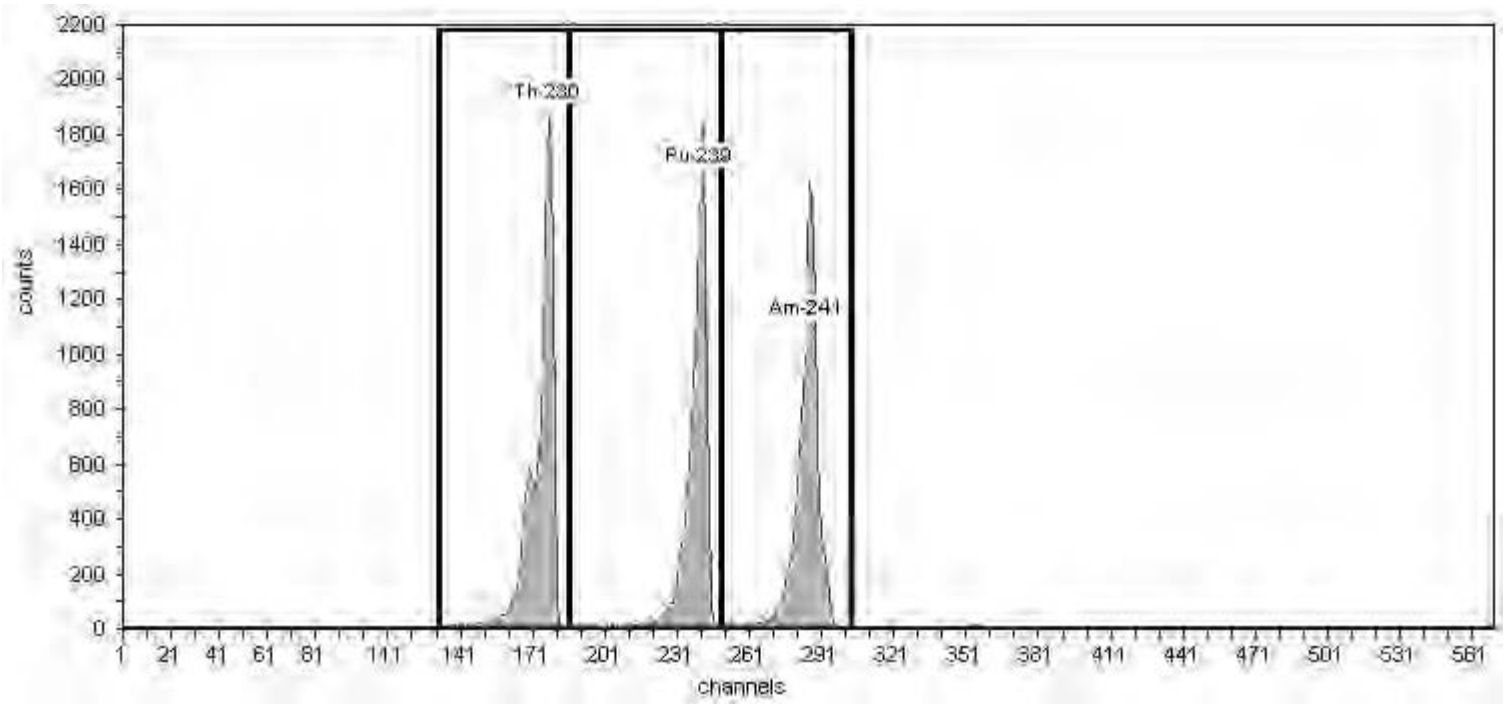
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/14/2018 6:37:42PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 22.21% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	13,641.00	97.43
Pu-239	240	5.16	186	249	0.00	12,687.00	90.62
Am-241	284	5.49	249	303	0.00	12,649.00	90.35

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:26:54PM 5/15/2018

Calibration

Sample Name: IC-1368446;AV44-05142018
Description:
Detector: AV44

Calibration Date: 5/15/2018 12:26:50PM
Analyst: 60040

Source Info

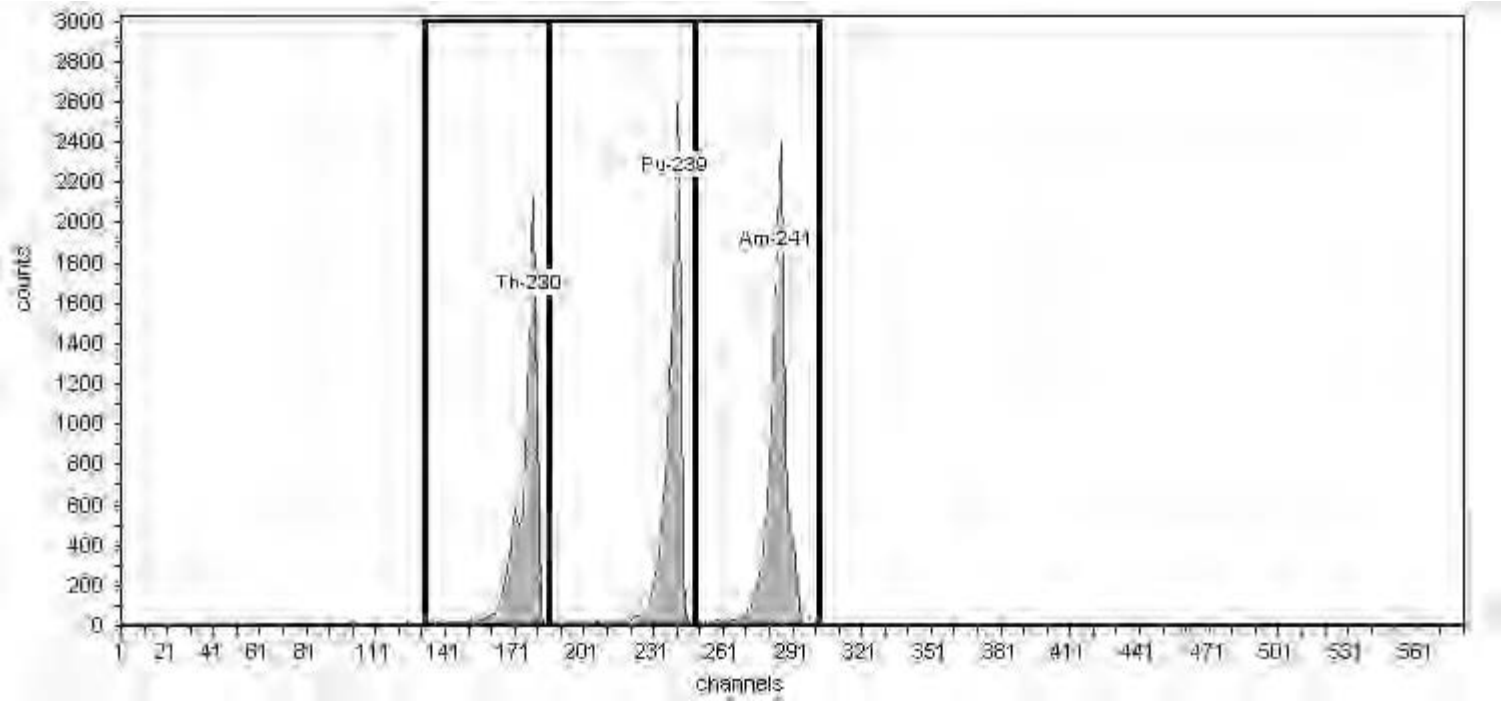
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/14/2018 6:38:43PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.49% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	13,858.00	98.99
Pu-239	240	5.16	186	249	0.00	15,600.00	111.43
Am-241	284	5.49	249	303	0.00	16,599.00	118.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:06PM 5/15/2018

Calibration

Sample Name: IC-1368447;AV45-05142018a
Description:
Detector: AV45

Calibration Date: 5/15/2018 12:29:34PM
Analyst: 60040

Source Info

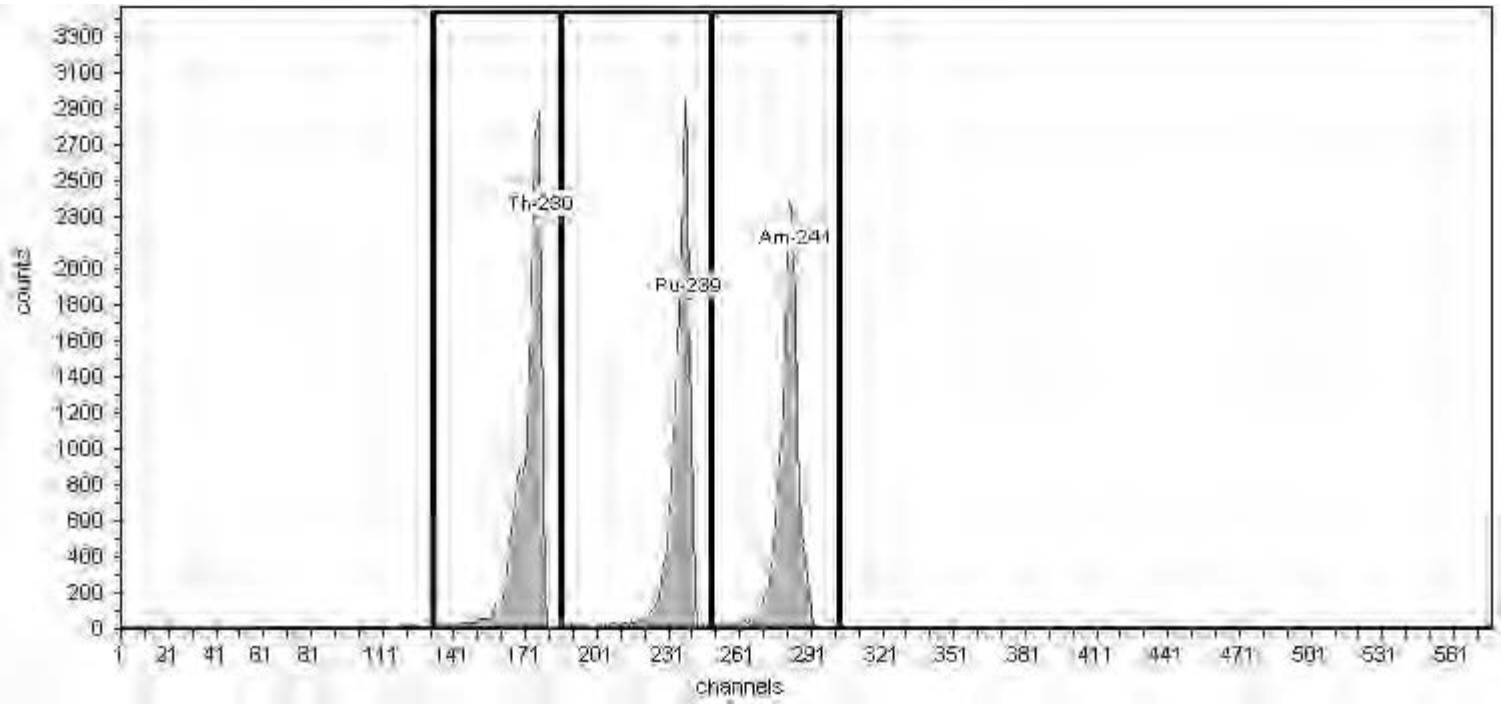
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/14/2018 6:51:32PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.95% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	21,966.00	156.90
Pu-239	240	5.16	186	249	0.00	19,966.00	142.61
Am-241	284	5.49	249	303	0.00	19,006.00	135.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:27:18PM 5/15/2018

Calibration

Sample Name: IC-1370622;AV47-05142018
Description:
Detector: AV47

Calibration Date: 5/15/2018 12:27:14PM
Analyst: 60040

Source Info

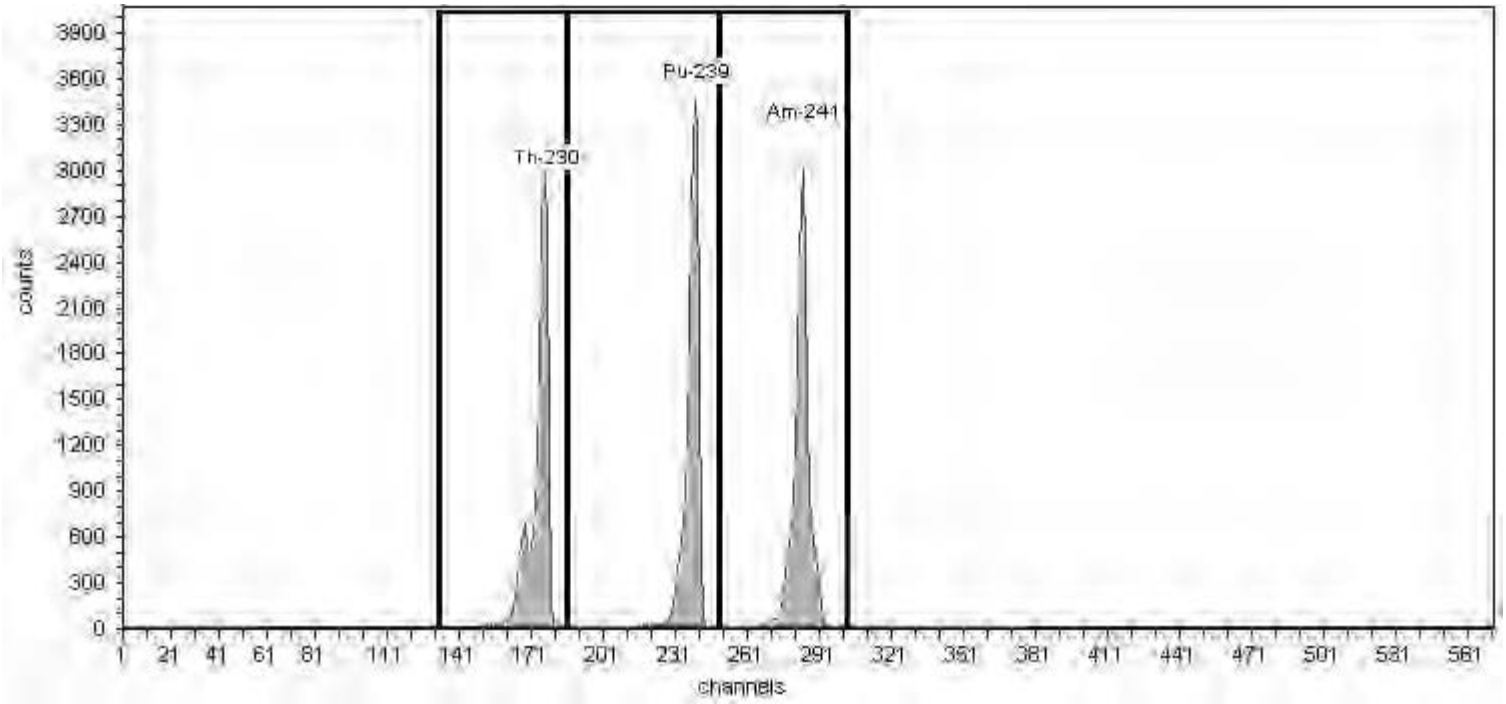
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV47 , SN: 46-032336
Acquisition Start Date: 5/14/2018 6:40:15PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.02% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	17,177.00	122.69
Pu-239	240	5.16	186	249	0.00	17,986.00	128.47
Am-241	284	5.49	249	303	0.00	17,993.00	128.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:27:29PM 5/15/2018

Calibration

Sample Name: IC-1370619;AV48-05142018
Description:
Detector: AV48

Calibration Date: 5/15/2018 12:27:25PM
Analyst: 60040

Source Info

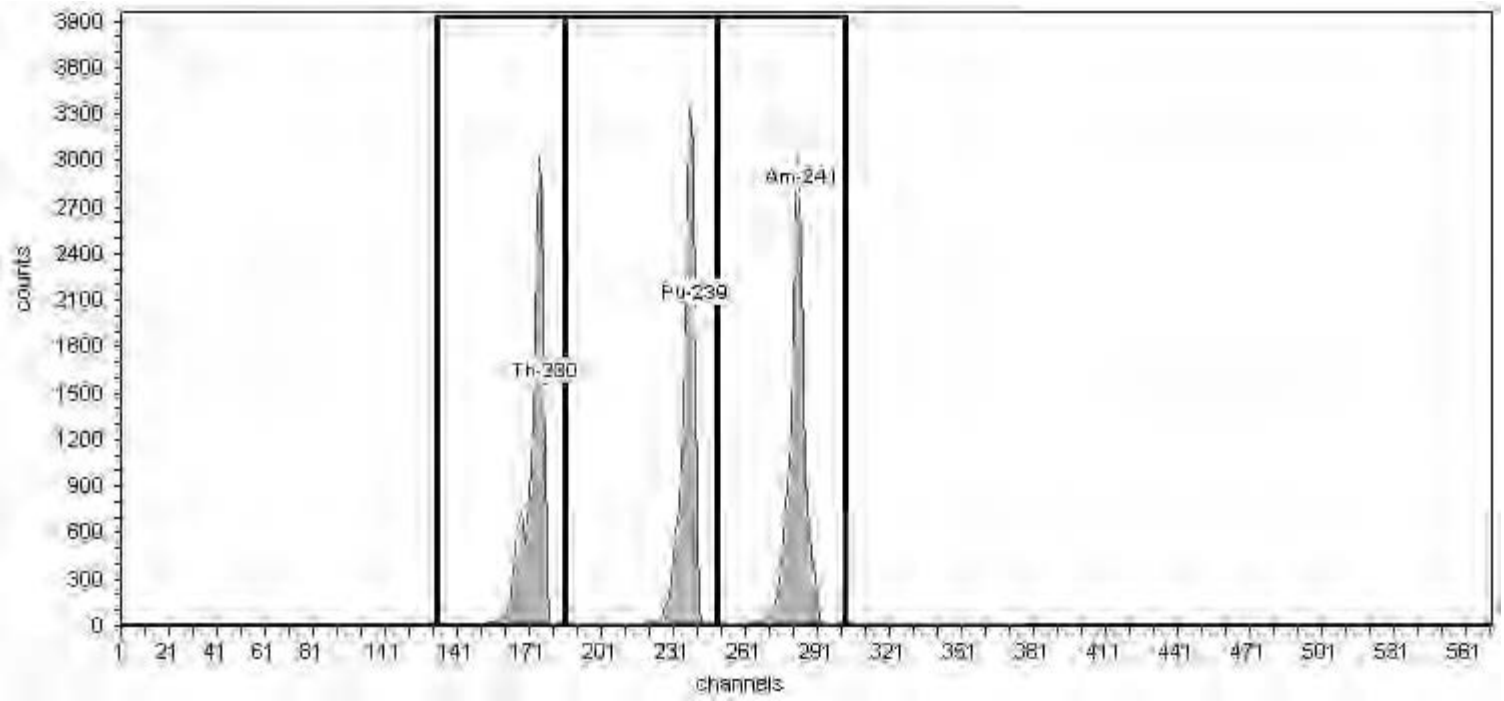
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV48 , SN: 46-033P6
Acquisition Start Date: 5/14/2018 6:40:17PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.06% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	18,367.00	131.19
Pu-239	240	5.16	186	249	0.00	18,273.00	130.52
Am-241	284	5.49	249	303	0.00	19,691.00	140.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:02PM 5/15/2018

Calibration

Sample Name: IC-9792;AV54-05152018
Description:
Detector: AV54

Calibration Date: 5/15/2018 3:37:57PM
Analyst: 60040

Source Info

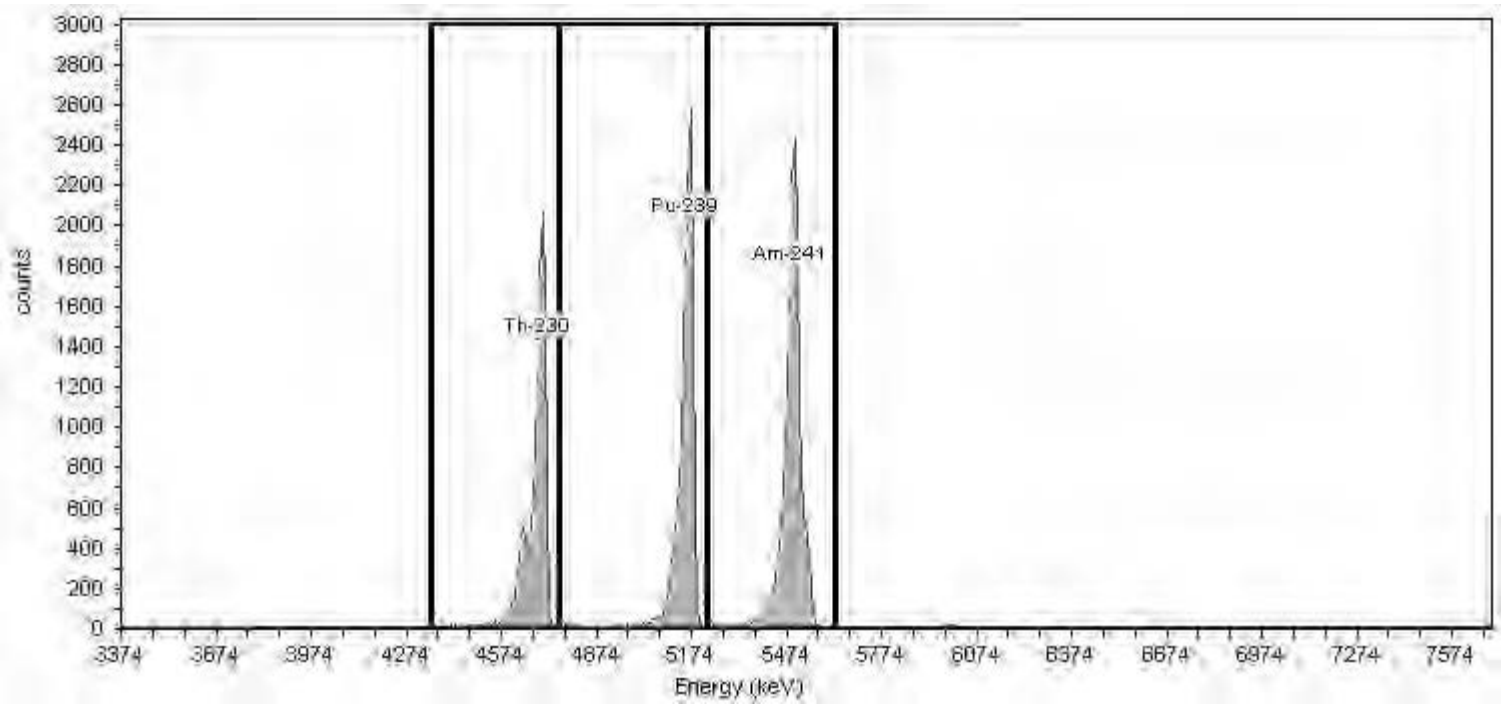
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 46-033P4
Acquisition Start Date: 5/15/2018 12:37:33PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 23.62% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,363.00	88.31
Pu-239	240	5.16	186	249	0.00	14,261.00	101.86
Am-241	284	5.49	249	303	0.00	16,341.00	116.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:21PM 5/15/2018

Calibration

Sample Name: IC-9793;AV55-05152018
Description:
Detector: AV55

Calibration Date: 5/15/2018 3:38:17PM
Analyst: 60040

Source Info

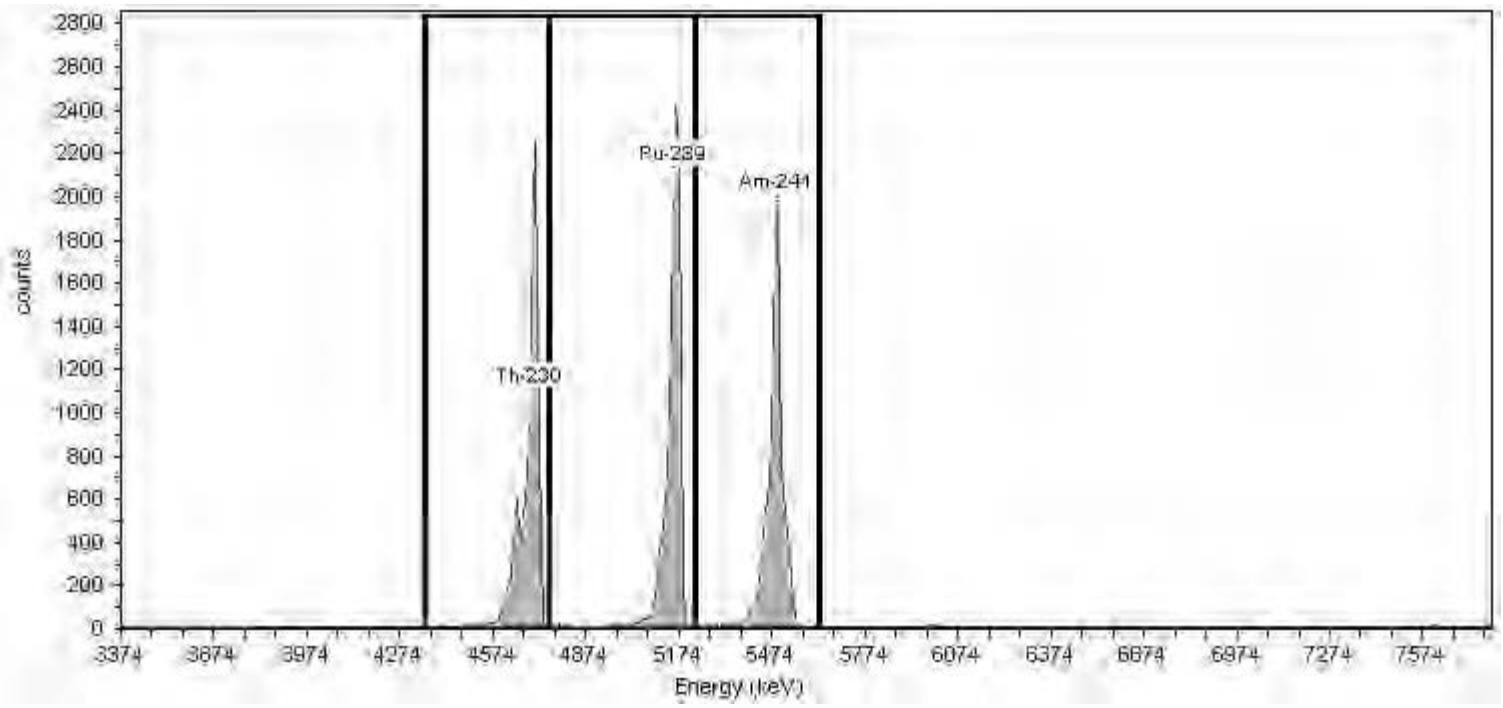
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/15/2018 12:38:07PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 22.96% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,747.00	91.05
Pu-239	240	5.16	186	249	0.00	13,182.00	94.16
Am-241	284	5.49	249	303	0.00	12,616.00	90.11

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:34PM 5/15/2018

Calibration

Sample Name: IC-9795;AV56-05152018
Description:
Detector: AV56

Calibration Date: 5/15/2018 3:38:31PM
Analyst: 60040

Source Info

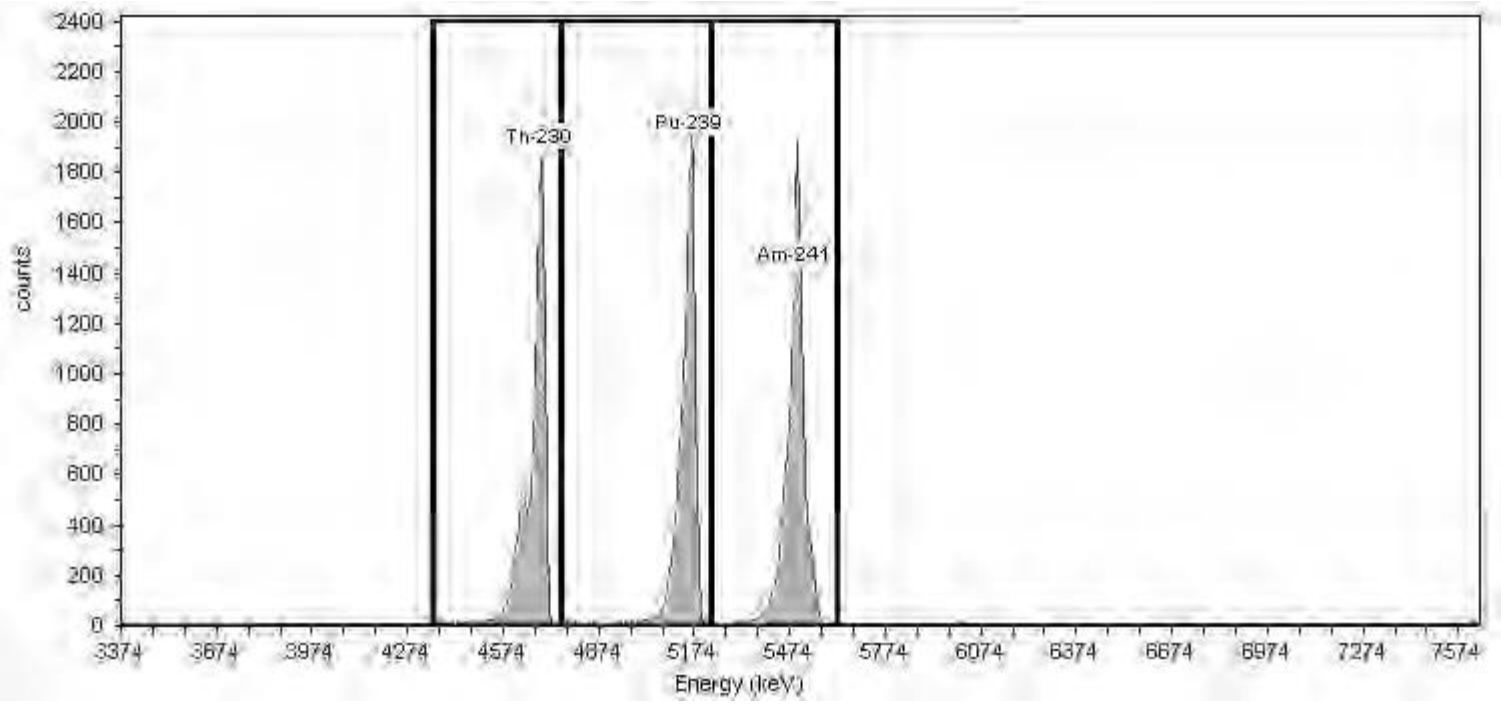
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/15/2018 12:38:26PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.25% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,377.00	88.41
Pu-239	240	5.16	186	249	0.00	12,528.00	89.49
Am-241	284	5.49	249	303	0.00	13,590.00	97.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:59PM 5/15/2018

Calibration

Sample Name: IC-9885;AV58-05152018
Description:
Detector: AV58

Calibration Date: 5/15/2018 3:38:55PM
Analyst: 60040

Source Info

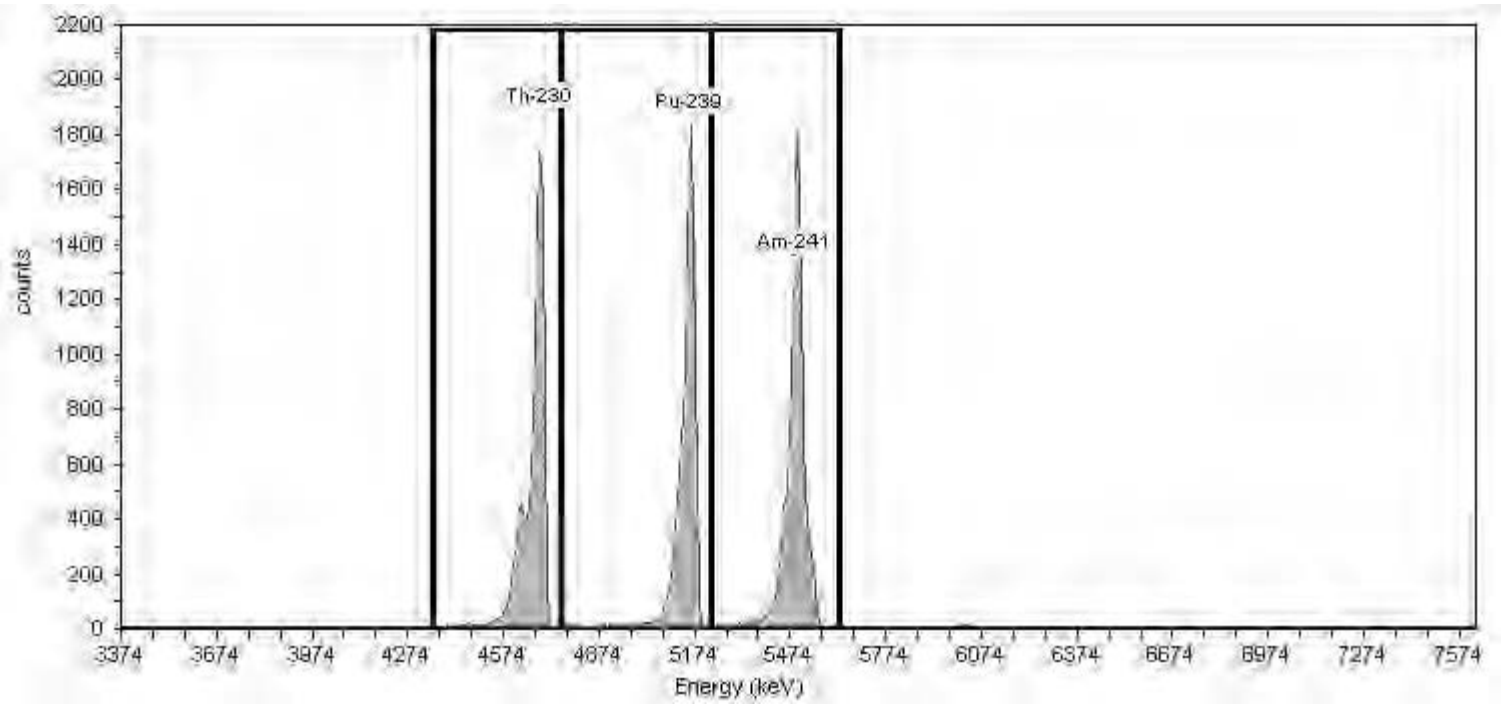
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/15/2018 12:39:21PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 24.05% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	11,232.00	80.23
Pu-239	240	5.16	186	249	0.00	10,843.00	77.45
Am-241	284	5.49	249	303	0.00	11,976.00	85.54

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:39:25PM 5/15/2018

Calibration

Sample Name: IC-1368447;AV62-05152018
Description:
Detector: AV62

Calibration Date: 5/15/2018 3:39:22PM
Analyst: 60040

Source Info

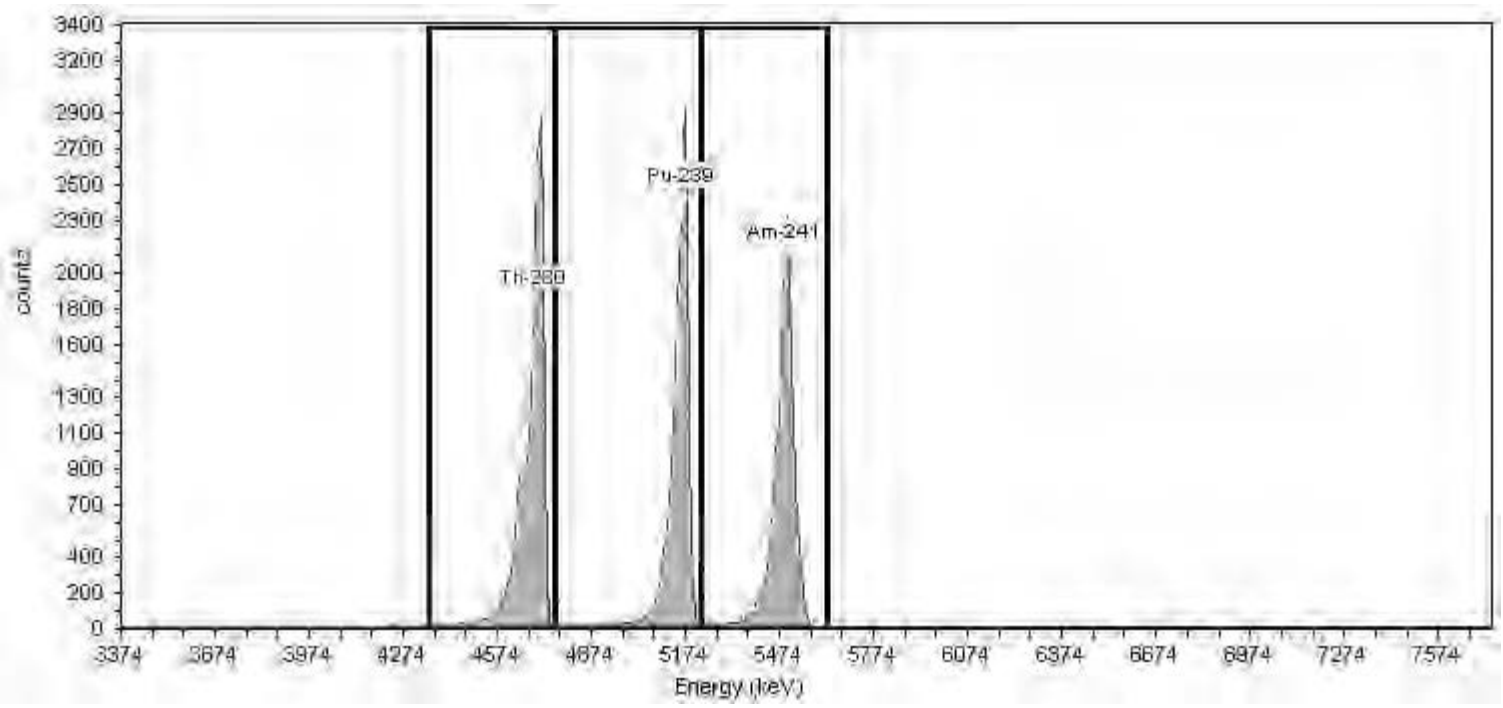
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/15/2018 12:40:11PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 28.40% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	22,234.00	158.81
Pu-239	240	5.16	186	249	0.00	20,494.00	146.39
Am-241	284	5.49	249	303	0.00	19,202.00	137.16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:39:47PM 5/15/2018

Calibration

Sample Name: IC-1370622;AV64-05152018
Description:
Detector: AV64

Calibration Date: 5/15/2018 3:39:44PM
Analyst: 60040

Source Info

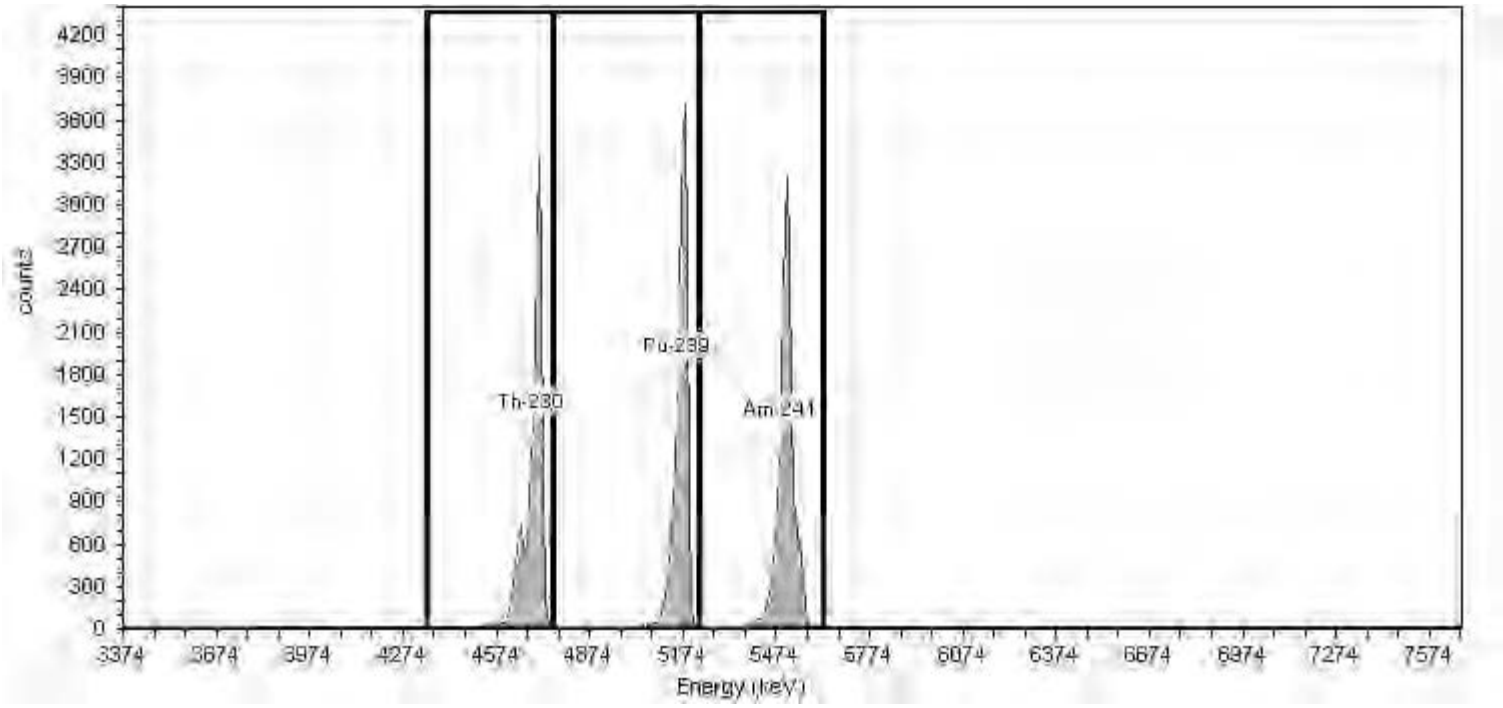
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV64 , SN: 43-028v3
Acquisition Start Date: 5/15/2018 12:40:47PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 28.38% +/- 0.24% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	18,088.00	129.20
Pu-239	240	5.16	186	249	0.00	18,769.00	134.06
Am-241	284	5.49	249	303	0.00	18,968.00	135.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:40:00PM 5/15/2018

Calibration

Sample Name: IC-1370619;AV65-05152018
Description:
Detector: AV65

Calibration Date: 5/15/2018 3:39:56PM
Analyst: 60040

Source Info

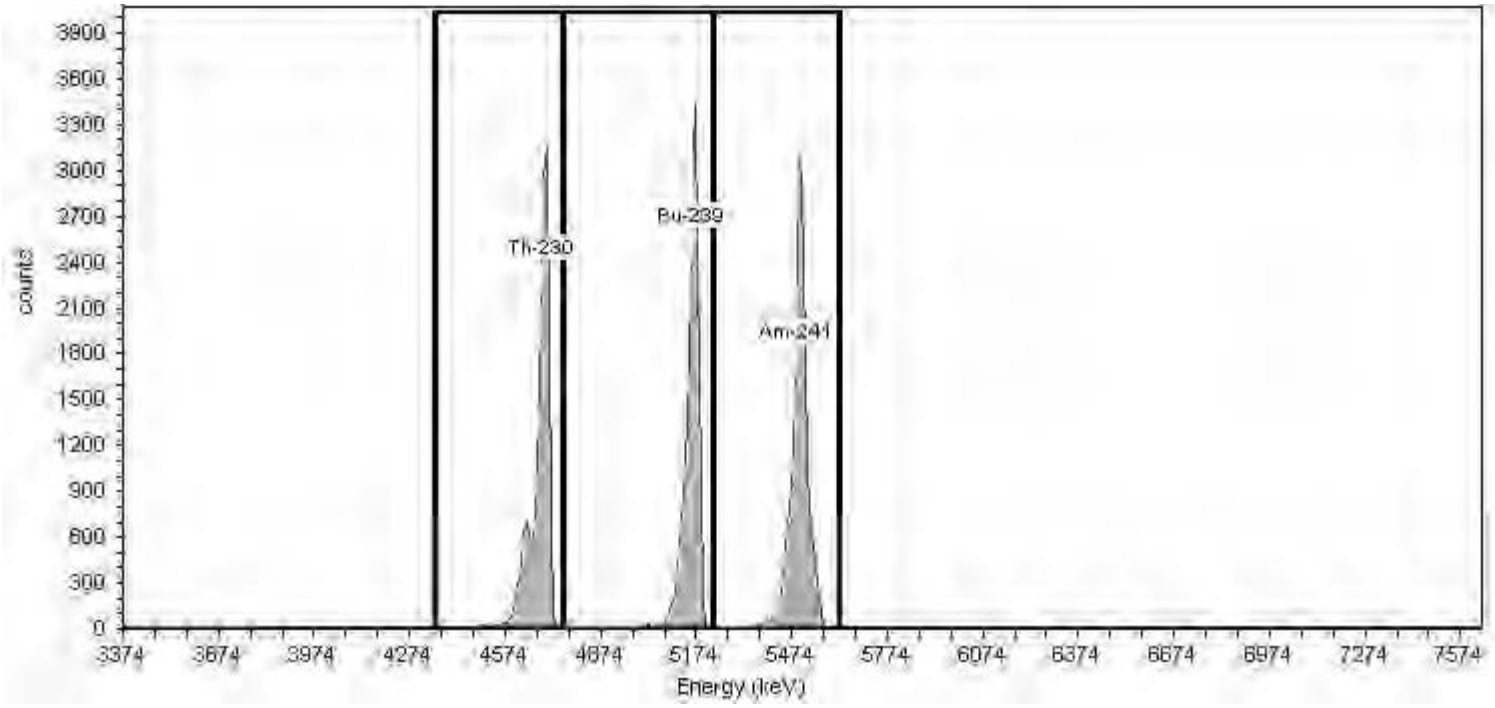
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/15/2018 12:41:11PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.12% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	18,550.00	132.50
Pu-239	240	5.16	186	249	0.00	18,359.00	131.14
Am-241	284	5.49	249	303	0.00	19,543.00	139.59

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:40:11PM 5/15/2018

Calibration

Sample Name: IC-1370620;AV66-05152018
Description:
Detector: AV66

Calibration Date: 5/15/2018 3:40:08PM
Analyst: 60040

Source Info

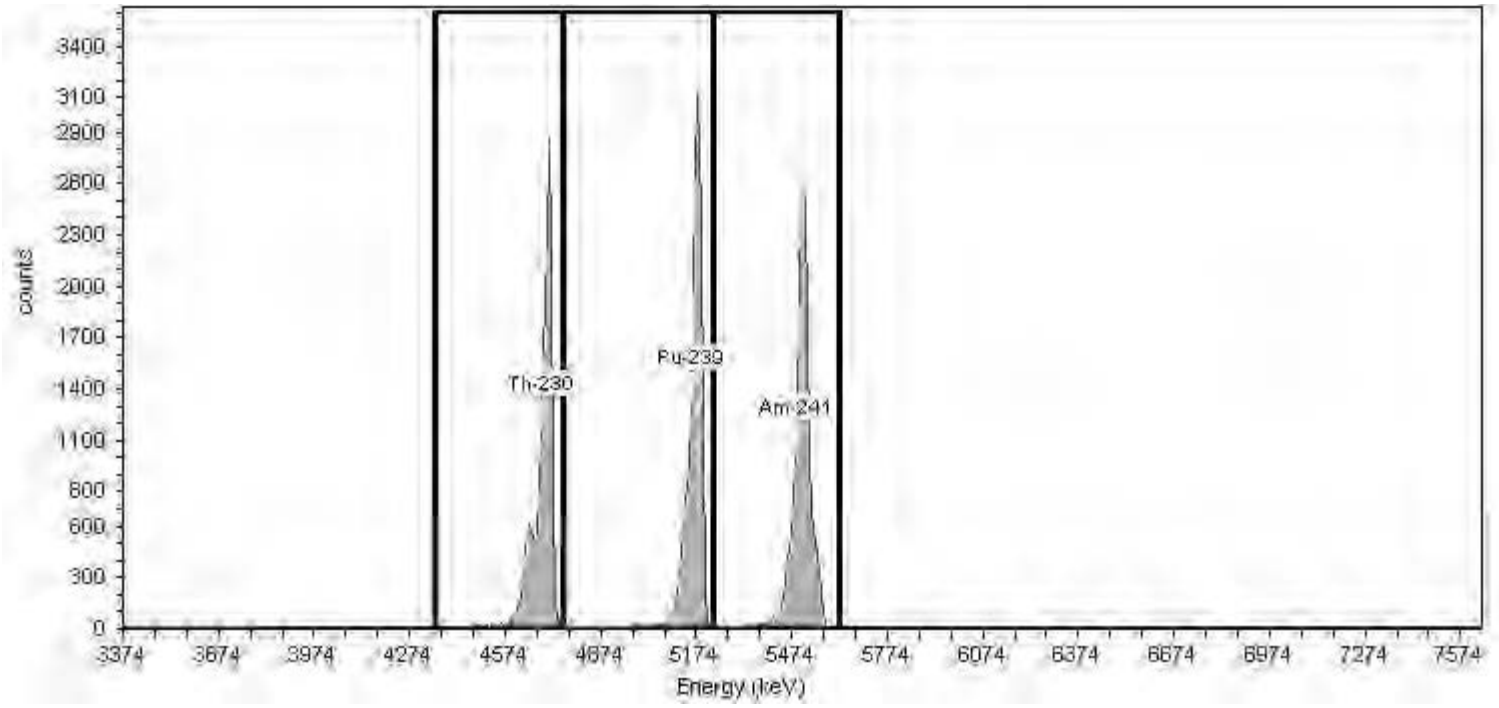
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/15/2018 12:41:27PM
Live Time: 140.01 min.
Real Time: 140.11 min.
Efficiency: 27.12% +/- 0.24% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	15,839.00	113.13
Pu-239	240	5.16	186	249	0.00	16,360.00	116.85
Am-241	284	5.49	249	303	0.00	16,840.00	120.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:13:38PM 7/16/2018

Calibration

Sample Name: IC-8874;AV69-05152018
Description:
Detector: AV69

Calibration Date: 5/15/2018 6:39:25PM
Analyst: 60040

Source Info

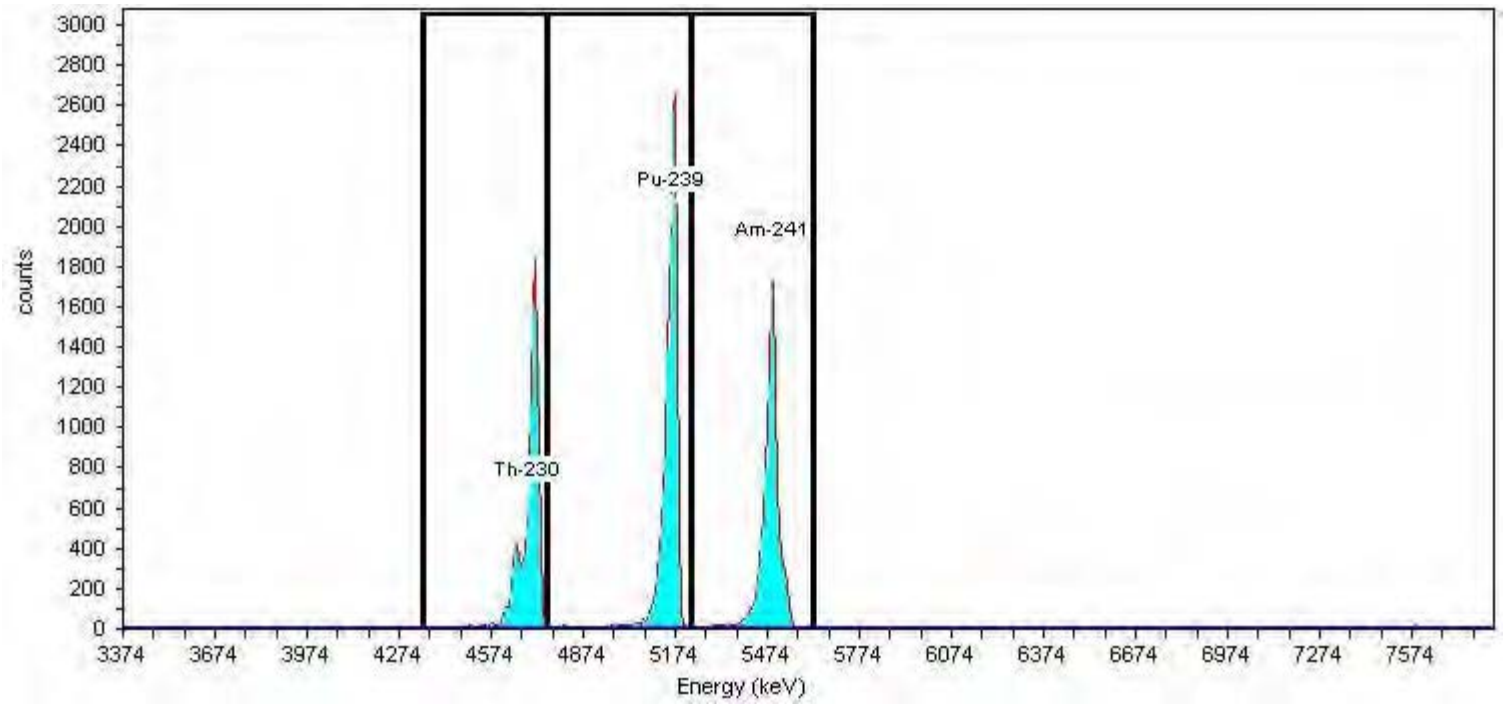
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/15/2018 3:45:35PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 26.43% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	10,543.00	75.31
Pu-239	240	5.16	186	249	0.00	14,132.00	100.94
Am-241	284	5.49	249	303	0.00	10,999.00	78.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:28PM 5/15/2018

Calibration

Sample Name: IC-8877;AV70-05152018
Description:
Detector: AV70

Calibration Date: 5/15/2018 6:36:23PM
Analyst: 60040

Source Info

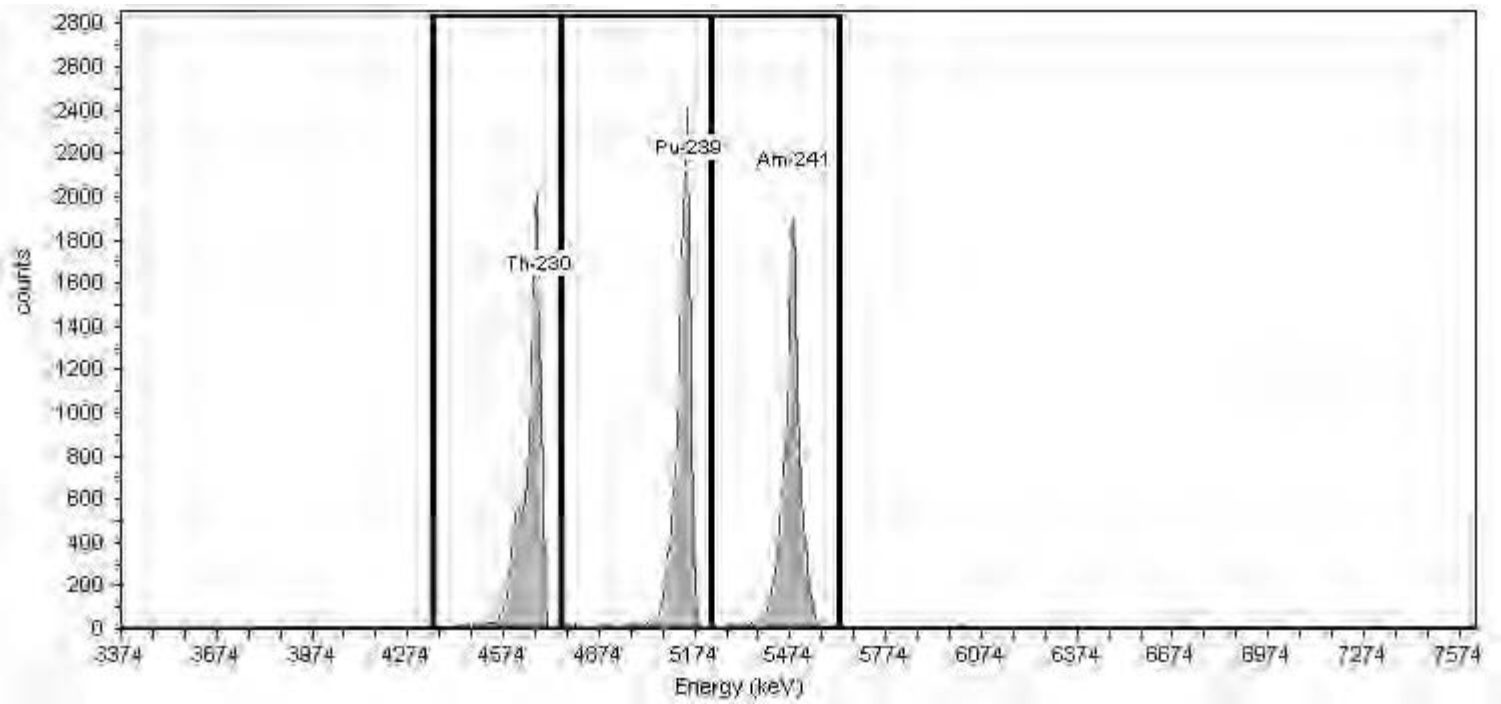
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/15/2018 3:45:50PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 24.40% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	13,992.00	99.94
Pu-239	240	5.16	186	249	0.00	14,576.00	104.11
Am-241	284	5.49	249	303	0.00	13,770.00	98.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:43PM 5/15/2018

Calibration

Sample Name: IC-9520;AV71-05152018
Description:
Detector: AV71

Calibration Date: 5/15/2018 6:36:40PM
Analyst: 60040

Source Info

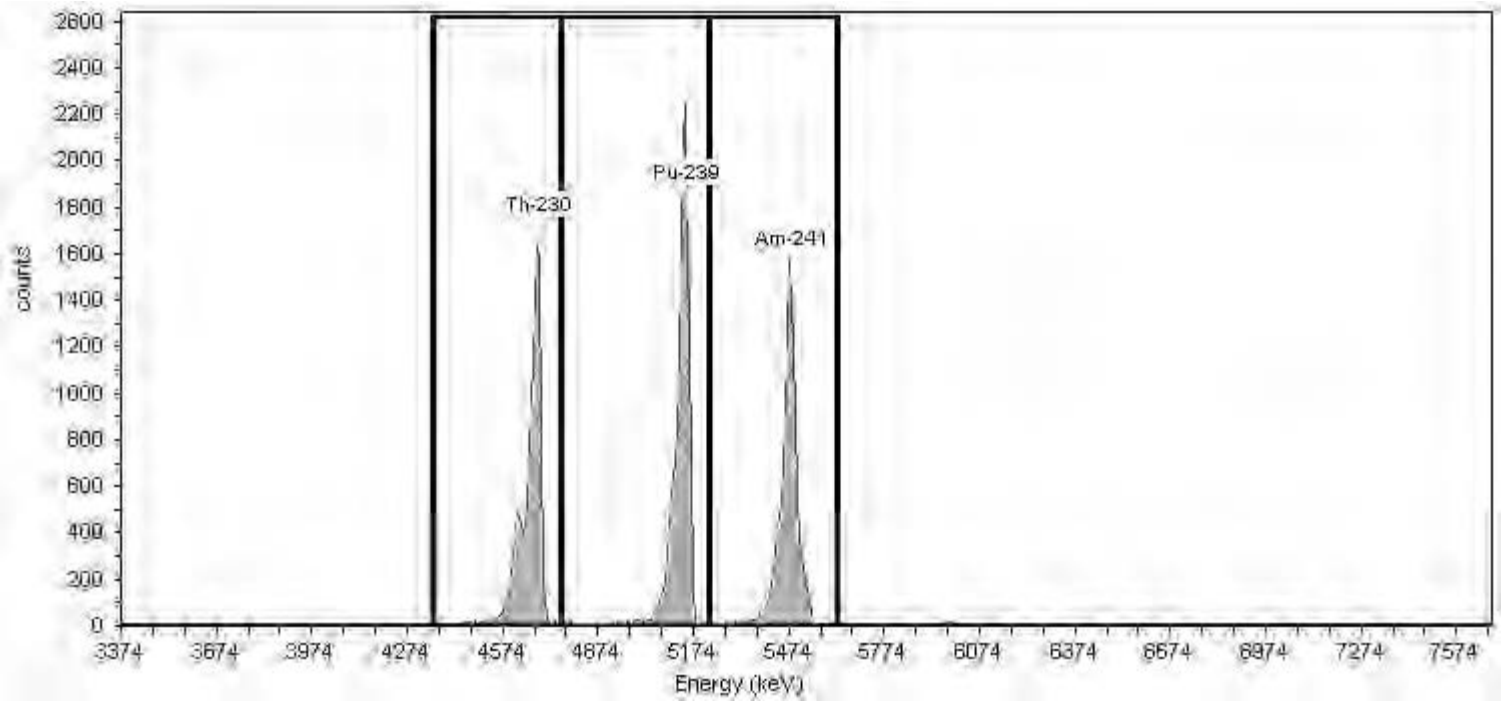
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 5/15/2018 3:46:14PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 23.00% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	10,904.00	77.89
Pu-239	240	5.16	186	249	0.00	13,002.00	92.87
Am-241	284	5.49	249	303	0.00	10,526.00	75.19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:54PM 5/15/2018

Calibration

Sample Name: IC-9792;AV72-05152018
Description:
Detector: AV72

Calibration Date: 5/15/2018 6:36:51PM
Analyst: 60040

Source Info

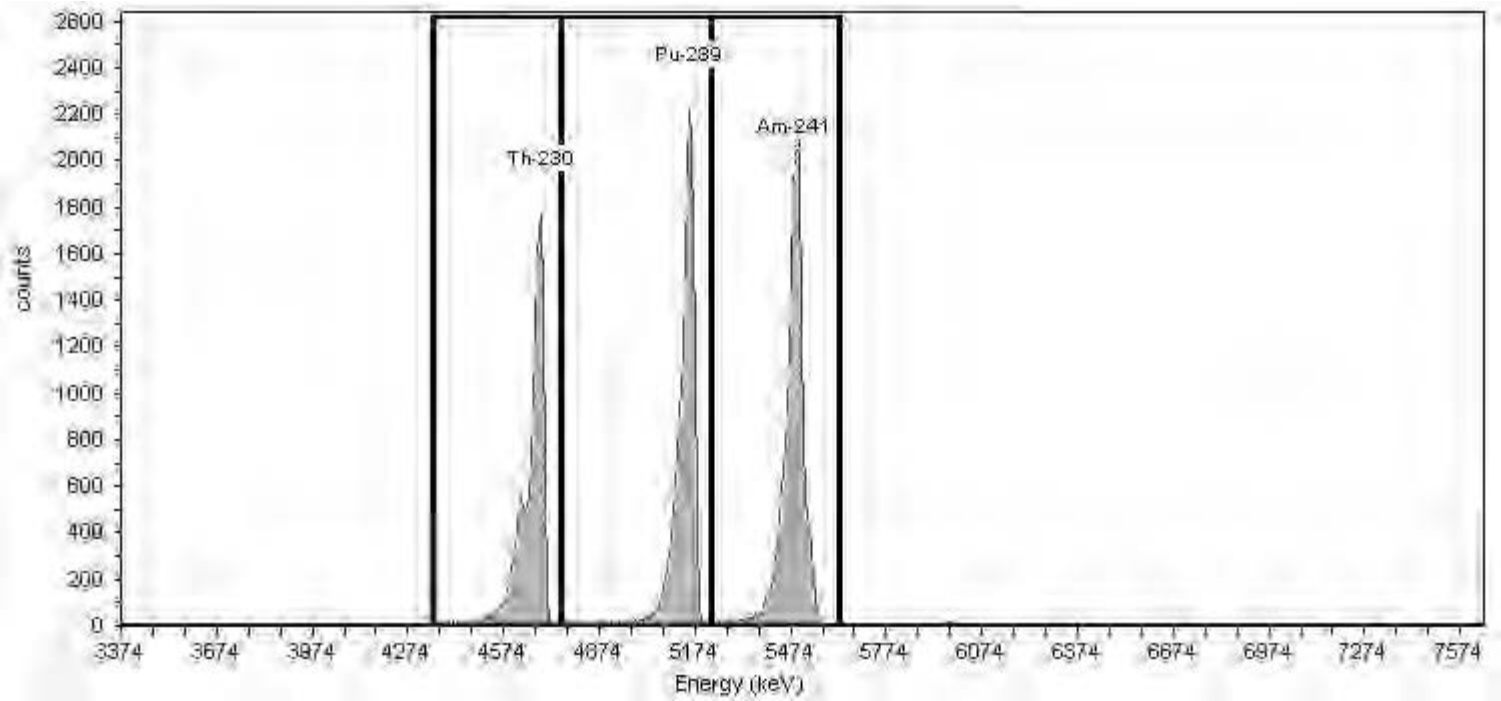
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 5/15/2018 3:46:37PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 24.58% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,917.00	92.26
Pu-239	240	5.16	186	249	0.00	14,959.00	106.85
Am-241	284	5.49	249	303	0.00	16,853.00	120.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:05PM 5/15/2018

Calibration

Sample Name: IC-9793;AV73-05152018
Description:
Detector: AV73

Calibration Date: 5/15/2018 6:37:02PM
Analyst: 60040

Source Info

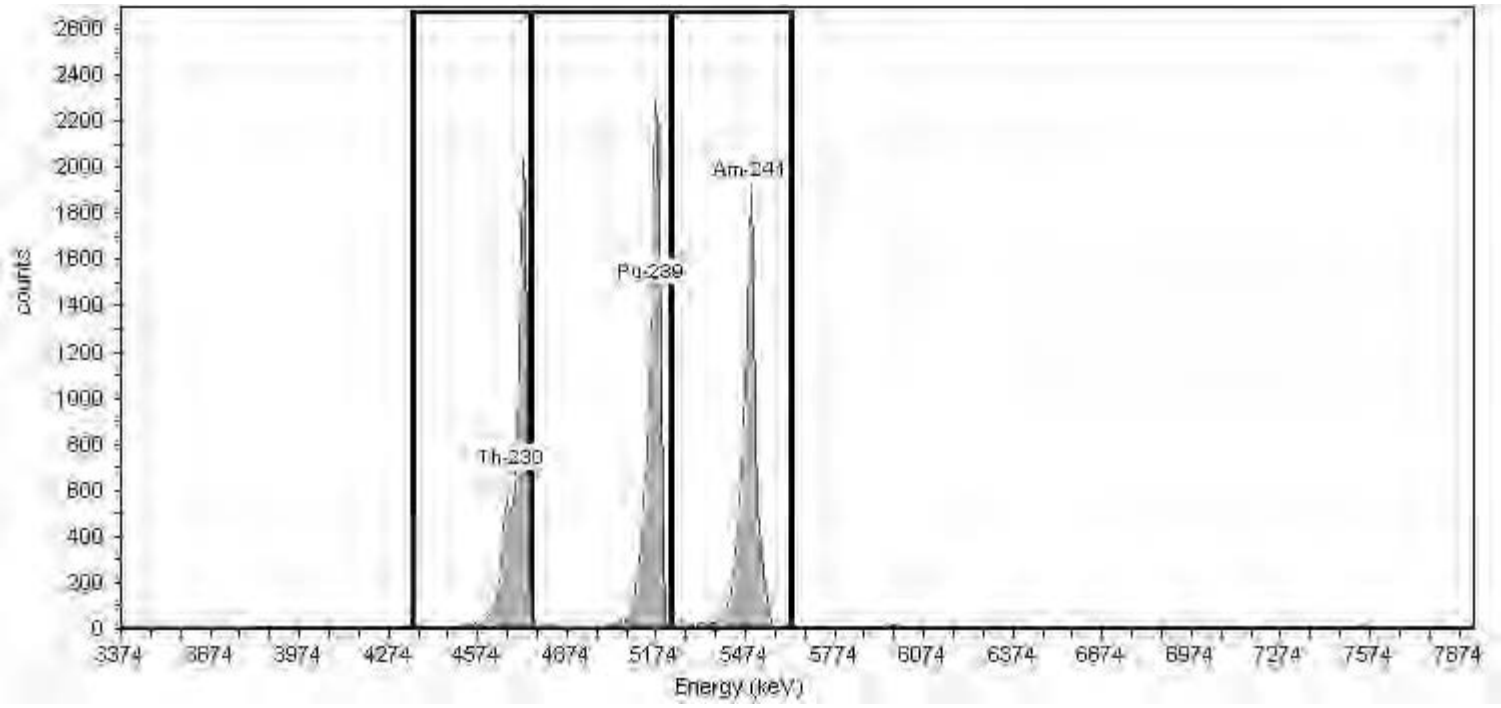
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV73 , SN: 46-03321
Acquisition Start Date: 5/15/2018 3:46:55PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 23.17% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,773.00	91.24
Pu-239	240	5.16	186	249	0.00	13,389.00	95.64
Am-241	284	5.49	249	303	0.00	12,736.00	90.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:17PM 5/15/2018

Calibration

Sample Name: IC-9795;AV74-05152018
Description:
Detector: AV74

Calibration Date: 5/15/2018 6:37:13PM
Analyst: 60040

Source Info

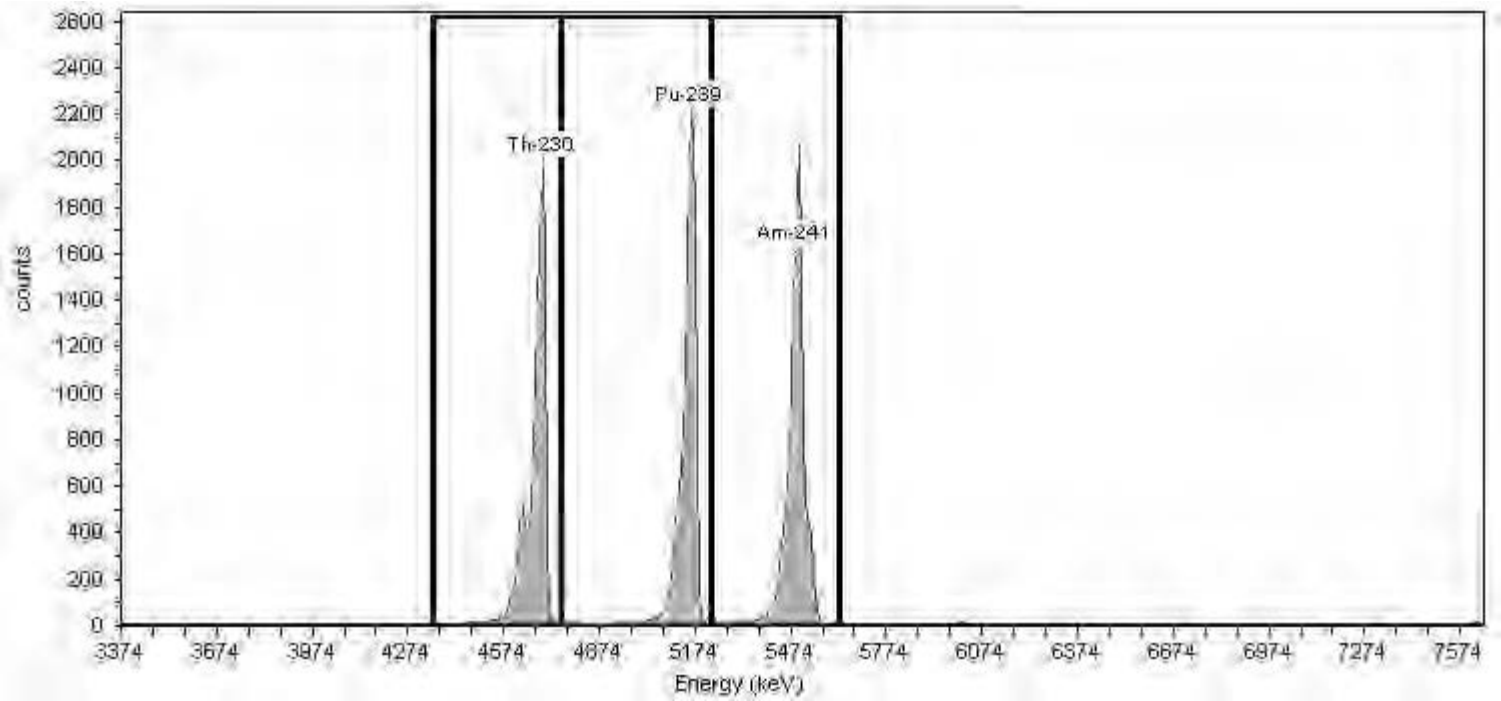
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 5/15/2018 3:47:17PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 25.68% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,725.00	90.89
Pu-239	240	5.16	186	249	0.00	12,875.00	91.96
Am-241	284	5.49	249	303	0.00	13,547.00	96.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:36PM 5/15/2018

Calibration

Sample Name: IC-9817;AV75-05152018
Description:
Detector: AV75

Calibration Date: 5/15/2018 6:37:33PM
Analyst: 60040

Source Info

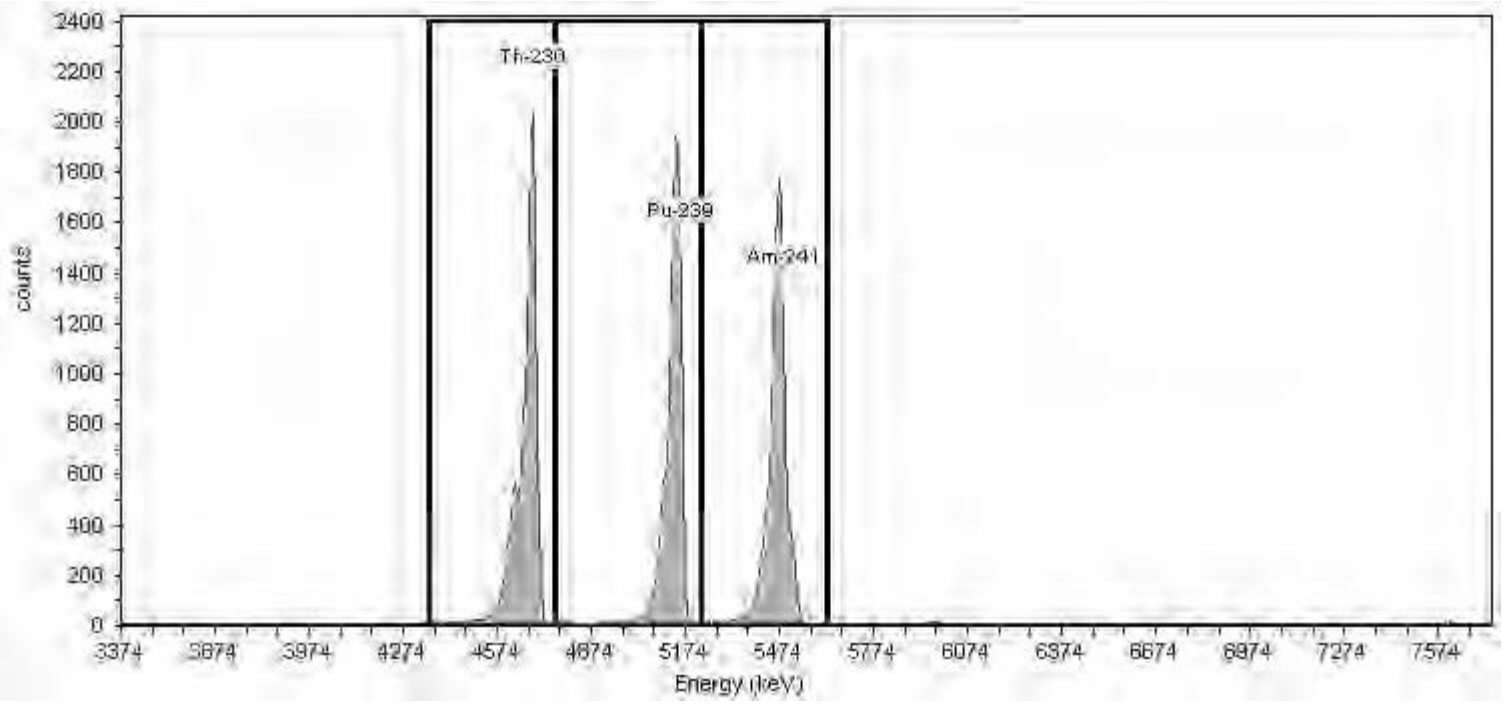
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV75 , SN: 51-082B4
Acquisition Start Date: 5/15/2018 3:47:36PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 22.76% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	14,089.00	100.64
Pu-239	240	5.16	186	249	0.00	12,728.00	90.91
Am-241	284	5.49	249	303	0.00	13,111.00	93.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:07PM 5/15/2018

Calibration

Sample Name: IC-138446;AV77-05152018a
Description:
Detector: AV77

Calibration Date: 5/15/2018 6:39:04PM
Analyst: 60040

Source Info

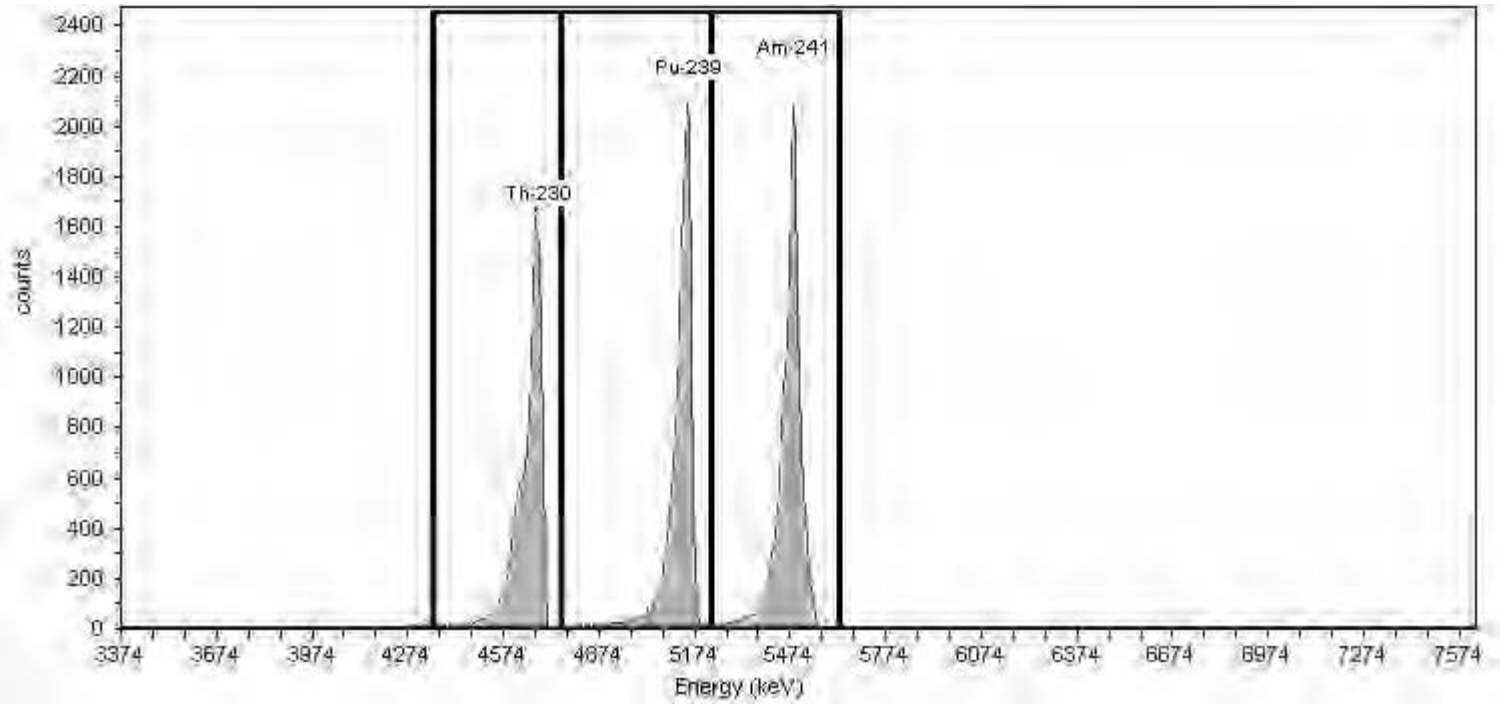
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 5/15/2018 3:54:26PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 27.42% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	14,006.00	100.04
Pu-239	240	5.16	186	249	0.00	15,357.00	109.69
Am-241	284	5.49	249	303	0.00	16,569.00	118.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:58PM 5/15/2018

Calibration

Sample Name: IC-1368447;AV78-05152018
Description:
Detector: AV78

Calibration Date: 5/15/2018 6:37:55PM
Analyst: 60040

Source Info

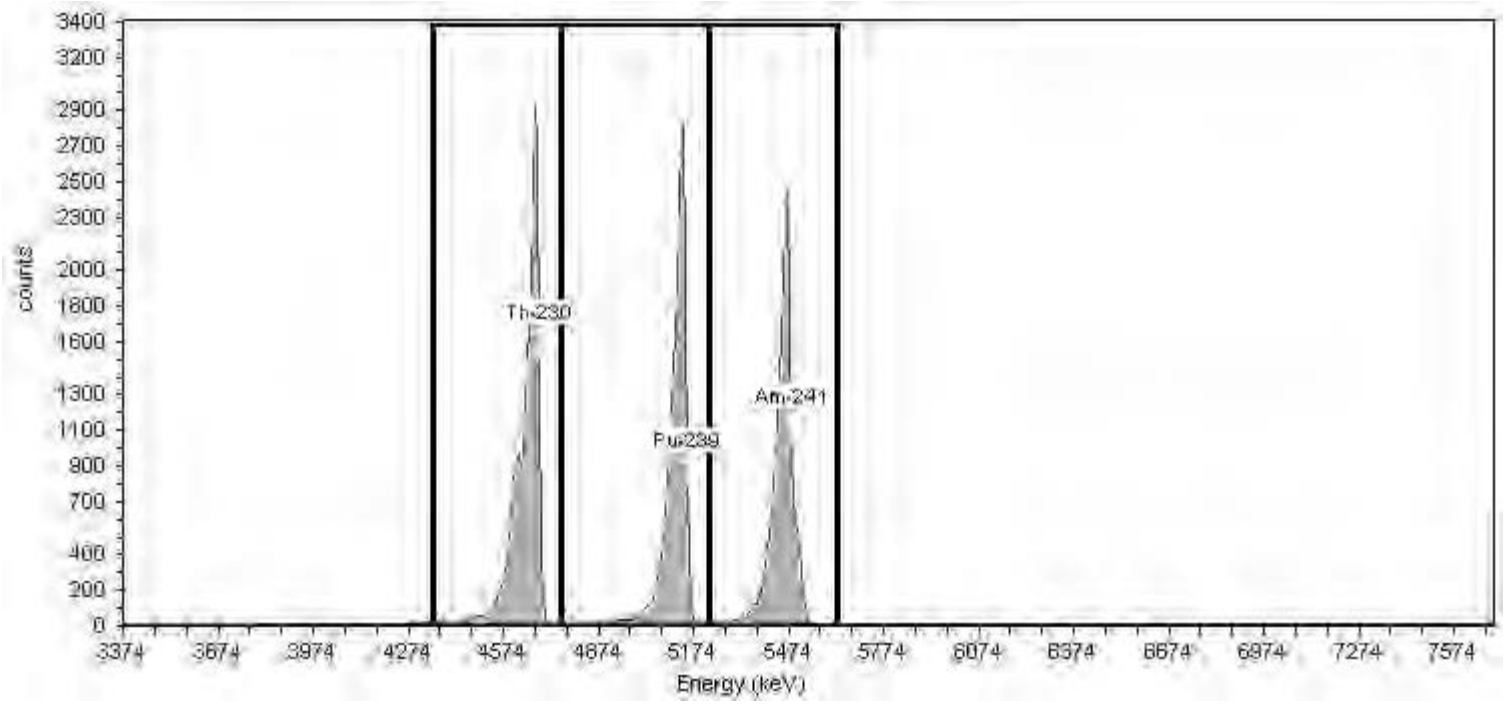
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/15/2018 3:49:18PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 27.77% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	21,976.00	156.97
Pu-239	240	5.16	186	249	0.00	20,000.00	142.86
Am-241	284	5.49	249	303	0.00	18,574.00	132.67

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:38:09PM 5/15/2018

Calibration

Sample Name: IC-1370621;AV79-05152018
Description:
Detector: AV79

Calibration Date: 5/15/2018 6:38:06PM
Analyst: 60040

Source Info

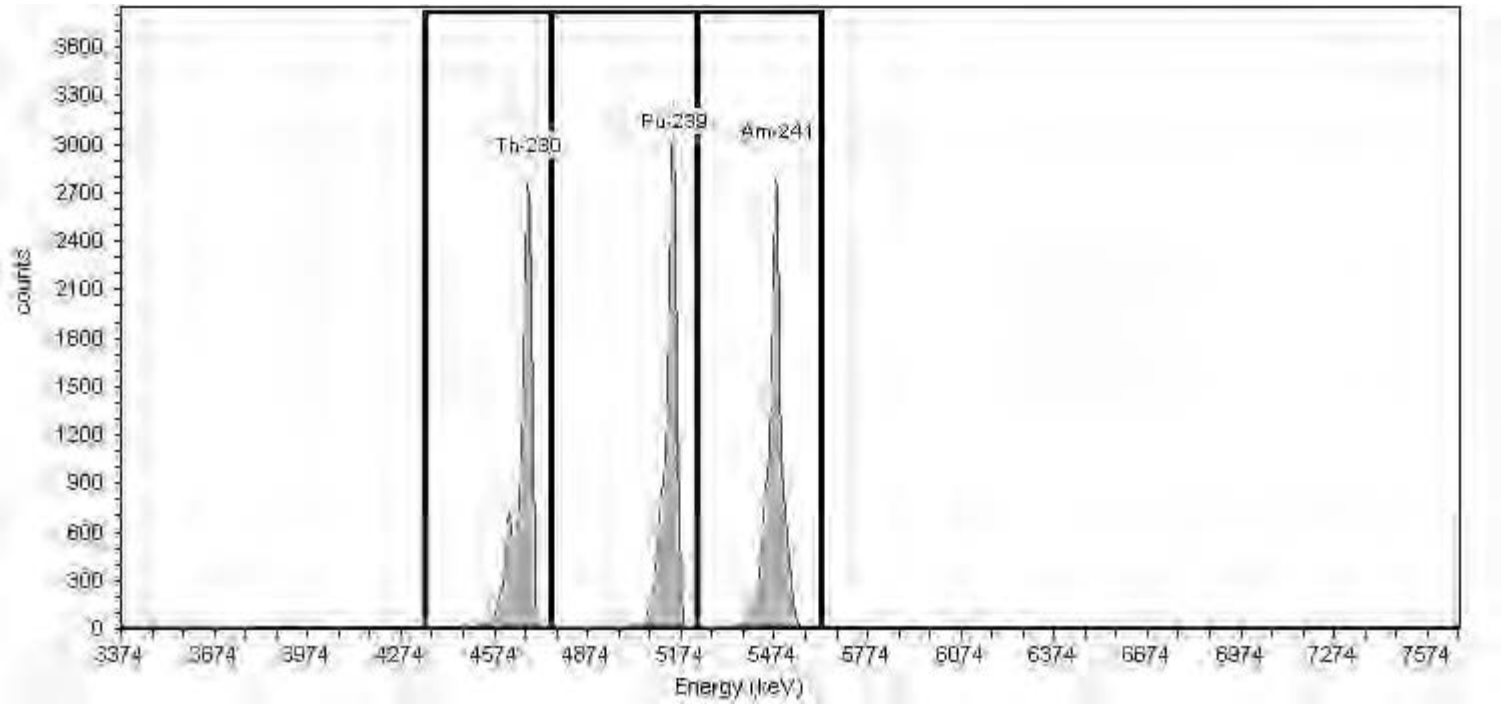
Certificate ID: 108345_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/15/2018 3:49:39PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 27.16% +/- 0.24% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	16,699.00	119.28
Pu-239	240	5.16	186	249	0.00	17,564.00	125.46
Am-241	284	5.49	249	303	0.00	18,056.00	128.97

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:38:20PM 5/15/2018

Calibration

Sample Name: IC-1370622;AV80-05152018
Description:
Detector: AV80

Calibration Date: 5/15/2018 6:38:17PM
Analyst: 60040

Source Info

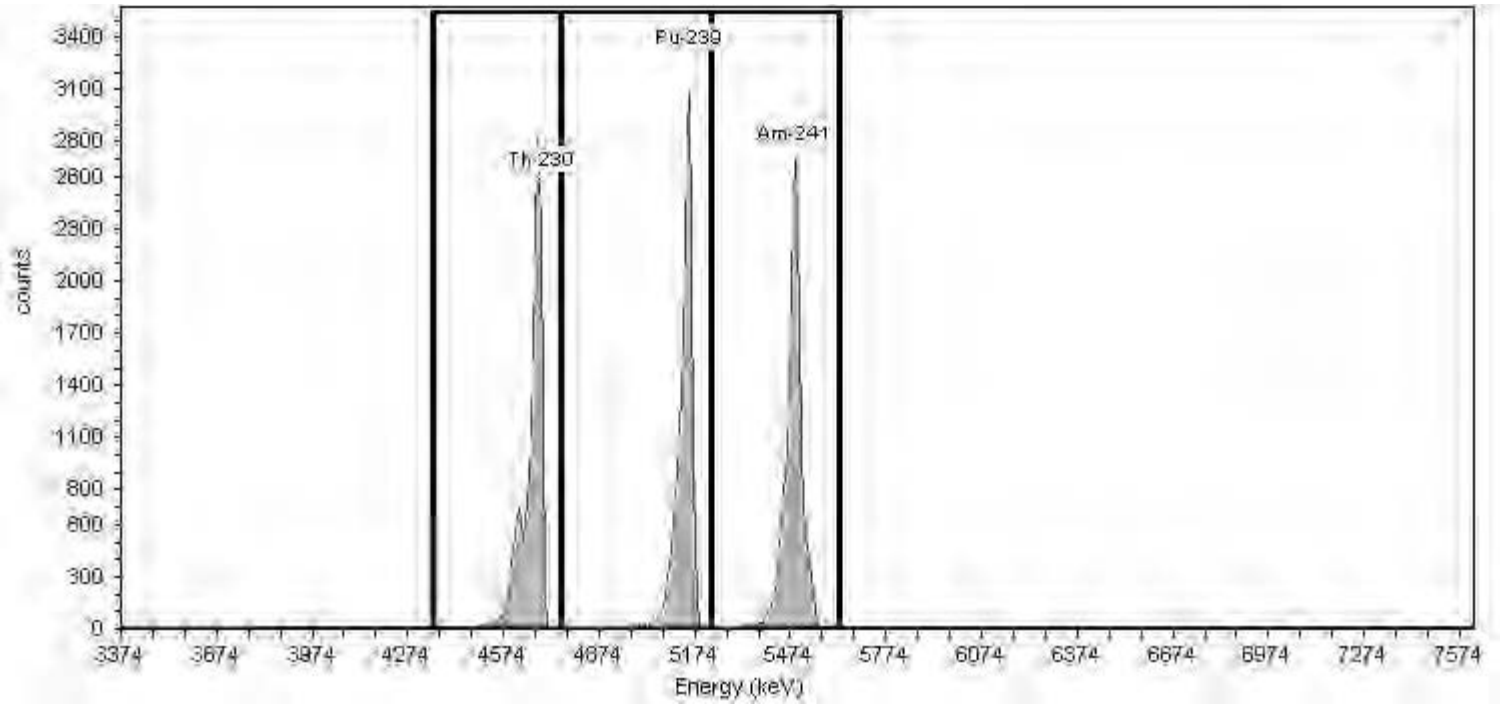
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 5/15/2018 3:50:00PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 26.32% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	16,814.00	120.10
Pu-239	240	5.16	186	249	0.00	17,558.00	125.41
Am-241	284	5.49	249	303	0.00	17,406.00	124.33

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:38:31PM 5/15/2018

Calibration

Sample Name: IC-1370619;AV81-05152018
Description:
Detector: AV81

Calibration Date: 5/15/2018 6:38:28PM
Analyst: 60040

Source Info

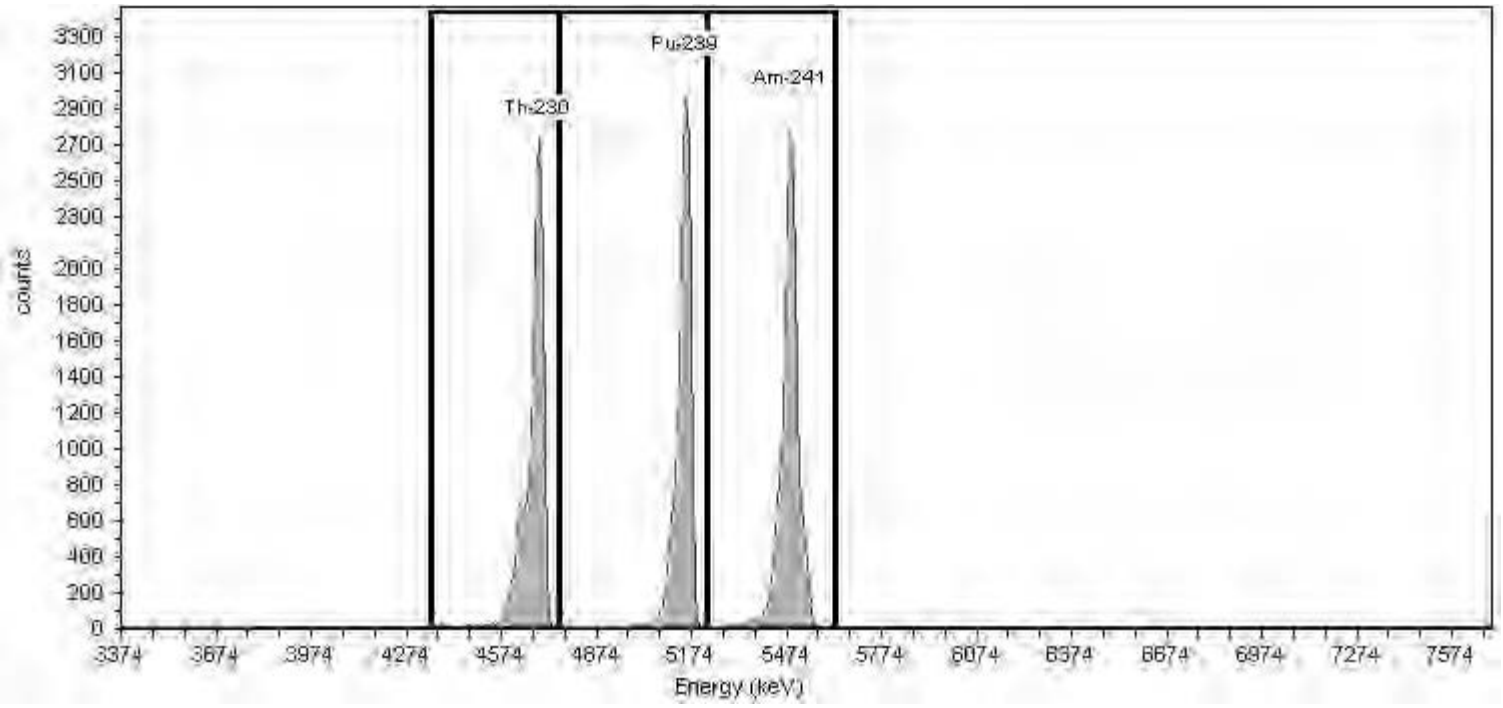
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 5/15/2018 3:50:22PM
Live Time: 140.00 min.
Real Time: 140.13 min.
Efficiency: 27.25% +/- 0.23% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	18,388.00	131.34
Pu-239	240	5.16	186	249	0.00	18,280.00	130.57
Am-241	284	5.49	249	303	0.00	20,063.00	143.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:38:46PM 5/15/2018

Calibration

Sample Name: IC-1370620;AV82-05152018
Description:
Detector: AV82

Calibration Date: 5/15/2018 6:38:42PM
Analyst: 60040

Source Info

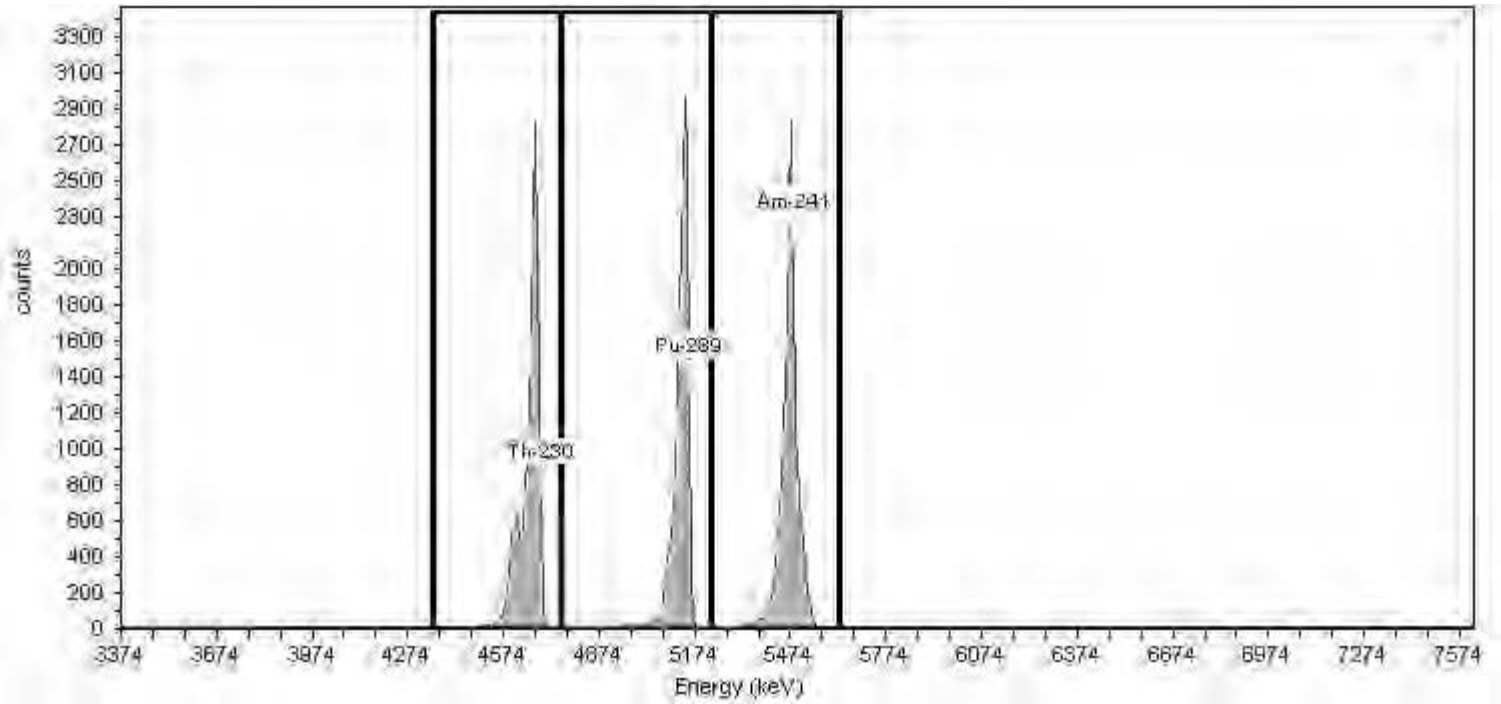
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/15/2018 3:50:43PM
Live Time: 140.01 min.
Real Time: 140.14 min.
Efficiency: 26.51% +/- 0.24% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	15,567.00	111.19
Pu-239	240	5.16	186	249	0.00	15,822.00	113.01
Am-241	284	5.49	249	303	0.00	16,542.00	118.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:13:51AM 5/17/2018

Calibration

Sample Name: IC-7107;AV83-05162018a
Description:
Detector: AV83

Calibration Date: 5/17/2018 6:13:48AM
Analyst: 60040

Source Info

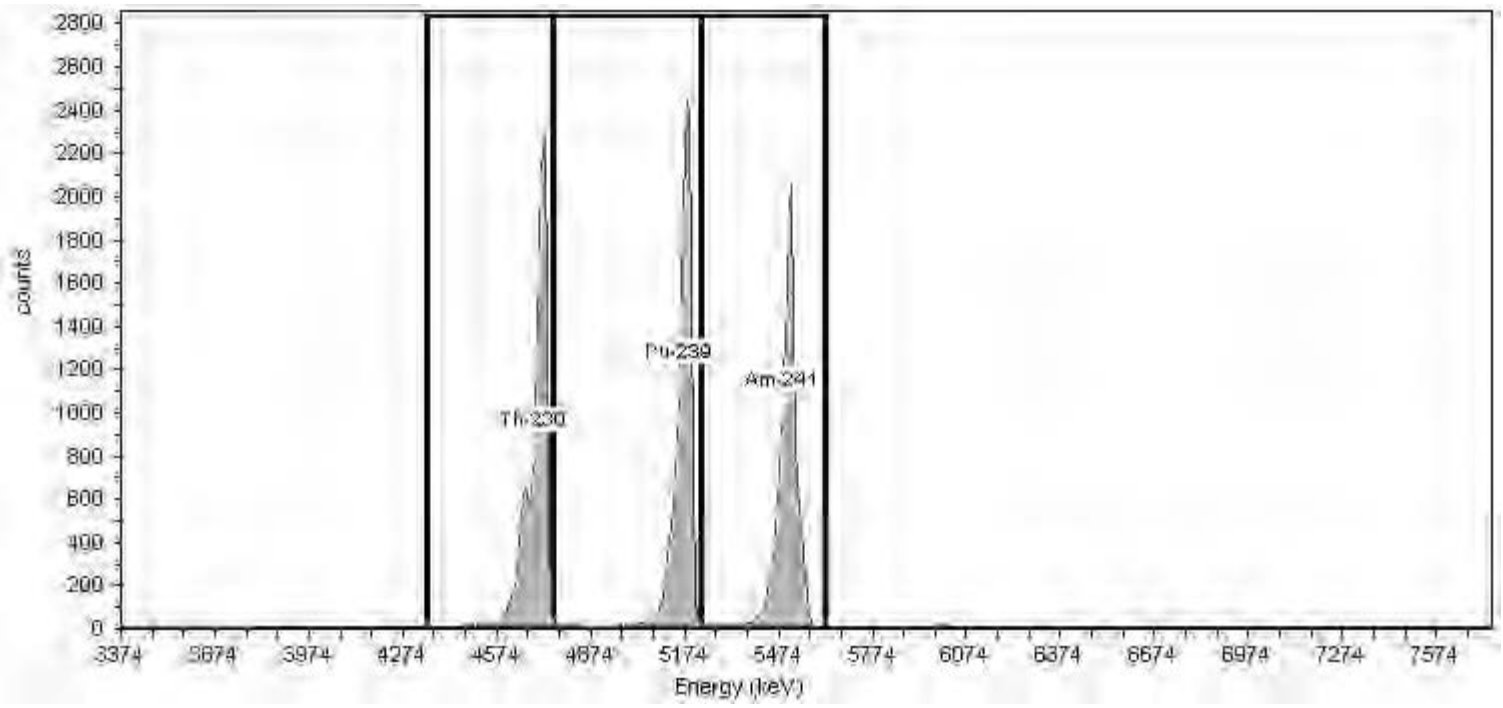
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 5/16/2018 1:31:24PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 24.89% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	15,622.00	111.59
Pu-239	240	5.16	186	249	0.00	15,566.00	111.19
Am-241	284	5.49	249	303	0.00	14,787.00	105.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:14:15AM 5/17/2018

Calibration

Sample Name: IC-8877;AV85-05162018a
Description:
Detector: AV85

Calibration Date: 5/17/2018 6:14:11AM
Analyst: 60040

Source Info

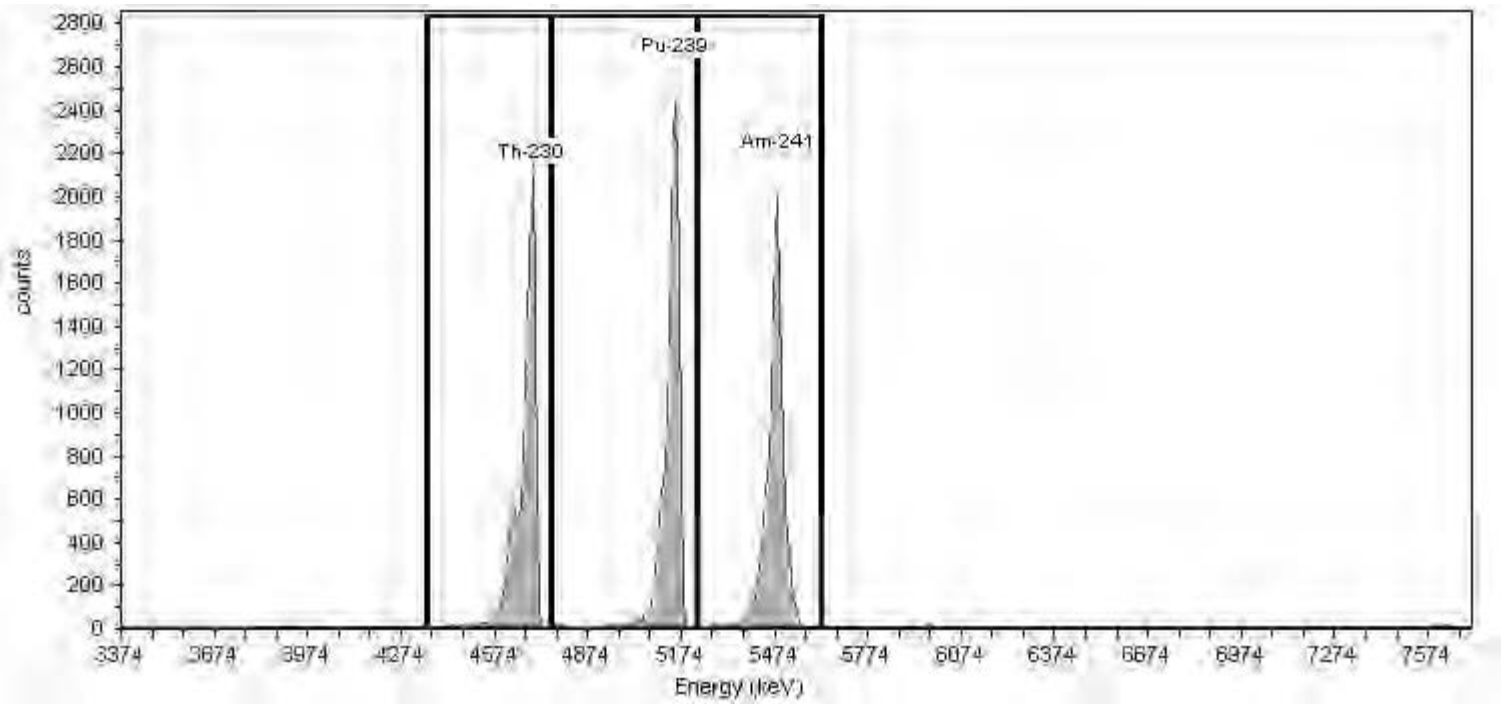
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 5/16/2018 1:32:06PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 24.22% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	13,805.00	98.61
Pu-239	240	5.16	186	249	0.00	14,512.00	103.66
Am-241	284	5.49	249	303	0.00	13,731.00	98.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:14:30AM 5/17/2018

Calibration

Sample Name: IC-9520;AV86-05162018a
Description:
Detector: AV86

Calibration Date: 5/17/2018 6:14:27AM
Analyst: 60040

Source Info

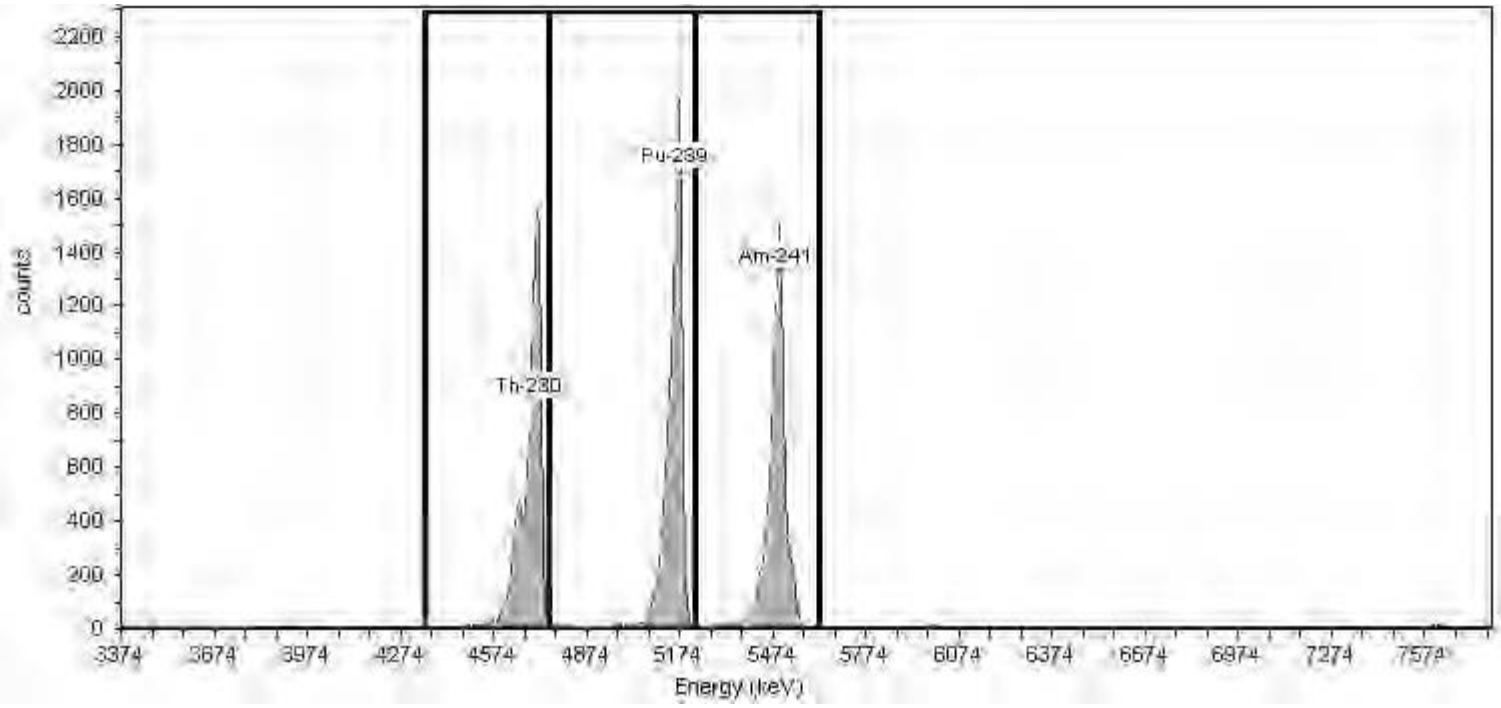
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 5/16/2018 1:32:25PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 22.68% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	10,856.00	77.54
Pu-239	240	5.16	186	249	0.00	12,737.00	90.98
Am-241	284	5.49	249	303	0.00	10,360.00	74.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:14:44AM 5/17/2018

Calibration

Sample Name: IC-9793;AV88-05162018a
Description:
Detector: AV88

Calibration Date: 5/17/2018 6:14:39AM
Analyst: 60040

Source Info

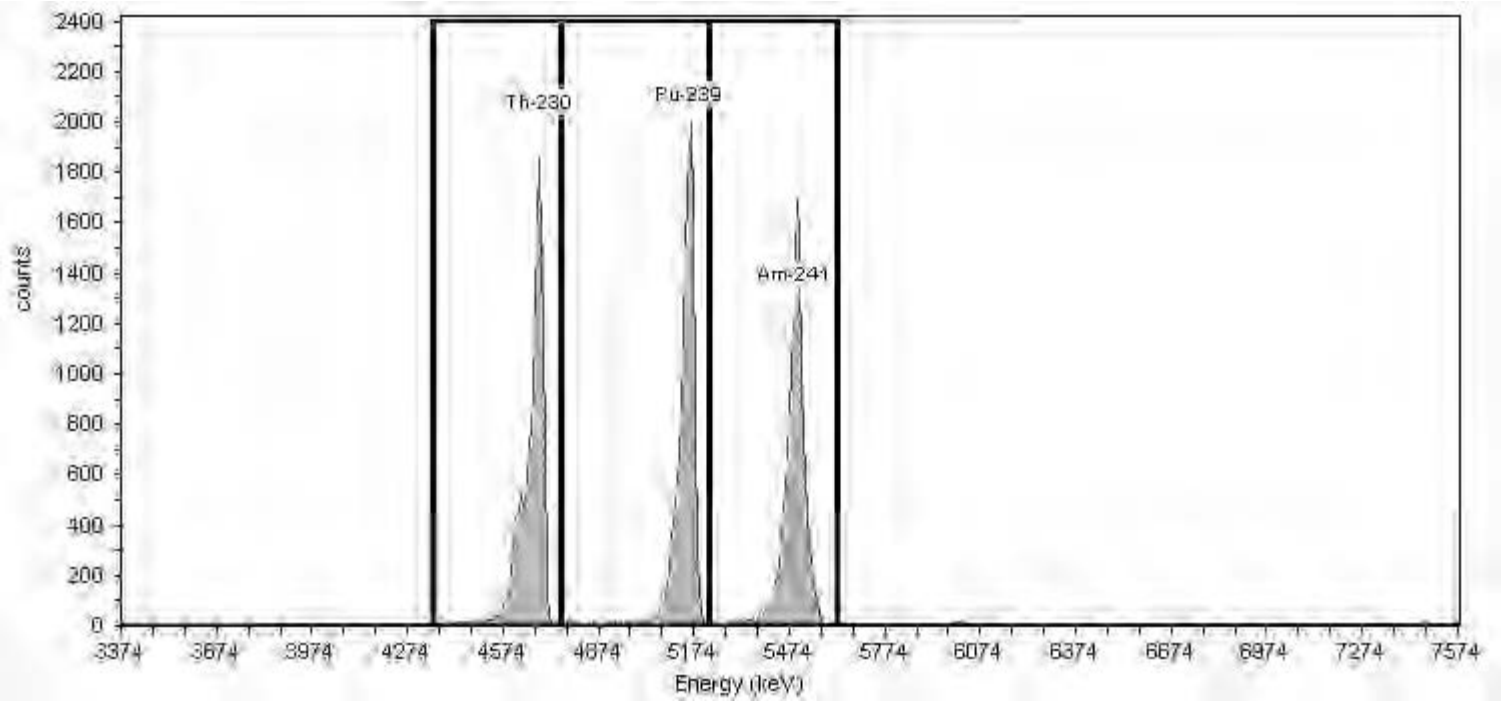
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 5/16/2018 1:33:13PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 22.81% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	12,705.00	90.75
Pu-239	240	5.16	186	249	0.00	13,056.00	93.26
Am-241	284	5.49	249	303	0.00	12,529.00	89.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:11:53AM 5/17/2018

Calibration

Sample Name: IC-9885;AV91-05162018
Description:
Detector: AV91

Calibration Date: 5/17/2018 6:11:48AM
Analyst: 60040

Source Info

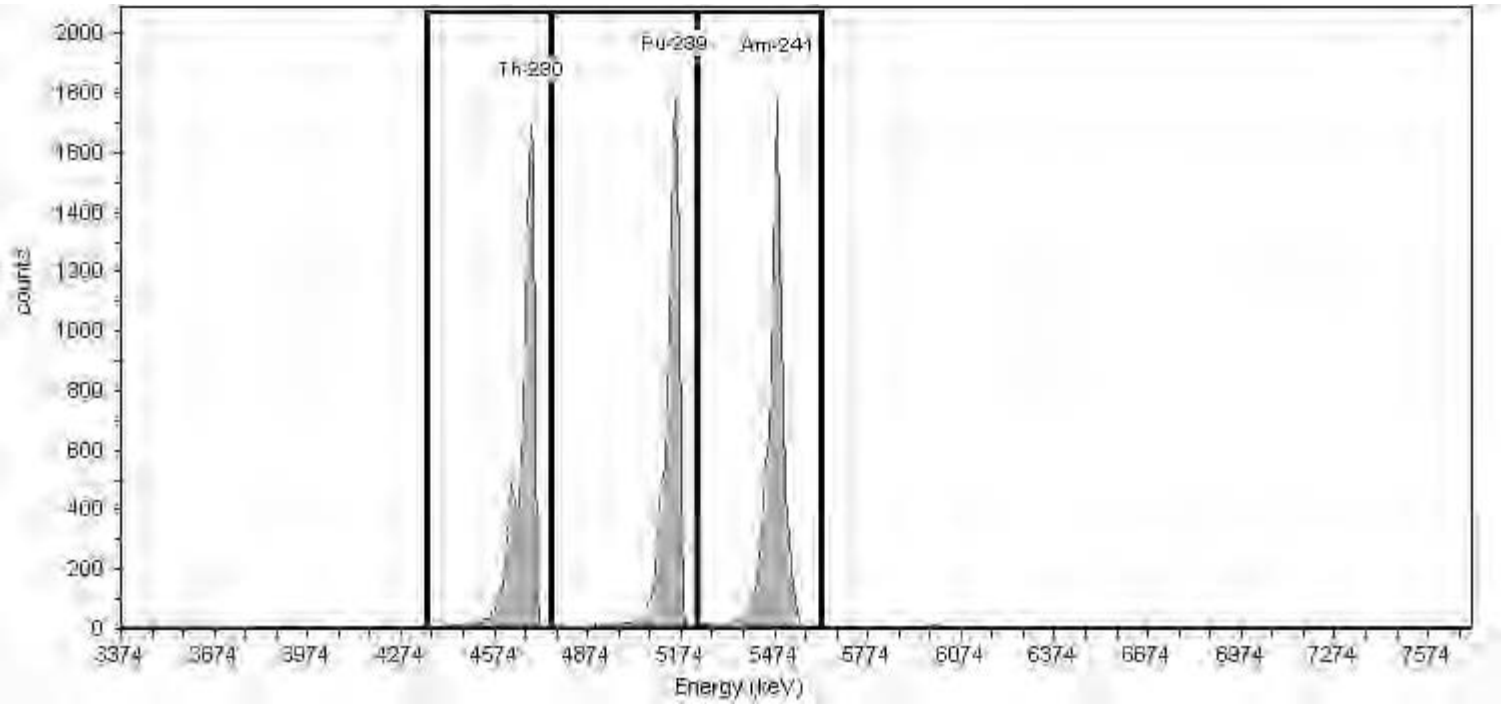
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 5/16/2018 1:16:01PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 23.75% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	11,102.00	79.30
Pu-239	240	5.16	186	249	0.00	10,720.00	76.57
Am-241	284	5.49	249	303	0.00	11,806.00	84.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:24:56PM 11/13/2017

Calibration

Sample Name: IC-8874;AV148-20171113a
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 11/13/2017 12:24:55PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

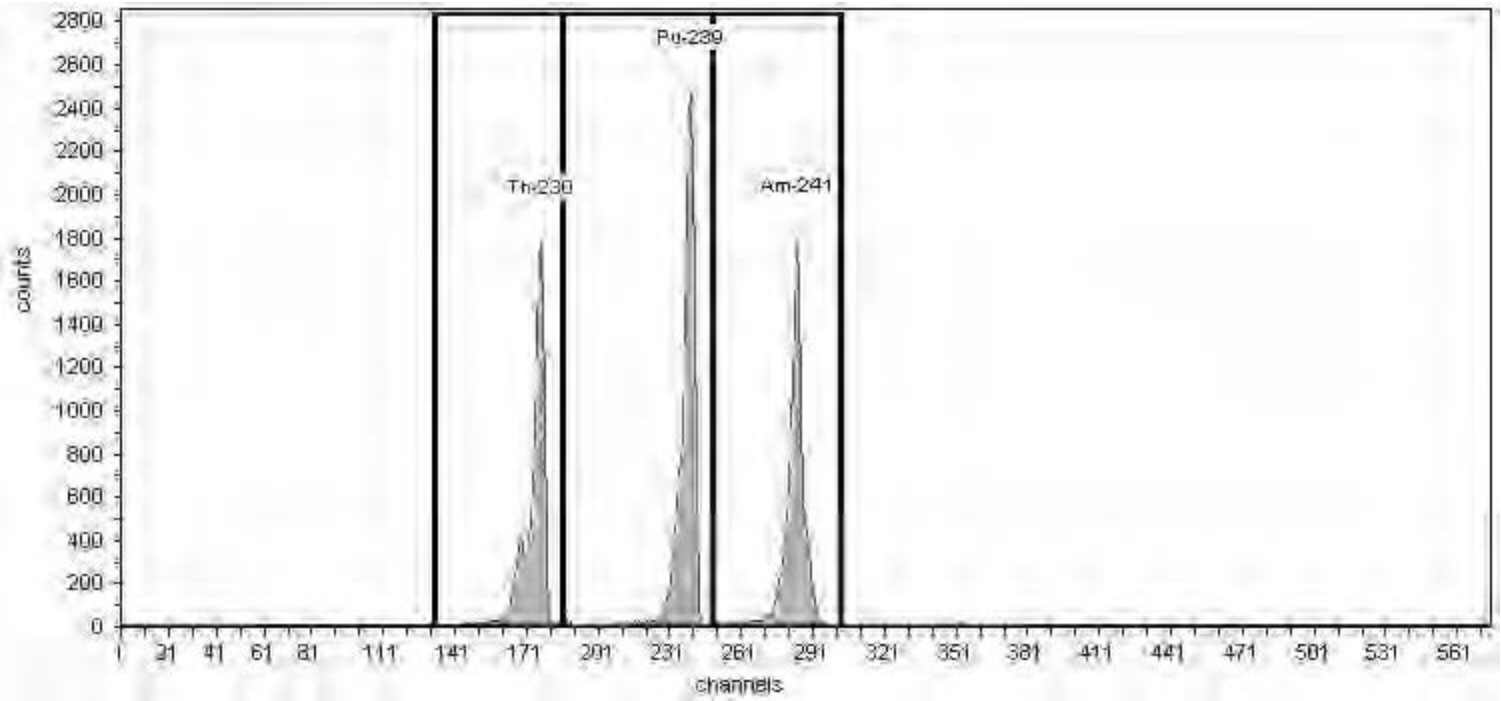
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 11/13/2017 10:03:59AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV148-20171113a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.37% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.83	10,555.00	75.39
Pu-239	240	5,155.40	186	249	33.82	13,849.00	98.92
Am-241	284	5,485.70	249	303	32.64	11,187.00	79.91

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:52PM 11/13/2017

Calibration

Sample Name: IC-8877;AV151-20171113
Description:
Detector: AV151

Analyst: 60040
Analysis Date: 11/13/2017 12:21:30PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

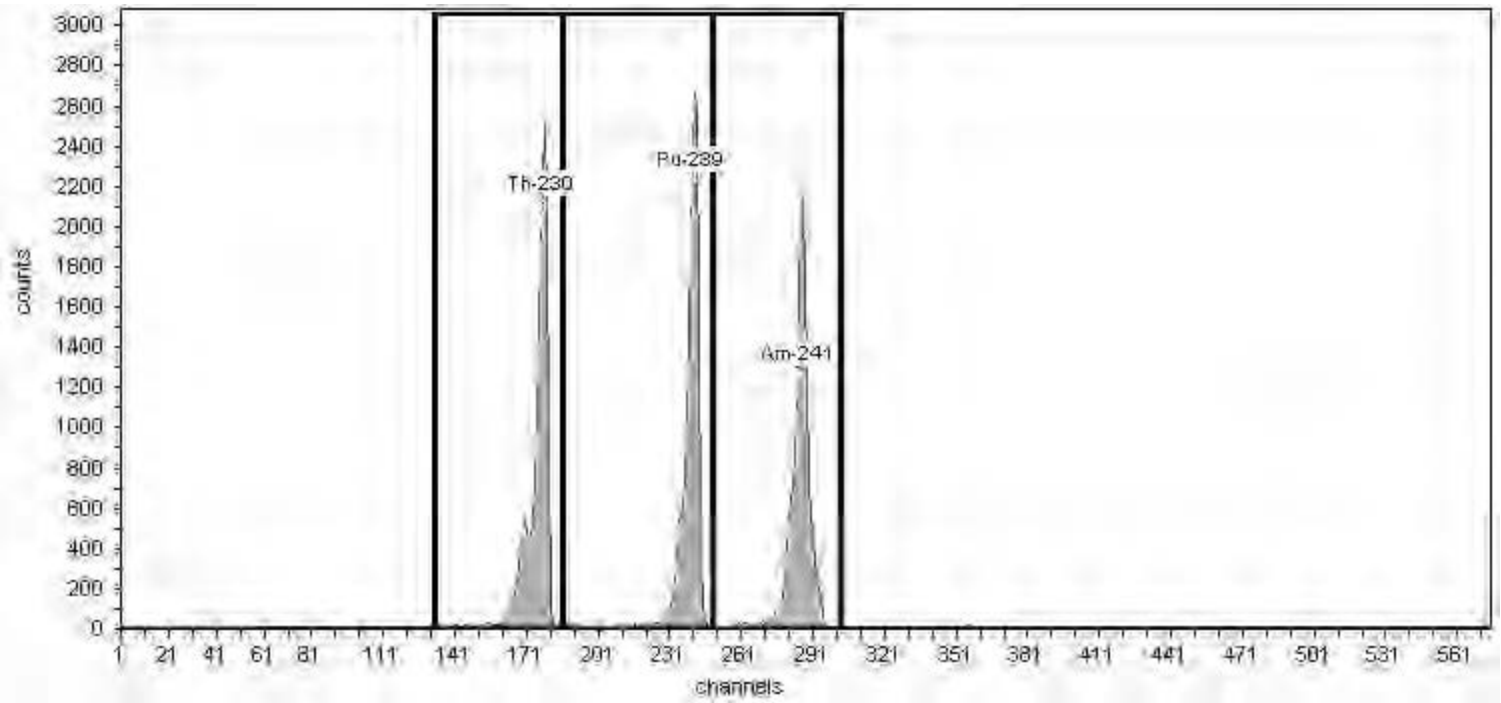
Detector: AV151 , SN: 50-05/R5
Acquisition Start Date: 11/13/2017 9:46:44AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV151-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.91% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.07	14,432.00	103.09
Pu-239	240	5,155.40	186	249	31.26	14,763.00	105.45
Am-241	284	5,485.70	249	303	32.74	14,012.00	100.09

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:55PM 11/13/2017

Calibration

Sample Name: IC-9520;AV152-20171113
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 11/13/2017 12:21:36PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

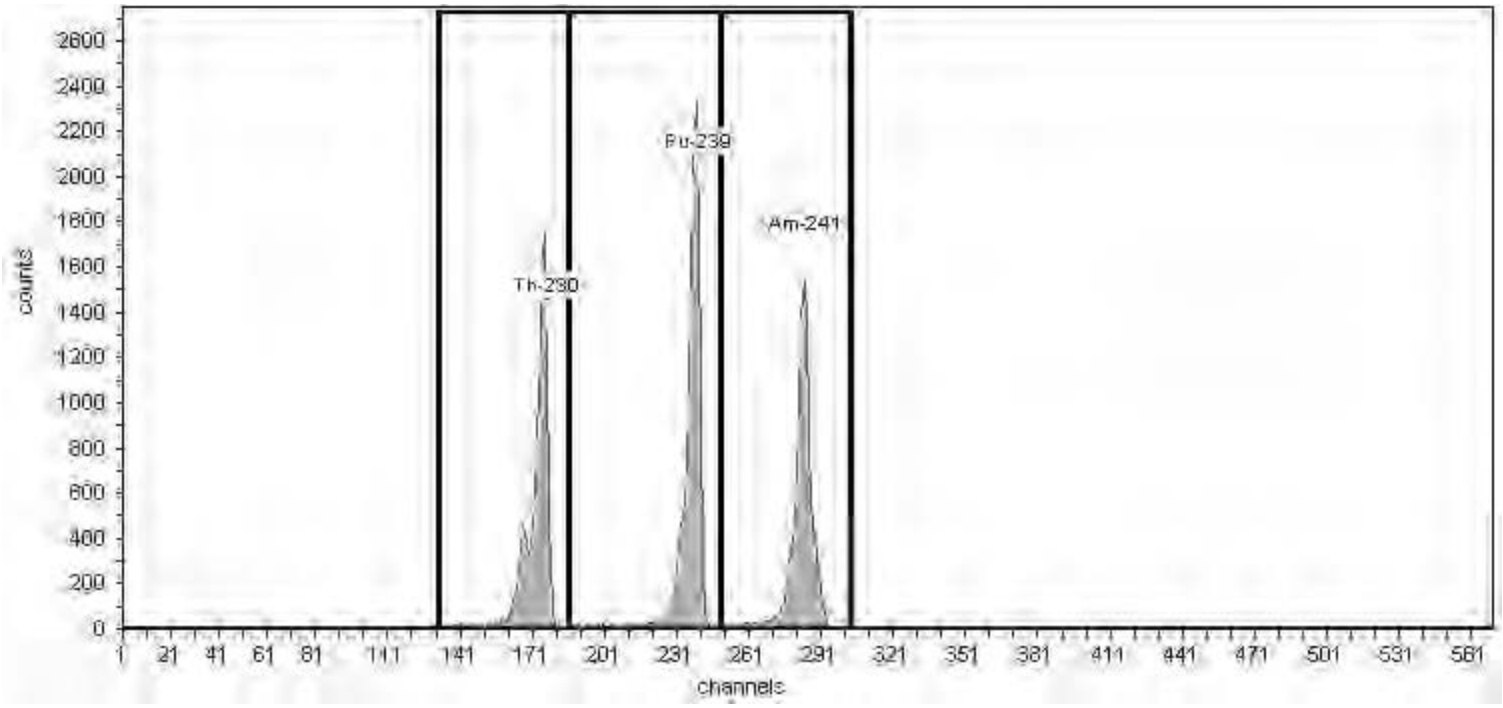
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 11/13/2017 9:47:25AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV152-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.19% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.66	11,118.00	79.41
Pu-239	240	5,155.40	186	249	33.40	13,097.00	93.55
Am-241	284	5,485.70	249	303	36.20	10,504.00	75.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:34:58PM 11/13/2017

Calibration

Sample Name: IC-8879;AV153-20171113
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 11/13/2017 12:21:42PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

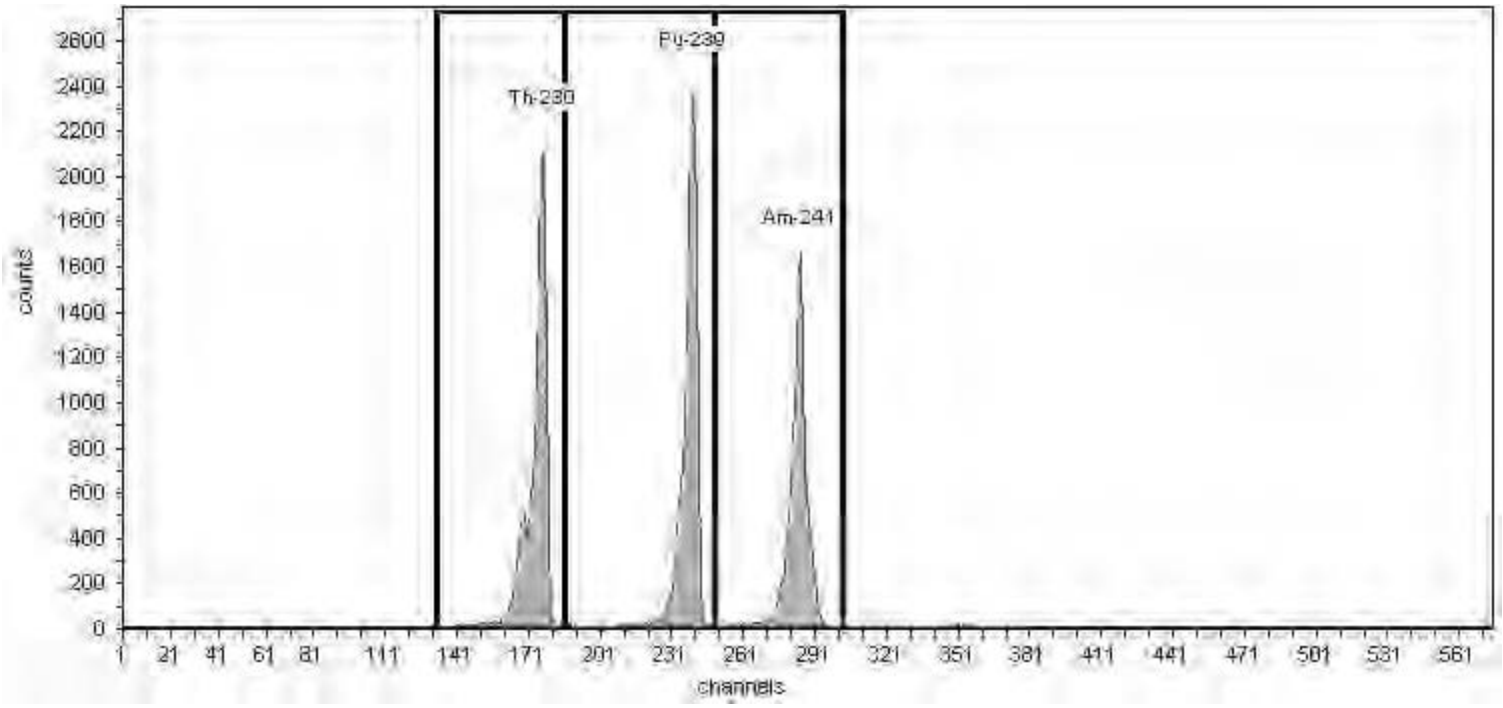
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 11/13/2017 9:48:03AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8879;AV153-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.17% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.08	13,276.00	94.83
Pu-239	240	5,155.40	186	249	35.29	13,964.00	99.74
Am-241	284	5,485.70	249	303	34.81	11,268.00	80.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:35:02PM 11/13/2017

Calibration

Sample Name: IC-9792;AV154-20171113
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 11/13/2017 12:21:47PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

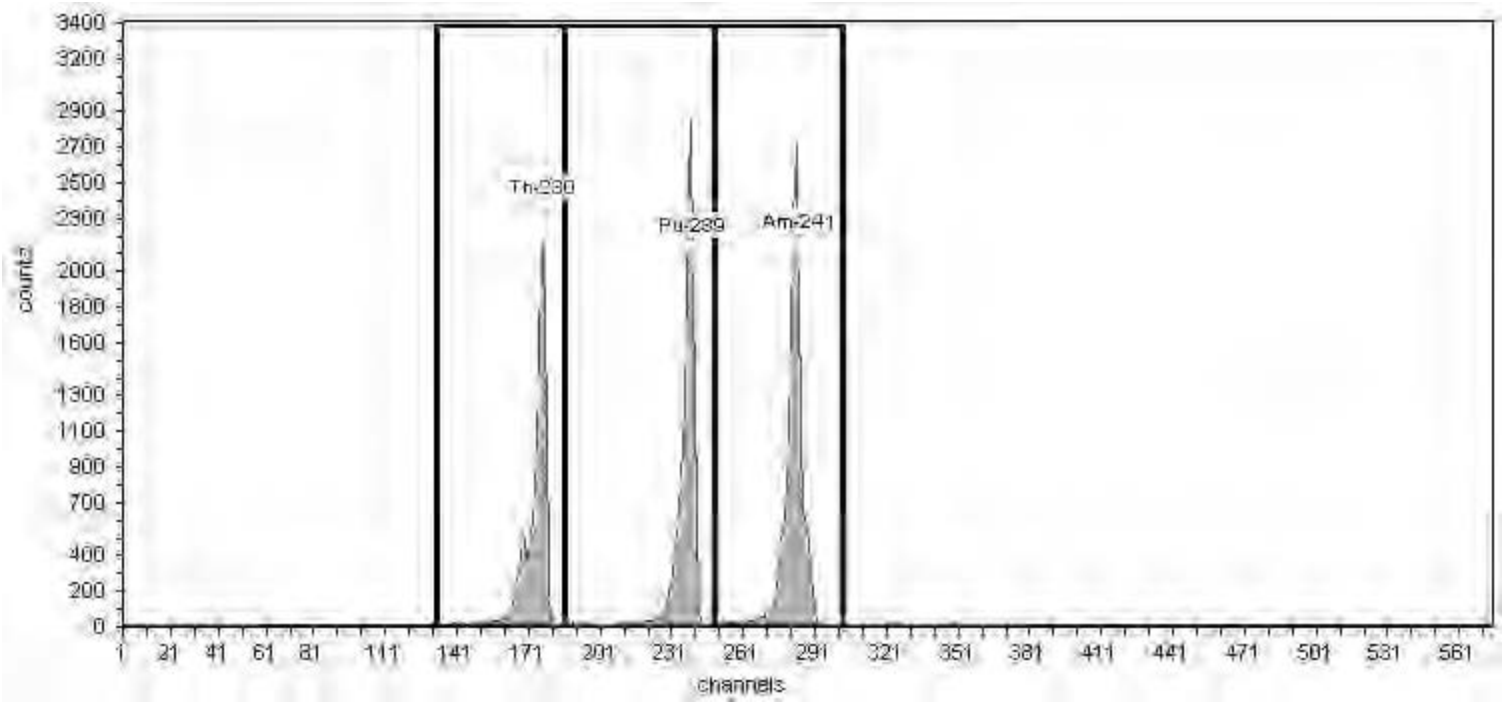
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 11/13/2017 9:48:38AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV154-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.71% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.28	12,508.00	89.34
Pu-239	240	5,155.40	186	249	29.50	14,495.00	103.54
Am-241	284	5,485.70	249	303	30.24	16,173.00	115.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:08PM 11/13/2017

Calibration

Sample Name: IC-9794;AV156-20171113a
Description:
Detector: AV156

Analyst: 60040
Analysis Date: 11/13/2017 12:25:07PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

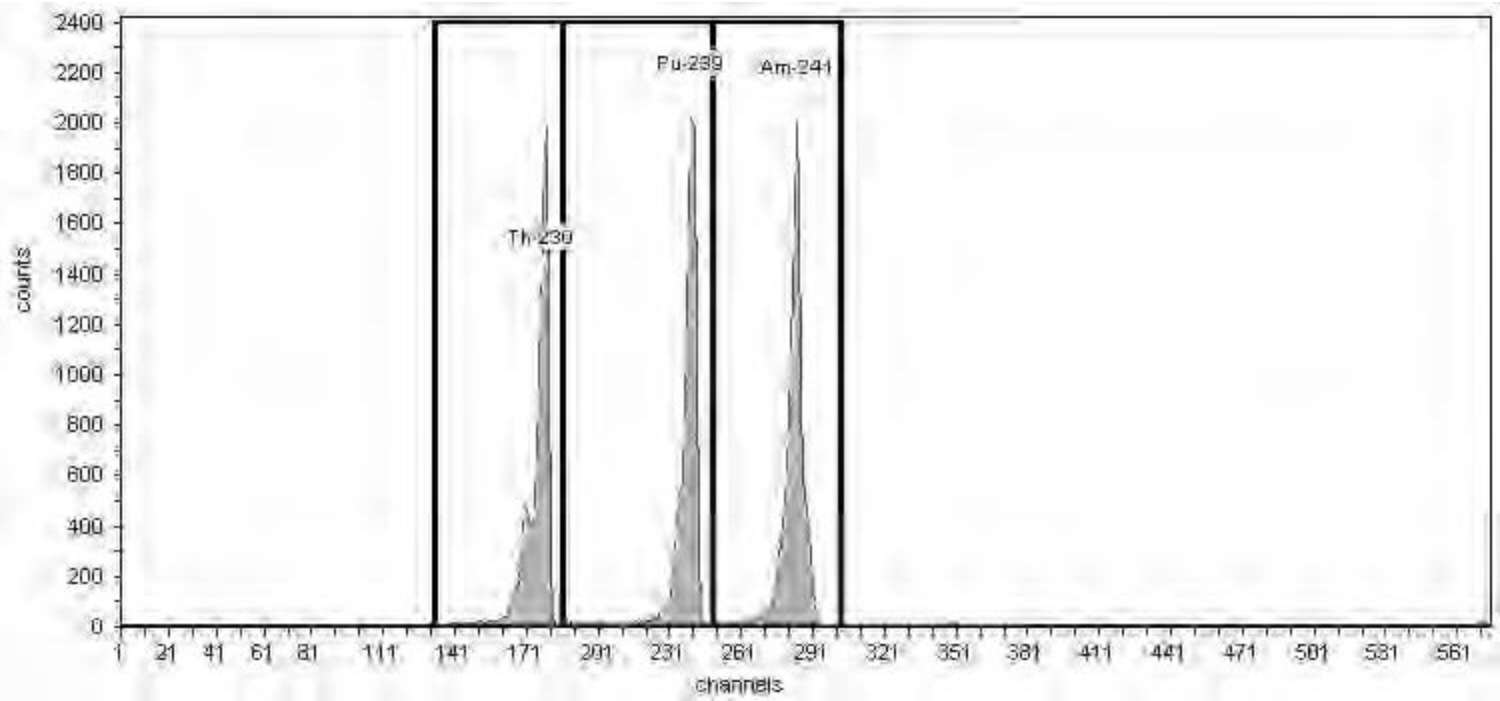
Detector: AV156 , SN: 49-155n4
Acquisition Start Date: 11/13/2017 10:04:53AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9794;AV156-20171113a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.52% +/- 0.28% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.10	11,834.00	84.53
Pu-239	240	5,155.40	186	249	34.43	11,751.00	83.94
Am-241	284	5,485.70	249	303	31.61	12,689.00	90.64

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:00:03AM 11/15/2017

Calibration

Sample Name: IC-9817;AV158-20171115
Description:
Detector: AV158

Analyst: 60040
Analysis Date: 11/15/2017 11:00:01AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

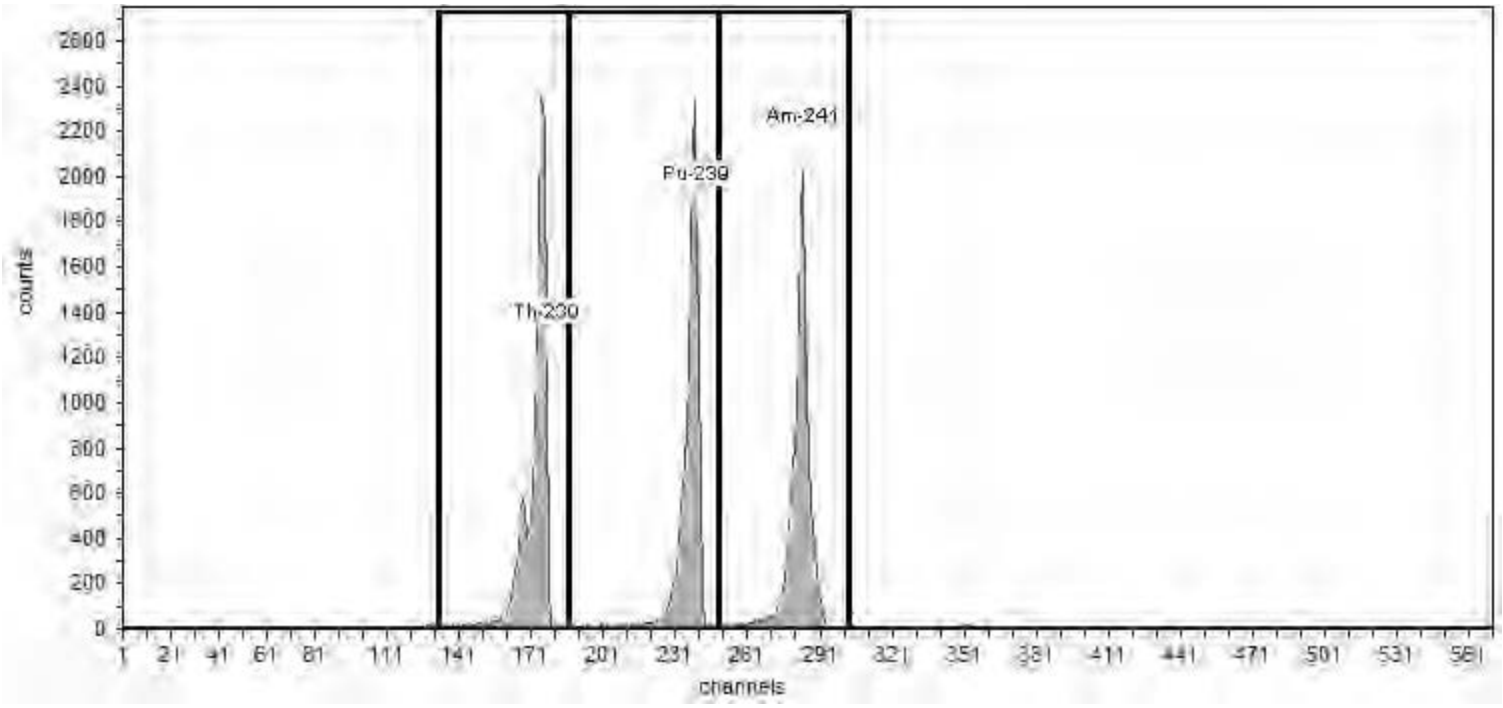
Detector: AV158 , SN: 50-05/II4
Acquisition Start Date: 11/15/2017 8:35:52AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9817;AV158-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.95% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.56	14,161.00	101.15
Pu-239	240	5,155.40	186	249	32.67	13,059.00	93.28
Am-241	284	5,485.70	249	303	32.49	13,059.00	93.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:26:25PM 11/13/2017

Calibration

Sample Name: IC-9884;AV159-20171113a
Description:
Detector: AV159

Analyst: 60040
Analysis Date: 11/13/2017 12:26:23PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

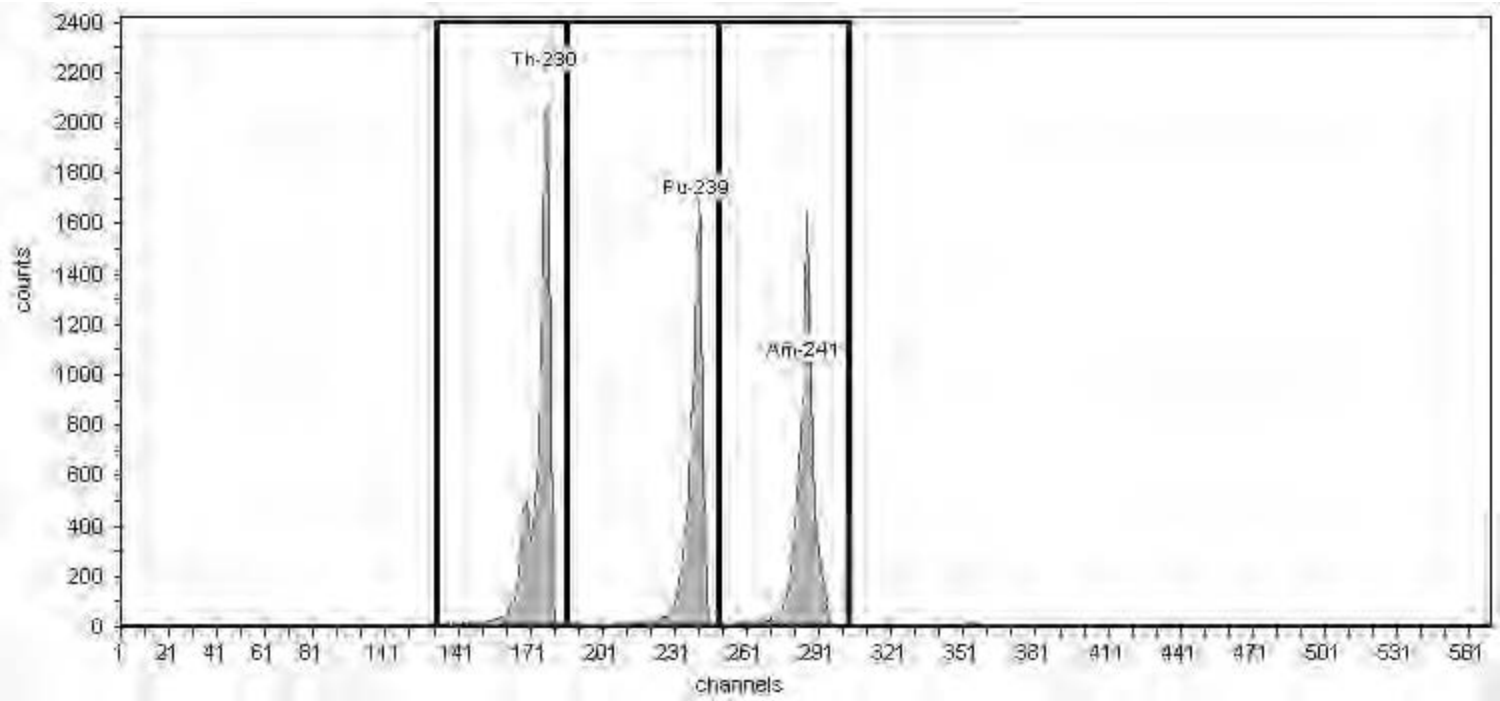
Detector: AV159 , SN: 50-05/II5
Acquisition Start Date: 11/13/2017 10:06:17AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV159-20171113a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.49% +/- 0.32% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.76	12,128.00	86.63
Pu-239	240	5,155.40	186	249	32.26	9,670.00	69.07
Am-241	284	5,485.70	249	303	29.69	10,037.00	71.69

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:24:44PM 11/13/2017

Calibration

Sample Name: IC-9885;AV160-20171113
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 11/13/2017 12:24:43PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

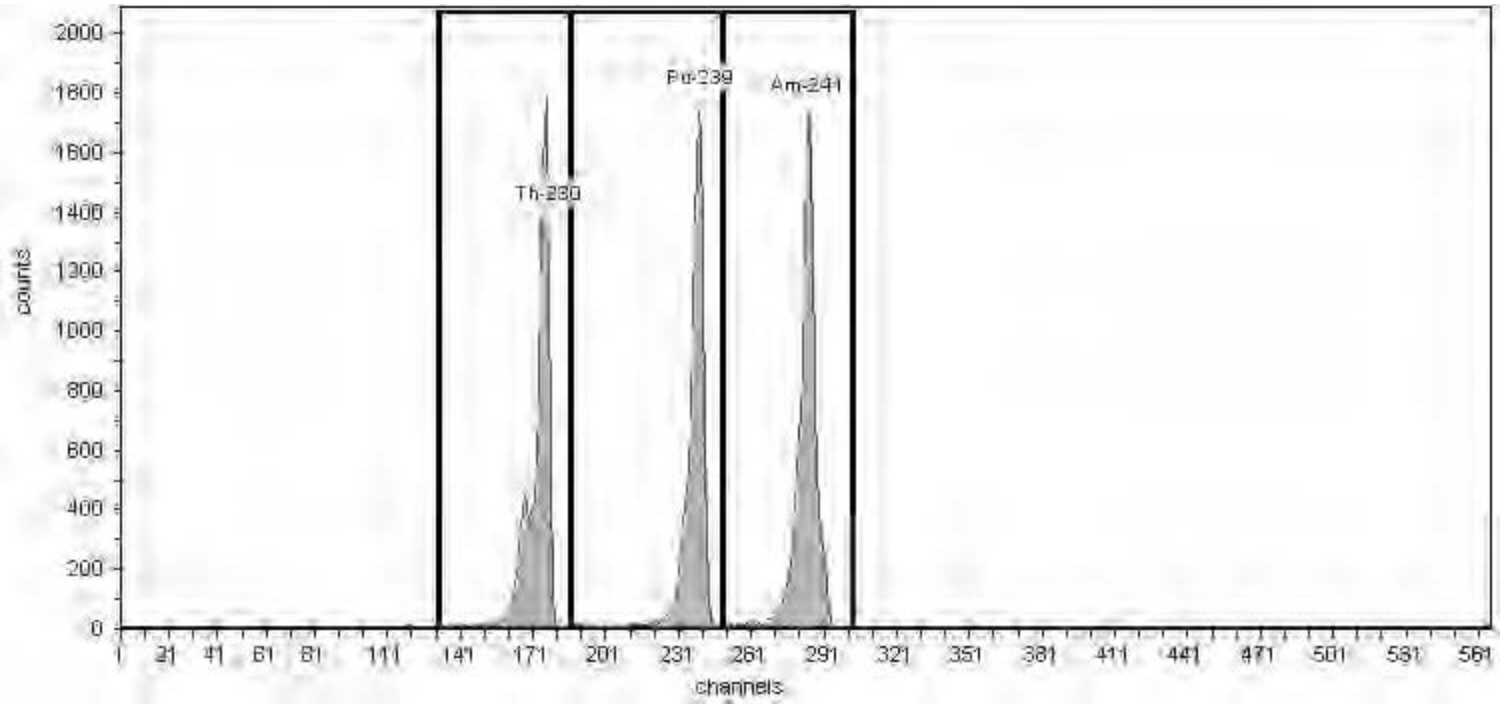
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 11/13/2017 9:52:46AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9885;AV160-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.98% +/- 0.36% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.53	11,172.00	79.80
Pu-239	240	5,155.40	186	249	37.65	10,821.00	77.29
Am-241	284	5,485.70	249	303	35.38	11,967.00	85.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:24:50PM 11/13/2017

Calibration

Sample Name: IC-9886;AV161-20171113
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 11/13/2017 12:24:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

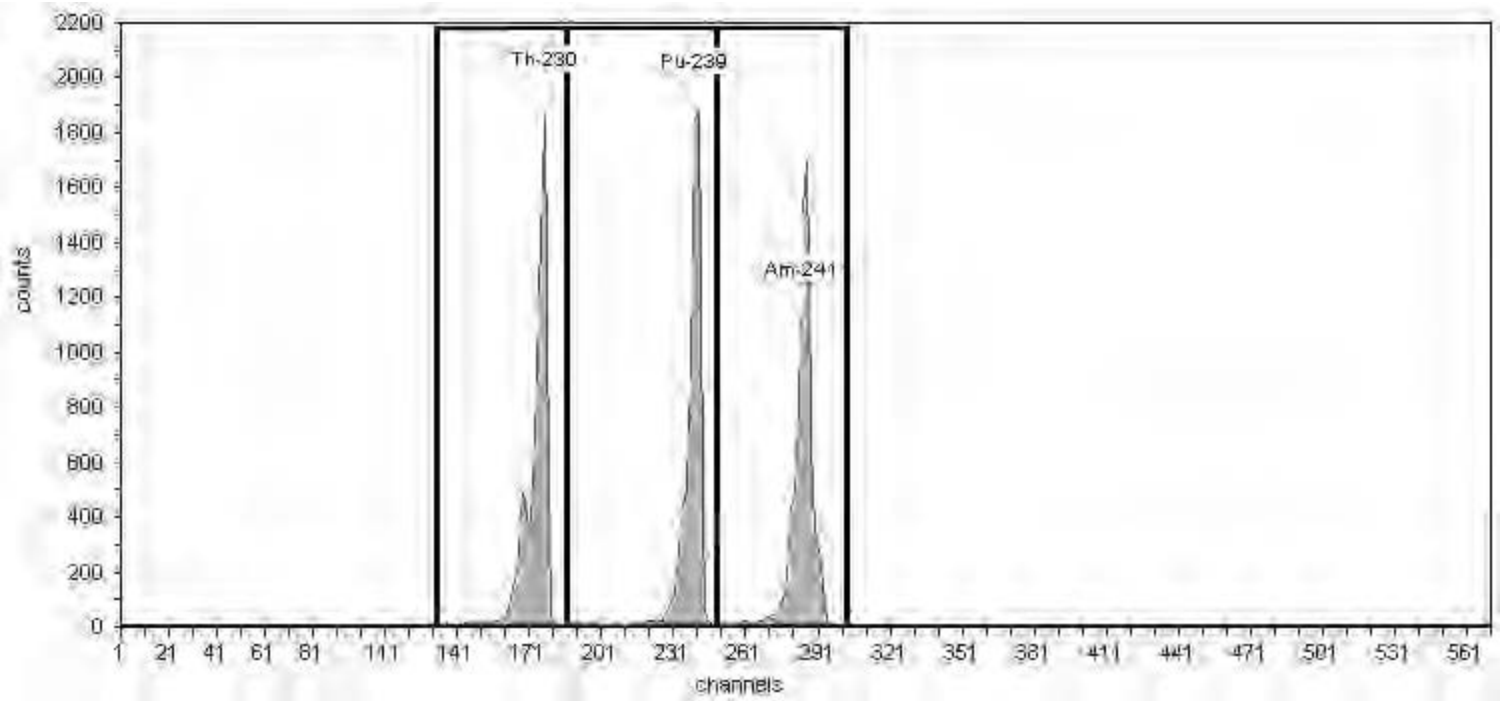
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 11/13/2017 9:53:34AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9886;AV161-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.86% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.74	11,477.00	81.98
Pu-239	240	5,155.40	186	249	32.28	10,776.00	76.97
Am-241	284	5,485.70	249	303	33.34	11,215.00	80.11

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:16:36PM 11/13/2017

Calibration

Sample Name: IC-8875;AV164-20171113
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 11/13/2017 3:16:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

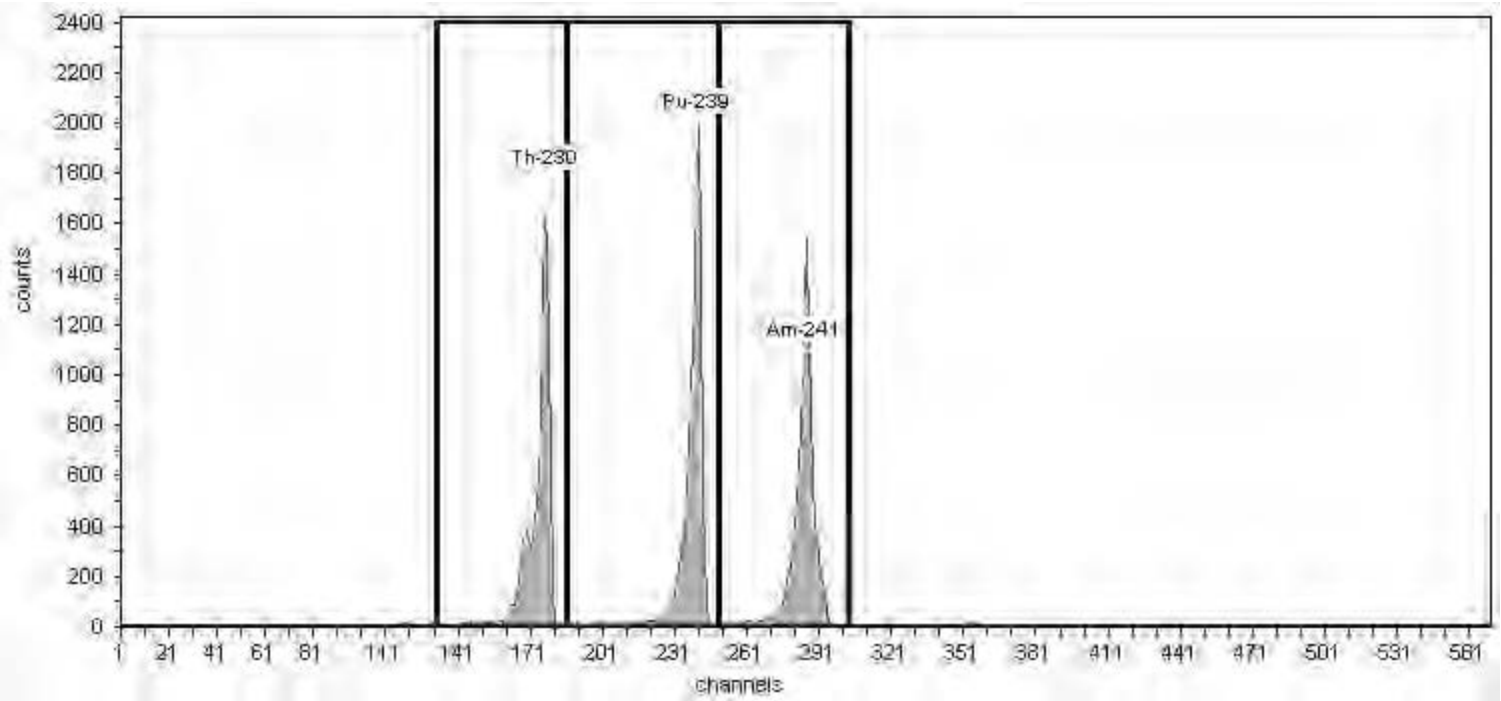
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 11/13/2017 12:45:21PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV164-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.08% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.77	9,655.00	68.96
Pu-239	240	5,155.40	186	249	31.81	11,124.00	79.46
Am-241	284	5,485.70	249	303	31.36	9,763.00	69.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:16:41PM 11/13/2017

Calibration

Sample Name: IC-8876;AV165-20171113
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 11/13/2017 3:16:40PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

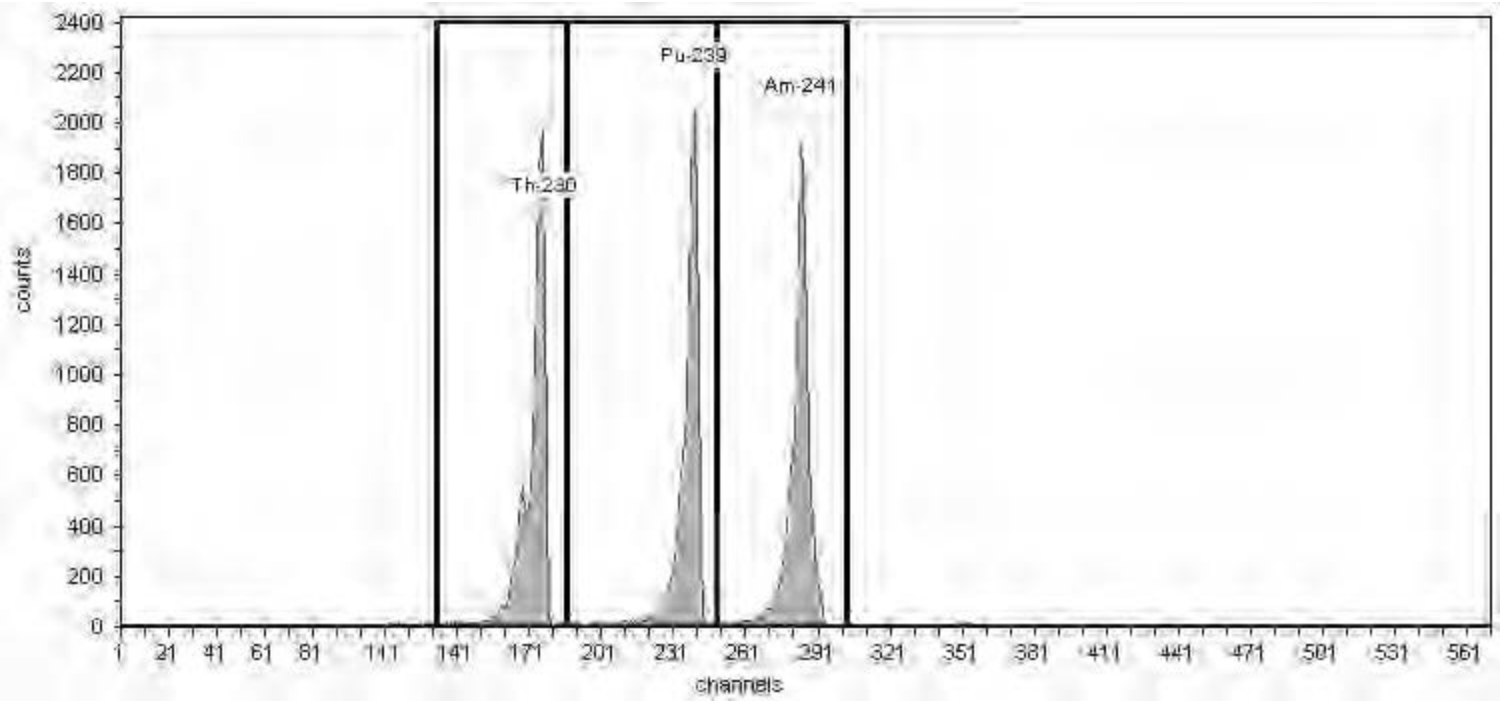
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 11/13/2017 12:45:39PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8876;AV165-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.77% +/- 0.27% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.19	13,159.00	93.99
Pu-239	240	5,155.40	186	249	35.54	12,788.00	91.34
Am-241	284	5,485.70	249	303	34.53	13,291.00	94.94

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:16:46PM 11/13/2017

Calibration

Sample Name: IC-8877;AV166-20171113
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 11/13/2017 3:16:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

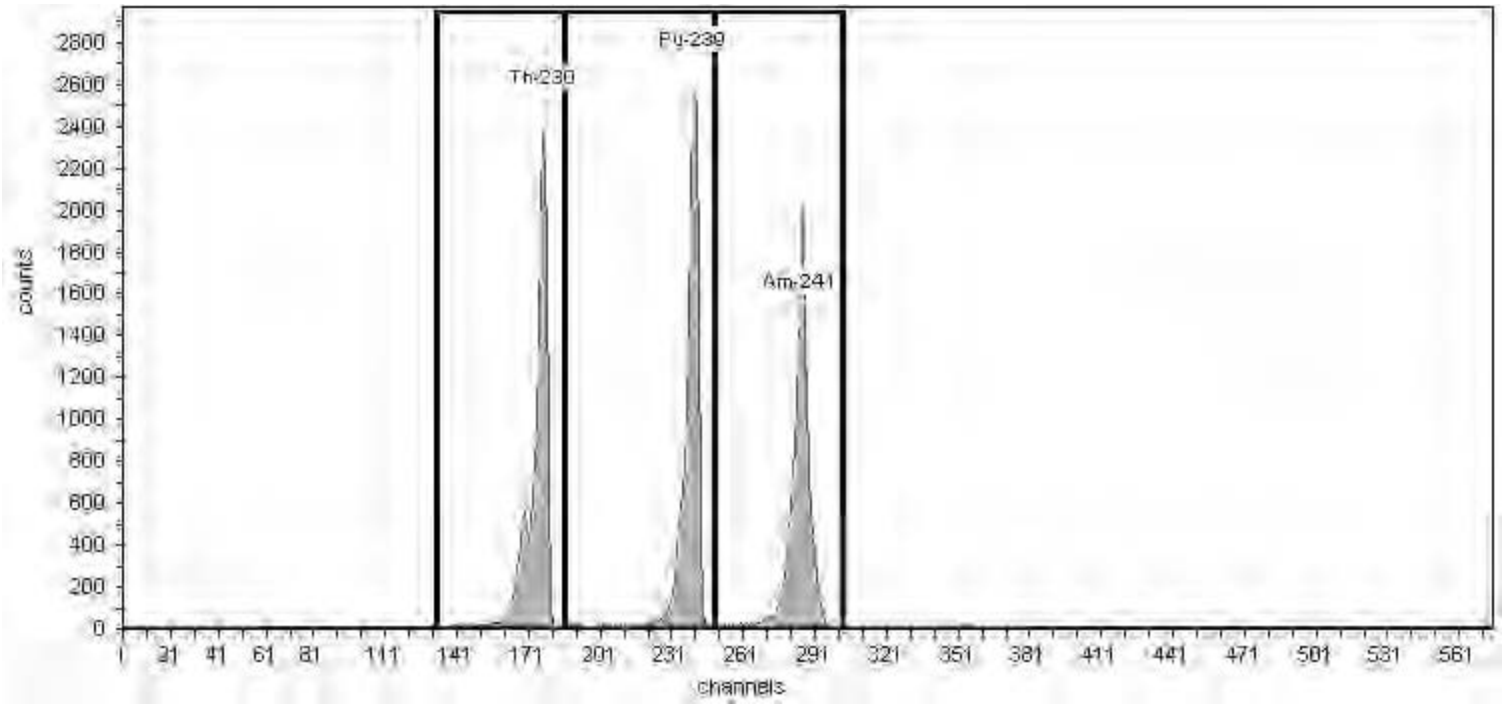
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 11/13/2017 12:45:58PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV166-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.28% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	14,028.00	100.20
Pu-239	240	5,155.40	186	249	33.89	14,721.00	105.15
Am-241	284	5,485.70	249	303	34.76	13,451.00	96.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:16:52PM 11/13/2017

Calibration

Sample Name: IC-9520;AV167-20171113
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 11/13/2017 3:16:50PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

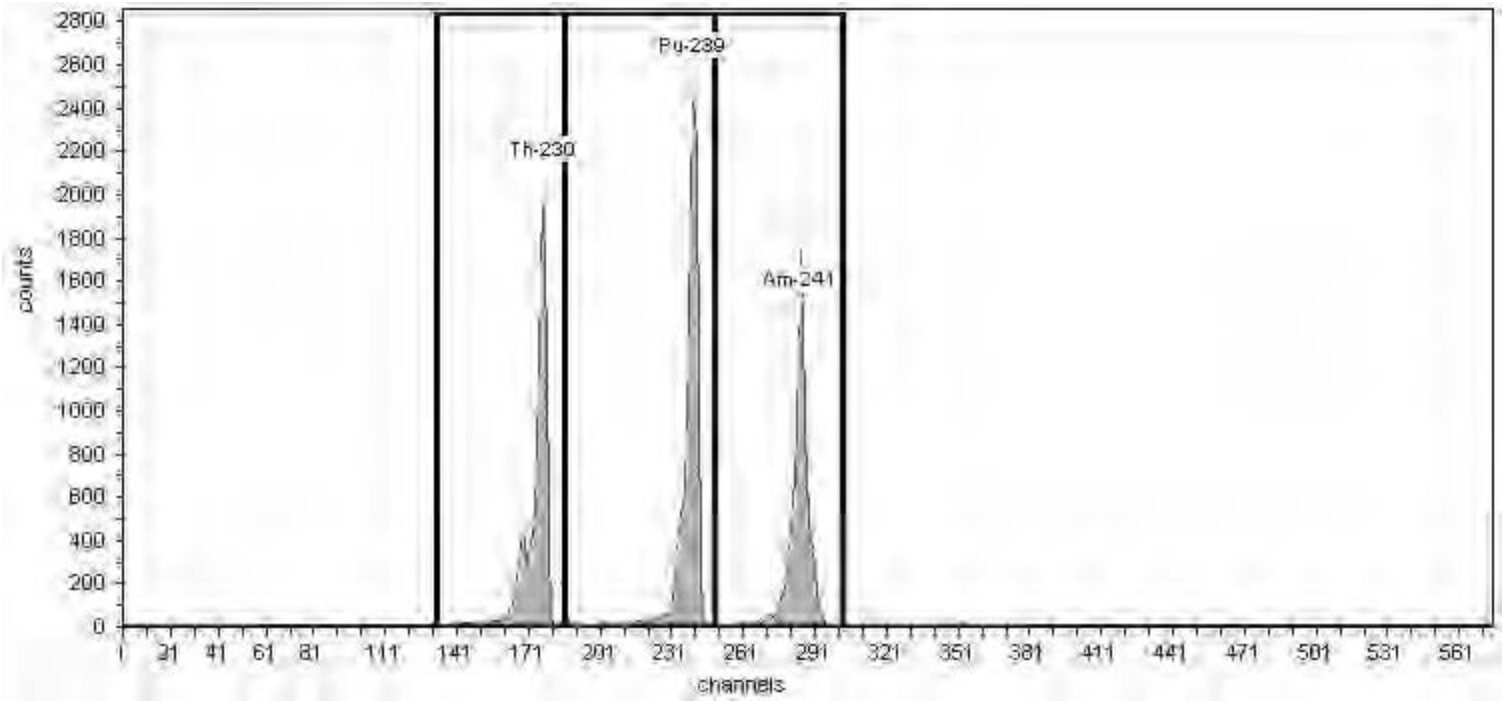
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 11/13/2017 12:46:16PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV167-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.92% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.63	10,808.00	77.20
Pu-239	240	5,155.40	186	249	31.39	13,087.00	93.48
Am-241	284	5,485.70	249	303	29.96	10,447.00	74.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:17:15PM 11/13/2017

Calibration

Sample Name: IC-9794;AV171-20171113
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 11/13/2017 3:17:14PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

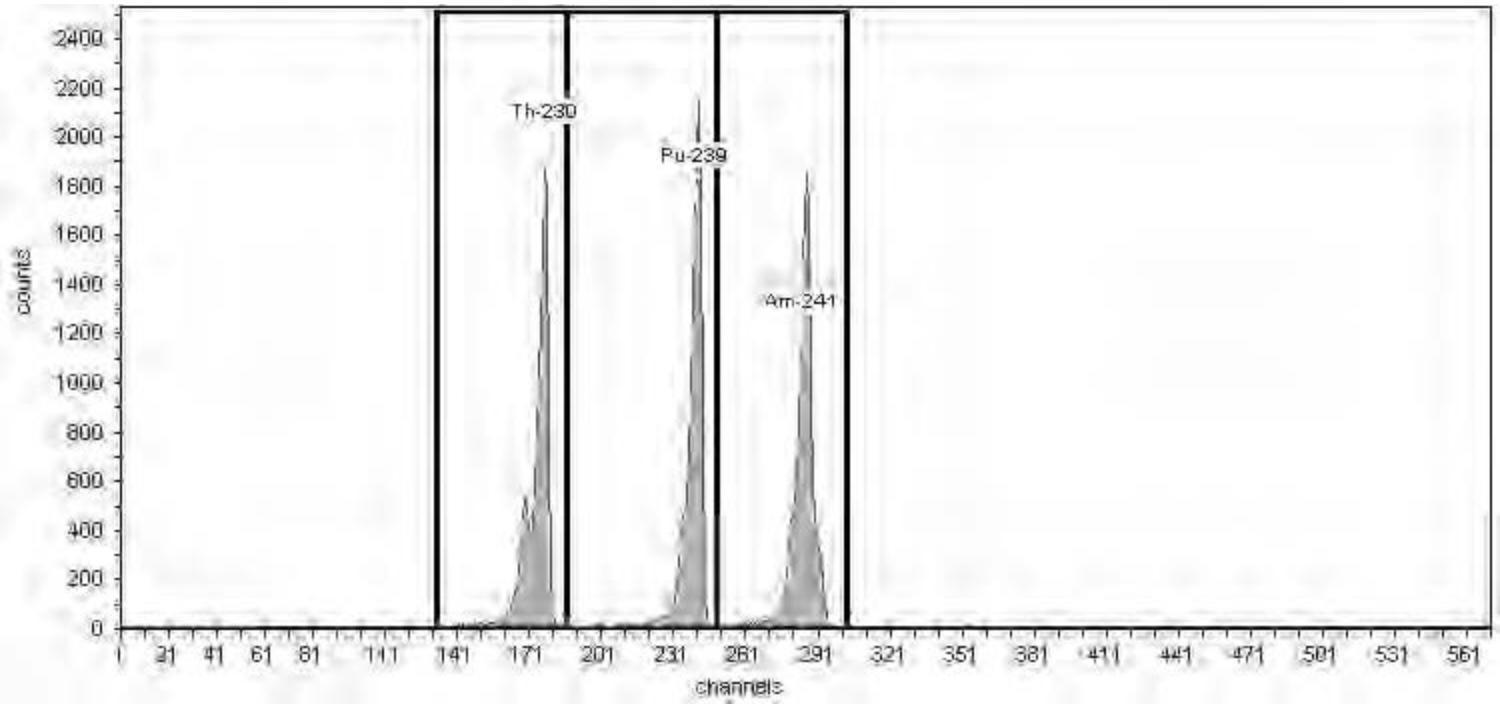
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 11/13/2017 12:47:36PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9794;AV171-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.64% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.29	11,887.00	84.91
Pu-239	240	5,155.40	186	249	32.07	11,865.00	84.75
Am-241	284	5,485.70	249	303	34.34	12,733.00	90.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:17:20PM 11/13/2017

Calibration

Sample Name: IC-9795;AV172-20171113
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 11/13/2017 3:17:19PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

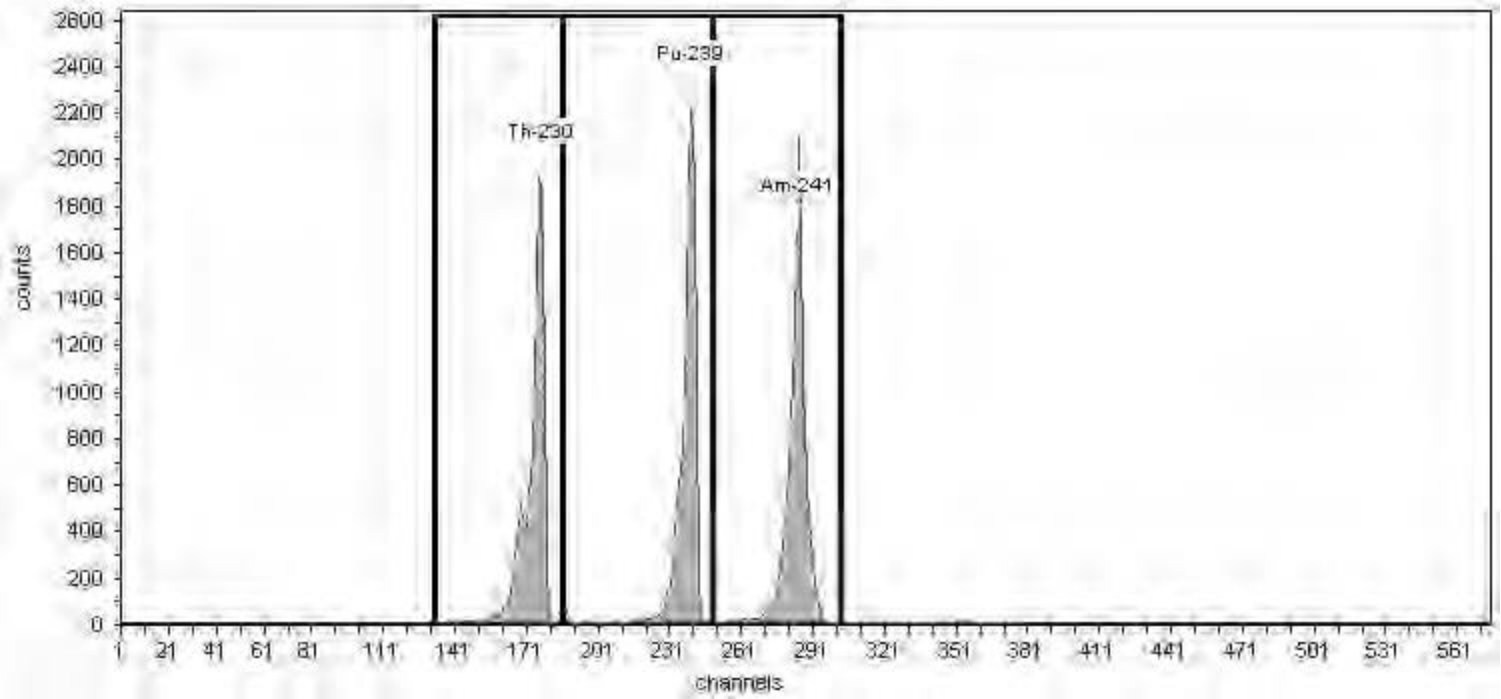
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 11/13/2017 12:47:59PM

Live Time: 140.00 min.
Real Time: 140.02 min.

Efficiency Calibration Name: IC-9795;AV172-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.32% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.88	12,280.00	87.71
Pu-239	240	5,155.40	186	249	33.75	12,794.00	91.39
Am-241	284	5,485.70	249	303	33.30	13,535.00	96.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:17:35PM 11/13/2017

Calibration

Sample Name: IC-9817;AV173-20171113b
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 11/13/2017 3:17:34PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

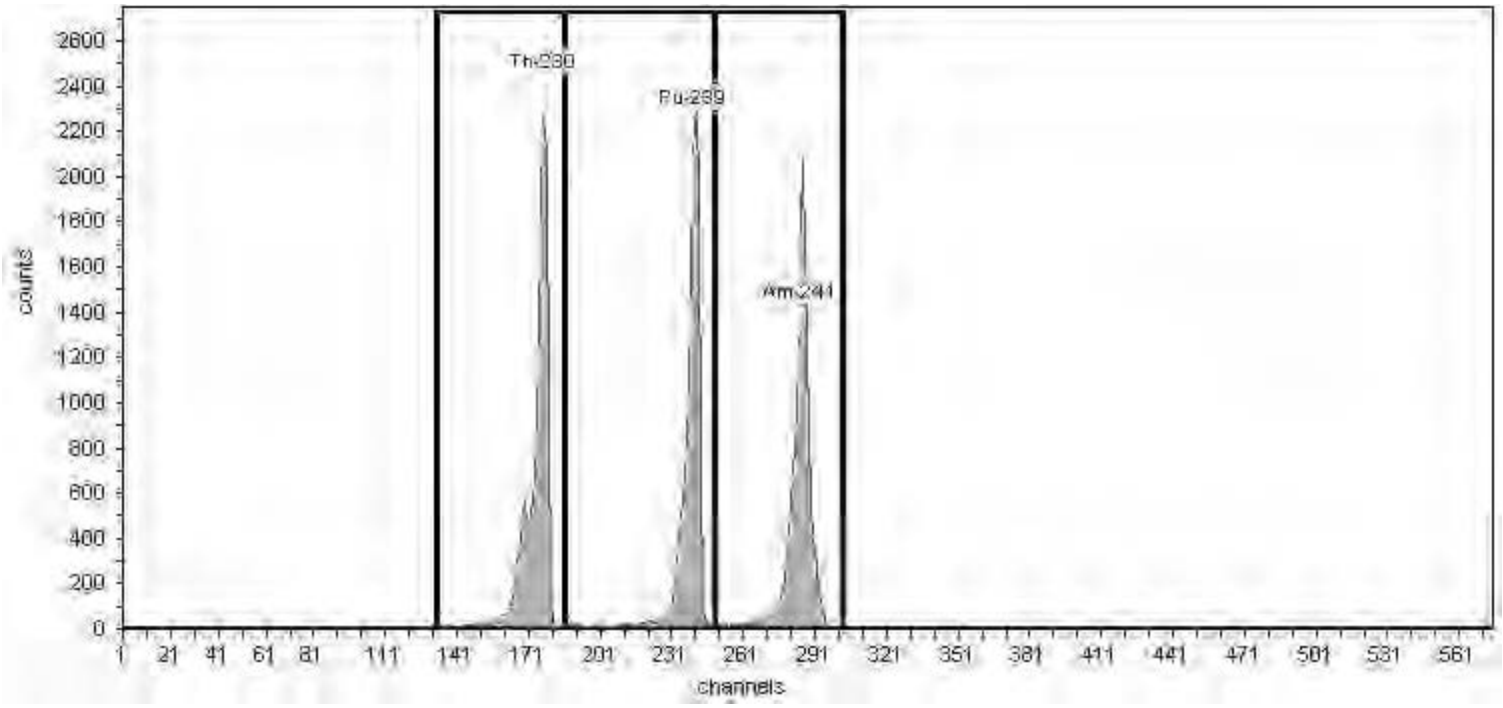
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 11/13/2017 12:55:58PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9817;AV173-20171113b

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.08% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.03	14,078.00	100.56
Pu-239	240	5,155.40	186	249	31.59	13,220.00	94.43
Am-241	284	5,485.70	249	303	32.73	13,228.00	94.49

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:17:40PM 11/13/2017

Calibration

Sample Name: IC-9884;AV174-20171113b
Description:
Detector: AV174

Analyst: 60040
Analysis Date: 11/13/2017 3:17:39PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

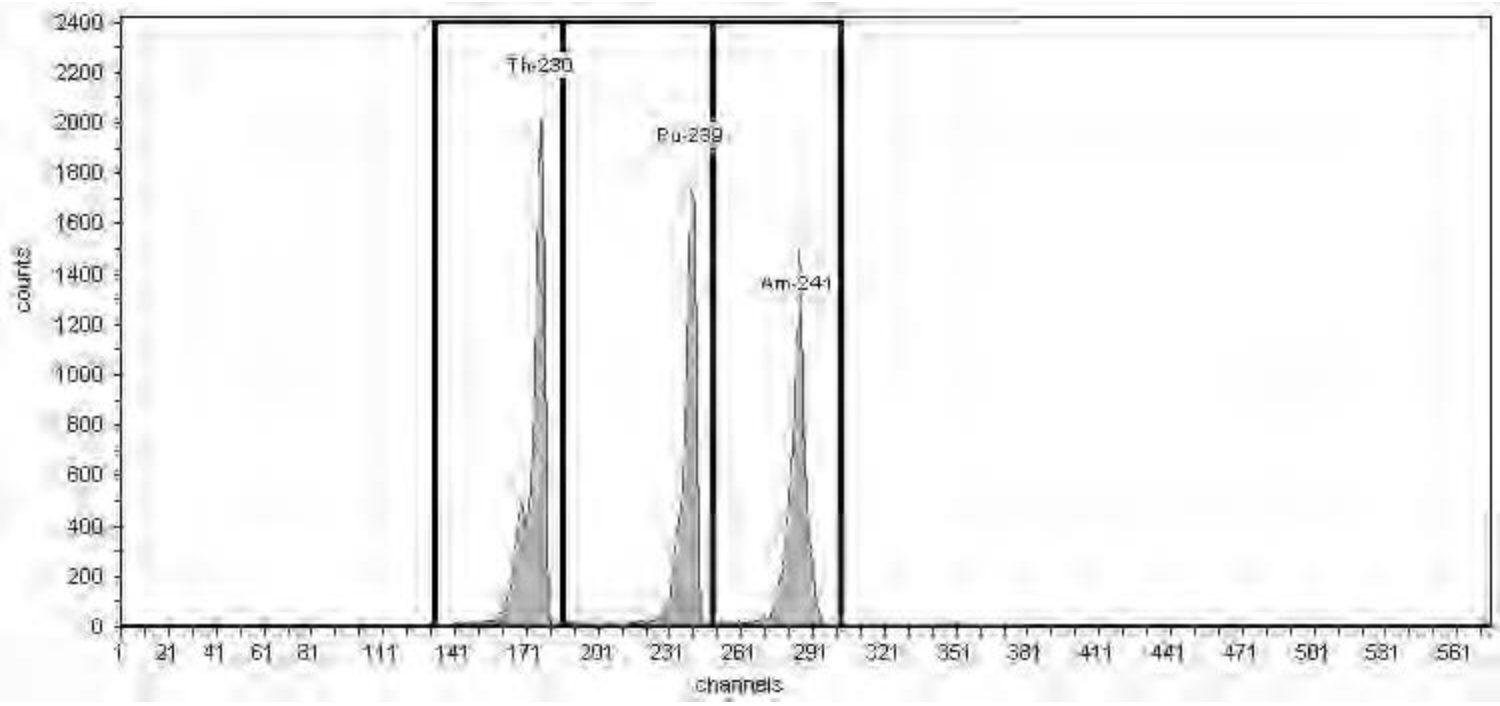
Detector: AV174 , SN: 50-112Y5
Acquisition Start Date: 11/13/2017 12:56:17PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV174-20171113b

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.94% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.17	12,387.00	88.48
Pu-239	240	5,155.40	186	249	33.59	10,093.00	72.09
Am-241	284	5,485.70	249	303	33.93	10,017.00	71.55

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:46:55AM 11/14/2017

Calibration

Sample Name: IC-8875;AV187-20171113
Description:
Detector: AV187

Analyst: 60040
Analysis Date: 11/14/2017 8:46:54AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

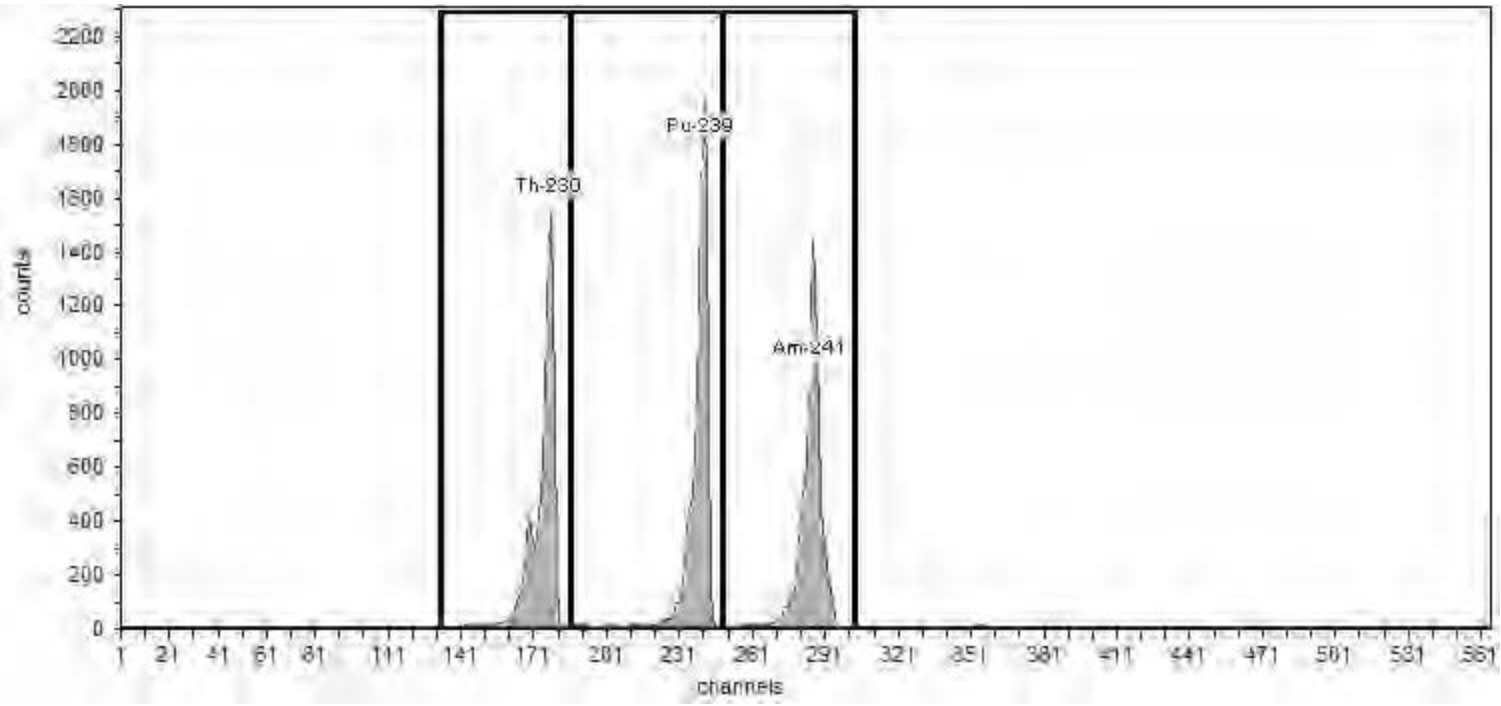
Detector: AV187 , SN: 50-119I2
Acquisition Start Date: 11/13/2017 3:34:05PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8875;AV187-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.07% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.48	9,637.00	68.84
Pu-239	240	5,155.40	186	249	32.33	11,126.00	79.47
Am-241	284	5,485.70	249	303	34.65	9,767.00	69.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:32AM 11/14/2017

Calibration

Sample Name: IC-8876;AV188-20171113a
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 11/14/2017 8:47:31AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

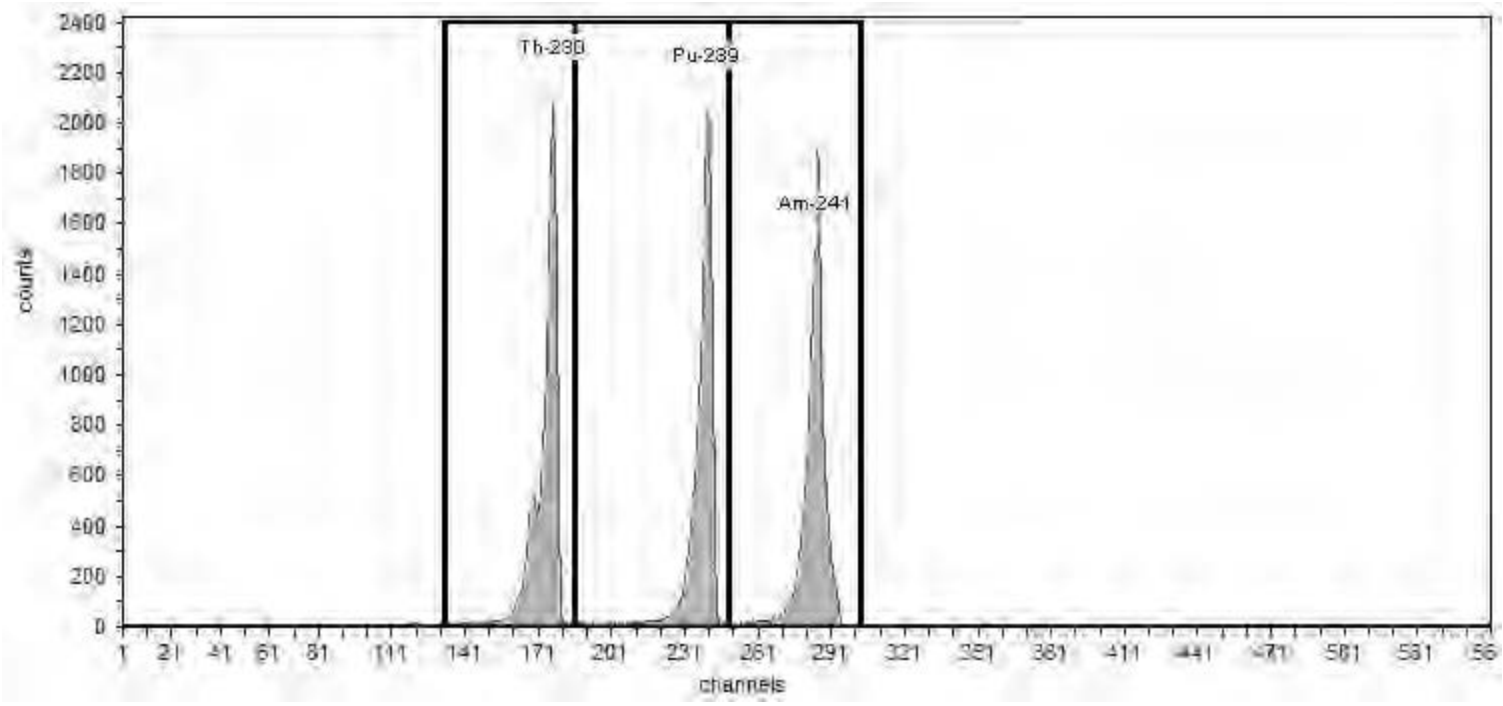
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 11/13/2017 3:46:29PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8876;AV188-20171113a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.62% +/- 0.27% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.32	13,101.00	93.58
Pu-239	240	5,155.40	186	249	35.37	12,712.00	90.80
Am-241	284	5,485.70	249	303	35.31	13,152.00	93.94

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:00AM 11/14/2017

Calibration

Sample Name: IC-8877;AV189-20171113
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 11/14/2017 8:46:59AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

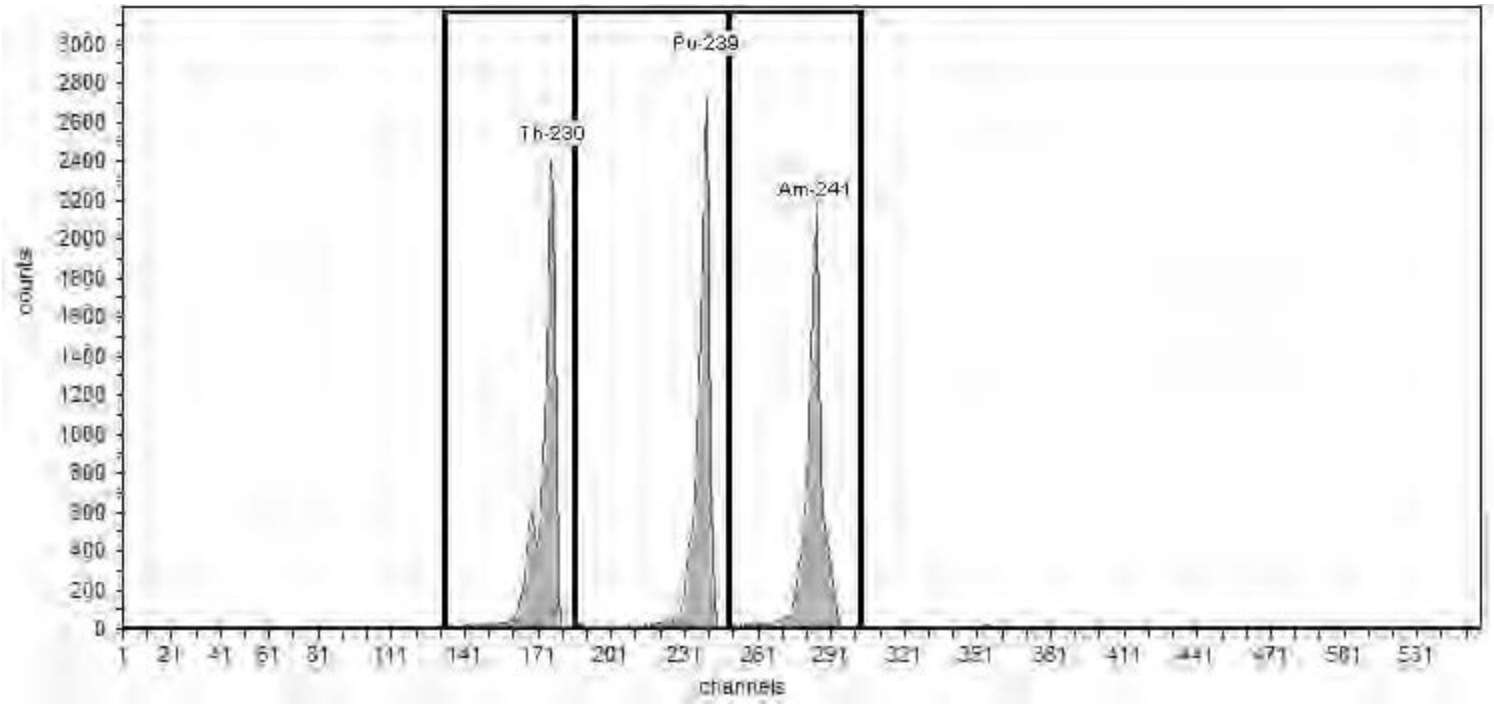
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 11/13/2017 3:34:45PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV189-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.49% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.37	14,110.00	100.79
Pu-239	240	5,155.40	186	249	31.75	14,537.00	103.84
Am-241	284	5,485.70	249	303	31.90	13,830.00	98.79

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:06AM 11/14/2017

Calibration

Sample Name: IC-9520;AV190-20171113
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 11/14/2017 8:47:05AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

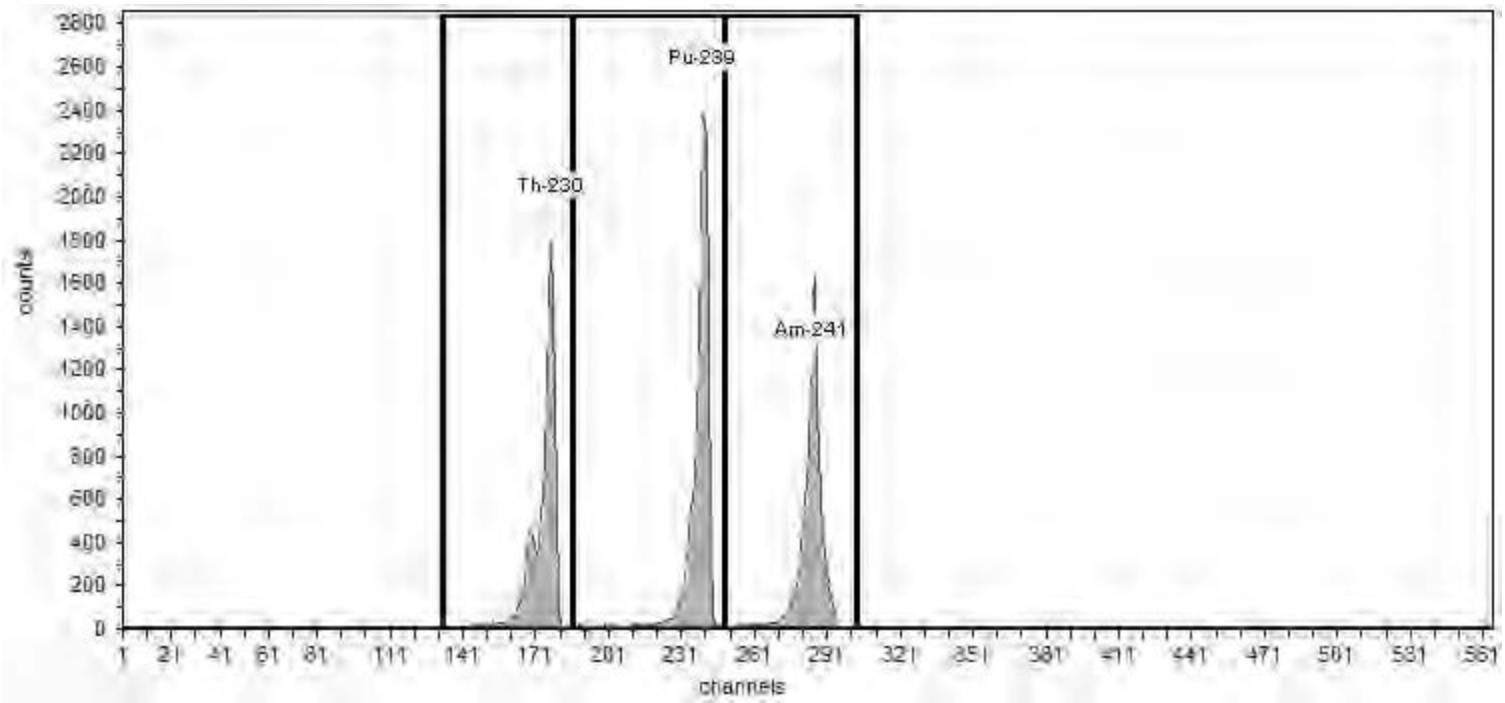
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 11/13/2017 3:35:19PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV190-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.30% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.43	10,978.00	78.41
Pu-239	240	5,155.40	186	249	32.73	13,418.00	95.84
Am-241	284	5,485.70	249	303	32.92	10,535.00	75.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:11AM 11/14/2017

Calibration

Sample Name: IC-8879;AV191-20171113
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 11/14/2017 8:47:10AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

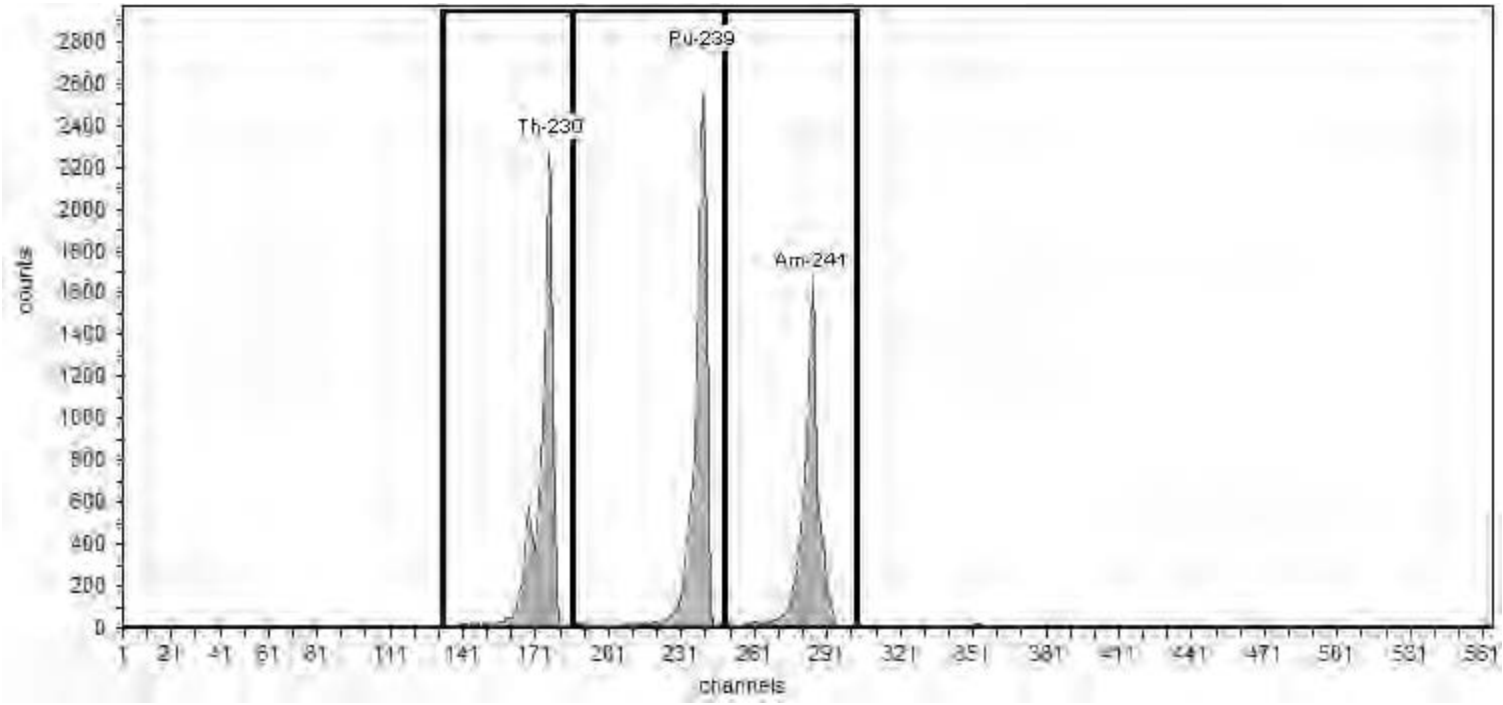
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/13/2017 3:35:38PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8879;AV191-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.90% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.46	13,301.00	95.01
Pu-239	240	5,155.40	186	249	32.26	13,769.00	98.35
Am-241	284	5,485.70	249	303	31.34	10,961.00	78.29

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:17AM 11/14/2017

Calibration

Sample Name: IC-9792;AV192-20171113
Description:
Detector: AV192

Analyst: 60040
Analysis Date: 11/14/2017 8:47:16AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

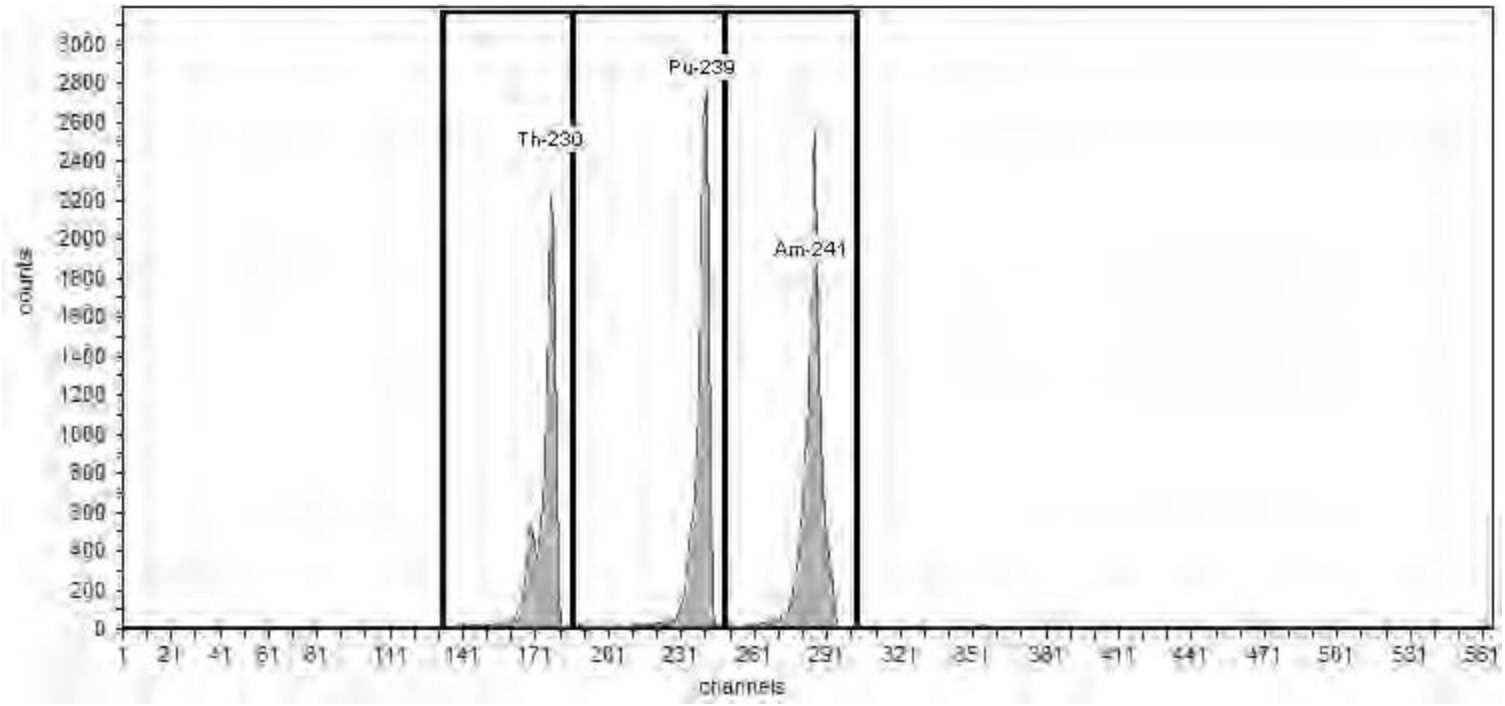
Detector: AV192 , SN: 50-119J7
Acquisition Start Date: 11/13/2017 3:35:58PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV192-20171113

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.09% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.19	12,919.00	92.28
Pu-239	240	5,155.40	186	249	30.70	14,591.00	104.22
Am-241	284	5,485.70	249	303	32.62	16,371.00	116.94

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:56PM 11/14/2017

Calibration

Sample Name: IC-8879;AV206-20171114
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 11/14/2017 12:00:54PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

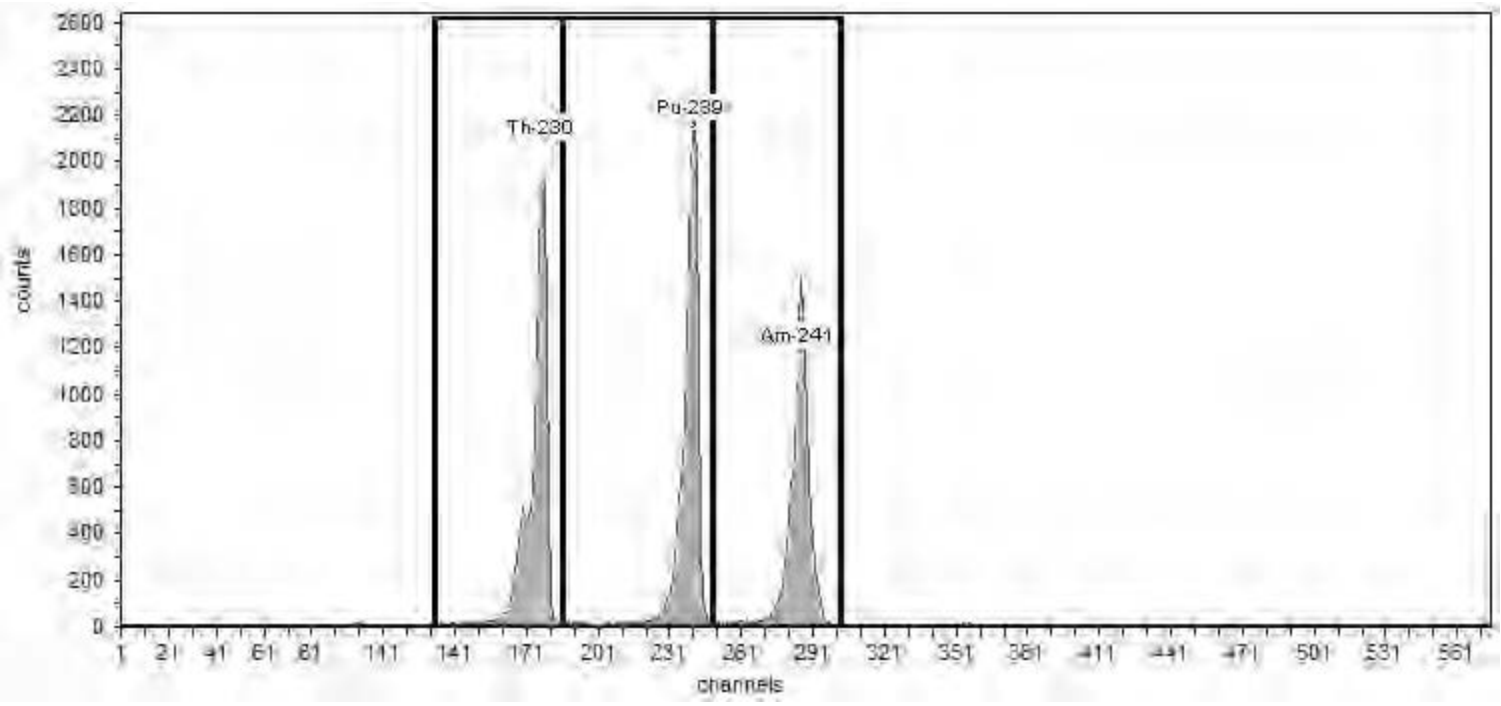
Detector: AV206 , SN: 5604420
Acquisition Start Date: 11/14/2017 9:00:34AM

Live Time: 140.00 min.
Real Time: 140.21 min.

Efficiency Calibration Name: IC-8879;AV206-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.42% +/- 0.32% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	36.39	13,422.00	95.87
Pu-239	240	5,155.40	186	249	38.62	14,237.00	101.69
Am-241	284	5,485.70	249	303	40.22	11,283.00	80.59

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:00:44PM 11/14/2017

Calibration

Sample Name: IC-9793;AV208-20171114
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 11/14/2017 12:00:42PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

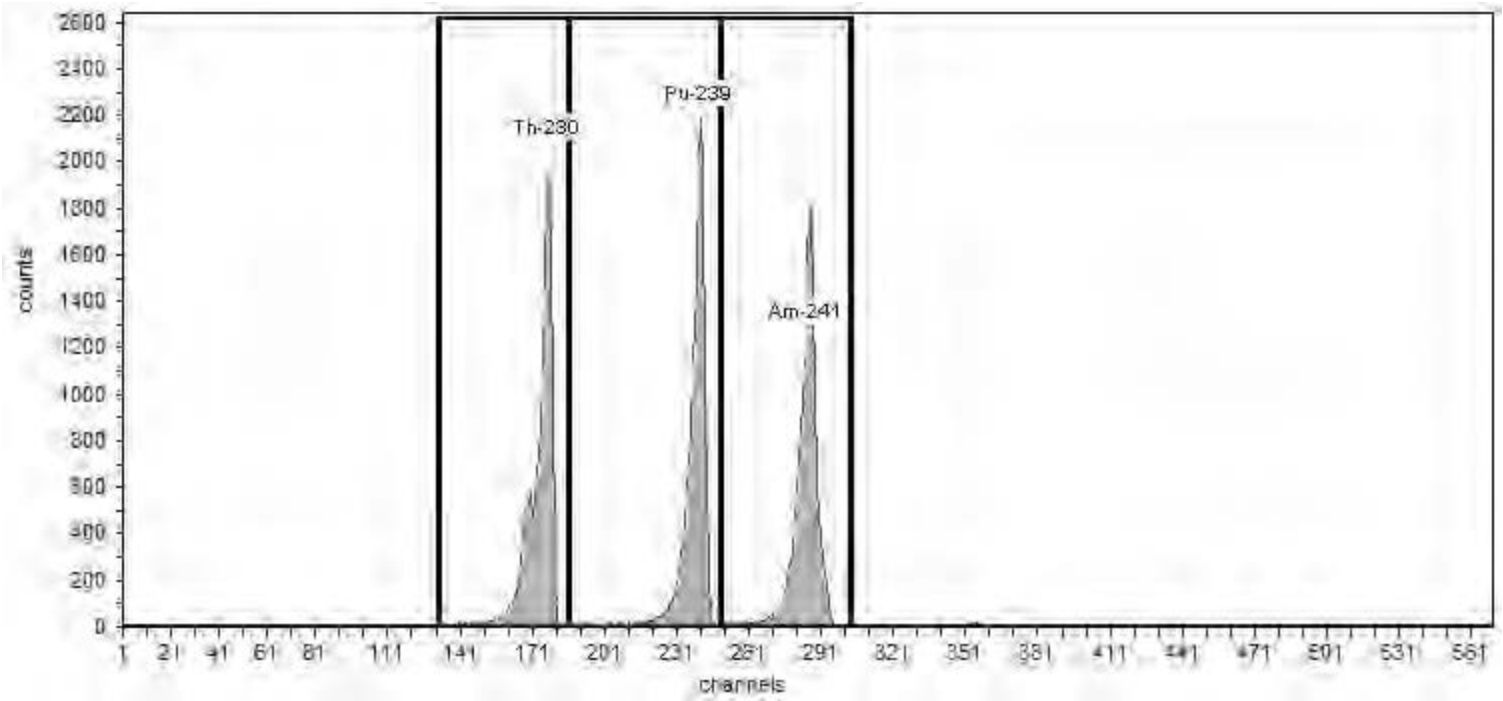
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 11/14/2017 8:59:57AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9793;AV208-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.28% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.62	13,337.00	95.26
Pu-239	240	5,155.40	186	249	37.14	14,000.00	100.00
Am-241	284	5,485.70	249	303	37.83	13,434.00	95.96

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:01:52PM 11/14/2017

Calibration

Sample Name: IC-9817;AV211-20171114a
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 11/14/2017 12:01:51PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

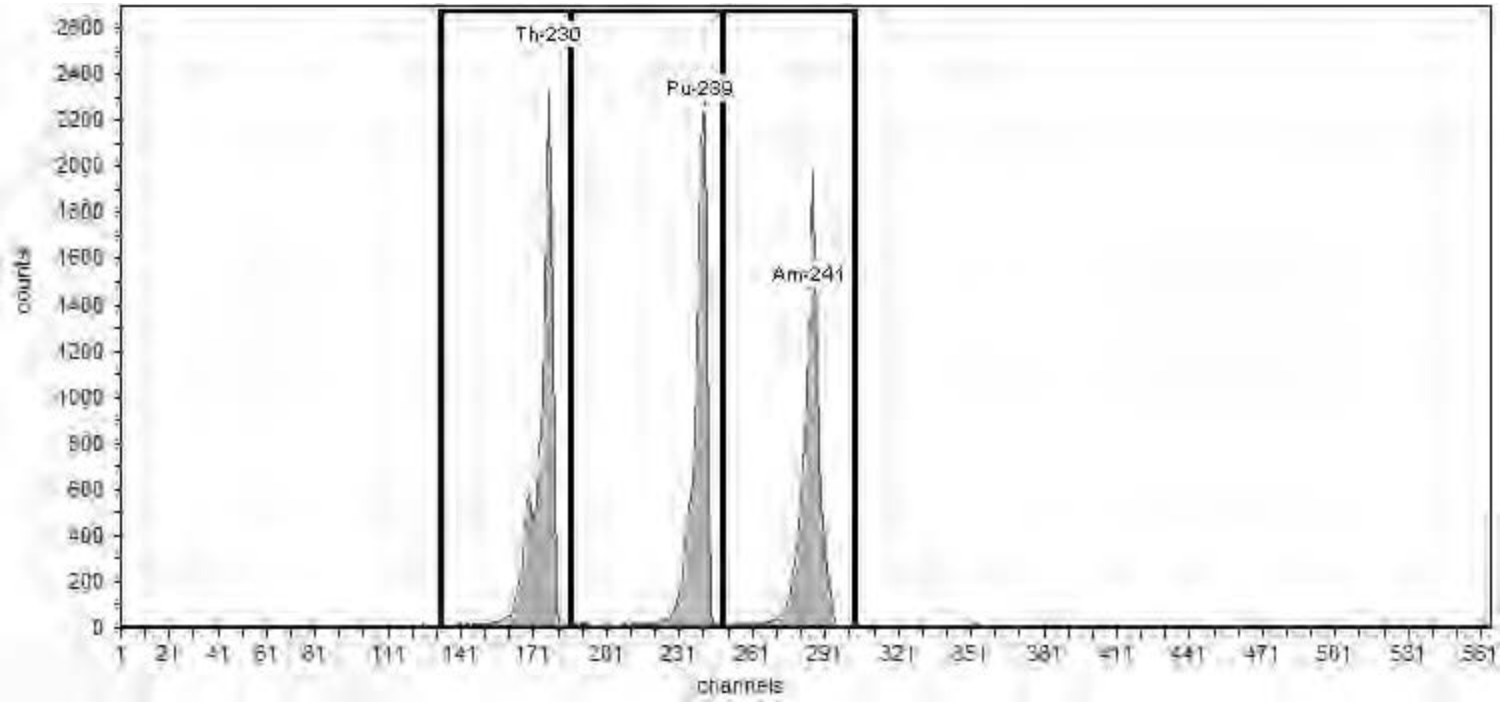
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 11/14/2017 9:06:42AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9817;AV211-20171114a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.81% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.11	14,089.00	100.64
Pu-239	240	5,155.40	186	249	32.66	12,978.00	92.70
Am-241	284	5,485.70	249	303	34.34	12,961.00	92.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:01:42PM 11/14/2017

Calibration

Sample Name: IC-9884;AV212-20171114
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 11/14/2017 12:01:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

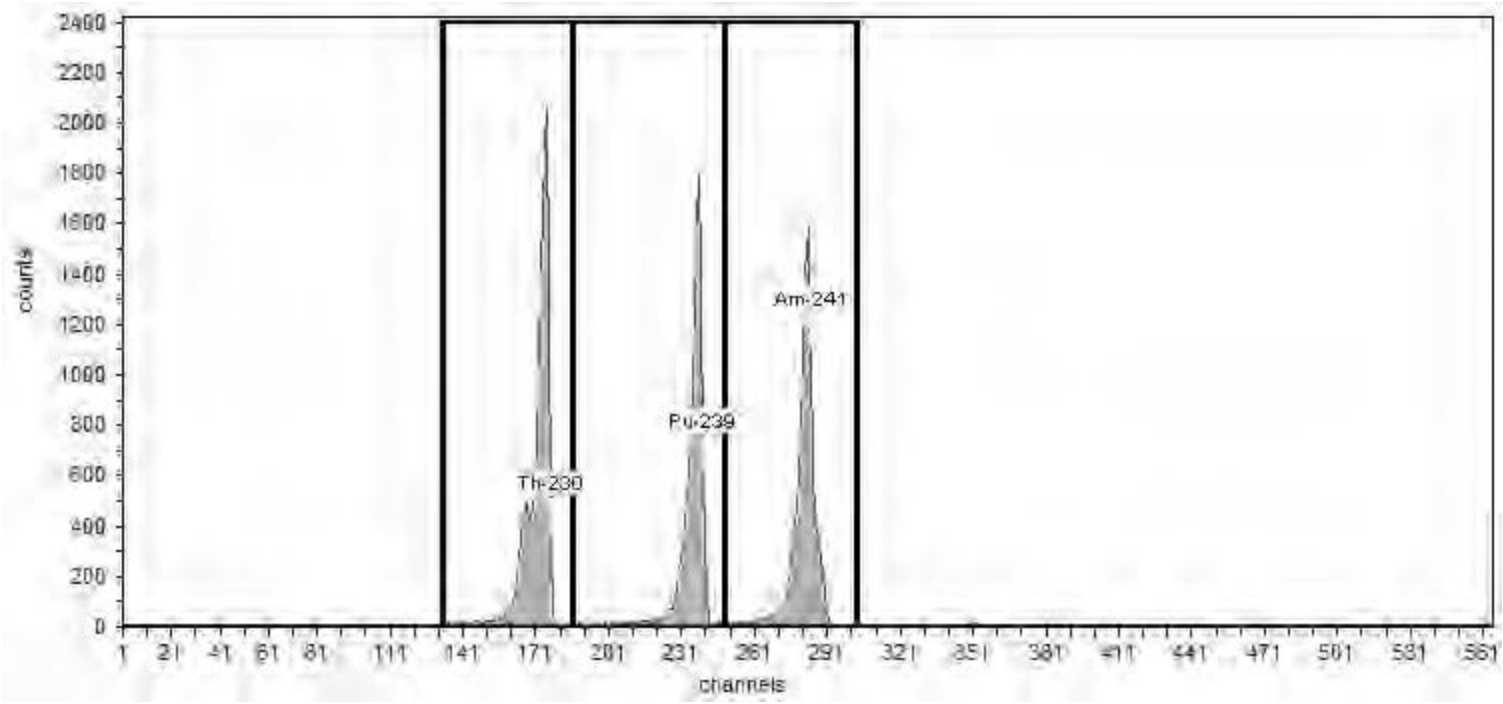
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 11/14/2017 8:58:33AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9884;AV212-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.41% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.19	12,658.00	90.41
Pu-239	240	5,155.40	186	249	32.03	10,206.00	72.90
Am-241	284	5,485.70	249	303	34.93	10,334.00	73.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:01:30PM 11/14/2017

Calibration

Sample Name: IC-9885;AV213-20171114
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 11/14/2017 12:01:29PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

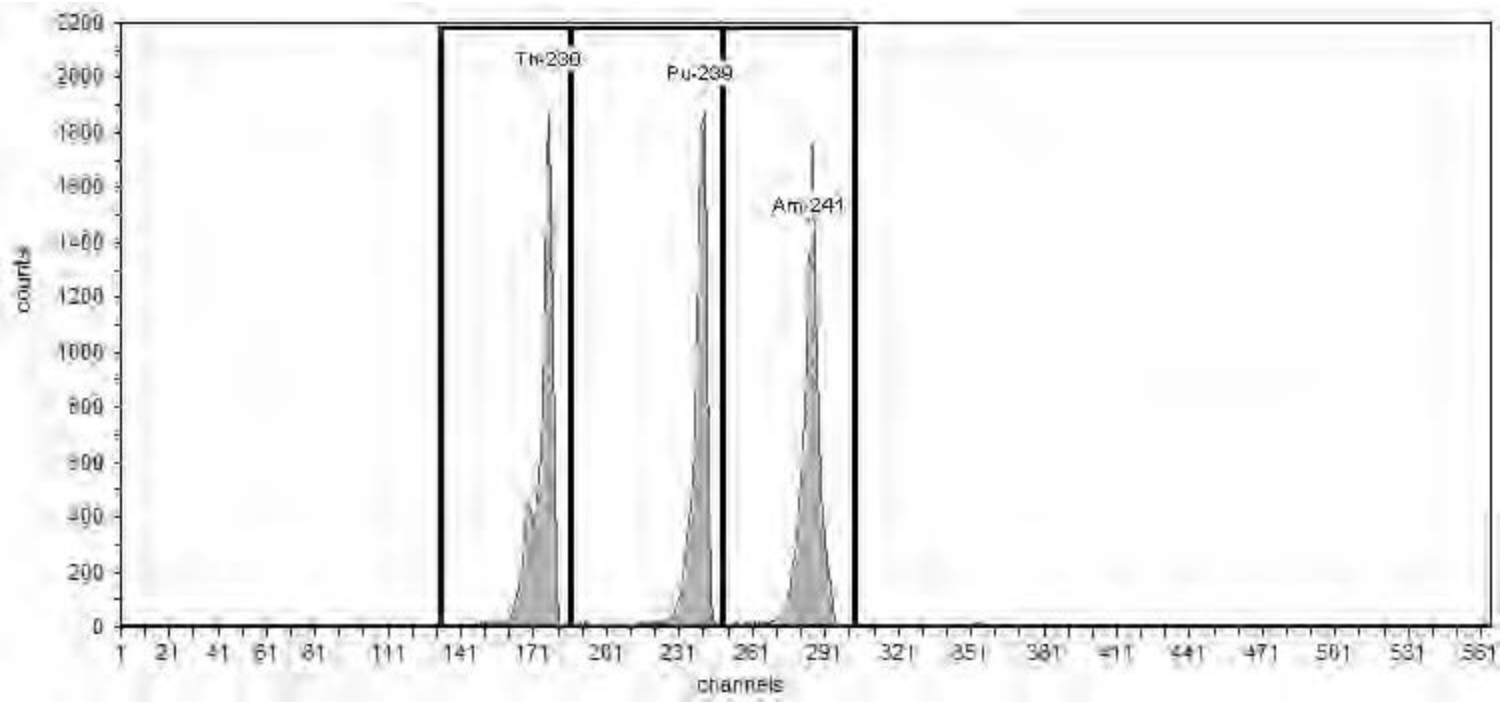
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 11/14/2017 8:58:16AM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9885;AV213-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.04% +/- 0.36% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.19	11,416.00	81.54
Pu-239	240	5,155.40	186	249	34.32	10,571.00	75.51
Am-241	284	5,485.70	249	303	35.97	12,063.00	86.16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:30PM 11/14/2017

Calibration

Sample Name: IC-7107;AV215-20171114
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 11/14/2017 3:23:29PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

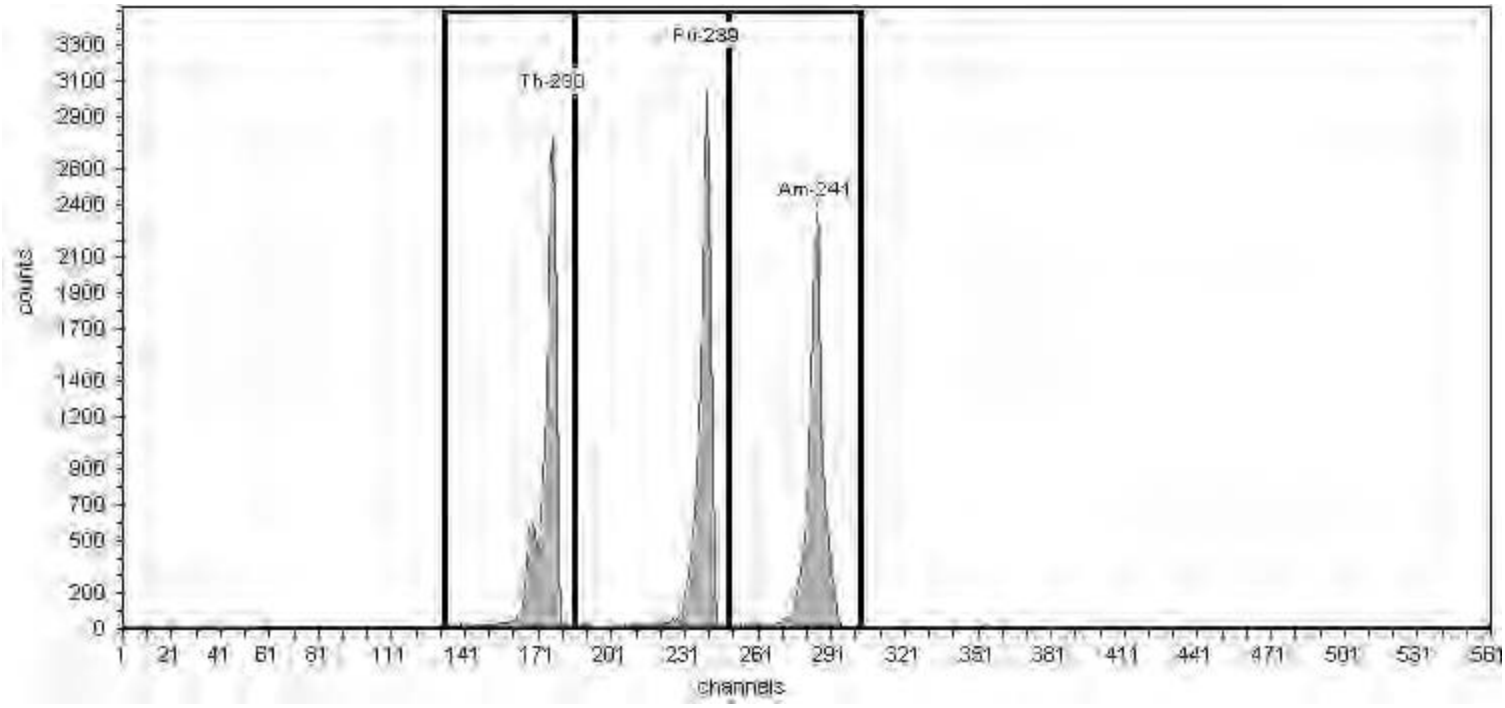
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 11/14/2017 12:26:05PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-7107;AV215-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.87	15,884.00	113.46
Pu-239	240	5,155.40	186	249	30.40	15,738.00	112.41
Am-241	284	5,485.70	249	303	30.91	15,390.00	109.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:23PM 11/14/2017

Calibration

Sample Name: IC-8874;AV216-20171114
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 11/14/2017 3:23:21PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

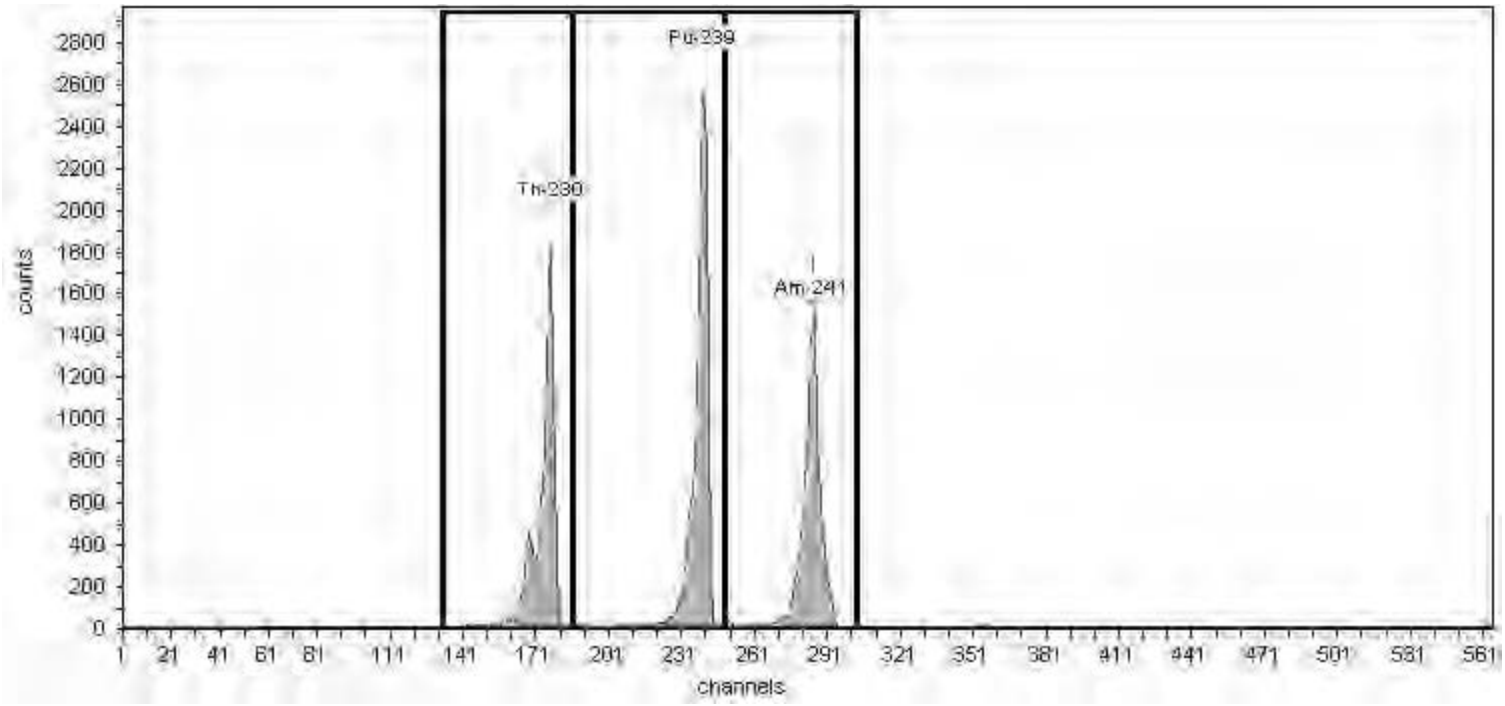
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 11/14/2017 12:25:42PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8874;AV216-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.89% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.99	10,807.00	77.19
Pu-239	240	5,155.40	186	249	32.21	14,121.00	100.86
Am-241	284	5,485.70	249	303	32.03	11,361.00	81.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:18PM 11/14/2017

Calibration

Sample Name: IC-8875;AV217-20171114
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 11/14/2017 3:23:16PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

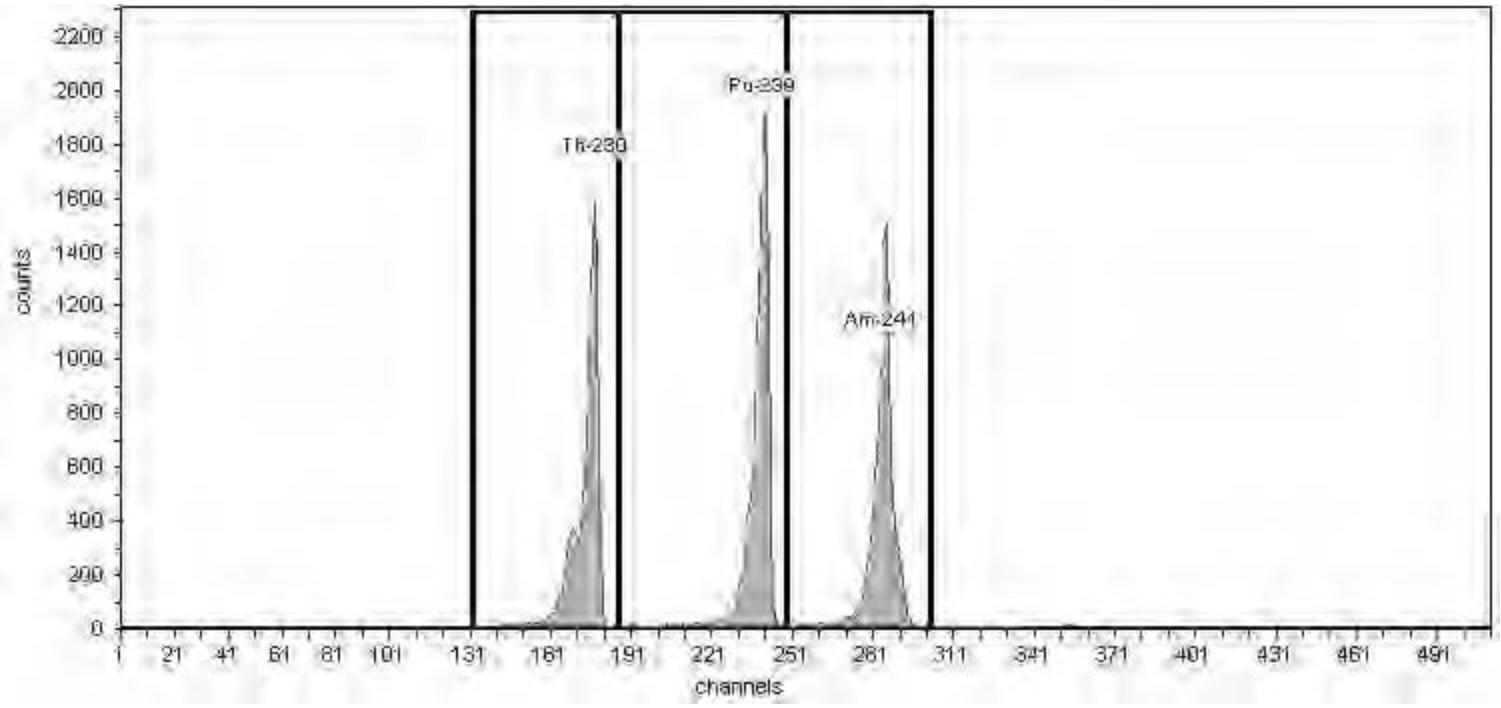
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 11/14/2017 12:25:24PM

Live Time: 140.00 min.
Real Time: 140.02 min.

Efficiency Calibration Name: IC-8875;AV217-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.21% +/- 0.31% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.98	9,697.00	69.26
Pu-239	240	5,155.40	186	249	34.94	11,197.00	79.98
Am-241	284	5,485.70	249	303	33.71	9,836.00	70.26

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:37PM 11/14/2017

Calibration

Sample Name: IC-8876;AV218-20171114a
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 11/14/2017 3:23:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

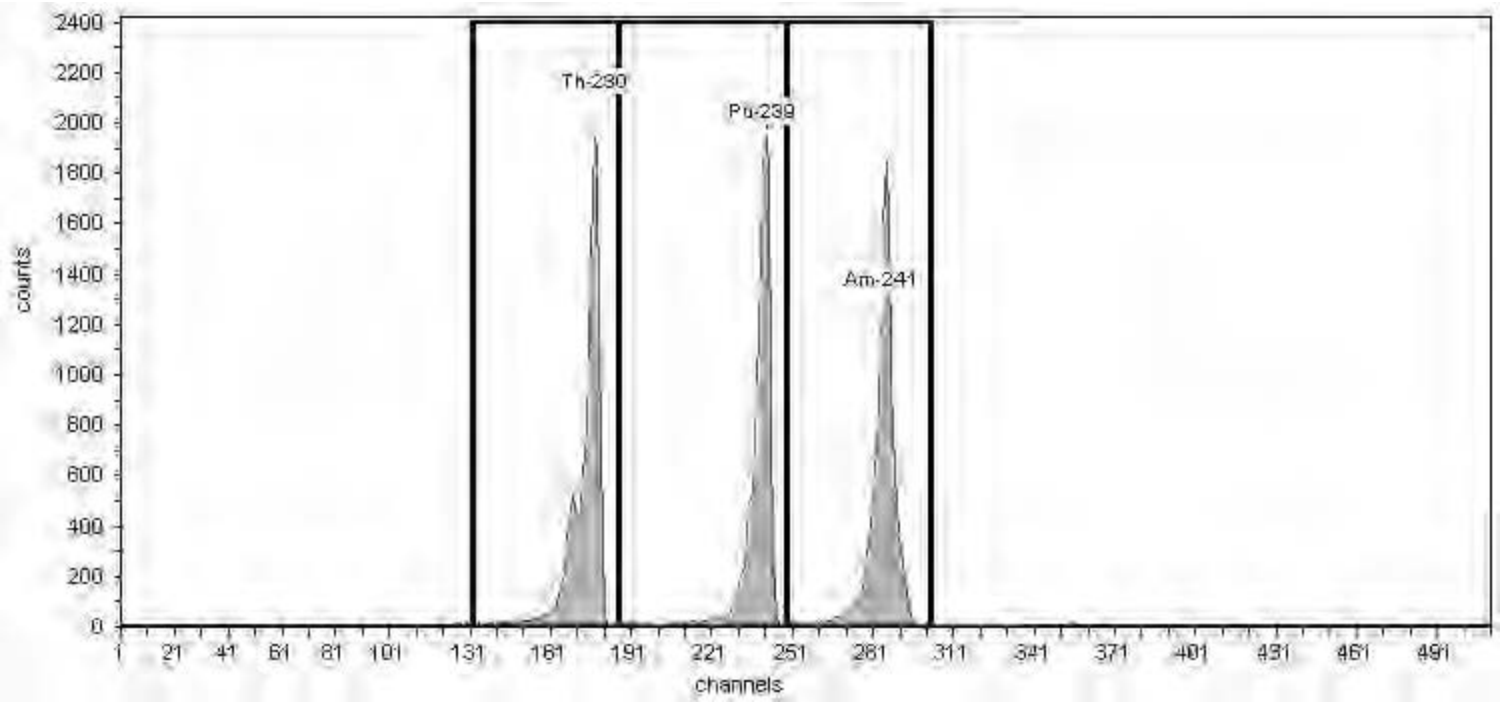
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 11/14/2017 12:33:22PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8876;AV218-20171114a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.31% +/- 0.27% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.47	13,001.00	92.86
Pu-239	240	5,155.40	186	249	34.77	12,511.00	89.36
Am-241	284	5,485.70	249	303	35.80	12,899.00	92.14

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:11PM 11/14/2017

Calibration

Sample Name: IC-8877;AV219-20171114
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 11/14/2017 3:23:10PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

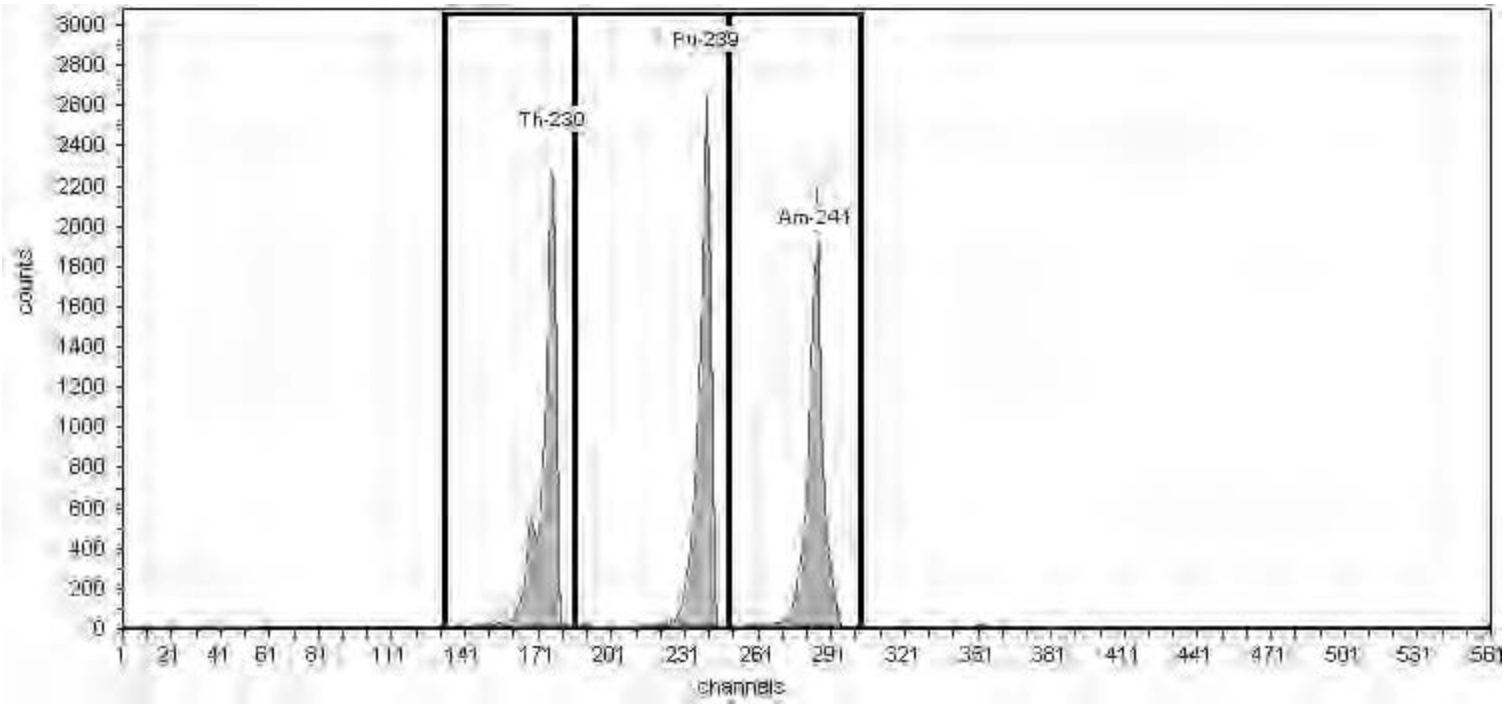
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 11/14/2017 12:24:41PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-8877;AV219-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.32% +/- 0.30% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.52	13,937.00	99.55
Pu-239	240	5,155.40	186	249	32.94	14,637.00	104.55
Am-241	284	5,485.70	249	303	32.51	13,671.00	97.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:43PM 11/14/2017

Calibration

Sample Name: IC-9520;AV220-20171114a
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 11/14/2017 3:23:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

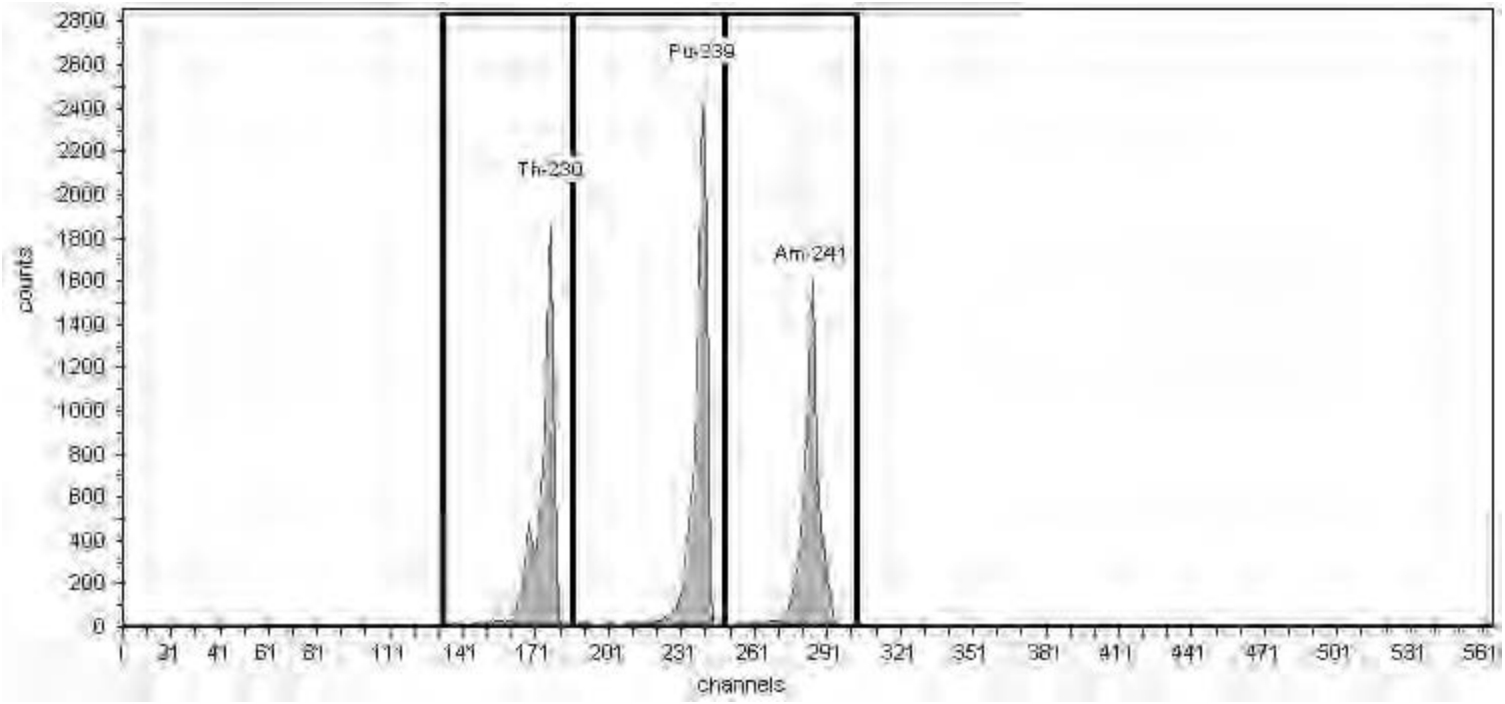
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 11/14/2017 12:33:46PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9520;AV220-20171114a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.50% +/- 0.33% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.34	11,169.00	79.78
Pu-239	240	5,155.40	186	249	32.83	13,339.00	95.28
Am-241	284	5,485.70	249	303	34.31	10,691.00	76.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:49PM 11/14/2017

Calibration

Sample Name: IC-9792;AV222-20171114a
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 11/14/2017 3:23:48PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

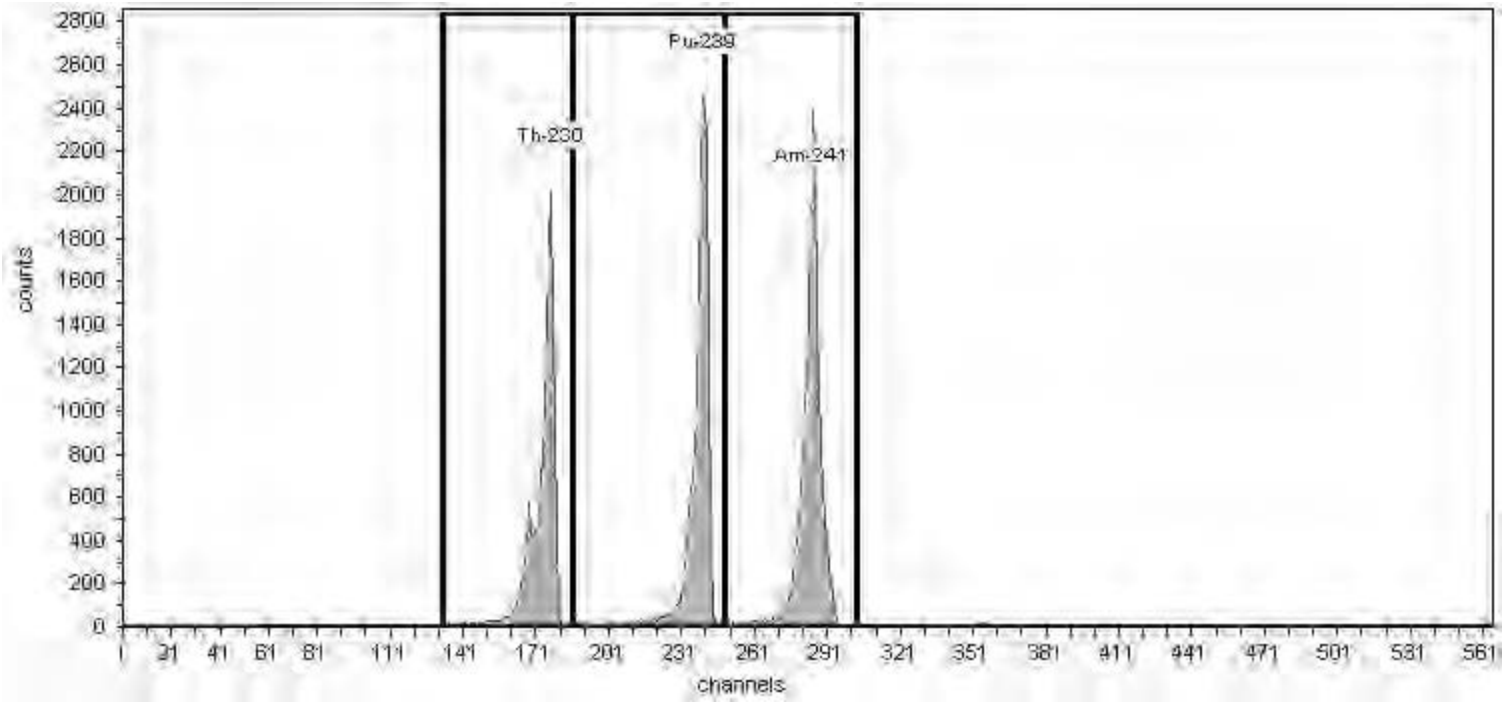
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 11/14/2017 12:34:07PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9792;AV222-20171114a

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.87% +/- 0.29% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.89	12,595.00	89.96
Pu-239	240	5,155.40	186	249	34.32	14,478.00	103.41
Am-241	284	5,485.70	249	303	35.63	16,379.00	116.99

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:22:45PM 11/14/2017

Calibration

Sample Name: IC-9795;AV225-20171114
Description:
Detector: AV225

Analyst: 60040
Analysis Date: 11/14/2017 3:22:43PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

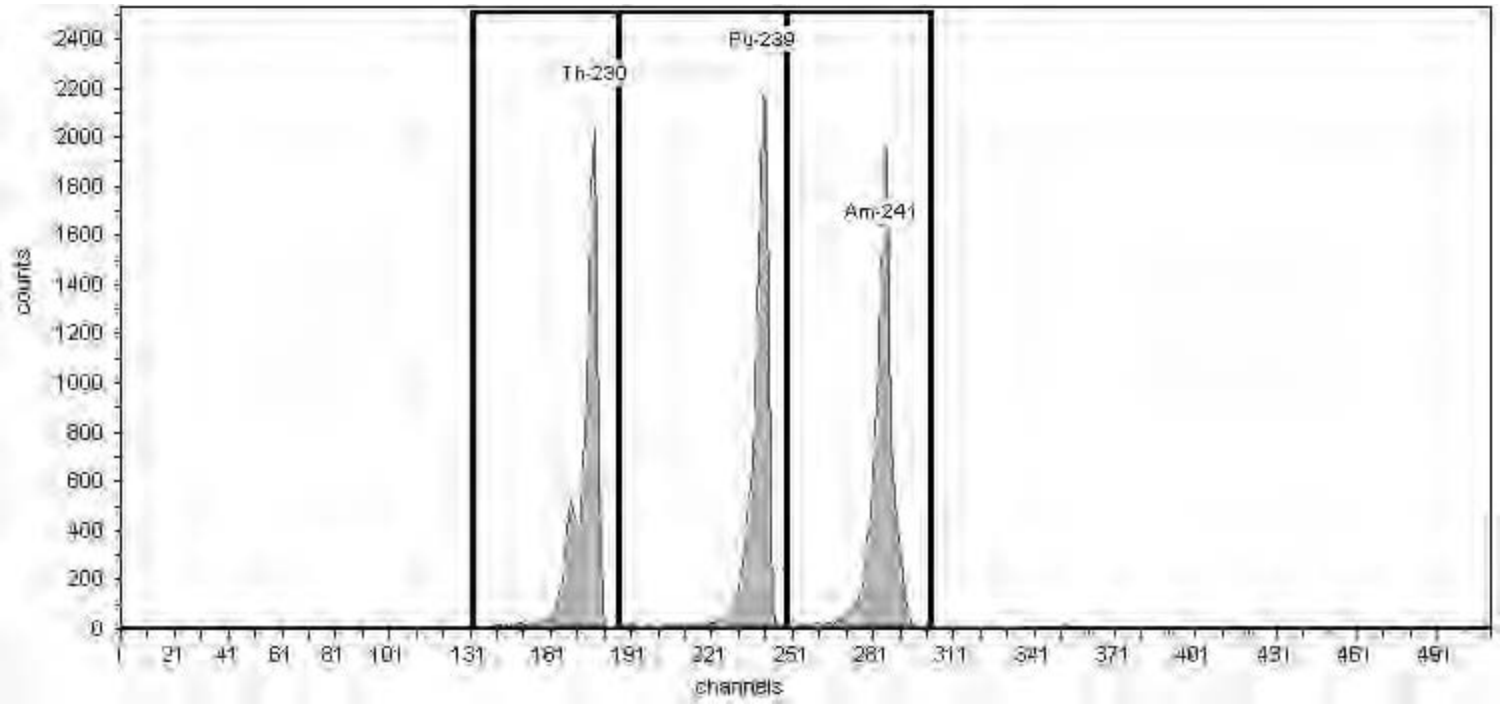
Detector: AV225 , SN: 50-117J7
Acquisition Start Date: 11/14/2017 12:22:42PM

Live Time: 140.00 min.
Real Time: 140.01 min.

Efficiency Calibration Name: IC-9795;AV225-20171114

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.63% +/- 0.34% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.55	12,558.00	89.70
Pu-239	240	5,155.40	186	249	35.67	12,978.00	92.70
Am-241	284	5,485.70	249	303	36.60	13,549.00	96.78

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV1

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371830/1	05/14/18 15:44	82232-334_00001	0.2436	0.20-0.32		
ICV 160-371933/1	05/18/18 19:25	82236-334_00001	0.2326	0.20-0.32	95.5	95-105
CCV 160-382694/1	08/14/18 14:05	82232-334_00001	0.2385	0.20-0.32	97.9	95-105

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371847/1	05/14/18 15:46	82236-334_00001	0.2444	0.20-0.32		
ICV 160-371942/1	05/18/18 19:25	82232-334_00001	0.2477	0.20-0.32	101.4	95-105
CCV 160-382709/1	08/14/18 14:06	82236-334_00001	0.2445	0.20-0.32	100.1	95-105

Detector: AV4

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371848/1	05/14/18 15:46	82237-334_00003	0.2279	0.20-0.32		
ICV 160-371943/1	05/18/18 19:26	82244-334_00001	0.2237	0.20-0.32	98.2	95-105
CCV 160-382710/1	08/14/18 14:07	82237-334_00003	0.2297	0.20-0.32	100.8	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371856/1	05/14/18 15:47	82241-334_00001	0.2298	0.20-0.32		
ICV 160-371945/1	05/18/18 19:26	82237-334_00003	0.2253	0.20-0.32	98.1	95-105
CCV 160-382723/1	08/14/18 14:08	82241-334_00001	0.2253	0.20-0.32	98.1	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371857/1	05/14/18 15:47	82243-334_00001	0.2596	0.20-0.32		
ICV 160-371946/1	05/18/18 19:27	82233-334_00001	0.2661	0.20-0.32	102.5	95-105
CCV 160-382733/1	08/14/18 14:08	82243-334_00001	0.2585	0.20-0.32	99.6	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371846/1	05/14/18 18:37	82244-334_00001	0.2221	0.20-0.32		
ICV 160-371957/1	05/20/18 16:12	82241-334_00001	0.2277	0.20-0.32	102.5	95-105
CCV 160-382708/1	08/14/18 16:04	82244-334_00001	0.2239	0.20-0.32	100.8	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371850/1	05/14/18 18:38	108001_00001	0.2749	0.20-0.32		
ICV 160-371959/1	05/20/18 16:13	108002_00001	0.2781	0.20-0.32	101.2	95-105
CCV 160-382711/1	08/14/18 16:05	108001_00001	0.2732	0.20-0.32	99.4	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371851/1	05/14/18 18:51	108002_00001	0.2795	0.20-0.32		
ICV 160-371960/1	05/20/18 16:13	108001_00001	0.2753	0.20-0.32	98.5	95-105
CCV 160-382712/1	08/14/18 16:05	108002_00001	0.2787	0.20-0.32	99.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV47

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371853/1	05/14/18 18:40	108346_00001	0.2702	0.20-0.32		
ICV 160-371962/1	05/20/18 16:15	108345_00001	0.2686	0.20-0.32	99.4	95-105
CCV 160-382714/1	08/14/18 16:06	108346_00001	0.2670	0.20-0.32	98.8	95-105

Detector: AV48

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371854/1	05/14/18 18:40	108347_00001	0.2706	0.20-0.32		
ICV 160-371963/1	05/20/18 16:15	108348_00001	0.2668	0.20-0.32	98.6	95-105
CCV 160-382715/1	08/14/18 16:07	108347_00001	0.2719	0.20-0.32	100.5	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371863/1	05/15/18 12:37	82240-334_00001	0.2362	0.20-0.32		
ICV 160-372000/1	05/23/18 11:27	82246-334_00001	0.2348	0.20-0.32	99.4	95-105
CCV 160-382766/1	08/15/18 14:17	82240-334_00001	0.2344	0.20-0.32	99.3	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371864/1	05/15/18 12:38	82241-334_00001	0.2296	0.20-0.32		
ICV 160-372001/1	05/23/18 11:28	82237-334_00003	0.2302	0.20-0.32	100.3	95-105
CCV 160-382685/1	08/15/18 12:57	82241-334_00001	0.2280	0.20-0.32	99.3	95-105

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371865/1	05/15/18 12:38	82243-334_00001	0.2525	0.20-0.32		
ICV 160-372002/1	05/23/18 11:28	82233-334_00001	0.2610	0.20-0.32	103.4	95-105
CCV 160-382686/1	08/15/18 12:58	82243-334_00001	0.2526	0.20-0.32	100.1	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371867/1	05/15/18 12:39	82246-334_00001	0.2405	0.20-0.32		
ICV 160-372004/1	05/23/18 11:29	82240-334_00001	0.2410	0.20-0.32	100.2	95-105
CCV 160-382687/1	08/15/18 12:59	82246-334_00001	0.2403	0.20-0.32	99.9	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371869/1	05/15/18 12:40	108002_00001	0.2840	0.20-0.32		
ICV 160-371966/1	05/21/18 10:36	108001_00001	0.2808	0.20-0.32	98.9	95-105
CCV 160-382716/1	08/14/18 17:25	108002_00001	0.2844	0.20-0.32	100.1	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371871/1	05/15/18 12:40	108346_00001	0.2838	0.20-0.32		
ICV 160-371968/1	05/21/18 10:37	108345_00001	0.2842	0.20-0.32	100.1	95-105
CCV 160-382718/1	08/14/18 17:25	108346_00001	0.2791	0.20-0.32	98.4	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371872/1	05/15/18 12:41	108347_00001	0.2712	0.20-0.32		
ICV 160-371969/1	05/21/18 10:37	108348_00001	0.2698	0.20-0.32	99.5	95-105
CCV 160-382719/1	08/14/18 17:26	108347_00001	0.2739	0.20-0.32	101.0	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371873/1	05/15/18 12:41	108348_00001	0.2712	0.20-0.32		
ICV 160-371970/1	05/21/18 10:38	108347_00001	0.2733	0.20-0.32	100.8	95-105
CCV 160-382720/1	08/14/18 17:26	108348_00001	0.2702	0.20-0.32	99.6	95-105

Detector: AV69

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371875/1	05/15/18 15:45	82233-334_00001	0.2643	0.20-0.32		
ICV 160-372006/1	05/23/18 12:55	82243-334_00001	0.2601	0.20-0.32	98.4	95-105
CCV 160-382722/1	08/14/18 17:27	82233-334_00001	0.2640	0.20-0.32	99.9	95-105

Detector: AV70

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371876/1	05/15/18 15:45	82236-334_00001	0.2440	0.20-0.32		
ICV 160-372007/1	05/23/18 12:55	82232-334_00001	0.2478	0.20-0.32	101.6	95-105
CCV 160-382724/1	08/14/18 17:27	82236-334_00001	0.2444	0.20-0.32	100.2	95-105

Detector: AV71

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371877/1	05/15/18 15:46	82237-334_00003	0.2300	0.20-0.32		
ICV 160-372008/1	05/23/18 12:56	82244-334_00001	0.2266	0.20-0.32	98.5	95-105
CCV 160-382725/1	08/14/18 17:28	82237-334_00003	0.2294	0.20-0.32	99.8	95-105

Detector: AV72

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371878/1	05/15/18 15:46	82240-334_00001	0.2458	0.20-0.32		
ICV 160-372009/1	05/23/18 12:56	82246-334_00001	0.2463	0.20-0.32	100.2	95-105
CCV 160-382726/1	08/14/18 17:28	82240-334_00001	0.2450	0.20-0.32	99.7	95-105

Detector: AV73

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371879/1	05/15/18 15:46	82241-334_00001	0.2317	0.20-0.32		
ICV 160-372010/1	05/23/18 12:57	82237-334_00003	0.2272	0.20-0.32	98.1	95-105
CCV 160-382727/1	08/14/18 17:29	82241-334_00001	0.2299	0.20-0.32	99.2	95-105

Detector: AV74

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371880/1	05/15/18 15:47	82243-334_00001	0.2568	0.20-0.32		
ICV 160-372011/1	05/23/18 13:04	82233-334_00001	0.2688	0.20-0.32	104.7	95-105
CCV 160-382728/1	08/14/18 17:29	82243-334_00001	0.2586	0.20-0.32	100.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV75

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371881/1	05/15/18 15:47	82244-334_00001	0.2276	0.20-0.32		
ICV 160-372012/1	05/23/18 13:01	82241-334_00001	0.2275	0.20-0.32	100.0	95-105
CCV 160-382729/1	08/14/18 17:30	82244-334_00001	0.2235	0.20-0.32	98.2	95-105

Detector: AV77

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371883/1	05/15/18 15:54		0.2742	0.20-0.32		
ICV 160-371971/1	05/21/18 12:19	108002_00001	0.2785	0.20-0.32	101.6	95-105
CCV 160-382730/1	08/14/18 17:31	108001_00001	0.2730	0.20-0.32	99.6	95-105

Detector: AV78

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371884/1	05/15/18 15:49	108002_00001	0.2777	0.20-0.32		
ICV 160-371972/1	05/21/18 12:19	108001_00001	0.2740	0.20-0.32	98.7	95-105
CCV 160-382731/1	08/14/18 18:50	108002_00001	0.2752	0.20-0.32	99.1	95-105

Detector: AV79

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371885/1	05/15/18 15:49	108345_00001	0.2716	0.20-0.32		
ICV 160-371973/1	05/21/18 12:19	108346_00001	0.2719	0.20-0.32	100.1	95-105
CCV 160-382732/1	08/14/18 18:51	108345_00001	0.2724	0.20-0.32	100.3	95-105

Detector: AV80

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371886/1	05/15/18 15:50	108346_00001	0.2632	0.20-0.32		
ICV 160-371974/1	05/21/18 12:20	108345_00001	0.2644	0.20-0.32	100.4	95-105
CCV 160-382734/1	08/14/18 18:51	108346_00001	0.2631	0.20-0.32	100.0	95-105

Detector: AV81

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371887/1	05/15/18 15:50	108347_00001	0.2725	0.20-0.32		
ICV 160-371975/1	05/21/18 12:20	108348_00001	0.2658	0.20-0.32	97.5	95-105
CCV 160-382735/1	08/14/18 18:53	108347_00001	0.2723	0.20-0.32	99.9	95-105

Detector: AV82

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371888/1	05/15/18 15:50	108348_00001	0.2651	0.20-0.32		
ICV 160-371976/2	05/21/18 14:23	108347_00001	0.2681	0.20-0.32	101.2	95-105
CCV 160-382736/1	08/14/18 18:53	108348_00001	0.2600	0.20-0.32	98.1	95-105

Detector: AV83

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371889/1	05/16/18 13:31	82232-334_00001	0.2489	0.20-0.32		
ICV 160-372014/1	05/23/18 15:19	82236-334_00001	0.2439	0.20-0.32	98.0	95-105
CCV 160-382737/1	08/14/18 18:54	82232-334_00001	0.2486	0.20-0.32	99.9	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV85

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371891/1	05/16/18 13:32	82236-334_00001	0.2422	0.20-0.32		
ICV 160-372016/1	05/23/18 15:20	82232-334_00001	0.2492	0.20-0.32	102.9	95-105
CCV 160-382739/1	08/14/18 18:56	82236-334_00001	0.2479	0.20-0.32	102.4	95-105

Detector: AV86

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371892/1	05/16/18 13:32	82237-334_00003	0.2268	0.20-0.32		
ICV 160-372017/1	05/23/18 15:20	82244-334_00001	0.2229	0.20-0.32	98.3	95-105
CCV 160-382740/1	08/14/18 18:55	82237-334_00003	0.2280	0.20-0.32	100.5	95-105

Detector: AV88

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371893/1	05/16/18 13:33	82241-334_00001	0.2281	0.20-0.32		
ICV 160-372018/1	05/23/18 15:20	82237-334_00003	0.2308	0.20-0.32	101.2	95-105
CCV 160-382741/1	08/14/18 18:57	82241-334_00001	0.2273	0.20-0.32	99.6	95-105

Detector: AV91

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-371896/1	05/16/18 13:16	82246-334_00001	0.2375	0.20-0.32		
ICV 160-372021/1	05/23/18 15:21	82240-334_00001	0.2369	0.20-0.32	99.7	95-105
CCV 160-382744/1	08/14/18 18:59	82246-334_00001	0.2383	0.20-0.32	100.3	95-105

Detector: AV148

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337251/1	11/13/17 10:03	82233-334_00001	0.2637	0.20-0.32		
ICV 160-337583/1	11/15/17 11:50	82243-334_00001	0.2573	0.20-0.32	97.6	95-105
CCV 160-384933/1	08/22/18 11:19	82233-334_00001	0.2599	0.20-0.32	98.6	95-105

Detector: AV151

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337254/1	11/13/17 09:46	82236-334_00001	0.2491	0.20-0.32		
ICV 160-337586/1	11/15/17 11:45	82232-334_00001	0.2464	0.20-0.32	98.9	95-105
CCV 160-385000/1	08/23/18 02:40	82236-334_00001	0.2430	0.20-0.32	97.5	95-105

Detector: AV152

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337255/1	11/13/17 09:47	82237-334_00003	0.2319	0.20-0.32		
ICV 160-337587/1	11/15/17 11:51	82241-334_00001	0.2345	0.20-0.32	101.1	95-105
CCV 160-384936/1	08/22/18 11:19	82237-334_00003	0.2286	0.20-0.32	98.6	95-105

Detector: AV153

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337256/1	11/13/17 09:48	82238-334_00001	0.2317	0.20-0.32		
ICV 160-337588/1	11/15/17 11:52	82244-334_00001	0.2338	0.20-0.32	100.9	95-105
CCV 160-385001/1	08/23/18 02:40	82238-334_00001	0.2225	0.20-0.32	96.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV154

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337257/1	11/13/17 09:48	82240-334_00001	0.2371	0.20-0.32		
ICV 160-337589/1	11/15/17 11:52	82246-334_00001	0.2363	0.20-0.32	99.7	95-105
CCV 160-384938/1	08/22/18 11:20	82240-334_00001	0.2330	0.20-0.32	98.3	95-105

Detector: AV156

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337259/1	11/13/17 10:04	82242-334_00001	0.2152	0.20-0.32		
ICV 160-337591/1	11/15/17 11:46	82235-334_00001	0.2115	0.20-0.32	98.3	95-105
CCV 160-384939/1	08/22/18 11:20	82242-334_00001	0.2085	0.20-0.32	96.9	95-105

Detector: AV158

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337338/1	11/15/17 08:35	82244-334_00001	0.2295	0.20-0.32		
ICV 160-337593/1	11/15/17 11:47	82238-334_00001	0.2243	0.20-0.32	97.7	95-105
CCV 160-384941/1	08/22/18 11:21	82244-334_00001	0.2217	0.20-0.32	96.6	95-105

Detector: AV159

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337261/1	11/13/17 10:06	82245-334_00001	0.2149	0.20-0.32		
ICV 160-337594/1	11/15/17 11:49	82247-334_00001	0.2157	0.20-0.32	100.4	95-105
CCV 160-384942/1	08/22/18 11:21	82245-334_00001	0.2056	0.20-0.32	95.7	95-105

Detector: AV160

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337262/1	11/13/17 09:52	82246-334_00001	0.2398	0.20-0.32		
ICV 160-337595/1	11/15/17 11:48	82240-334_00001	0.2355	0.20-0.32	98.2	95-105
CCV 160-384943/1	08/22/18 11:21	82246-334_00001	0.2299	0.20-0.32	95.9	95-105

Detector: AV161

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337263/1	11/13/17 09:53	82247-334_00001	0.2186	0.20-0.32		
ICV 160-337596/1	11/15/17 11:49	82245-334_00001	0.2149	0.20-0.32	98.3	95-105
CCV 160-384944/1	08/22/18 11:22	82247-334_00001	0.2093	0.20-0.32	95.8	95-105

Detector: AV164

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337267/1	11/13/17 12:45	82234-334_00001	0.2108	0.20-0.32		
ICV 160-337599/1	11/15/17 13:10	82242-334_00001	0.2152	0.20-0.32	102.1	95-105
CCV 160-385002/1	08/23/18 02:40	82234-334_00001	0.2047	0.20-0.32	97.1	95-105

Detector: AV165

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337268/1	11/13/17 12:45	82235-334_00001	0.2177	0.20-0.32		
ICV 160-337600/1	11/15/17 13:11	82234-334_00001	0.2166	0.20-0.32	99.5	95-105
CCV 160-384947/1	08/22/18 12:40	82235-334_00001	0.2120	0.20-0.32	97.4	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV166

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337269/1	11/13/17 12:45	82236-334_00001	0.2428	0.20-0.32		
ICV 160-337601/1	11/15/17 13:11	82232-334_00001	0.2475	0.20-0.32	101.9	95-105
CCV 160-384948/1	08/22/18 12:41	82236-334_00001	0.2429	0.20-0.32	100.0	95-105

Detector: AV167

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337270/1	11/13/17 12:46	82237-334_00003	0.2292	0.20-0.32		
ICV 160-337602/1	11/15/17 13:09	82241-334_00001	0.2362	0.20-0.32	103.0	95-105
CCV 160-385003/1	08/23/18 02:41	82237-334_00003	0.2276	0.20-0.32	99.3	95-105

Detector: AV171

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337274/1	11/13/17 12:47	82242-334_00001	0.2164	0.20-0.32		
ICV 160-337606/1	11/15/17 13:12	82235-334_00001	0.2119	0.20-0.32	97.9	95-105
CCV 160-384950/1	08/22/18 12:41	82242-334_00001	0.2076	0.20-0.32	95.9	95-105

Detector: AV172

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337275/1	11/13/17 12:47	82243-334_00001	0.2532	0.20-0.32		
ICV 160-337607/1	11/15/17 13:12	82233-334_00001	0.2630	0.20-0.32	103.9	95-105
CCV 160-384951/1	08/22/18 12:41	82243-334_00001	0.2511	0.20-0.32	99.2	95-105

Detector: AV173

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337276/1	11/13/17 12:55	82244-334_00001	0.2308	0.20-0.32		
ICV 160-337608/1	11/15/17 13:13	82238-334_00001	0.2247	0.20-0.32	97.4	95-105
CCV 160-384952/1	08/22/18 12:41	82244-334_00001	0.2250	0.20-0.32	97.5	95-105

Detector: AV174

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337351/1	11/13/17 12:56	82245-334_00001	0.2194	0.20-0.32		
ICV 160-337609/1	11/15/17 13:08	82247-334_00001	0.2191	0.20-0.32	99.9	95-105
CCV 160-384953/1	08/22/18 12:42	82245-334_00001	0.2113	0.20-0.32	96.3	95-105

Detector: AV187

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337281/1	11/13/17 15:34	82234-334_00001	0.2107	0.20-0.32		
ICV 160-337614/1	11/15/17 14:30	82242-334_00001	0.2154	0.20-0.32	102.3	95-105
CCV 160-384955/1	08/22/18 14:19	82234-334_00001	0.2050	0.20-0.32	97.3	95-105

Detector: AV188

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337282/1	11/13/17 15:46	82235-334_00001	0.2162	0.20-0.32		
ICV 160-337615/1	11/15/17 14:27	82234-334_00001	0.2158	0.20-0.32	99.8	95-105
CCV 160-384956/1	08/22/18 14:20	82235-334_00001	0.2077	0.20-0.32	96.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV189

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337283/1	11/13/17 15:34	82236-334_00001	0.2449	0.20-0.32		
ICV 160-337616/1	11/15/17 14:27	82232-334_00001	0.2498	0.20-0.32	102.0	95-105
CCV 160-384957/1	08/22/18 14:20	82236-334_00001	0.2478	0.20-0.32	101.2	95-105

Detector: AV190

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337284/1	11/13/17 15:35	82237-334_00003	0.2330	0.20-0.32		
ICV 160-337617/1	11/15/17 14:30	82241-334_00001	0.2394	0.20-0.32	102.7	95-105
CCV 160-384958/1	08/22/18 14:20	82237-334_00003	0.2300	0.20-0.32	98.7	95-105

Detector: AV191

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337285/1	11/13/17 15:35	82238-334_00001	0.2290	0.20-0.32		
ICV 160-337618/1	11/15/17 14:31	82244-334_00001	0.2380	0.20-0.32	103.9	95-105
CCV 160-384959/1	08/22/18 14:21	82238-334_00001	0.2202	0.20-0.32	96.2	95-105

Detector: AV192

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337286/1	11/13/17 15:35	82240-334_00001	0.2409	0.20-0.32		
ICV 160-337619/1	11/15/17 14:31	82246-334_00001	0.2377	0.20-0.32	98.7	95-105
CCV 160-384960/1	08/22/18 14:27	82240-334_00001	0.2320	0.20-0.32	96.3	95-105

Detector: AV206

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337300/1	11/14/17 09:00	82238-334_00001	0.2342	0.20-0.32		
ICV 160-337632/1	11/15/17 15:53	82244-334_00001	0.2374	0.20-0.32	101.4	95-105
CCV 160-384967/1	08/22/18 16:35	82238-334_00001	0.2258	0.20-0.32	96.4	95-105

Detector: AV208

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337302/1	11/14/17 08:59	82241-334_00001	0.2428	0.20-0.32		
ICV 160-337634/1	11/15/17 15:50	82237-334_00003	0.2379	0.20-0.32	98.0	95-105
CCV 160-385006/1	08/23/18 00:55	82241-334_00001	0.2385	0.20-0.32	98.2	95-105

Detector: AV211

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337305/1	11/14/17 09:06	82244-334_00001	0.2281	0.20-0.32		
ICV 160-337642/1	11/16/17 11:19	82238-334_00001	0.2239	0.20-0.32	98.2	95-105
CCV 160-384970/1	08/22/18 16:37	82244-334_00001	0.2194	0.20-0.32	96.2	95-105

Detector: AV212

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337306/1	11/14/17 08:58	82245-334_00001	0.2241	0.20-0.32		
ICV 160-337638/1	11/15/17 15:52	82247-334_00001	0.2256	0.20-0.32	100.7	95-105
CCV 160-384971/1	08/22/18 16:38	82245-334_00001	0.2219	0.20-0.32	99.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV213

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337307/1	11/14/17 08:58	82246-334_00001	0.2404	0.20-0.32		
ICV 160-337639/1	11/15/17 15:52	82240-334_00001	0.2411	0.20-0.32	100.3	95-105
CCV 160-384972/1	08/22/18 16:38	82246-334_00001	0.2371	0.20-0.32	98.6	95-105

Detector: AV215

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337309/1	11/14/17 12:26	82232-334_00001	0.2545	0.20-0.32		
ICV 160-337643/1	11/16/17 08:34	82236-334_00001	0.2486	0.20-0.32	97.7	95-105
CCV 160-384973/1	08/22/18 21:23	82232-334_00001	0.2489	0.20-0.32	97.8	95-105

Detector: AV216

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337310/1	11/14/17 12:25	82233-334_00001	0.2689	0.20-0.32		
ICV 160-337644/1	11/16/17 08:34	82243-334_00001	0.2577	0.20-0.32	95.8	95-105
CCV 160-384974/1	08/22/18 21:24	82233-334_00001	0.2651	0.20-0.32	98.6	95-105

Detector: AV217

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337311/1	11/14/17 12:25	82234-334_00001	0.2121	0.20-0.32		
ICV 160-337645/1	11/16/17 08:33	82242-334_00001	0.2138	0.20-0.32	100.8	95-105
CCV 160-384975/1	08/22/18 21:24	82234-334_00001	0.2039	0.20-0.32	96.1	95-105

Detector: AV218

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337312/1	11/14/17 12:33	82235-334_00001	0.2131	0.20-0.32		
ICV 160-337646/1	11/16/17 08:34	82234-334_00001	0.2112	0.20-0.32	99.1	95-105
CCV 160-384976/1	08/22/18 21:24	82235-334_00001	0.2069	0.20-0.32	97.1	95-105

Detector: AV219

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337313/1	11/14/17 12:24	82236-334_00001	0.2432	0.20-0.32		
ICV 160-337647/1	11/16/17 08:34	82232-334_00001	0.2479	0.20-0.32	101.9	95-105
CCV 160-384977/1	08/22/18 21:24	82236-334_00001	0.2428	0.20-0.32	99.8	95-105

Detector: AV220

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337314/1	11/14/17 12:33	82237-334_00003	0.2350	0.20-0.32		
ICV 160-337648/1	11/16/17 08:33	82241-334_00001	0.2329	0.20-0.32	99.1	95-105
CCV 160-384978/1	08/22/18 21:24	82237-334_00003	0.2279	0.20-0.32	97.0	95-105

Detector: AV222

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337316/1	11/14/17 12:34	82240-334_00001	0.2387	0.20-0.32		
ICV 160-337650/1	11/16/17 08:32	82246-334_00001	0.2388	0.20-0.32	100.1	95-105
CCV 160-385008/1	08/23/18 00:55	82240-334_00001	0.2331	0.20-0.32	97.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV225

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-337319/1	11/14/17 12:22	82243-334_00001	0.2563	0.20-0.32		
ICV 160-337653/1	11/16/17 08:36	82233-334_00001	0.2614	0.20-0.32	102.0	95-105
CCV 160-384980/1	08/22/18 21:25	82243-334_00001	0.2524	0.20-0.32	98.5	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:58:09PM 5/19/2018

Calibration

Sample Name: ICV-8877;AV1-05182018
Description:
Detector: AV1

Calibration Date: 5/19/2018 3:58:05PM
Analyst: 60040

Source Info

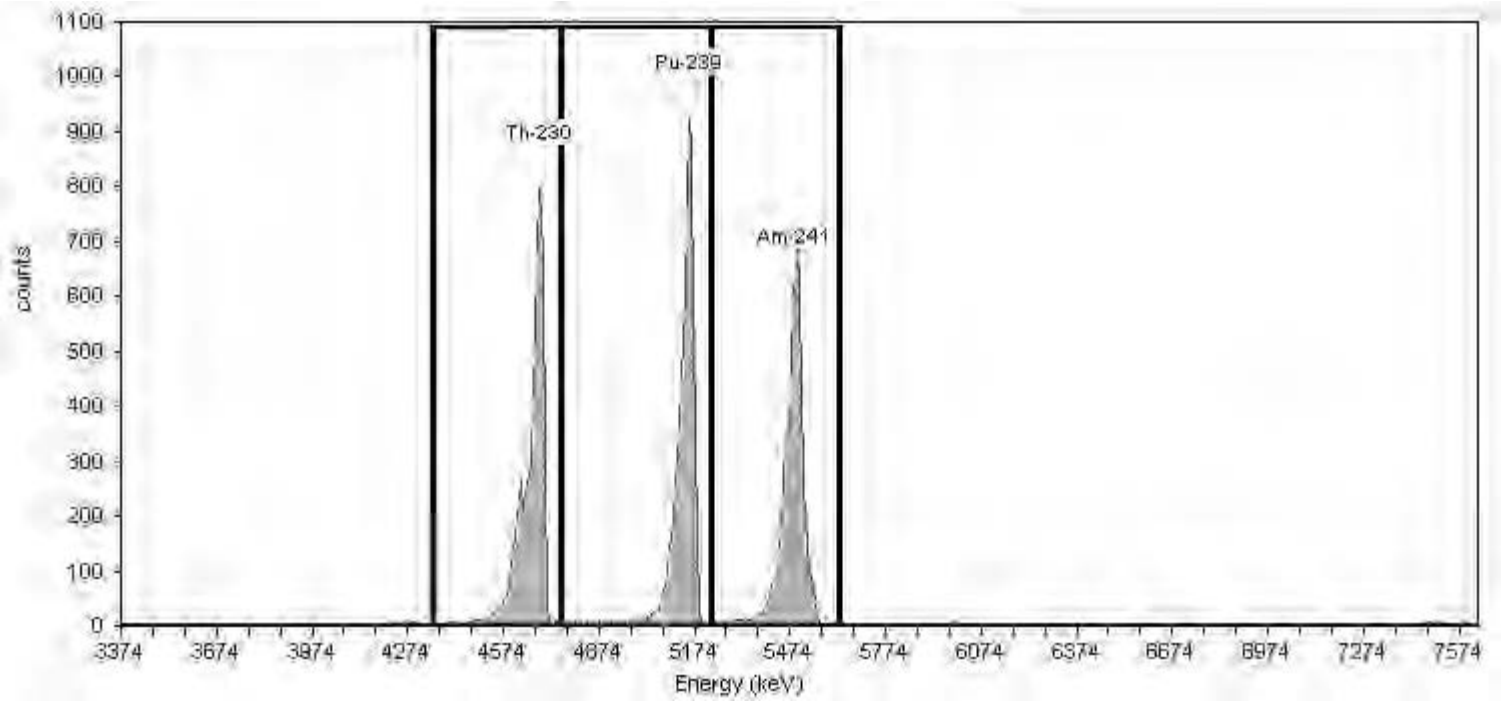
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/18/2018 7:25:01PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 23.26% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,697.00	94.95
Pu-239	240	5.16	186	249	0.00	6,038.00	100.63
Am-241	284	5.49	249	303	0.00	5,570.00	92.83

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:58:37PM 5/19/2018

Calibration

Sample Name: ICV-7107;AV3-05182018
Description:
Detector: AV3

Calibration Date: 5/19/2018 3:58:34PM
Analyst: 60040

Source Info

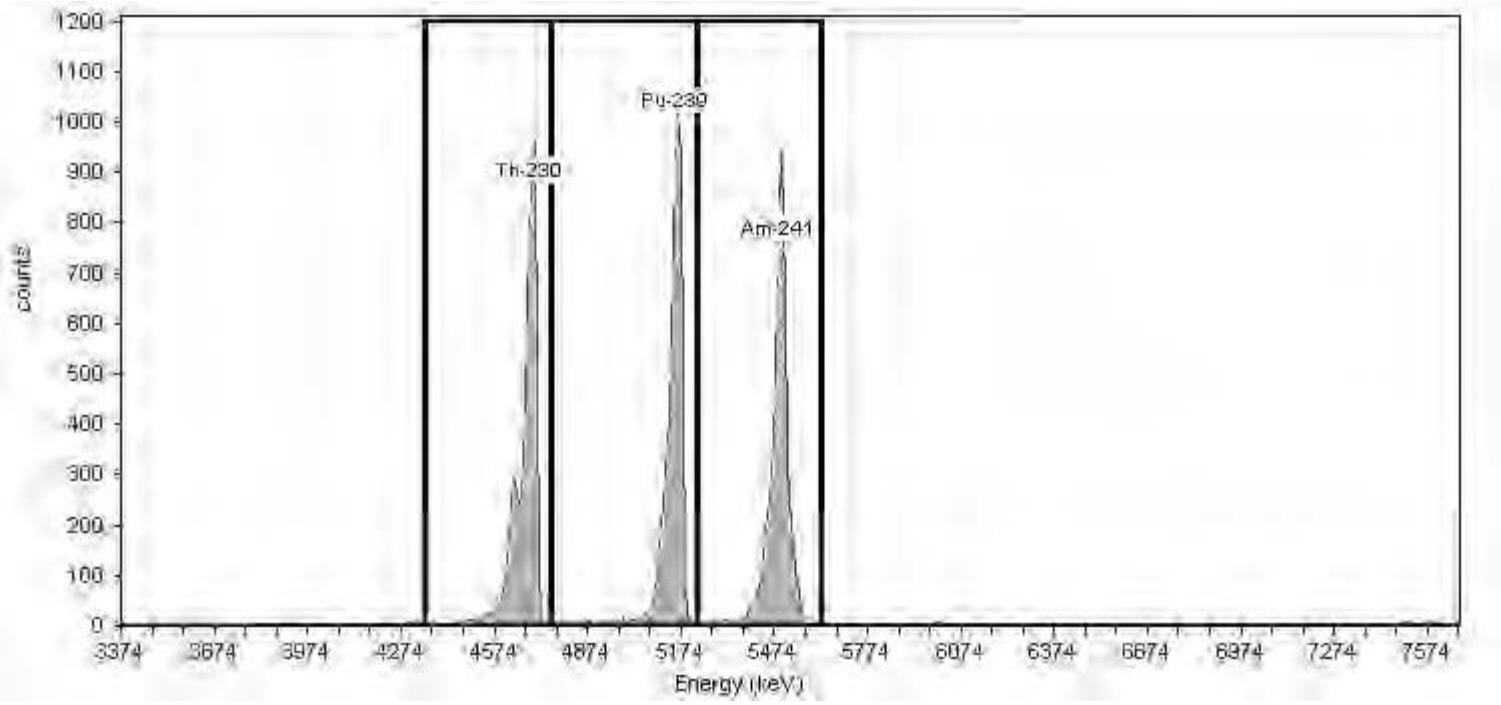
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/18/2018 7:25:51PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 24.77% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,662.00	111.03
Pu-239	240	5.16	186	249	0.00	6,545.00	109.08
Am-241	284	5.49	249	303	0.00	6,389.00	106.48

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:58:48PM 5/19/2018

Calibration

Sample Name: ICV-9817;AV4-05182018
Description:
Detector: AV4

Calibration Date: 5/19/2018 3:58:45PM
Analyst: 60040

Source Info

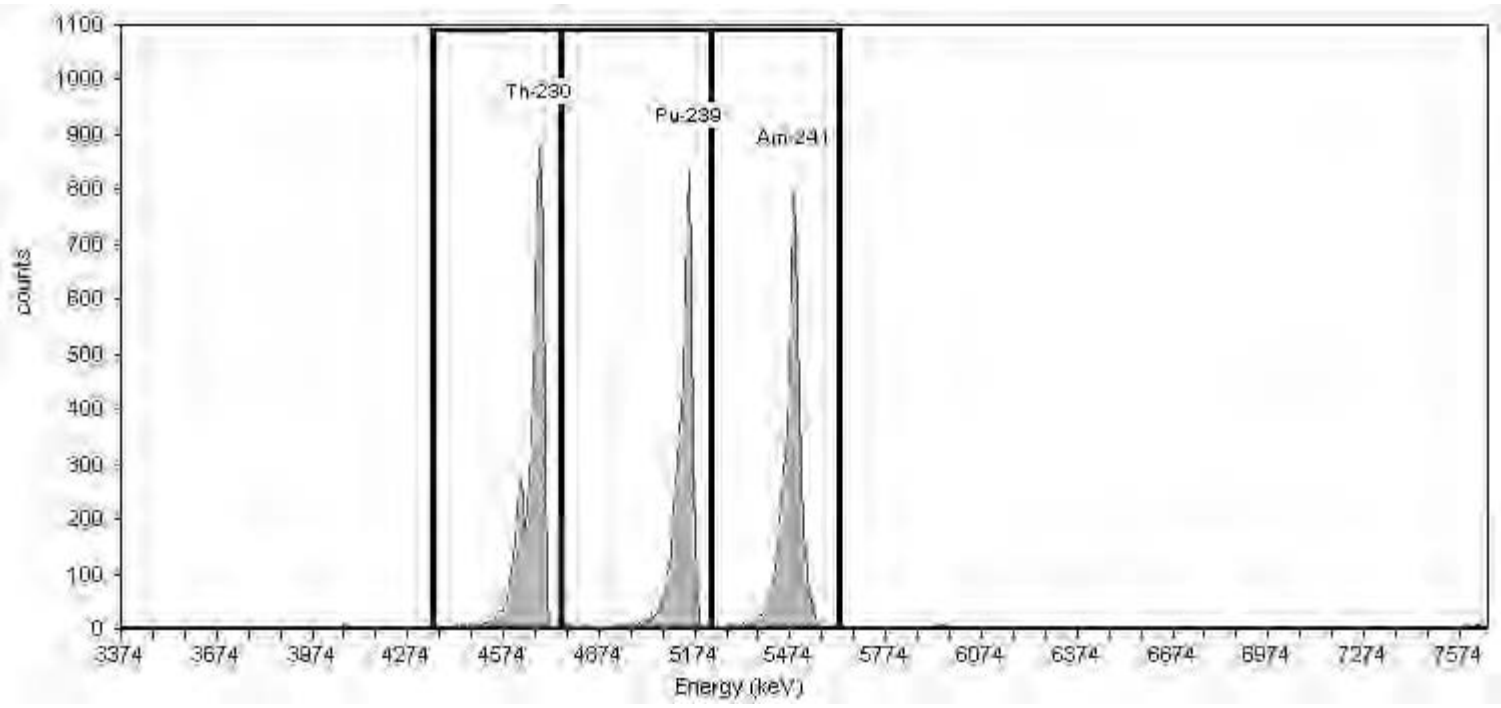
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/18/2018 7:26:15PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.37% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,064.00	101.07
Pu-239	240	5.16	186	249	0.00	5,321.00	88.68
Am-241	284	5.49	249	303	0.00	5,439.00	90.65

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:59:12PM 5/19/2018

Calibration

Sample Name: ICV-9520;AV7-05182018
Description:
Detector: AV7

Calibration Date: 5/19/2018 3:59:09PM
Analyst: 60040

Source Info

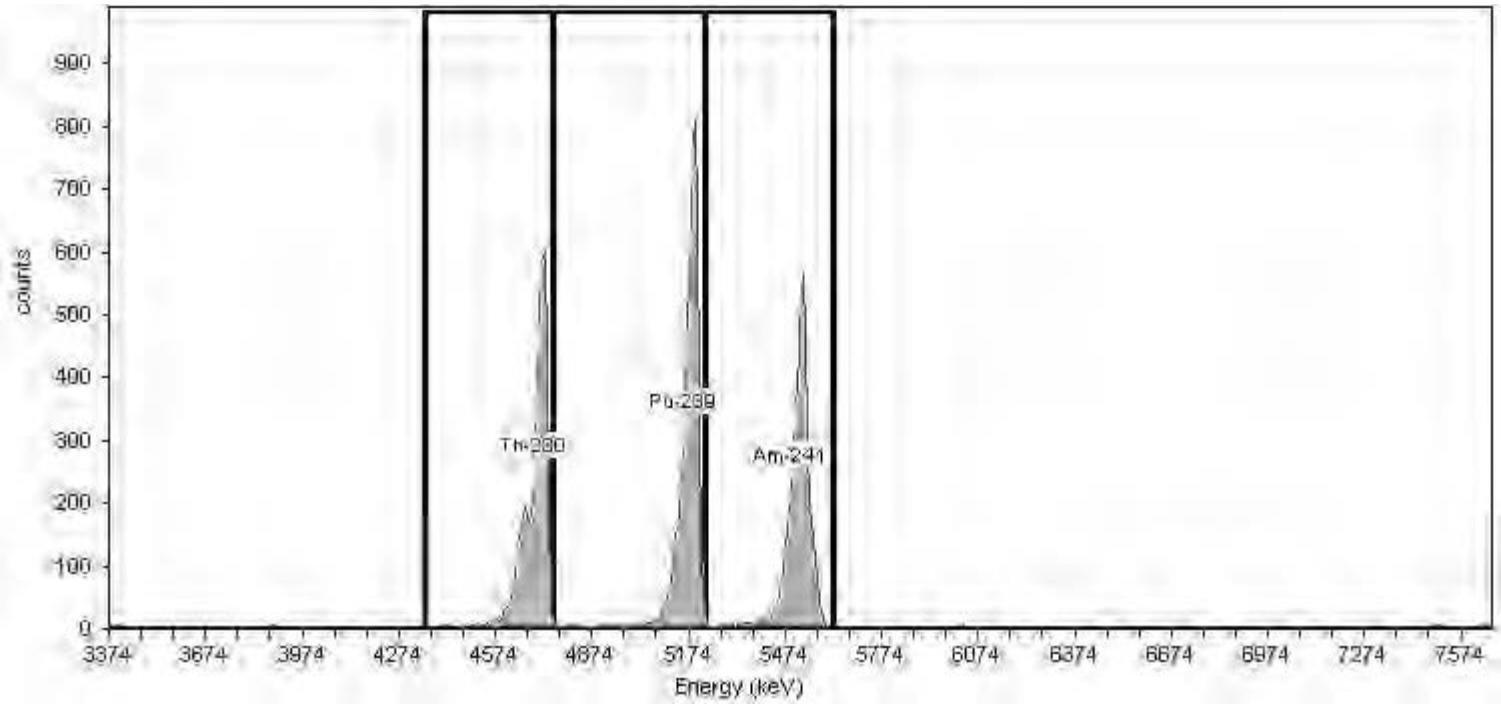
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/18/2018 7:26:58PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.53% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,559.00	75.98
Pu-239	240	5.16	186	249	0.00	5,466.00	91.10
Am-241	284	5.49	249	303	0.00	4,443.00	74.05

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:59:31PM 5/19/2018

Calibration

Sample Name: ICV-8874;AV8-05182018
Description:
Detector: AV8

Calibration Date: 5/19/2018 3:59:26PM
Analyst: 60040

Source Info

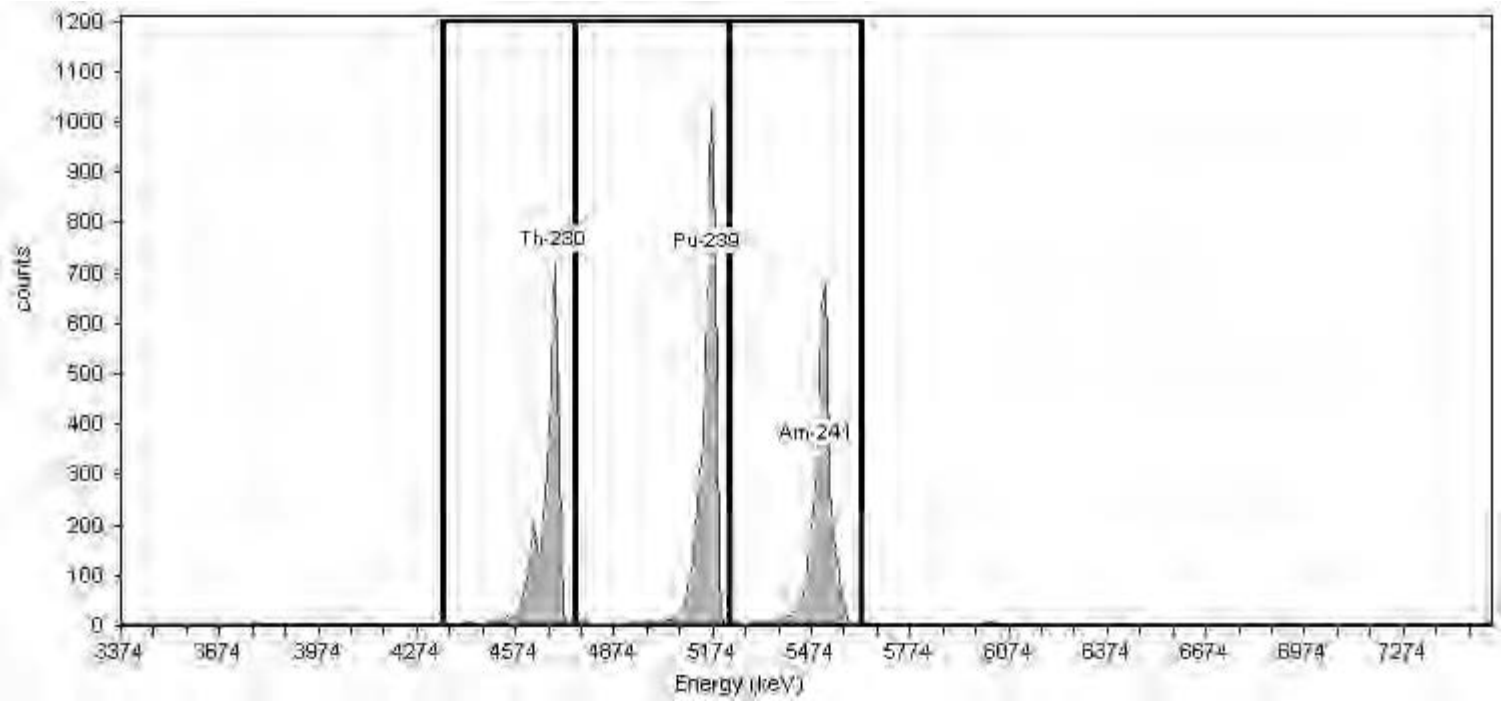
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/18/2018 7:27:27PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.61% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,638.00	77.30
Pu-239	240	5.16	186	249	0.00	5,945.00	99.08
Am-241	284	5.49	249	303	0.00	4,809.00	80.15

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:30:44AM 5/21/2018

Calibration

Sample Name: ICV-9793;AV24-05202018
Description:
Detector: AV24

Calibration Date: 5/21/2018 10:30:40AM
Analyst: 60040

Source Info

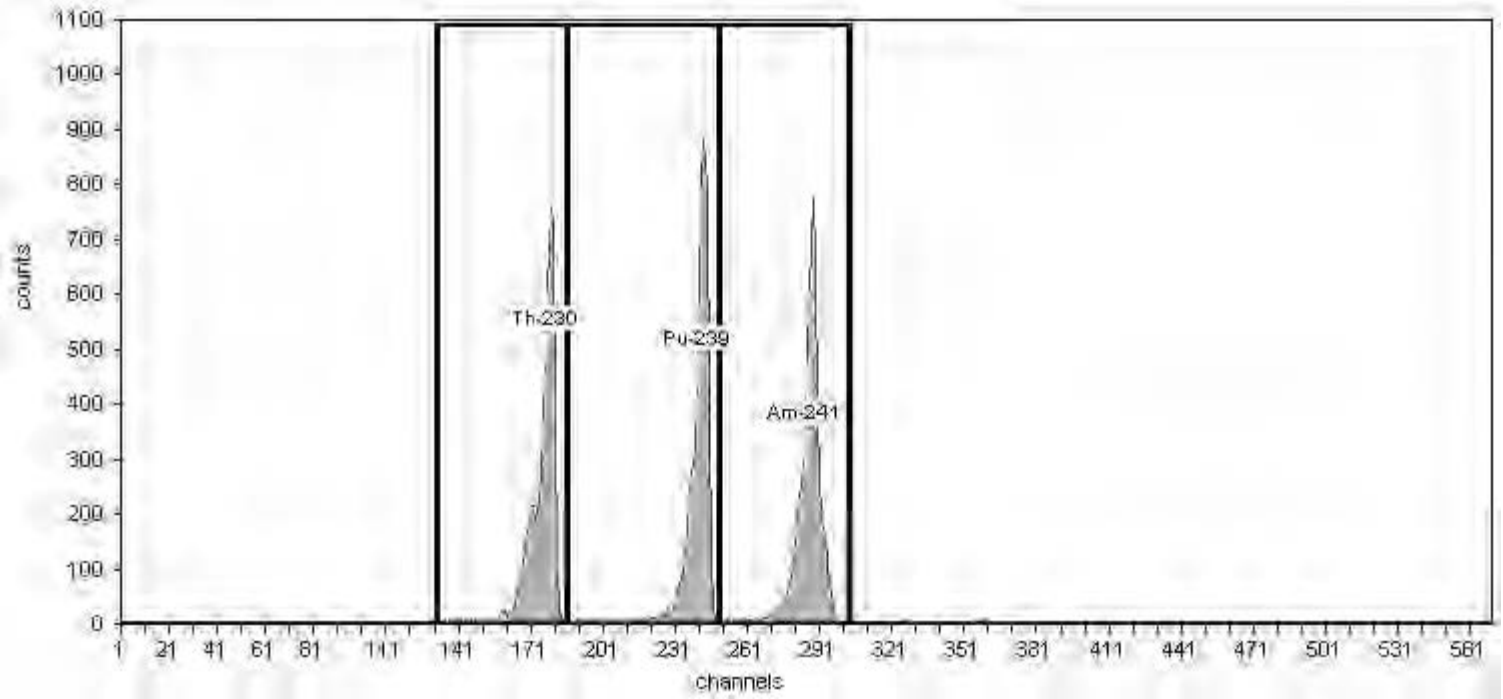
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/20/2018 4:12:51PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.77% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,356.00	89.27
Pu-239	240	5.16	186	249	0.00	5,558.00	92.63
Am-241	284	5.49	249	303	0.00	5,475.00	91.25

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:31:12AM 5/21/2018

Calibration

Sample Name: ICV-1368447;AV44-05202018
Description:
Detector: AV44

Calibration Date: 5/21/2018 10:31:08AM
Analyst: 60040

Source Info

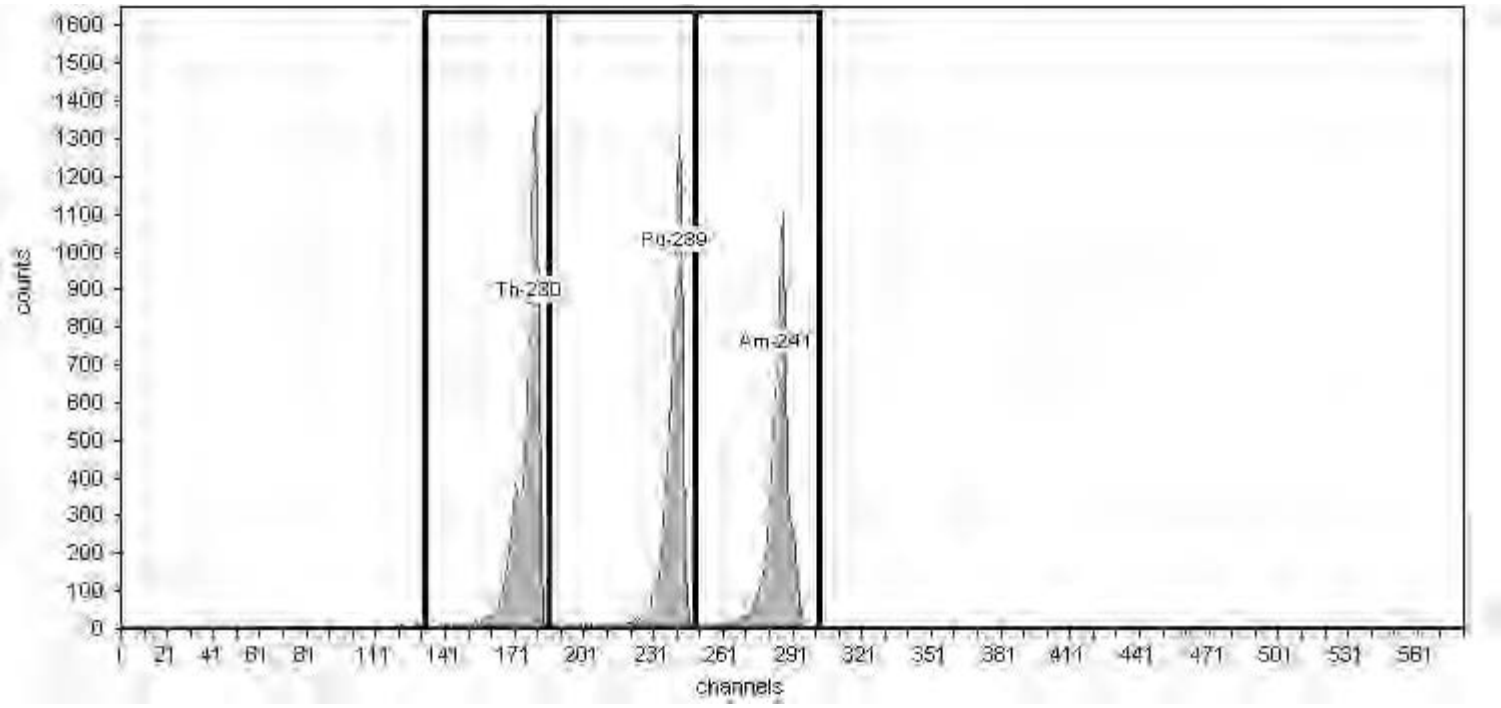
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/20/2018 4:13:34PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.81% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	9,438.00	157.30
Pu-239	240	5.16	186	249	0.00	8,527.00	142.12
Am-241	284	5.49	249	303	0.00	8,024.00	133.73

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:31:30AM 5/21/2018

Calibration

Sample Name: ICV-1368446;AV45-05202018
Description:
Detector: AV45

Calibration Date: 5/21/2018 10:31:27AM
Analyst: 60040

Source Info

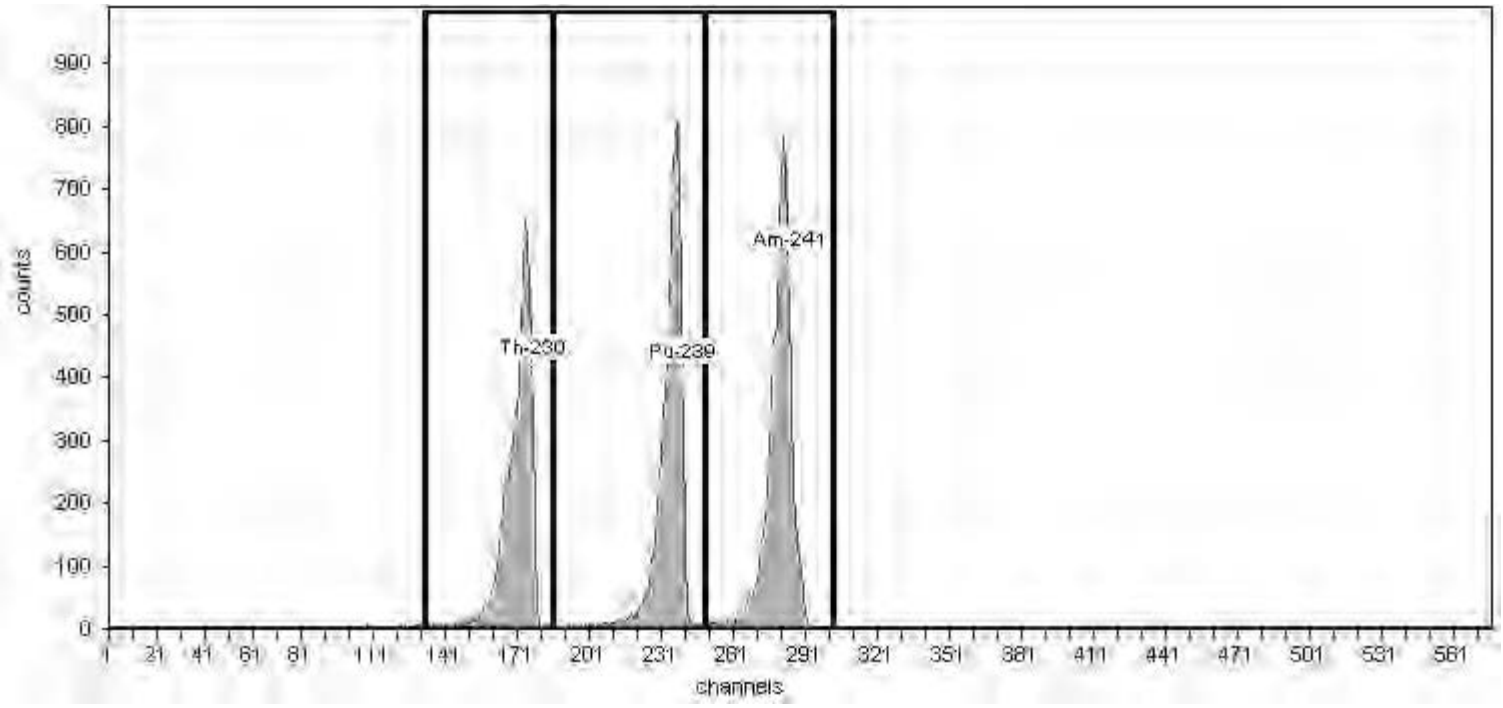
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/20/2018 4:13:59PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.53% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,035.00	100.58
Pu-239	240	5.16	186	249	0.00	6,623.00	110.38
Am-241	284	5.49	249	303	0.00	7,111.00	118.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:31:54AM 5/21/2018

Calibration

Sample Name: ICV-1370621;AV47-05202018
Description:
Detector: AV47

Calibration Date: 5/21/2018 10:31:51AM
Analyst: 60040

Source Info

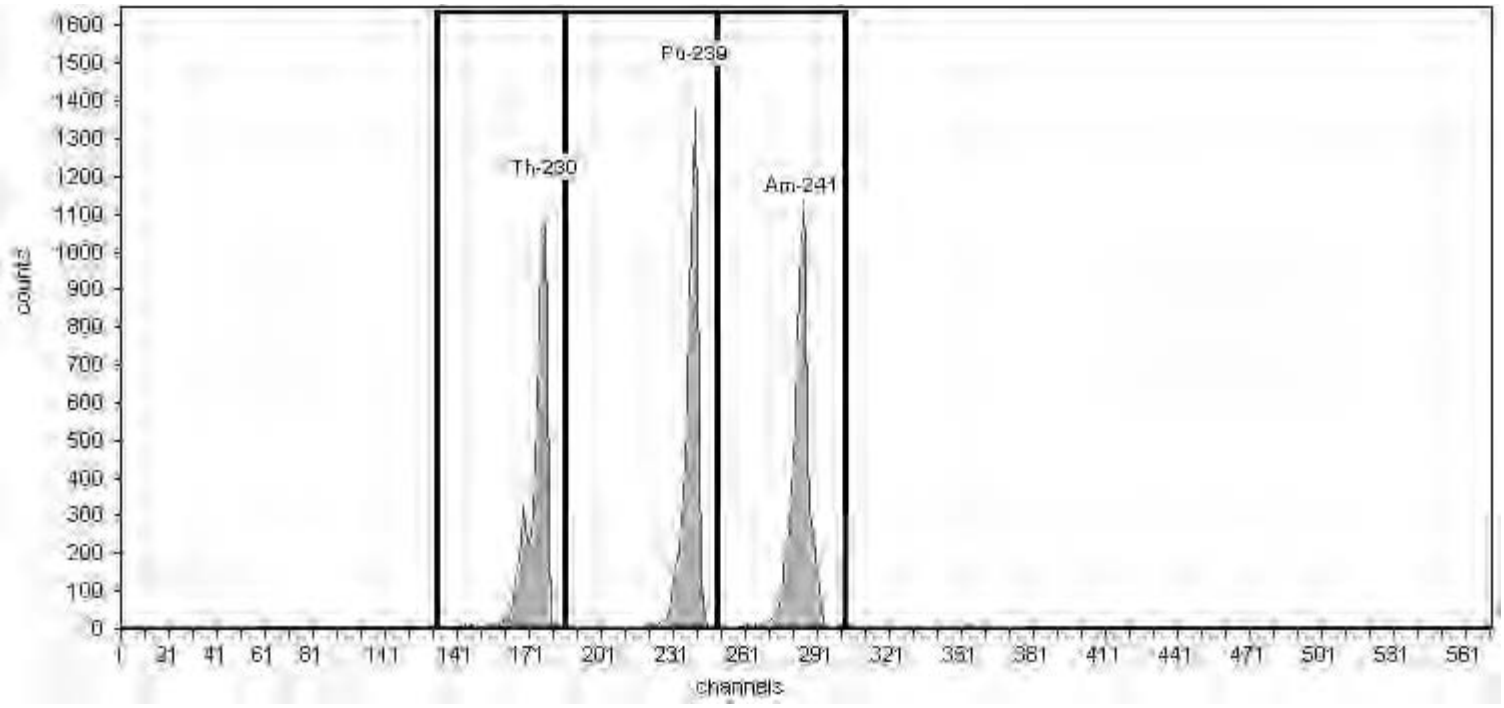
Certificate ID: 108345_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV47 , SN: 46-032336
Acquisition Start Date: 5/20/2018 4:15:04PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.86% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,975.00	116.25
Pu-239	240	5.16	186	249	0.00	7,481.00	124.68
Am-241	284	5.49	249	303	0.00	7,719.00	128.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:32:19AM 5/21/2018

Calibration

Sample Name: ICV-1370620;AV48-05202018
Description:
Detector: AV48

Calibration Date: 5/21/2018 10:32:15AM
Analyst: 60040

Source Info

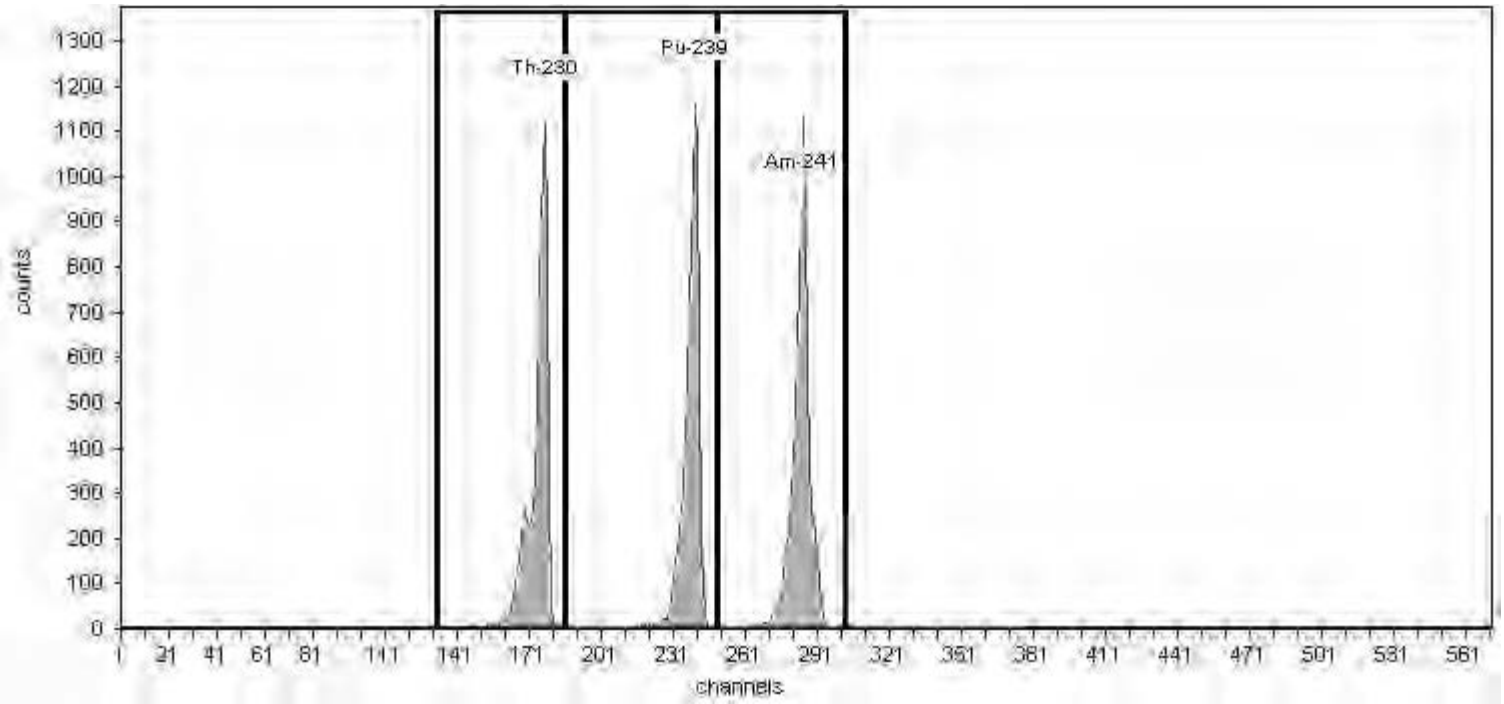
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 46-033P6
Acquisition Start Date: 5/20/2018 4:15:27PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.68% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,607.00	110.12
Pu-239	240	5.16	186	249	0.00	6,842.00	114.03
Am-241	284	5.49	249	303	0.00	7,223.00	120.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:45:51PM 5/23/2018

Calibration

Sample Name: ICV-9885;AV54-05232018
Description:
Detector: AV54

Calibration Date: 5/23/2018 12:37:06PM
Analyst: 60040

Source Info

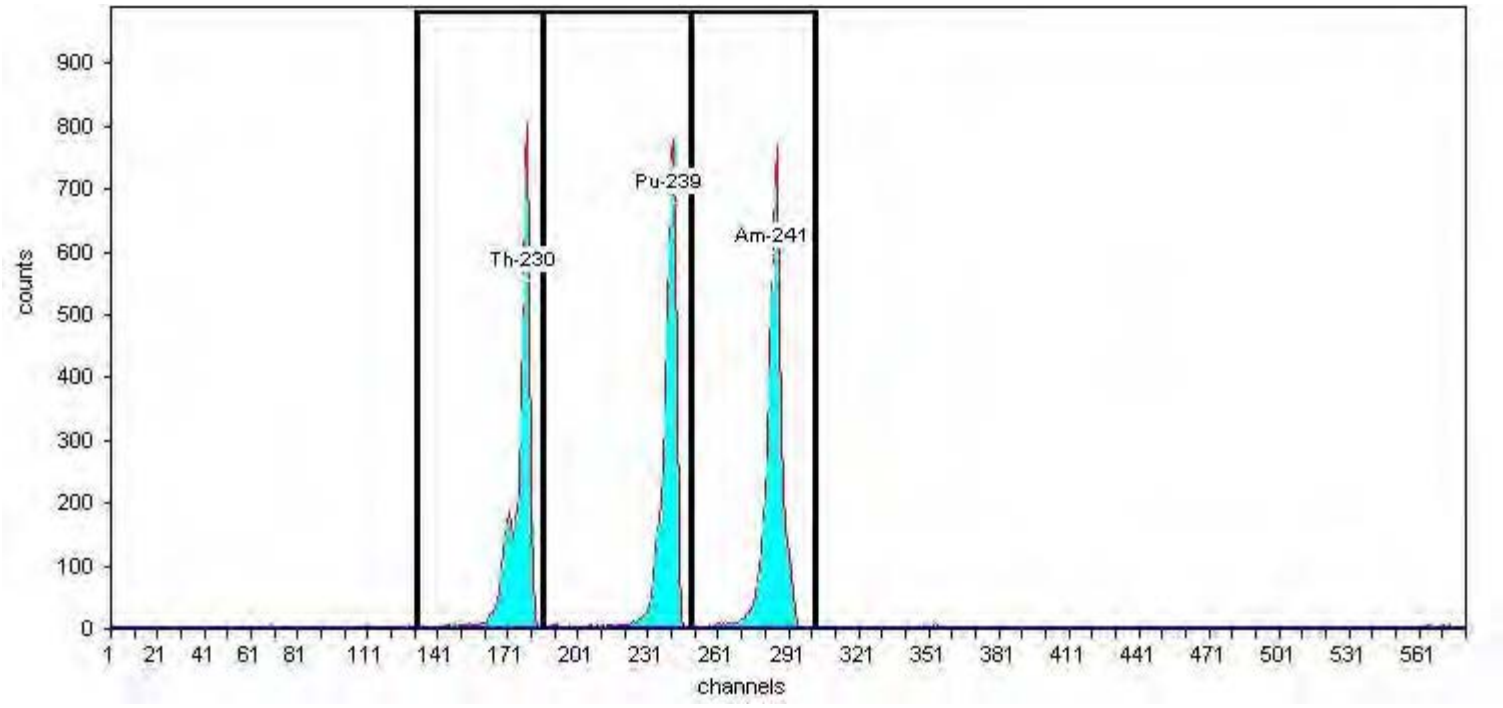
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 46-033P4
Acquisition Start Date: 5/23/2018 11:27:55AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 23.48% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,671.00	77.85
Pu-239	240	5.16	186	249	0.00	4,552.00	75.87
Am-241	284	5.49	249	303	0.00	5,021.00	83.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:46:13PM 5/23/2018

Calibration

Sample Name: ICV-9520;AV55-05232018
Description:
Detector: AV55

Calibration Date: 5/23/2018 12:37:34PM
Analyst: 60040

Source Info

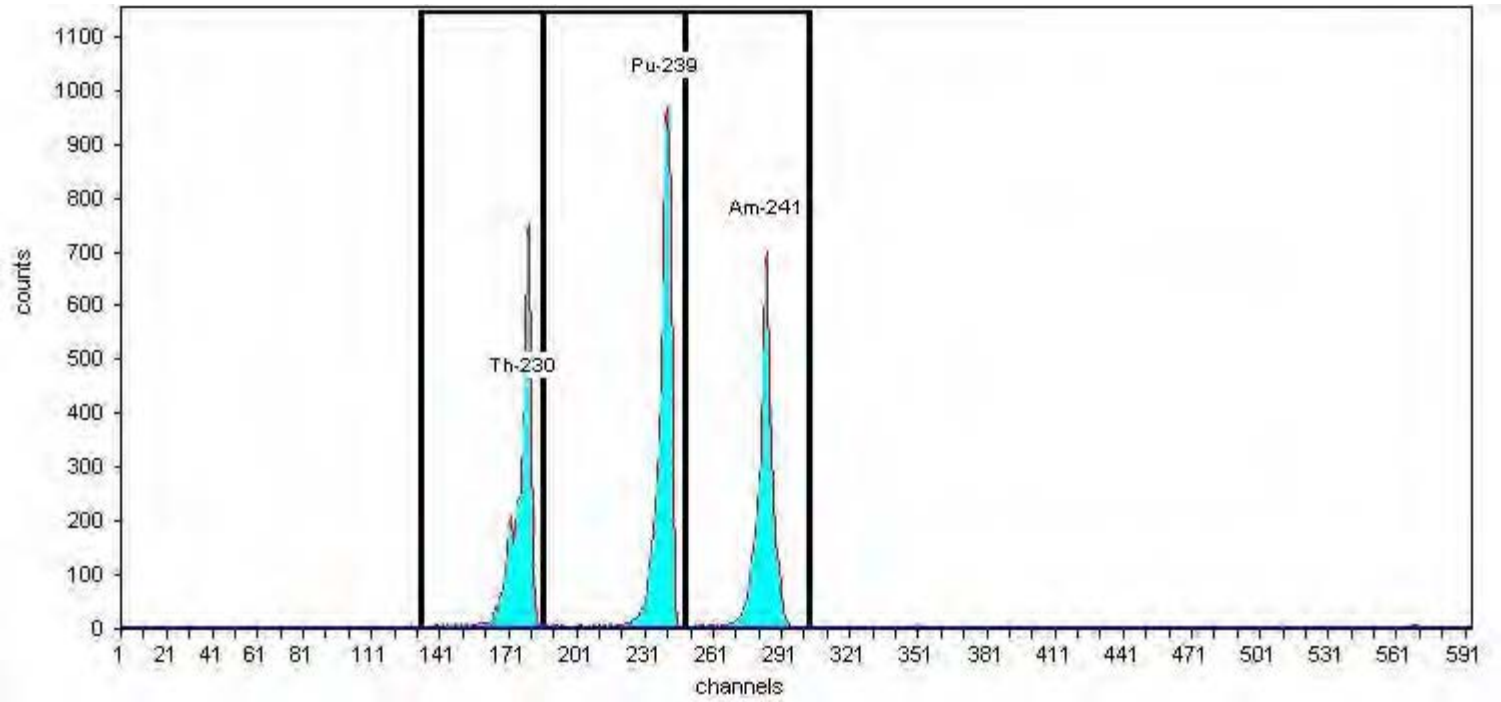
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/23/2018 11:28:32AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 23.02% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,655.00	77.58
Pu-239	240	5.16	186	249	0.00	5,603.00	93.38
Am-241	284	5.49	249	303	0.00	4,525.00	75.42

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:47:34PM 5/23/2018

Calibration

Sample Name: ICV-8874;AV56-05232018
Description:
Detector: AV56

Calibration Date: 5/23/2018 12:37:46PM
Analyst: 60040

Source Info

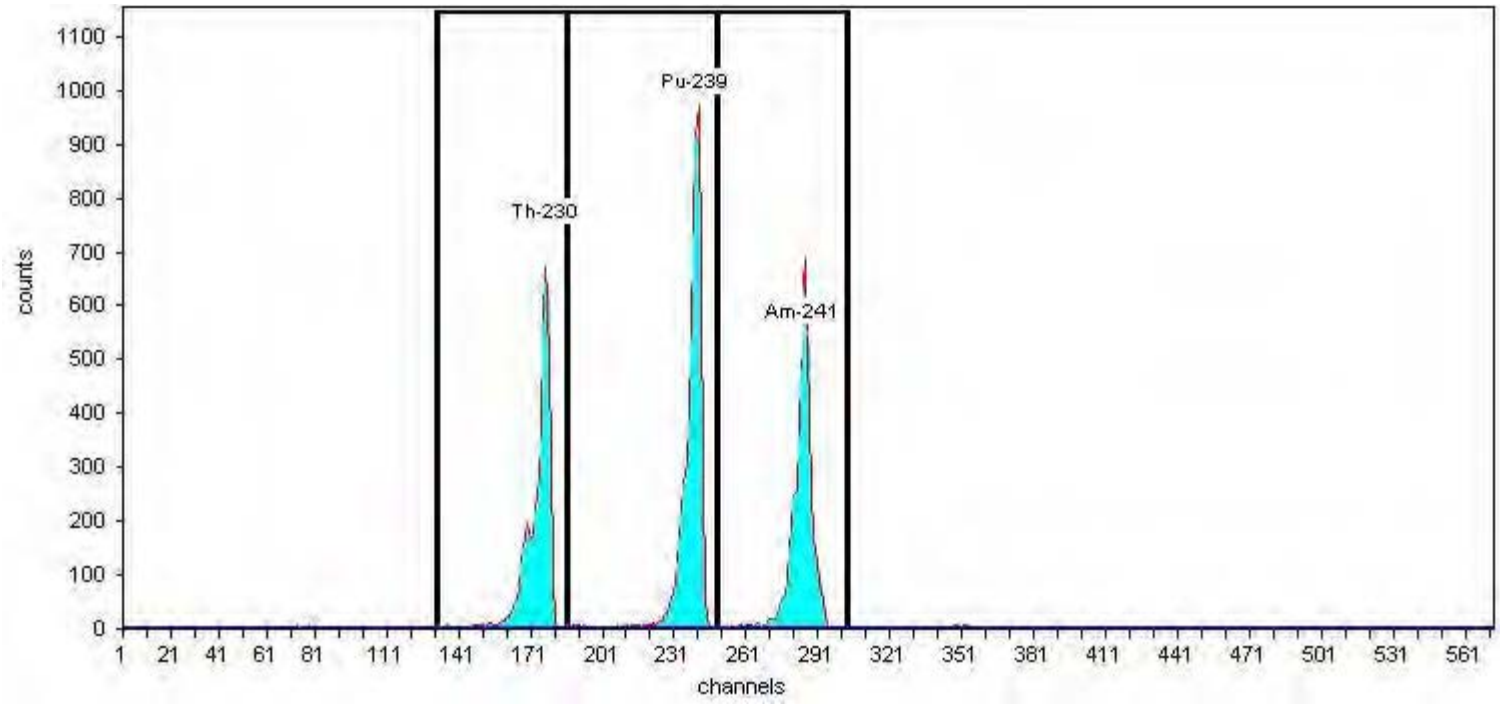
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/23/2018 11:28:59AM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.10% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,451.00	74.18
Pu-239	240	5.16	186	249	0.00	5,941.00	99.02
Am-241	284	5.49	249	303	0.00	4,711.00	78.52

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:48:09PM 5/23/2018

Calibration

Sample Name: ICV-9792;AV58-05232018
Description:
Detector: AV58

Calibration Date: 5/23/2018 12:38:17PM
Analyst: 60040

Source Info

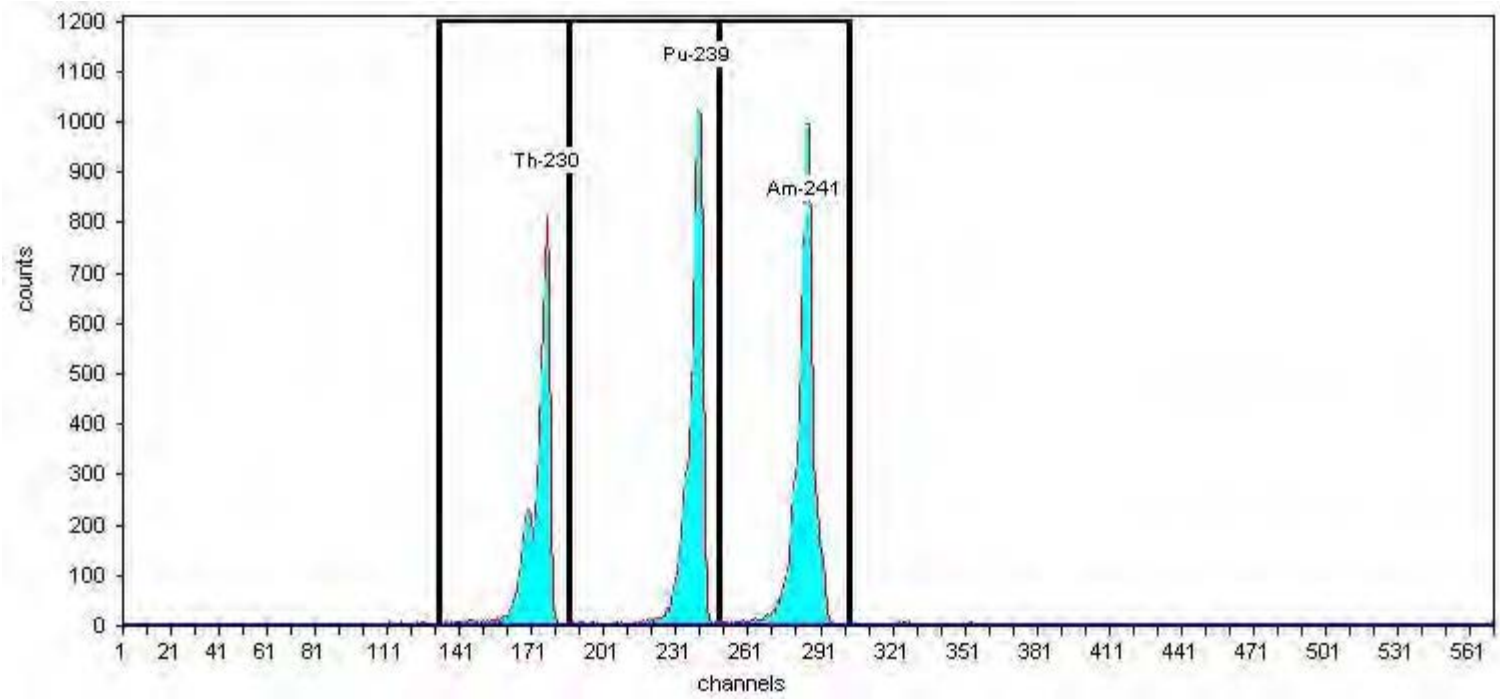
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/23/2018 11:29:48AM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 24.10% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,316.00	88.60
Pu-239	240	5.16	186	249	0.00	6,366.00	106.10
Am-241	284	5.49	249	303	0.00	7,114.00	118.57

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:16:02PM 5/21/2018

Calibration

Sample Name: ICV-1368446;AV62-05212018
Description:
Detector: AV62

Calibration Date: 5/21/2018 12:15:56PM
Analyst: 60040

Source Info

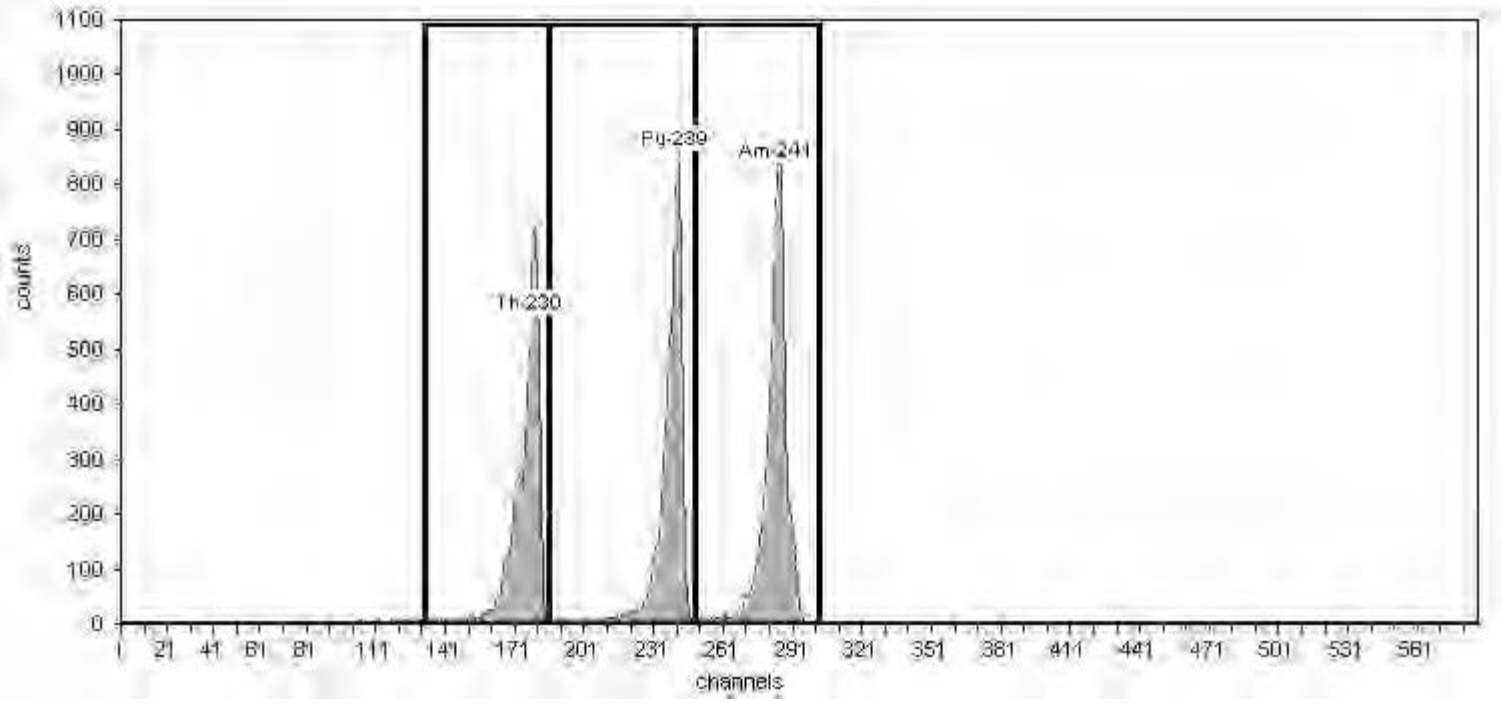
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/21/2018 10:36:30AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 28.08% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,095.00	101.58
Pu-239	240	5.16	186	249	0.00	6,782.00	113.03
Am-241	284	5.49	249	303	0.00	7,286.00	121.43

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:16:33PM 5/21/2018

Calibration

Sample Name: ICV-1370621;AV64-05212018
Description:
Detector: AV64

Calibration Date: 5/21/2018 12:16:30PM
Analyst: 60040

Source Info

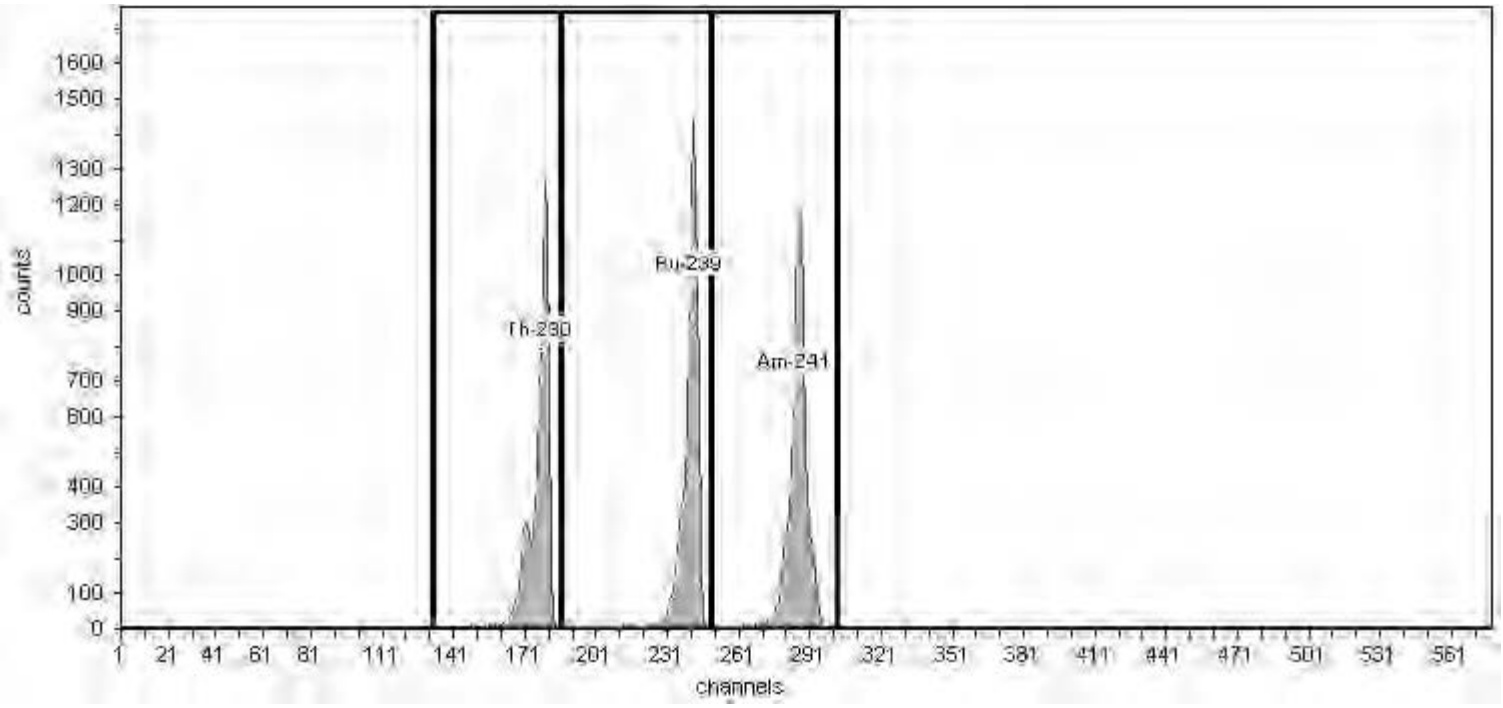
Certificate ID: 108345_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV64 , SN: 43-028v3
Acquisition Start Date: 5/21/2018 10:37:21AM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 28.42% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,547.00	125.78
Pu-239	240	5.16	186	249	0.00	7,867.00	131.12
Am-241	284	5.49	249	303	0.00	8,042.00	134.03

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:16:46PM 5/21/2018

Calibration

Sample Name: ICV-1370620;AV65-05212018
Description:
Detector: AV65

Calibration Date: 5/21/2018 12:16:42PM
Analyst: 60040

Source Info

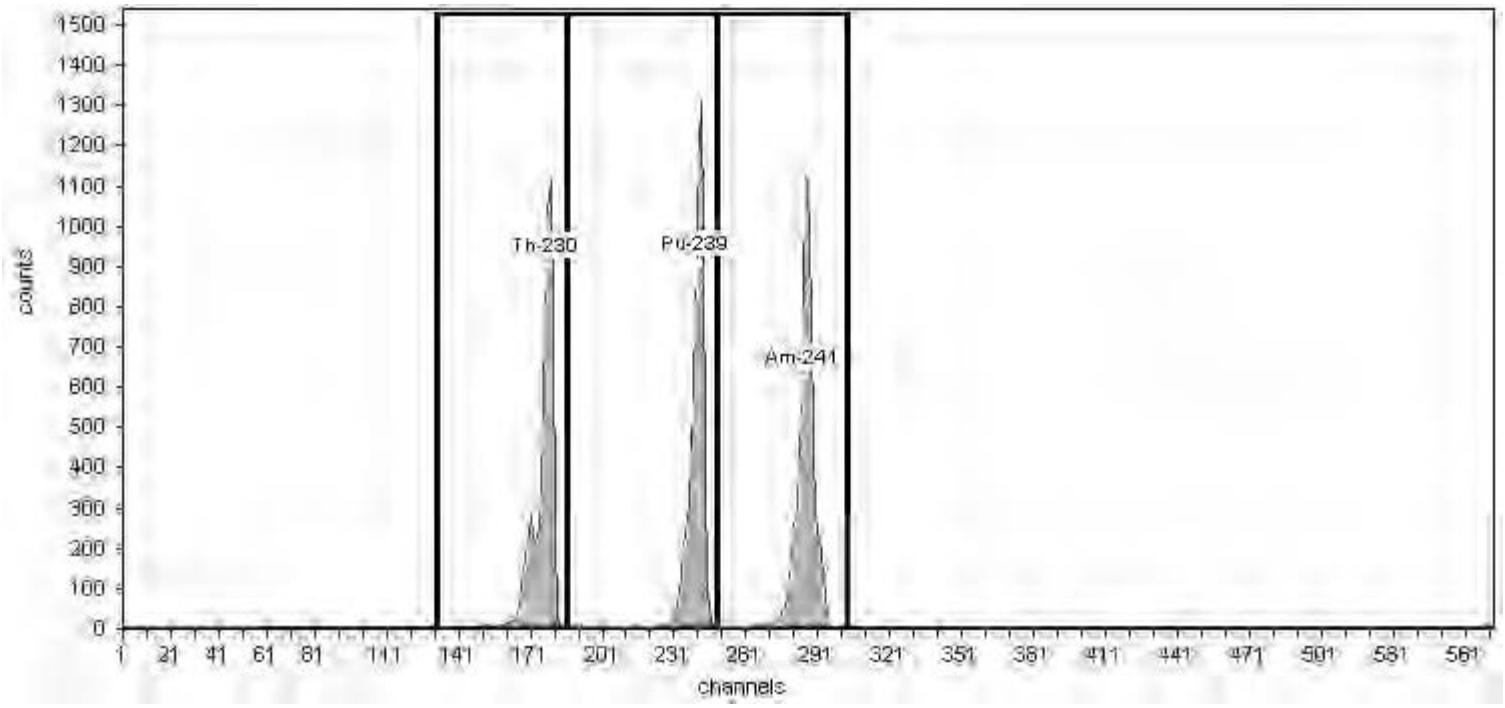
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/21/2018 10:37:49AM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.98% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,654.00	110.90
Pu-239	240	5.16	186	249	0.00	6,957.00	115.95
Am-241	284	5.49	249	303	0.00	7,298.00	121.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:17:02PM 5/21/2018

Calibration

Sample Name: ICV-1370619;AV66-05212018
Description:
Detector: AV66

Calibration Date: 5/21/2018 12:16:58PM
Analyst: 60040

Source Info

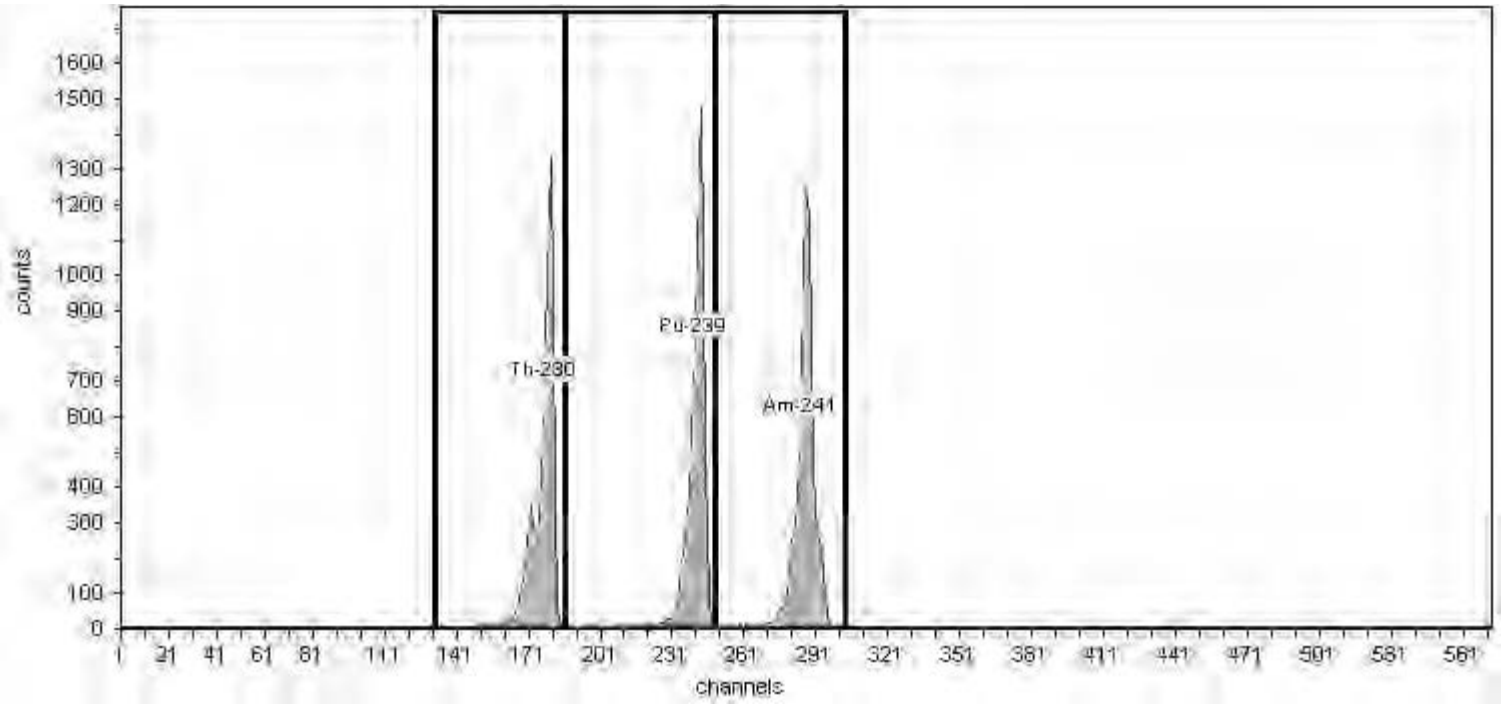
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/21/2018 10:38:03AM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.33% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,887.00	131.45
Pu-239	240	5.16	186	249	0.00	8,137.00	135.62
Am-241	284	5.49	249	303	0.00	8,372.00	139.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:05:48PM 5/23/2018

Calibration

Sample Name: ICV-9795;AV69-05232018
Description:
Detector: AV69

Calibration Date: 5/23/2018 3:05:43PM
Analyst: 60040

Source Info

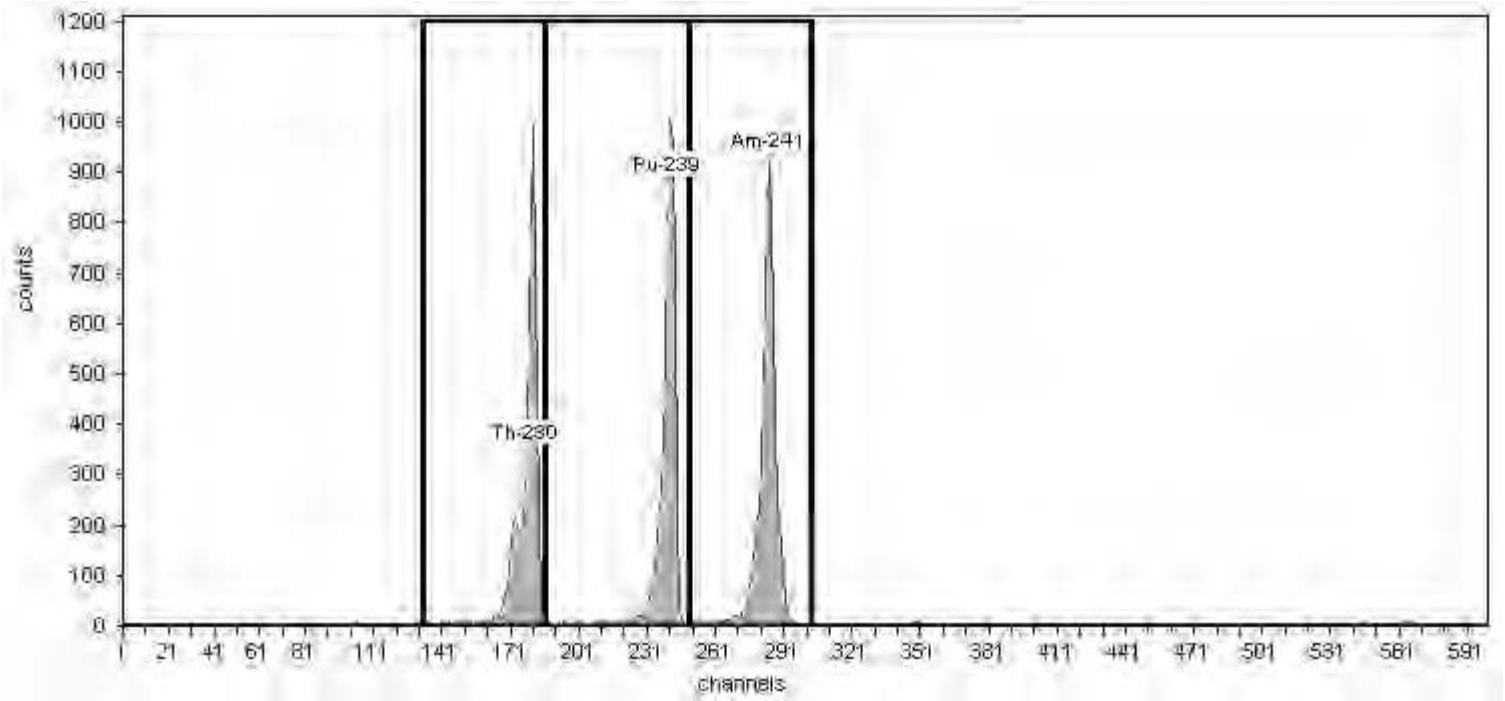
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/23/2018 12:55:19PM
Live Time: 60.00 min.
Real Time: 60.50 min.
Efficiency: 26.01% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,454.00	90.90
Pu-239	240	5.16	186	249	0.00	5,614.00	93.57
Am-241	284	5.49	249	303	0.00	5,923.00	98.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:06:12PM 5/23/2018

Calibration

Sample Name: ICV-7107;AV70-05232018
Description:
Detector: AV70

Calibration Date: 5/23/2018 3:06:09PM
Analyst: 60040

Source Info

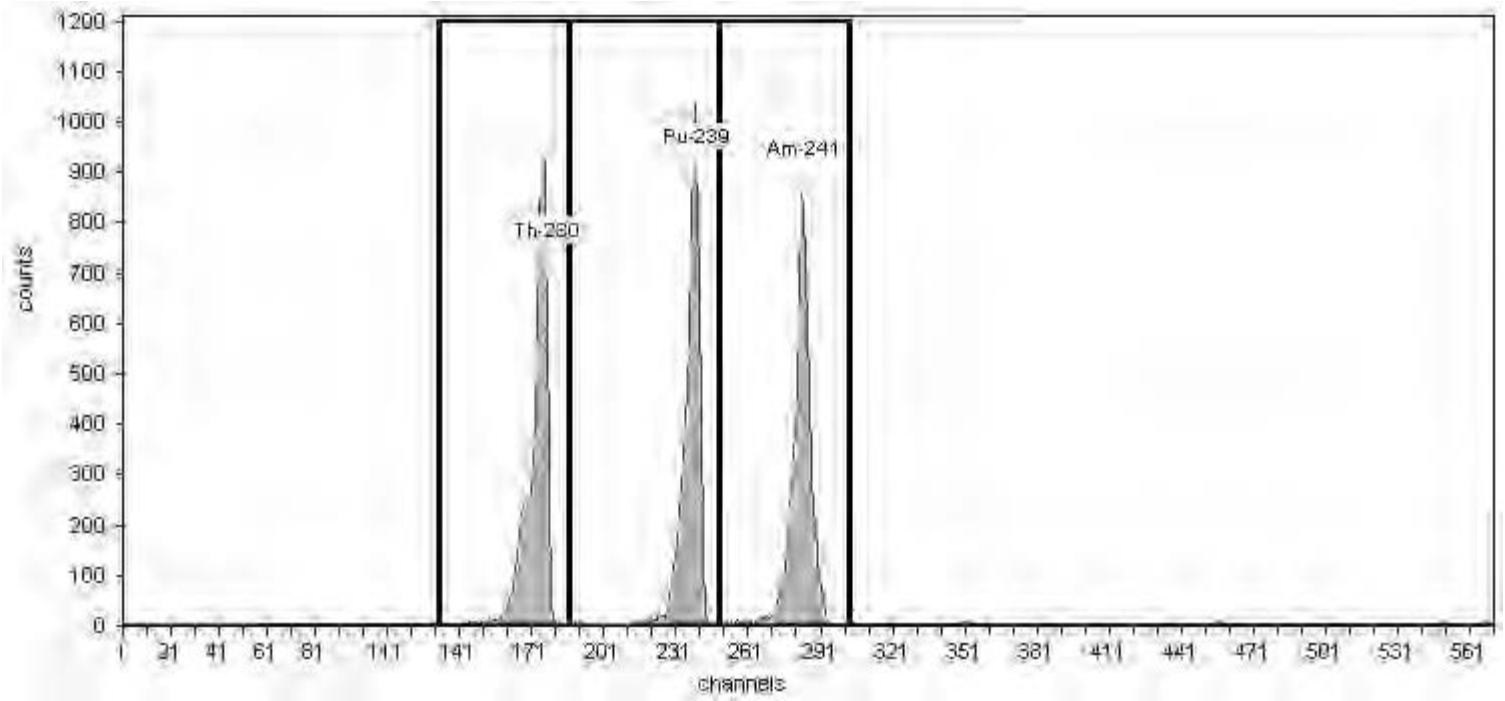
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/23/2018 12:55:36PM
Live Time: 60.00 min.
Real Time: 60.52 min.
Efficiency: 24.78% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,661.00	111.02
Pu-239	240	5.16	186	249	0.00	6,531.00	108.85
Am-241	284	5.49	249	303	0.00	6,413.00	106.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:06:36PM 5/23/2018

Calibration

Sample Name: ICV-9817;AV71-05232018
Description:
Detector: AV71

Calibration Date: 5/23/2018 3:06:33PM
Analyst: 60040

Source Info

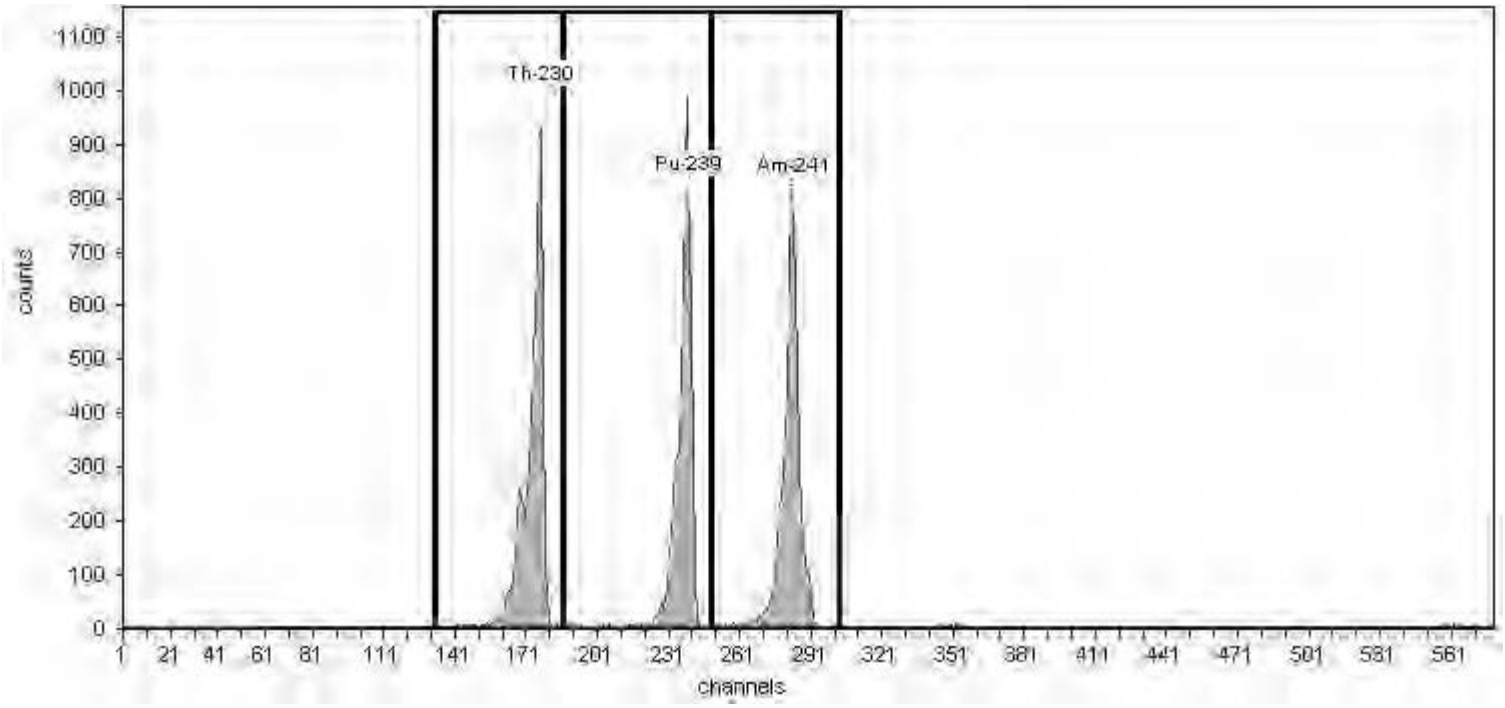
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 5/23/2018 12:56:03PM
Live Time: 60.00 min.
Real Time: 60.52 min.
Efficiency: 22.66% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,922.00	98.70
Pu-239	240	5.16	186	249	0.00	5,556.00	92.60
Am-241	284	5.49	249	303	0.00	5,565.00	92.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:07:33PM 5/23/2018

Calibration

Sample Name: ICV-9885;AV72-05232018
Description:
Detector: AV72

Calibration Date: 5/23/2018 3:07:28PM
Analyst: 60040

Source Info

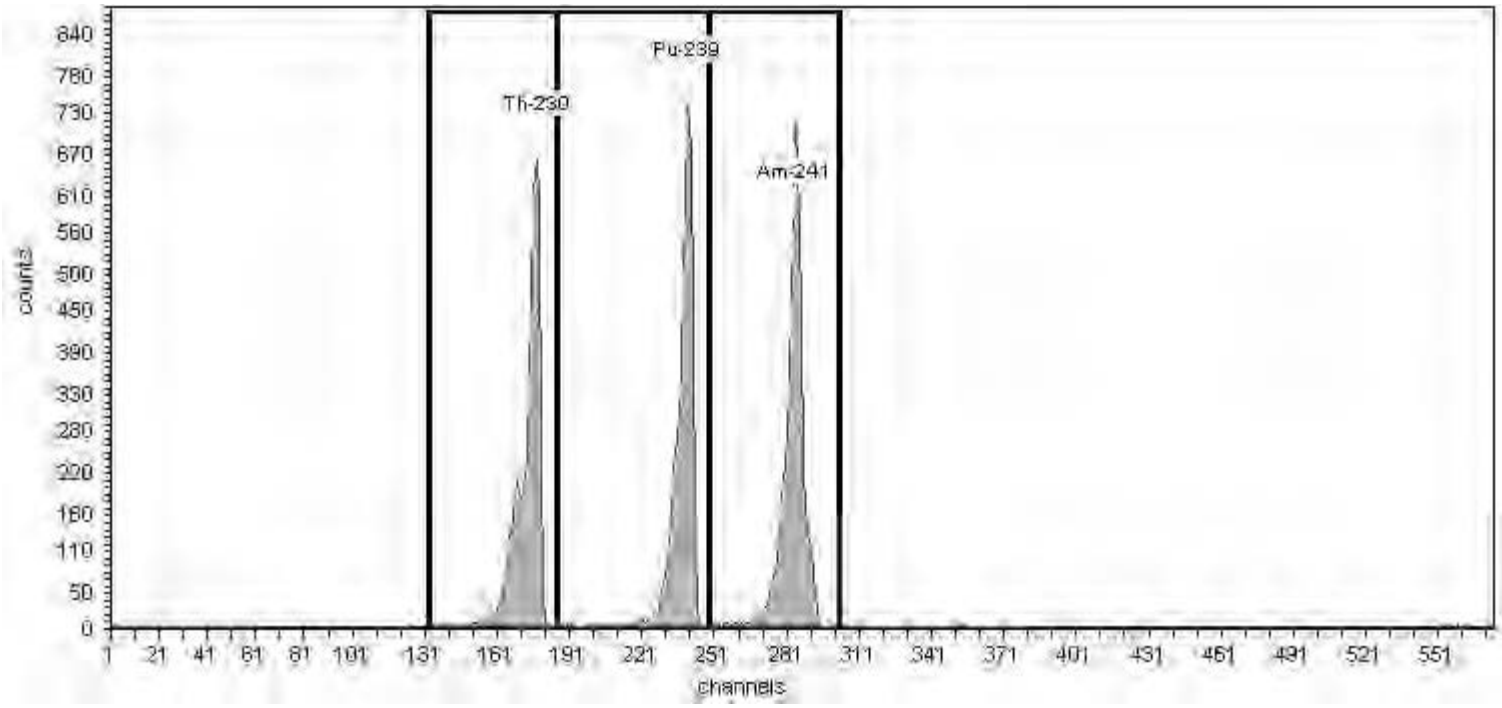
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 5/23/2018 12:56:54PM
Live Time: 60.00 min.
Real Time: 60.50 min.
Efficiency: 24.63% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,923.00	82.05
Pu-239	240	5.16	186	249	0.00	4,871.00	81.18
Am-241	284	5.49	249	303	0.00	5,161.00	86.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:19PM 5/23/2018

Calibration

Sample Name: ICV-9520;AV73-05232018
Description:
Detector: AV73

Calibration Date: 5/23/2018 3:08:15PM
Analyst: 60040

Source Info

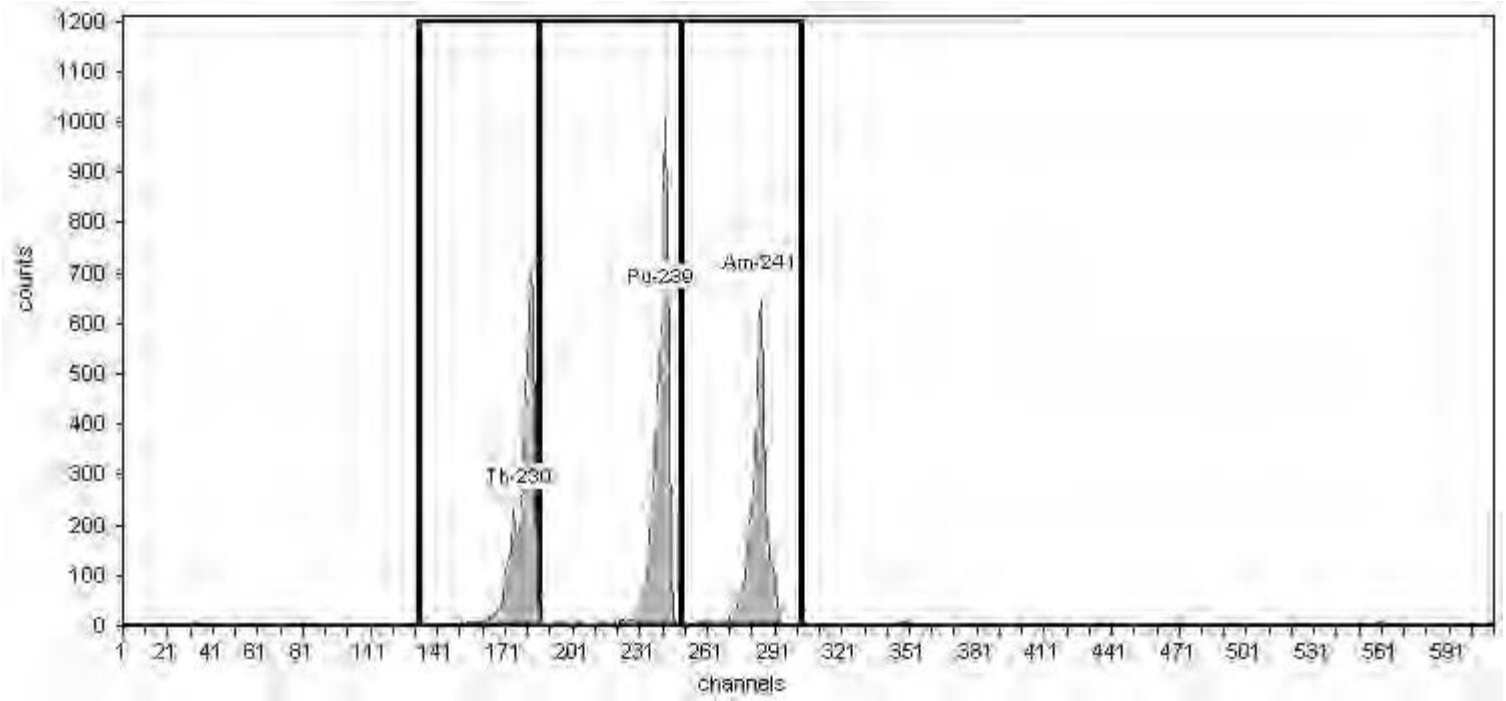
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV73 , SN: 46-03321
Acquisition Start Date: 5/23/2018 12:57:19PM
Live Time: 60.01 min.
Real Time: 60.52 min.
Efficiency: 22.72% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,673.00	77.87
Pu-239	240	5.16	186	249	0.00	5,639.00	93.97
Am-241	284	5.49	249	303	0.00	4,296.00	71.59

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:43PM 5/23/2018

Calibration

Sample Name: ICV-8874;AV74-05232018a
Description:
Detector: AV74

Calibration Date: 5/23/2018 3:08:39PM
Analyst: 60040

Source Info

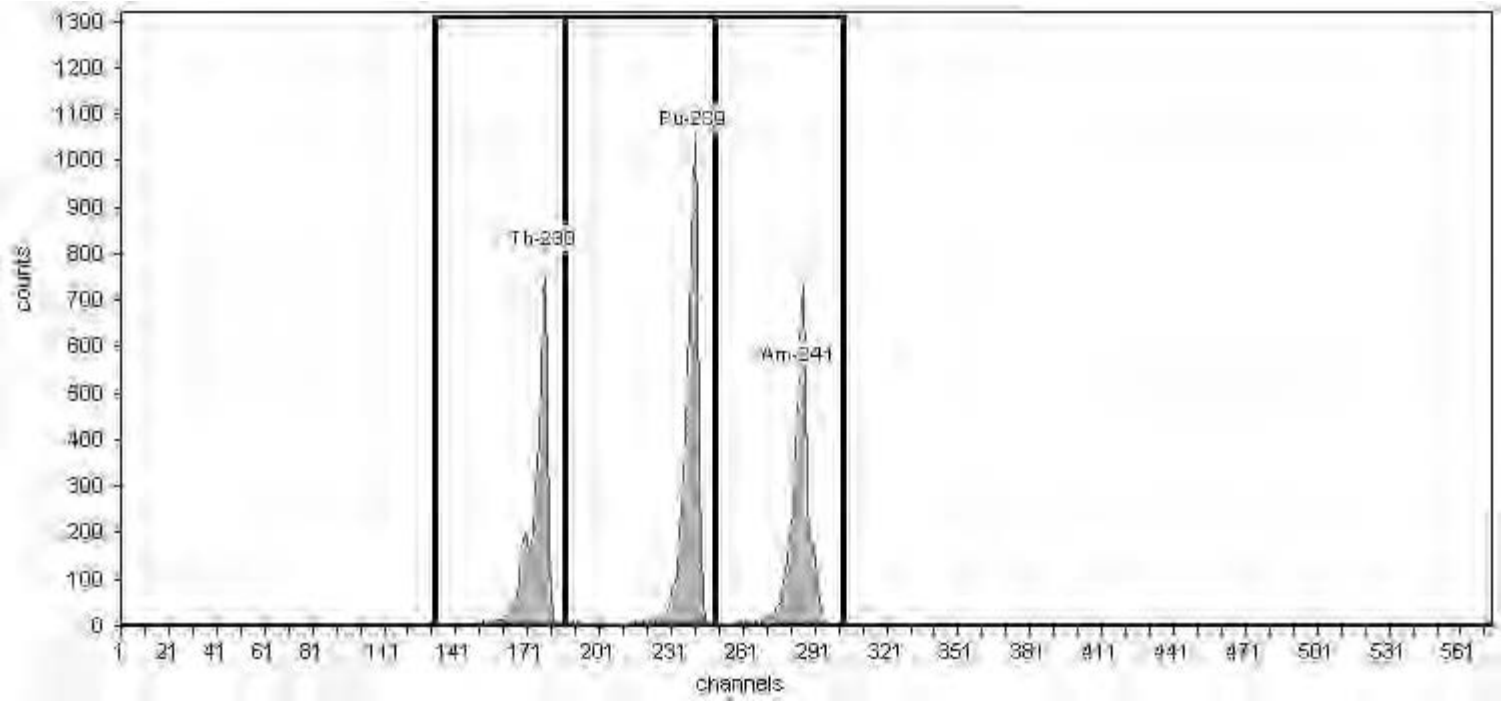
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 5/23/2018 1:04:36PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.88% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,628.00	77.13
Pu-239	240	5.16	186	249	0.00	6,130.00	102.17
Am-241	284	5.49	249	303	0.00	4,796.00	79.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:08:31PM 5/23/2018

Calibration

Sample Name: ICV-9793;AV75-05232018a
Description:
Detector: AV75

Calibration Date: 5/23/2018 3:08:27PM
Analyst: 60040

Source Info

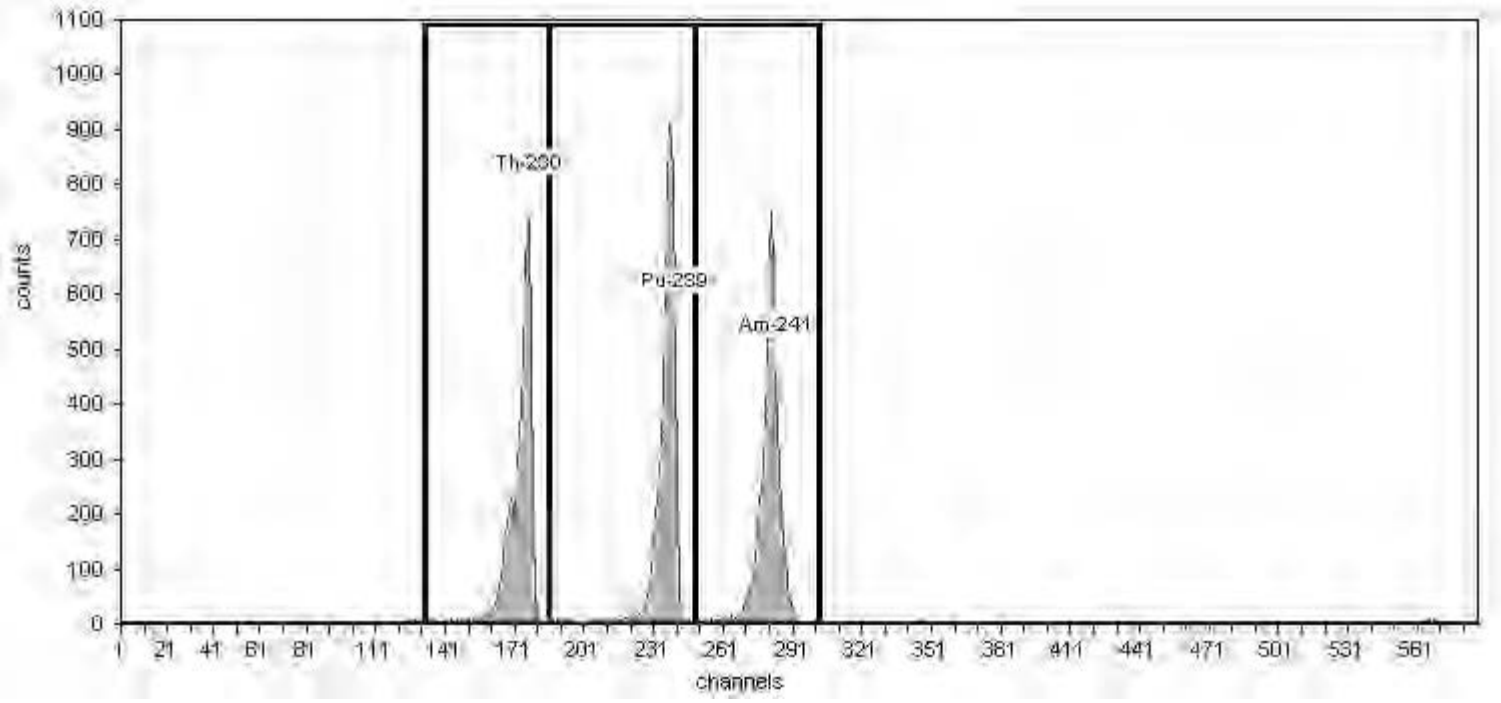
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV75 , SN: 51-082B4
Acquisition Start Date: 5/23/2018 1:01:29PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 22.75% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,369.00	89.48
Pu-239	240	5.16	186	249	0.00	5,606.00	93.43
Am-241	284	5.49	249	303	0.00	5,393.00	89.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:16:47PM 5/21/2018

Calibration

Sample Name: ICV-1368447;AV77-05212018
Description:
Detector: AV77

Calibration Date: 5/21/2018 2:16:43PM
Analyst: 60040

Source Info

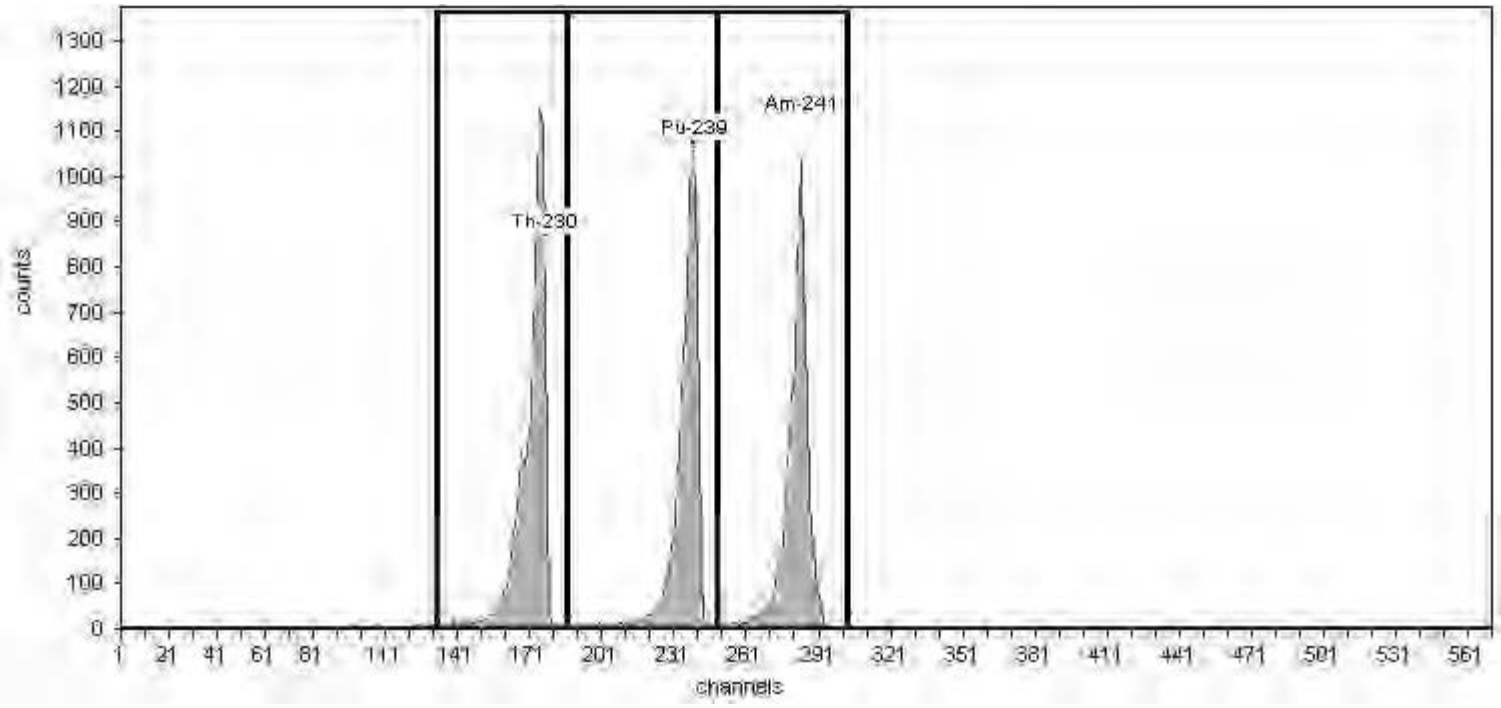
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 5/21/2018 12:19:25PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.85% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	9,379.00	156.32
Pu-239	240	5.16	186	249	0.00	8,512.00	141.87
Am-241	284	5.49	249	303	0.00	8,132.00	135.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:17:12PM 5/21/2018

Calibration

Sample Name: ICV-1368446;AV78-05212018
Description:
Detector: AV78

Calibration Date: 5/21/2018 2:17:08PM
Analyst: 60040

Source Info

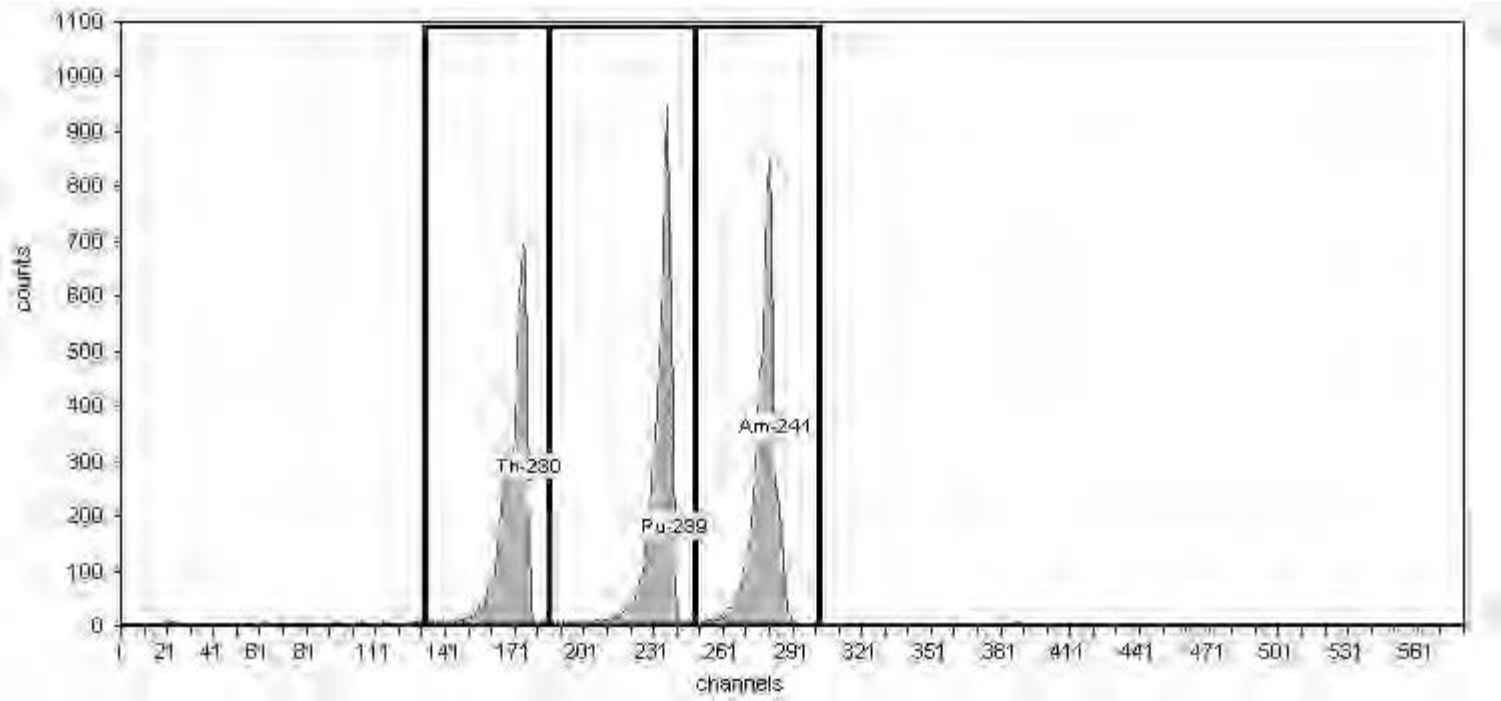
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 5/21/2018 12:19:42PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.40% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,934.00	98.90
Pu-239	240	5.16	186	249	0.00	6,692.00	111.53
Am-241	284	5.49	249	303	0.00	7,049.00	117.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:17:24PM 5/21/2018

Calibration

Sample Name: ICV-1370622;AV79-05212018
Description:
Detector: AV79

Calibration Date: 5/21/2018 2:17:21PM
Analyst: 60040

Source Info

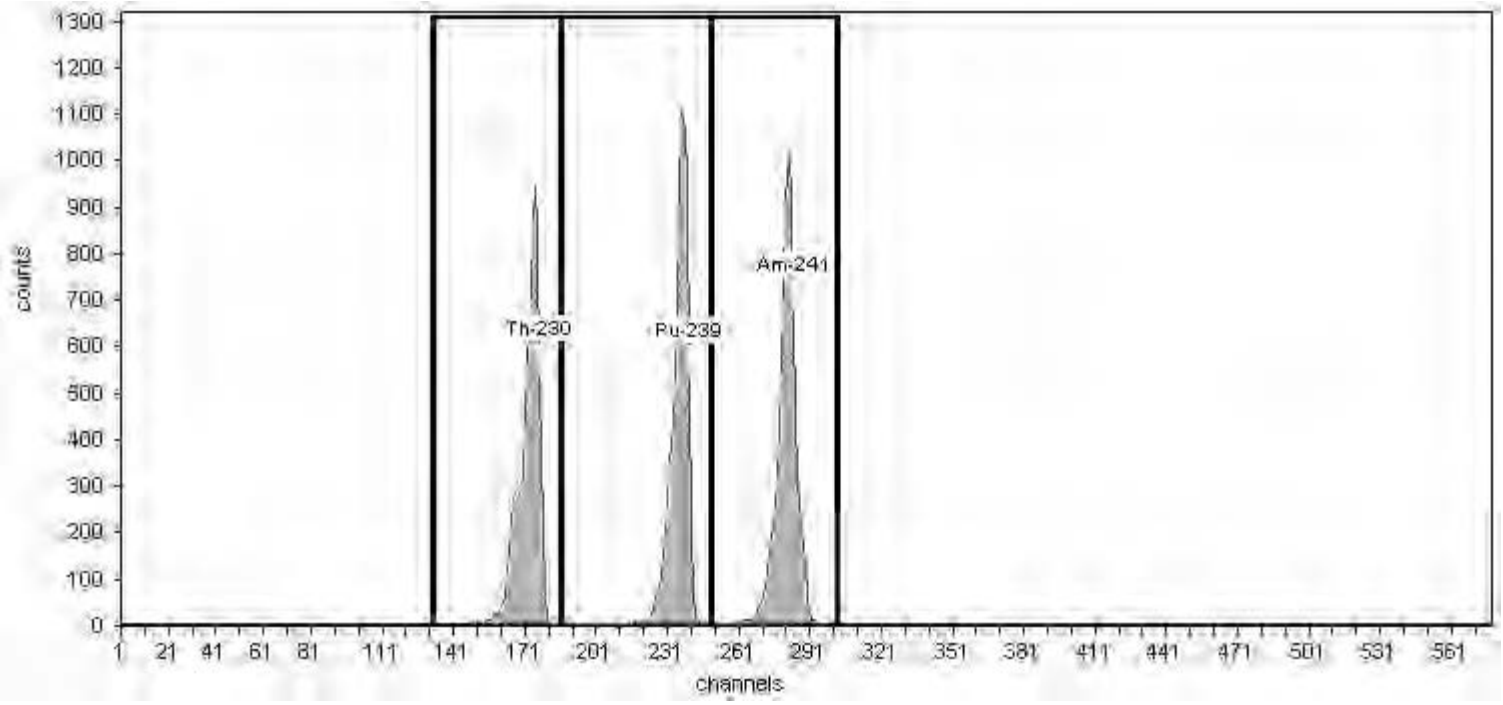
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 5/21/2018 12:19:59PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 27.19% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,340.00	122.33
Pu-239	240	5.16	186	249	0.00	7,741.00	129.02
Am-241	284	5.49	249	303	0.00	7,842.00	130.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:09PM 5/21/2018

Calibration

Sample Name: ICV-1370621;AV80-05212018
Description:
Detector: AV80

Calibration Date: 5/21/2018 2:21:01PM
Analyst: 60040

Source Info

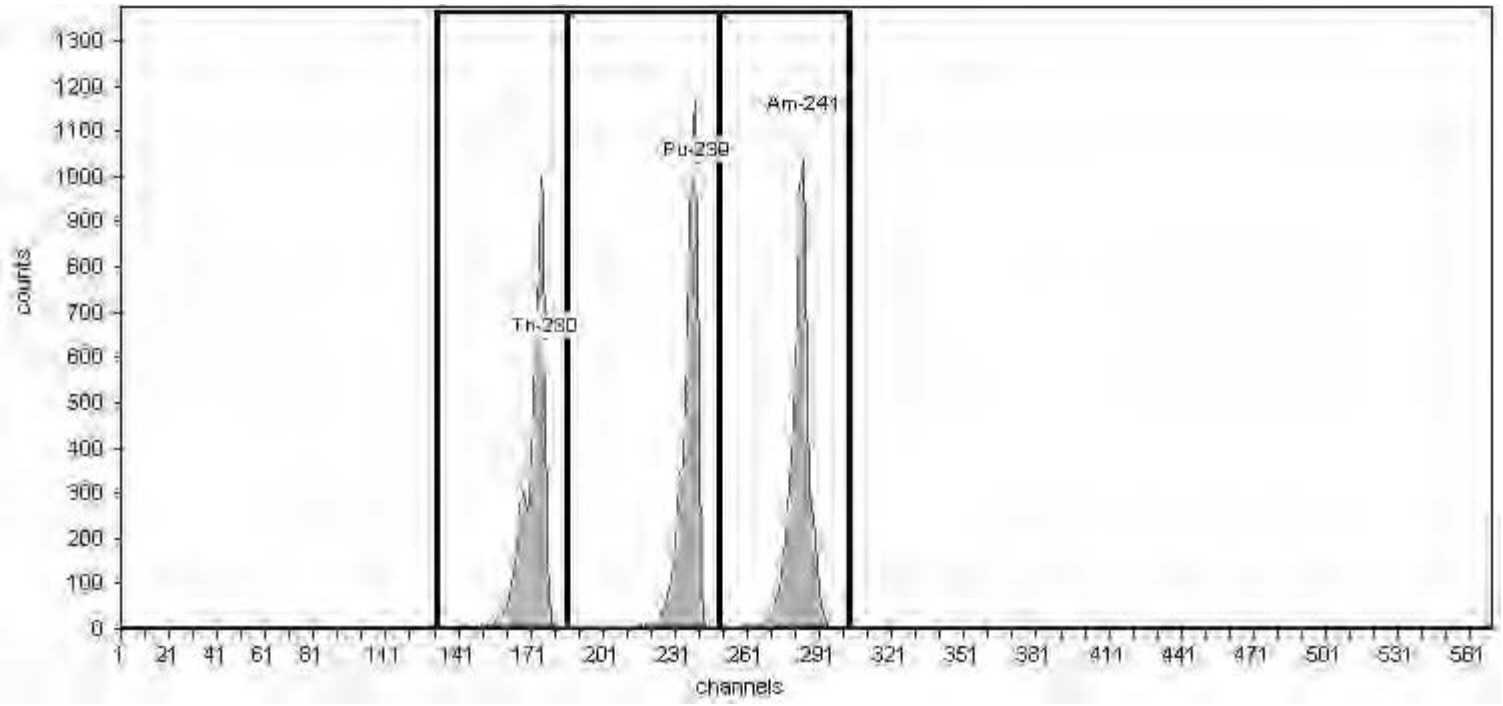
Certificate ID: 108345_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 5/21/2018 12:20:33PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.44% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,001.00	116.68
Pu-239	240	5.16	186	249	0.00	7,316.00	121.93
Am-241	284	5.49	249	303	0.00	7,505.00	125.08

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:36PM 5/21/2018

Calibration

Sample Name: ICV-1370620;AV81-05212018
Description:
Detector: AV81

Calibration Date: 5/21/2018 2:21:32PM
Analyst: 60040

Source Info

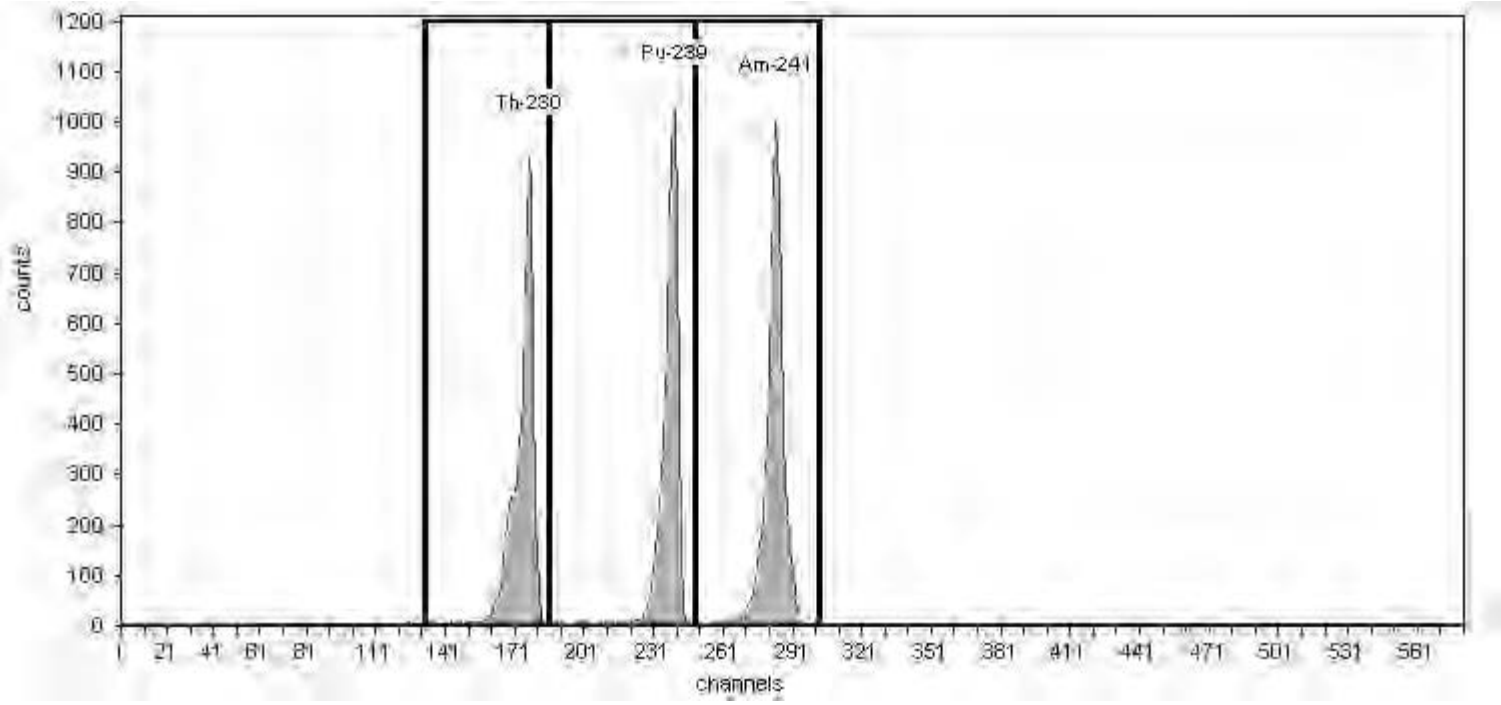
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 5/21/2018 12:20:50PM
Live Time: 60.00 min.
Real Time: 60.05 min.
Efficiency: 26.58% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,701.00	111.68
Pu-239	240	5.16	186	249	0.00	6,647.00	110.78
Am-241	284	5.49	249	303	0.00	7,249.00	120.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:15:02PM 5/21/2018

Calibration

Sample Name: ICV-1370619;AV82-05212018
Description:
Detector: AV82

Calibration Date: 5/21/2018 4:14:59PM
Analyst: 60040

Source Info

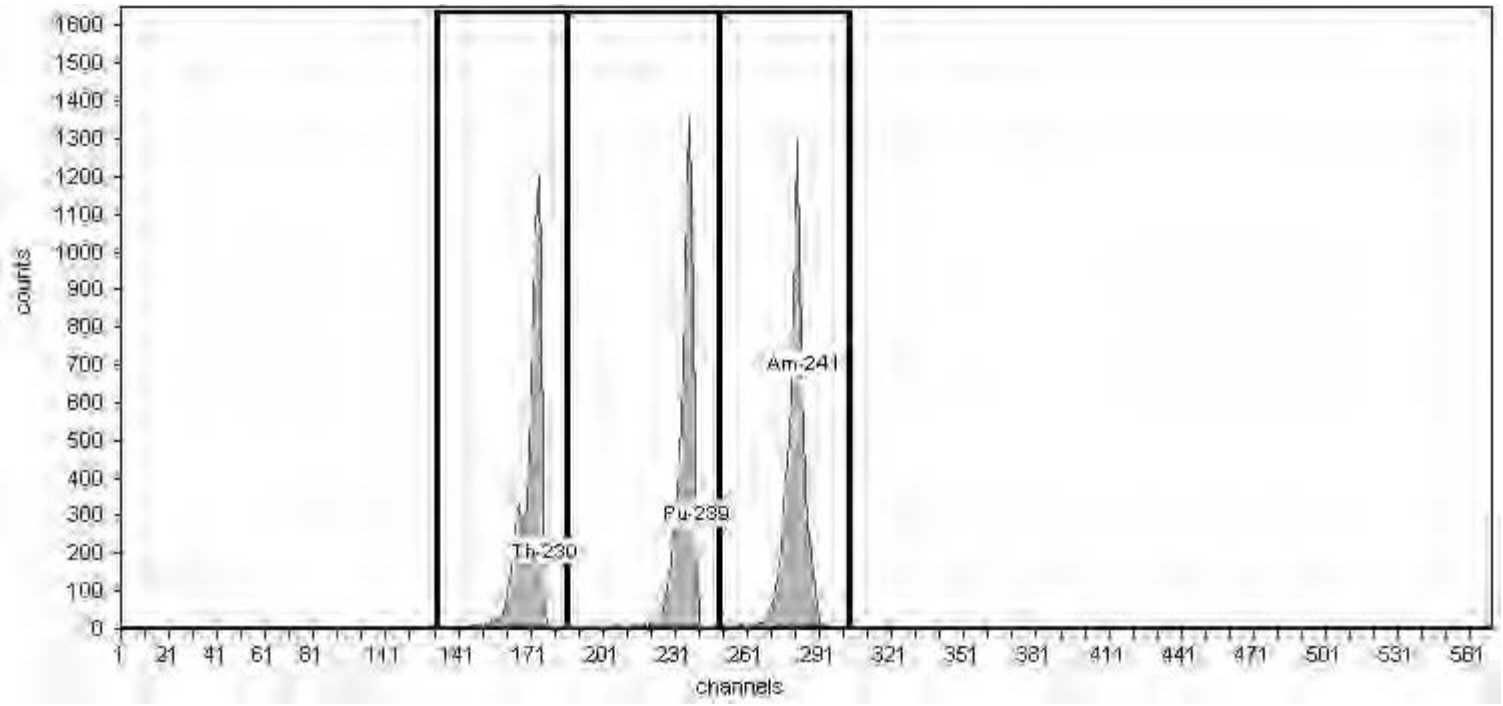
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 5/21/2018 2:23:42PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.81% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,771.00	129.52
Pu-239	240	5.16	186	249	0.00	7,803.00	130.05
Am-241	284	5.49	249	303	0.00	8,351.00	139.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:00:19PM 5/24/2018

Calibration

Sample Name: ICV-8877;AV83-05232018
Description:
Detector: AV83

Calibration Date: 5/24/2018 2:00:15PM
Analyst: 60040

Source Info

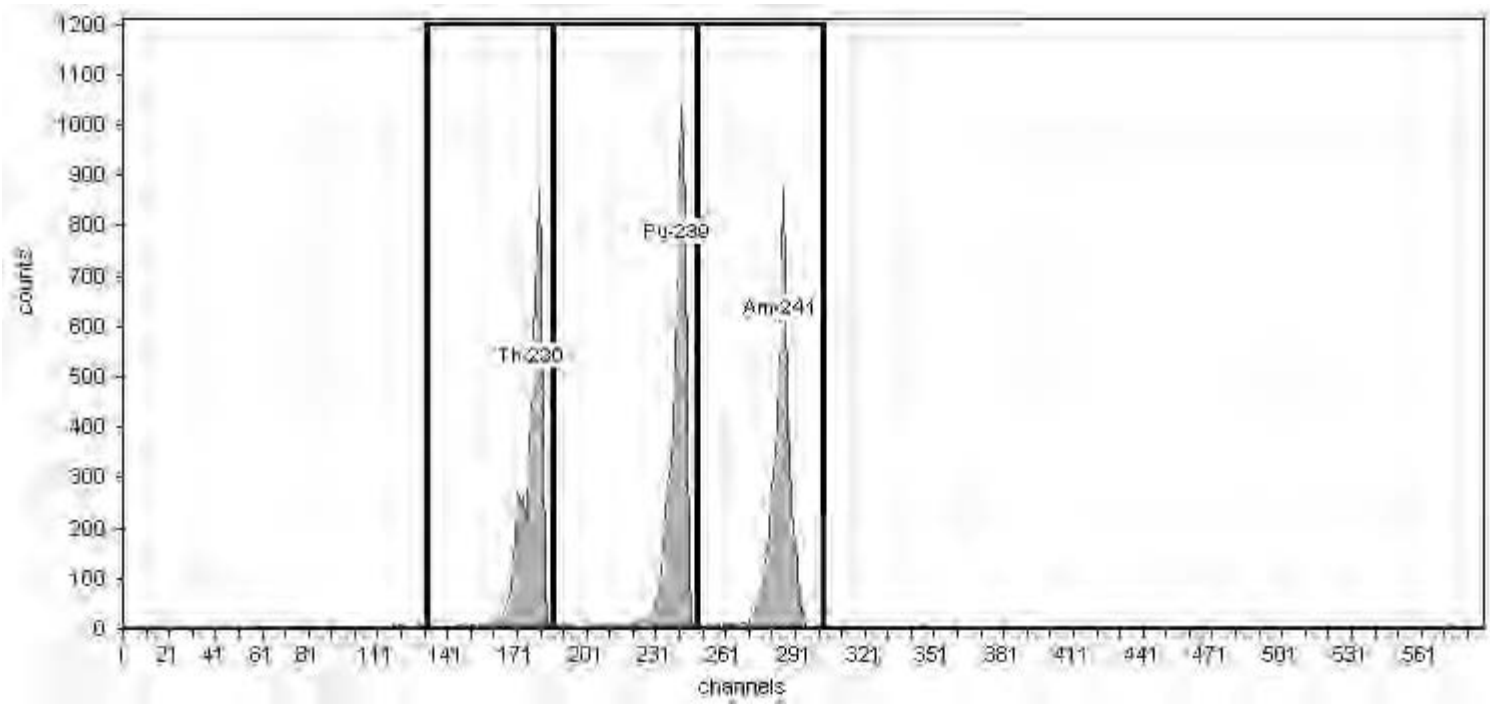
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 5/23/2018 3:19:28PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 24.39% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,989.00	99.82
Pu-239	240	5.16	186	249	0.00	6,281.00	104.68
Am-241	284	5.49	249	303	0.00	5,860.00	97.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:00:47PM 5/24/2018

Calibration

Sample Name: ICV-7107;AV85-05232018
Description:
Detector: AV85

Calibration Date: 5/24/2018 2:00:43PM
Analyst: 60040

Source Info

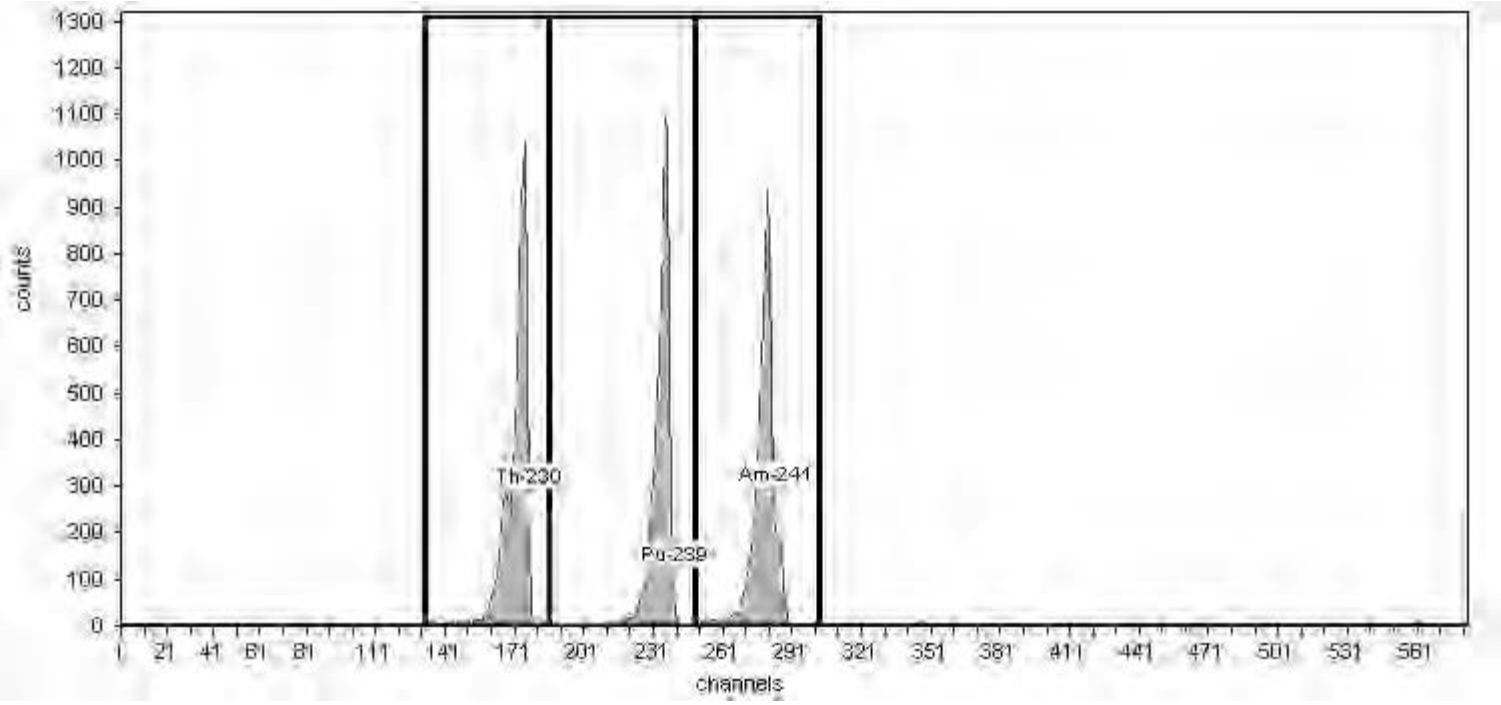
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 5/23/2018 3:20:10PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 24.92% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,623.00	110.38
Pu-239	240	5.16	186	249	0.00	6,630.00	110.50
Am-241	284	5.49	249	303	0.00	6,468.00	107.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:00:58PM 5/24/2018

Calibration

Sample Name: ICV-9817;86-05232018
Description:
Detector: AV86

Calibration Date: 5/24/2018 2:00:55PM
Analyst: 60040

Source Info

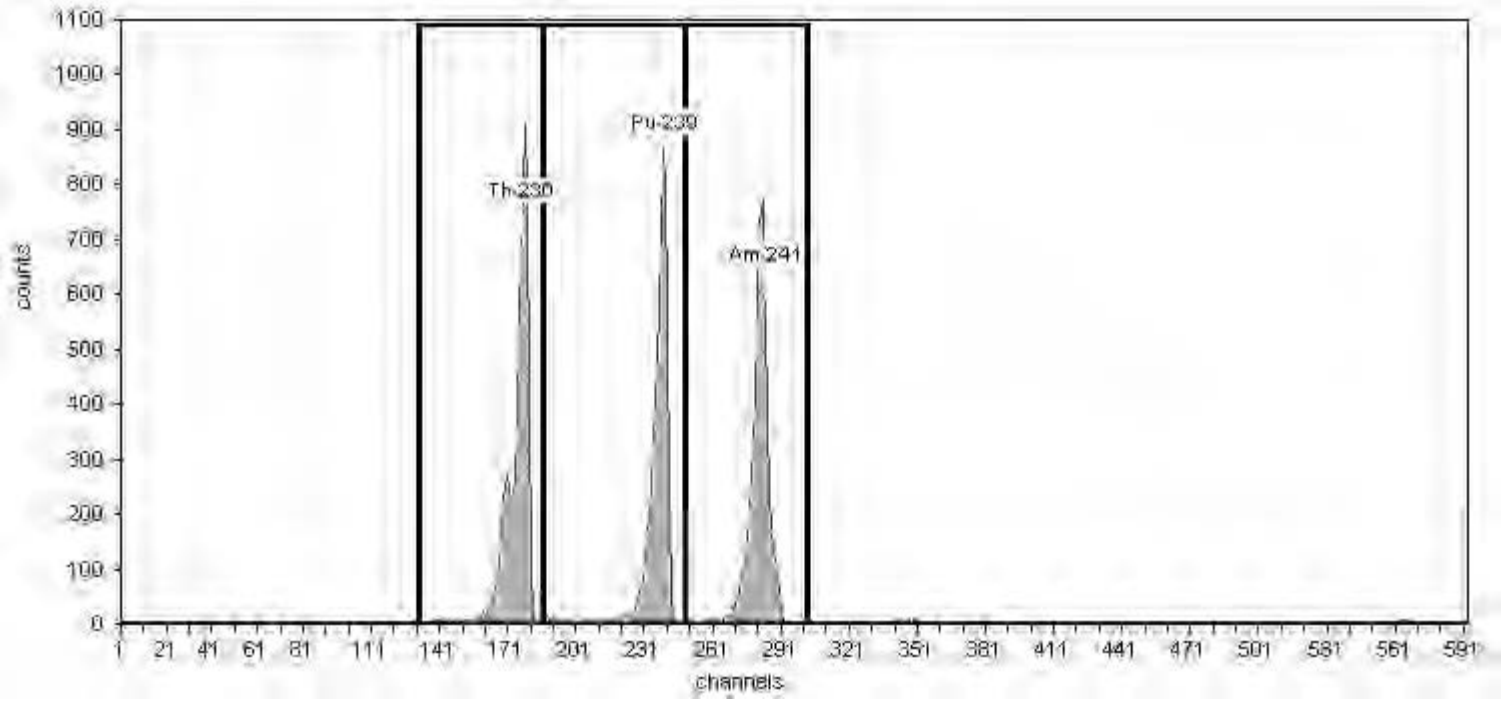
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 5/23/2018 3:20:27PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.29% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,849.00	97.48
Pu-239	240	5.16	186	249	0.00	5,438.00	90.63
Am-241	284	5.49	249	303	0.00	5,475.00	91.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:01:08PM 5/24/2018

Calibration

Sample Name: ICV-9520;AV88-05232018
Description:
Detector: AV88

Calibration Date: 5/24/2018 2:01:05PM
Analyst: 60040

Source Info

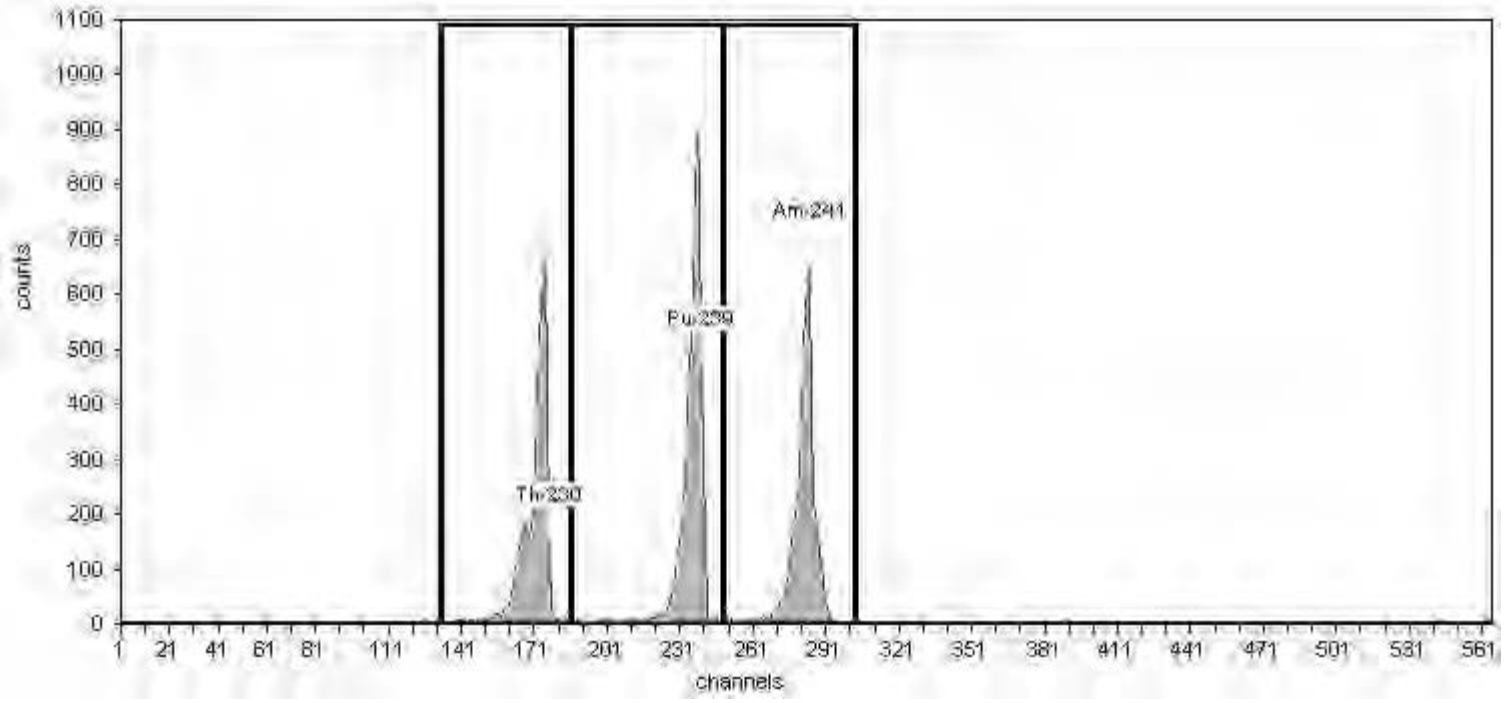
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 5/23/2018 3:20:45PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 23.08% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,625.00	77.08
Pu-239	240	5.16	186	249	0.00	5,626.00	93.77
Am-241	284	5.49	249	303	0.00	4,573.00	76.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:01:49PM 5/24/2018

Calibration

Sample Name: ICV-9792;AV91-05232018
Description:
Detector: AV91

Calibration Date: 5/24/2018 2:01:46PM
Analyst: 60040

Source Info

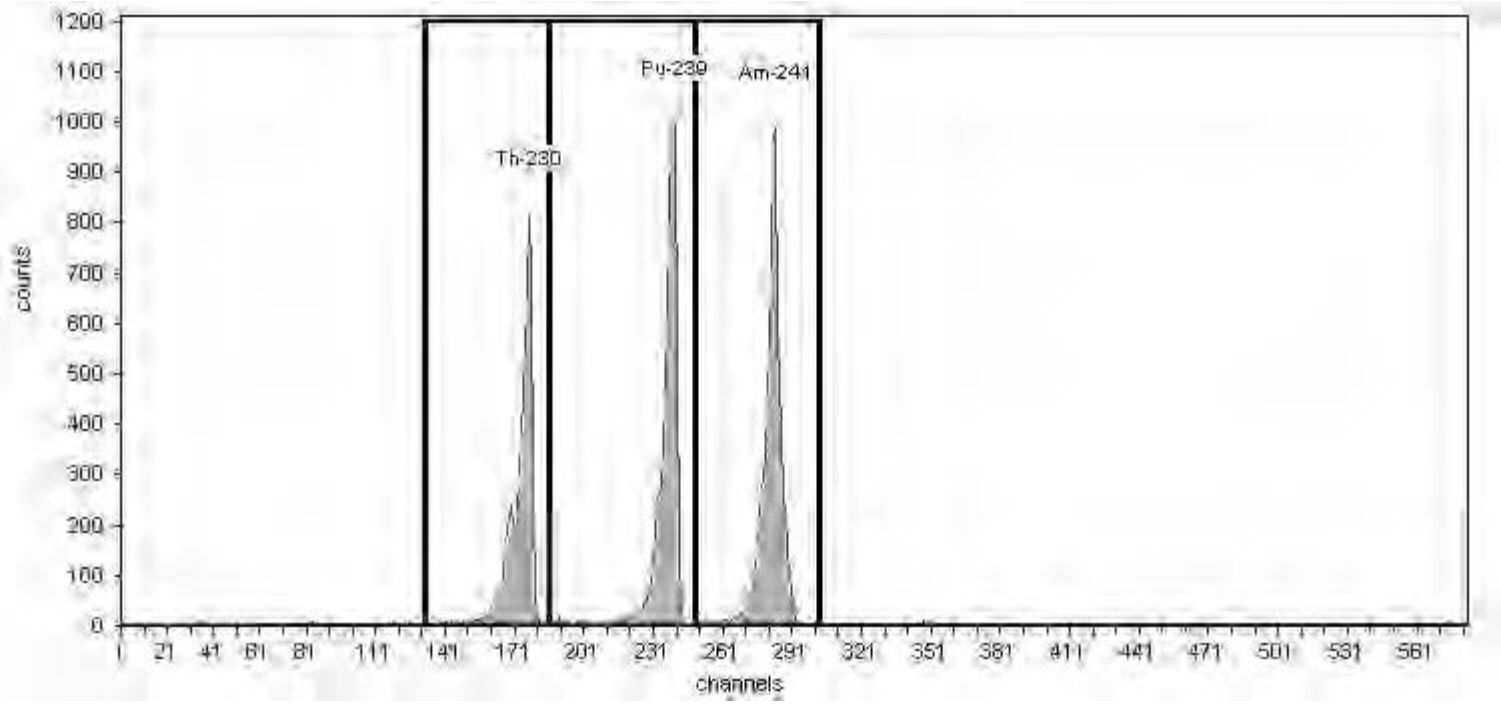
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 5/23/2018 3:21:37PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 23.69% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,378.00	89.63
Pu-239	240	5.16	186	249	0.00	6,180.00	103.00
Am-241	284	5.49	249	303	0.00	6,920.00	115.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:50:34PM 11/15/2017

Calibration

Sample Name: ICV-9795;AV148-20171115
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 11/15/2017 12:50:32PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

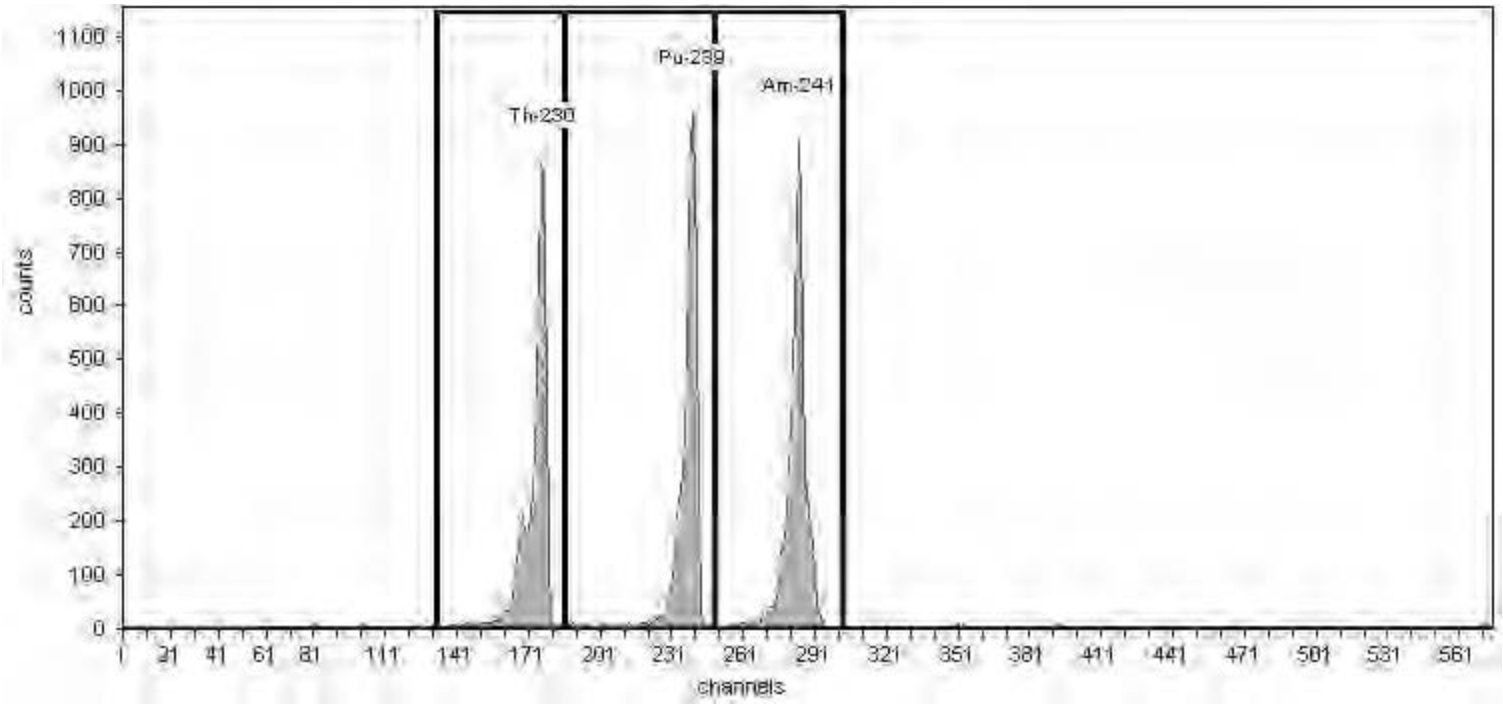
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 11/15/2017 11:50:26AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9795;AV148-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.73% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.81	5,339.00	88.98
Pu-239	240	5,155.40	186	249	33.04	5,548.00	92.47
Am-241	284	5,485.70	249	303	33.16	5,932.00	98.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:46:00PM 11/15/2017

Calibration

Sample Name: ICV-7107;AV151-20171115
Description:
Detector: AV151

Analyst: 60040
Analysis Date: 11/15/2017 12:45:58PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

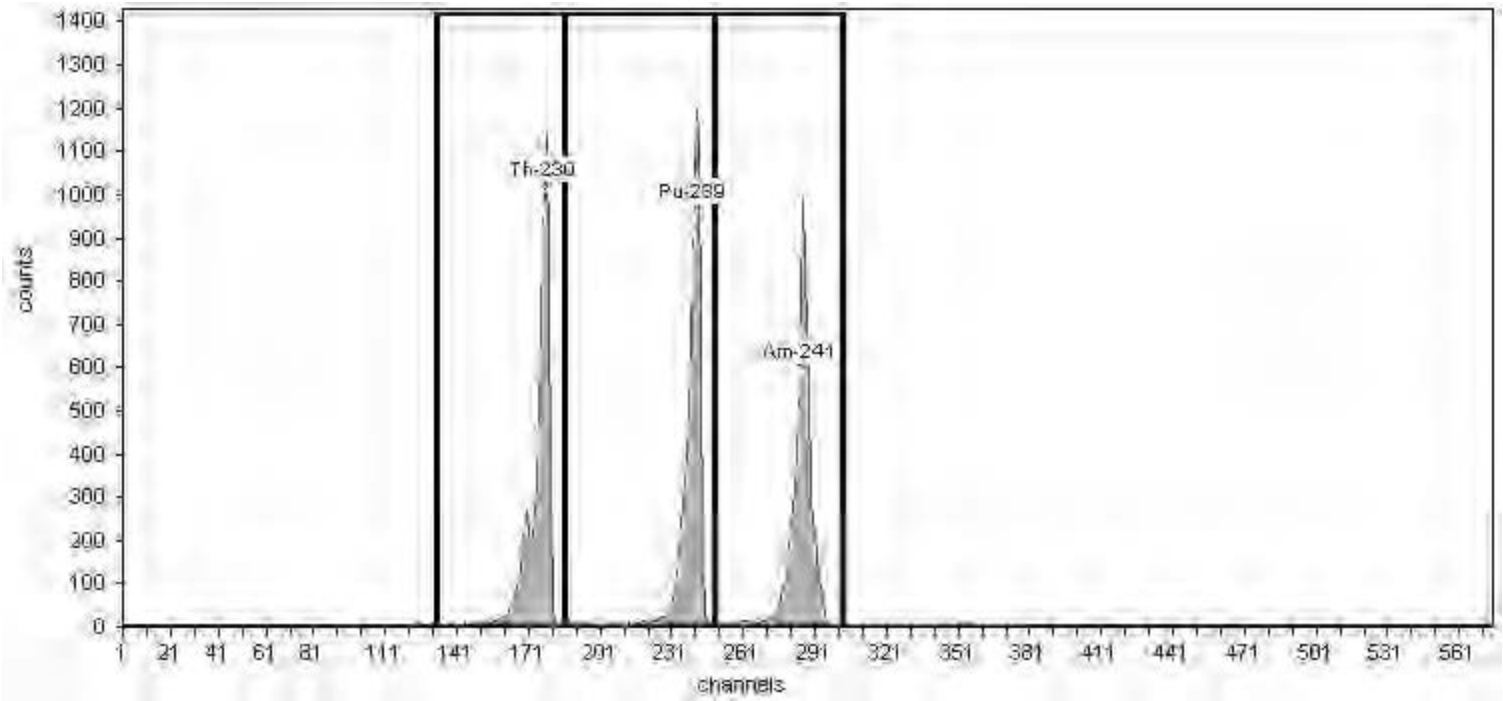
Detector: AV151 , SN: 50-05/R5
Acquisition Start Date: 11/15/2017 11:45:34AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV151-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.64% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.90	6,543.00	109.05
Pu-239	240	5,155.40	186	249	31.07	6,698.00	111.63
Am-241	284	5,485.70	249	303	31.83	6,287.00	104.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:51:48PM 11/15/2017

Calibration

Sample Name: ICV-9793;AV152-20171115
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 11/15/2017 12:51:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

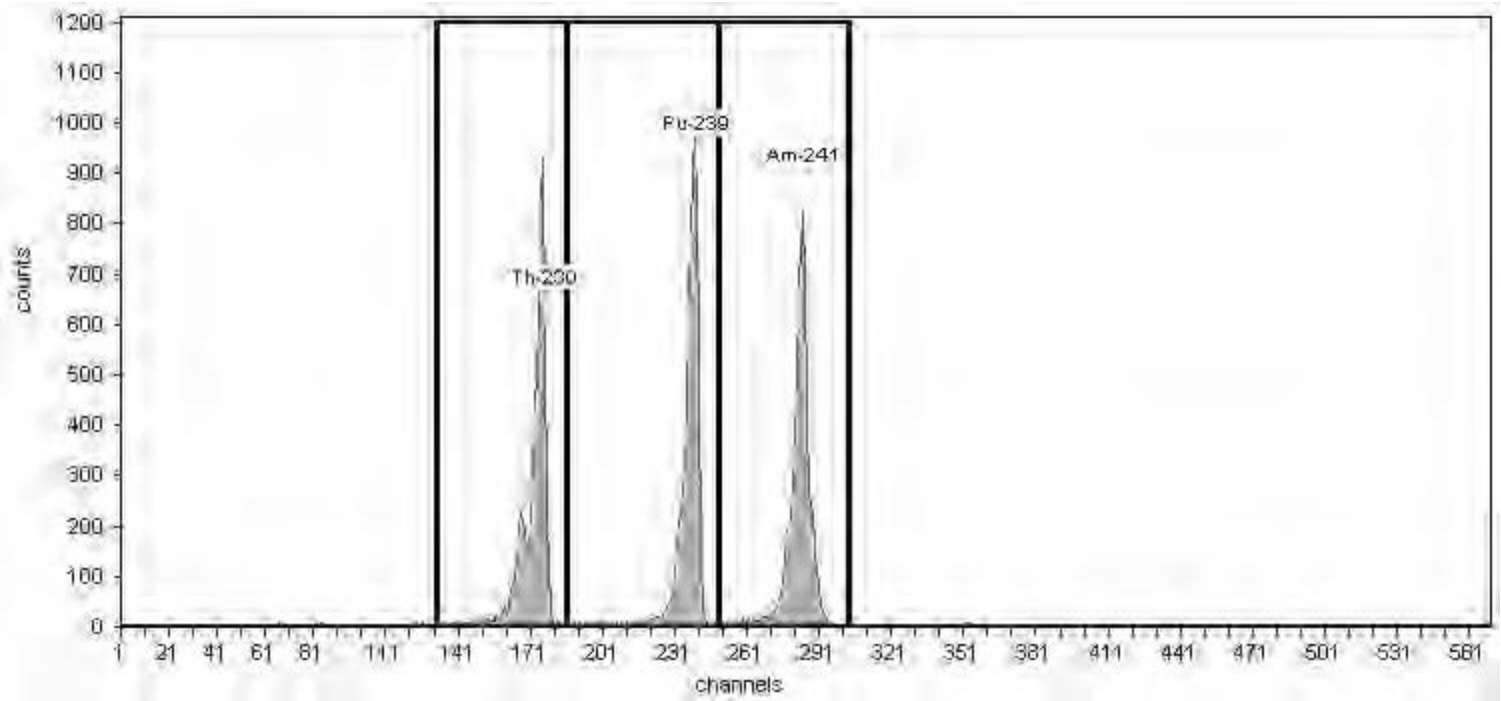
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 11/15/2017 11:51:37AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV152-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.45% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.31	5,616.00	93.60
Pu-239	240	5,155.40	186	249	34.00	5,727.00	95.45
Am-241	284	5,485.70	249	303	34.59	5,535.00	92.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:52:18PM 11/15/2017

Calibration

Sample Name: ICV-9817;AV153-20171115
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 11/15/2017 12:52:16PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

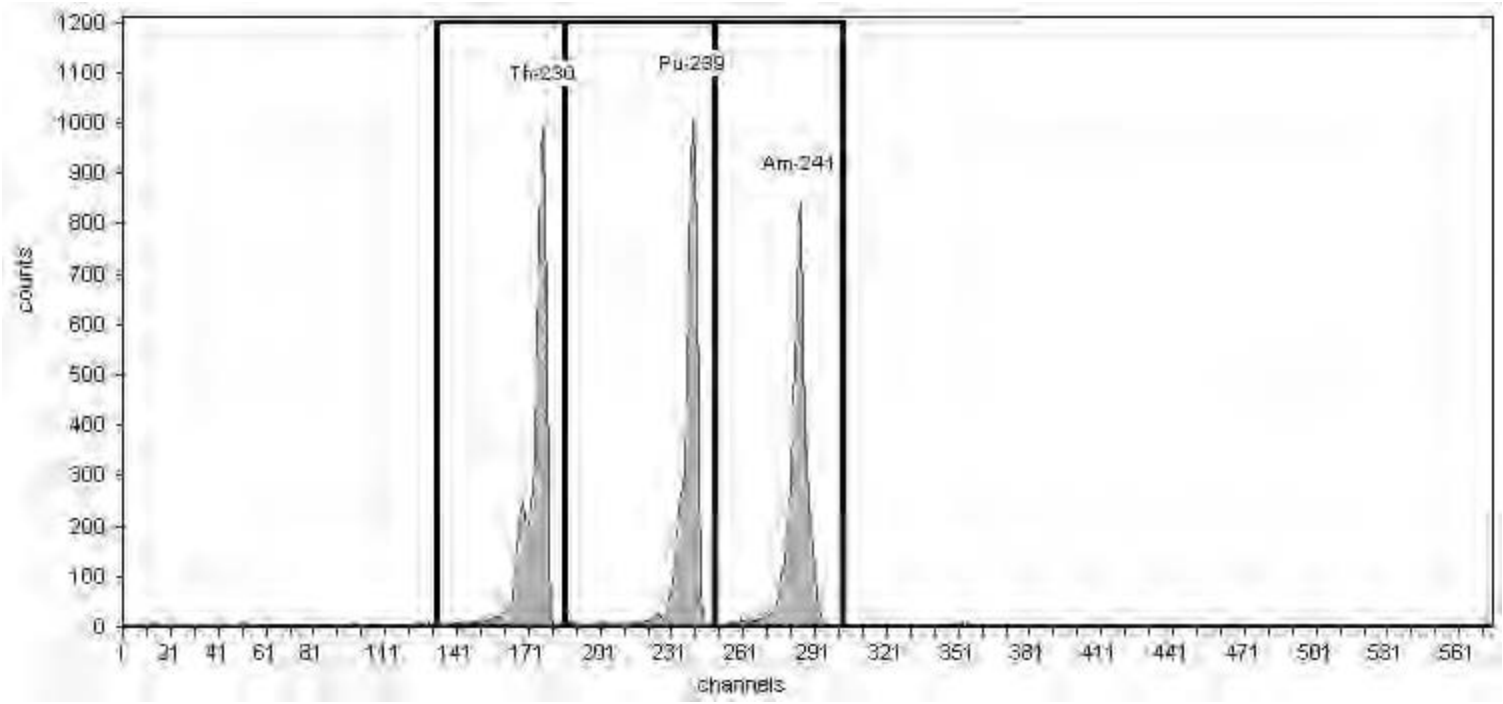
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 11/15/2017 11:52:13AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9817;AV153-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.38% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.51	6,197.00	103.28
Pu-239	240	5,155.40	186	249	32.76	5,687.00	94.78
Am-241	284	5,485.70	249	303	36.56	5,699.00	94.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:52:53PM 11/15/2017

Calibration

Sample Name: ICV-9885;AV154-20171115
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 11/15/2017 12:52:51PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

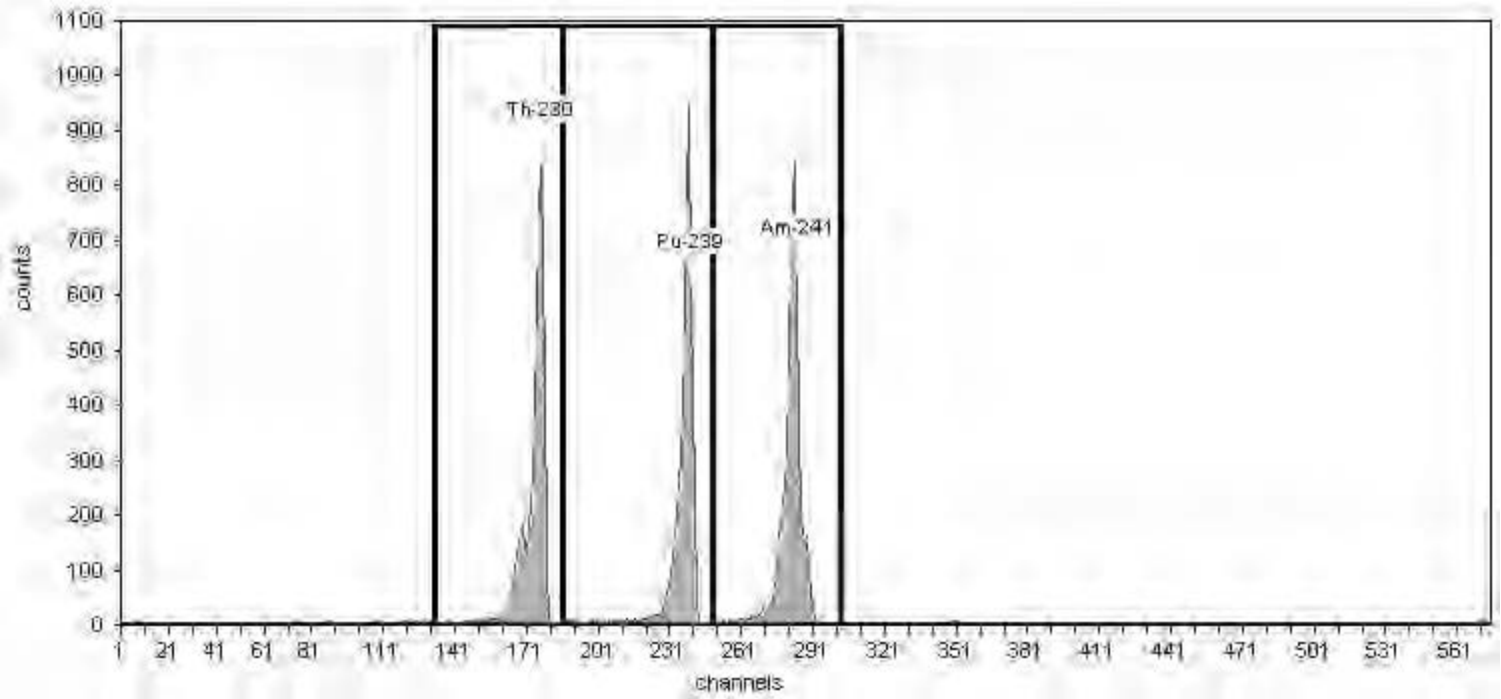
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 11/15/2017 11:52:47AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV154-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.63% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.97	4,685.00	78.08
Pu-239	240	5,155.40	186	249	27.70	4,586.00	76.43
Am-241	284	5,485.70	249	303	29.50	5,071.00	84.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:09PM 11/15/2017

Calibration

Sample Name: ICV-8876;AV156-20171115
Description:
Detector: AV156

Analyst: 60040
Analysis Date: 11/15/2017 12:49:06PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

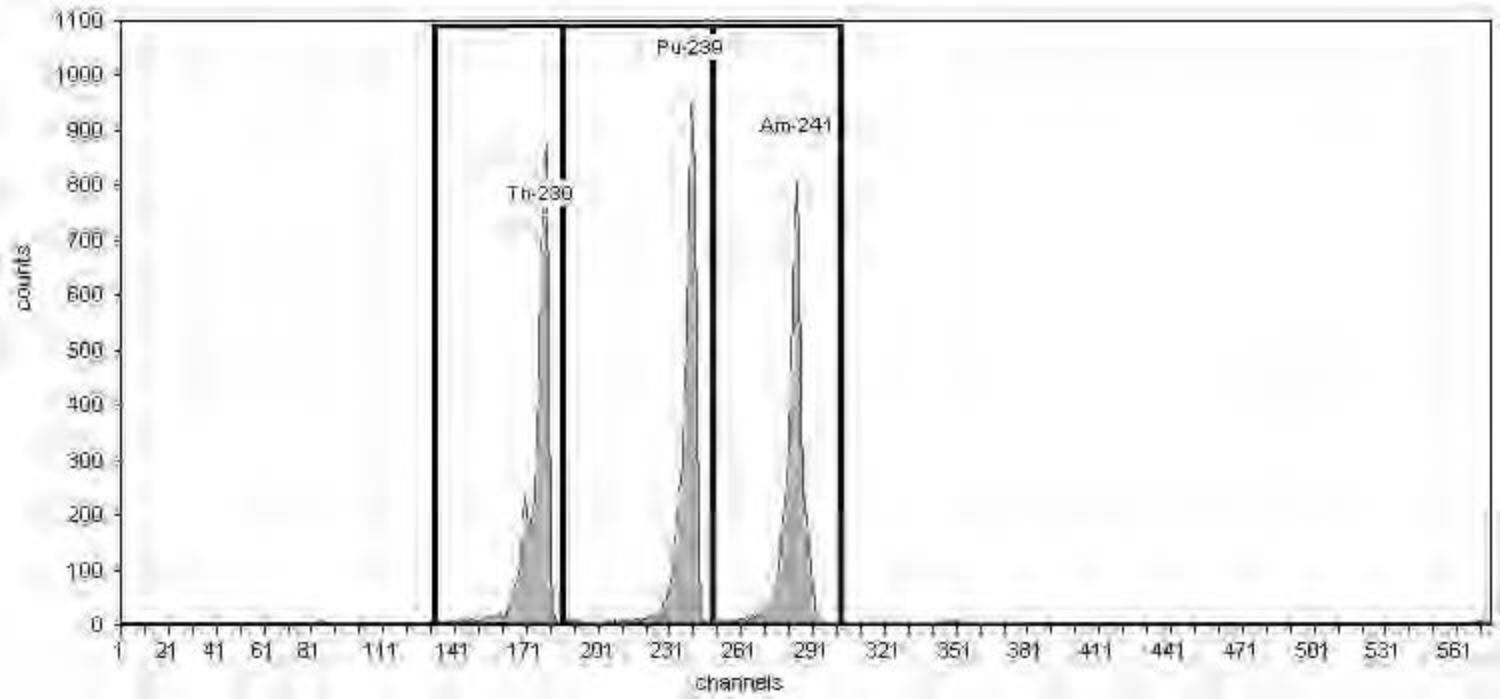
Detector: AV156 , SN: 49-155n4
Acquisition Start Date: 11/15/2017 11:46:52AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8876;AV156-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 21.15% +/- 0.36% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.58	5,607.00	93.45
Pu-239	240	5,155.40	186	249	32.99	5,358.00	89.30
Am-241	284	5,485.70	249	303	32.66	5,383.00	89.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:24PM 11/15/2017

Calibration

Sample Name: ICV-8879;AV158-20171115
Description:
Detector: AV158

Analyst: 60040
Analysis Date: 11/15/2017 12:49:22PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

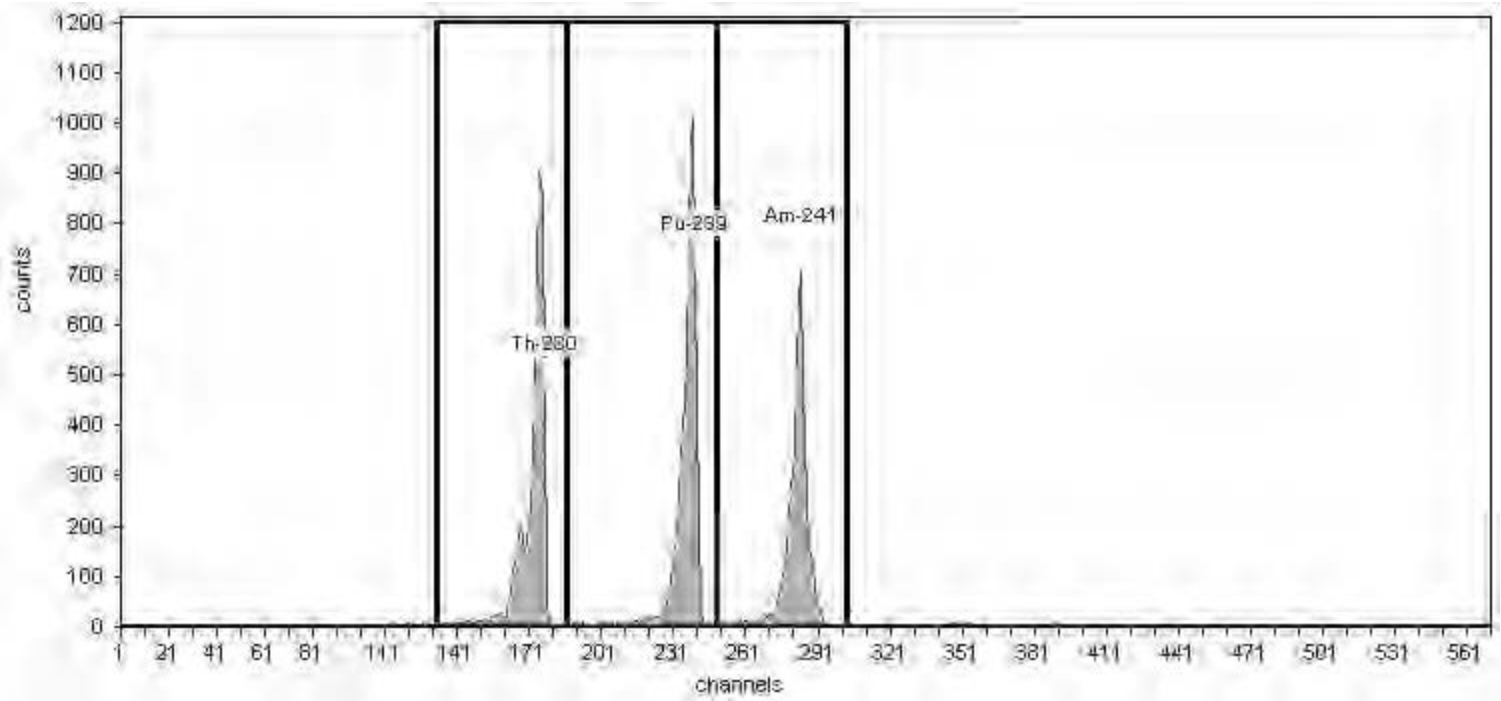
Detector: AV158 , SN: 50-05/II4
Acquisition Start Date: 11/15/2017 11:47:55AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8879;AV158-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.43% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.37	5,461.00	91.02
Pu-239	240	5,155.40	186	249	33.14	5,897.00	98.28
Am-241	284	5,485.70	249	303	33.24	4,632.00	77.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:50:00PM 11/15/2017

Calibration

Sample Name: ICV-9886;AV159-20171115
Description:
Detector: AV159

Analyst: 60040
Analysis Date: 11/15/2017 12:49:58PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

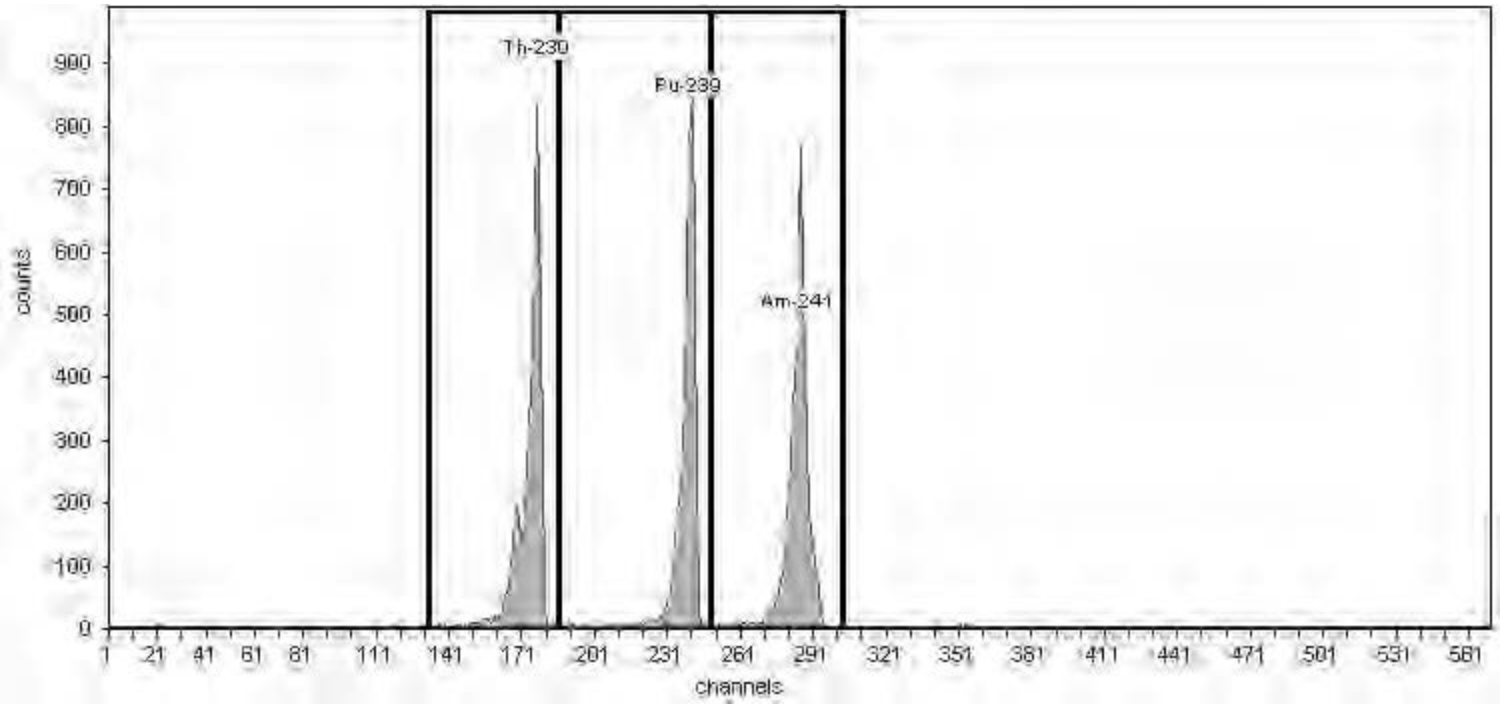
Detector: AV159 , SN: 50-05/II5
Acquisition Start Date: 11/15/2017 11:49:52AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV159-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.57% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.00	4,820.00	80.33
Pu-239	240	5,155.40	186	249	30.18	4,525.00	75.42
Am-241	284	5,485.70	249	303	31.87	4,806.00	80.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:30PM 11/15/2017

Calibration

Sample Name: ICV-9792;AV160-20171115
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 11/15/2017 12:49:28PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

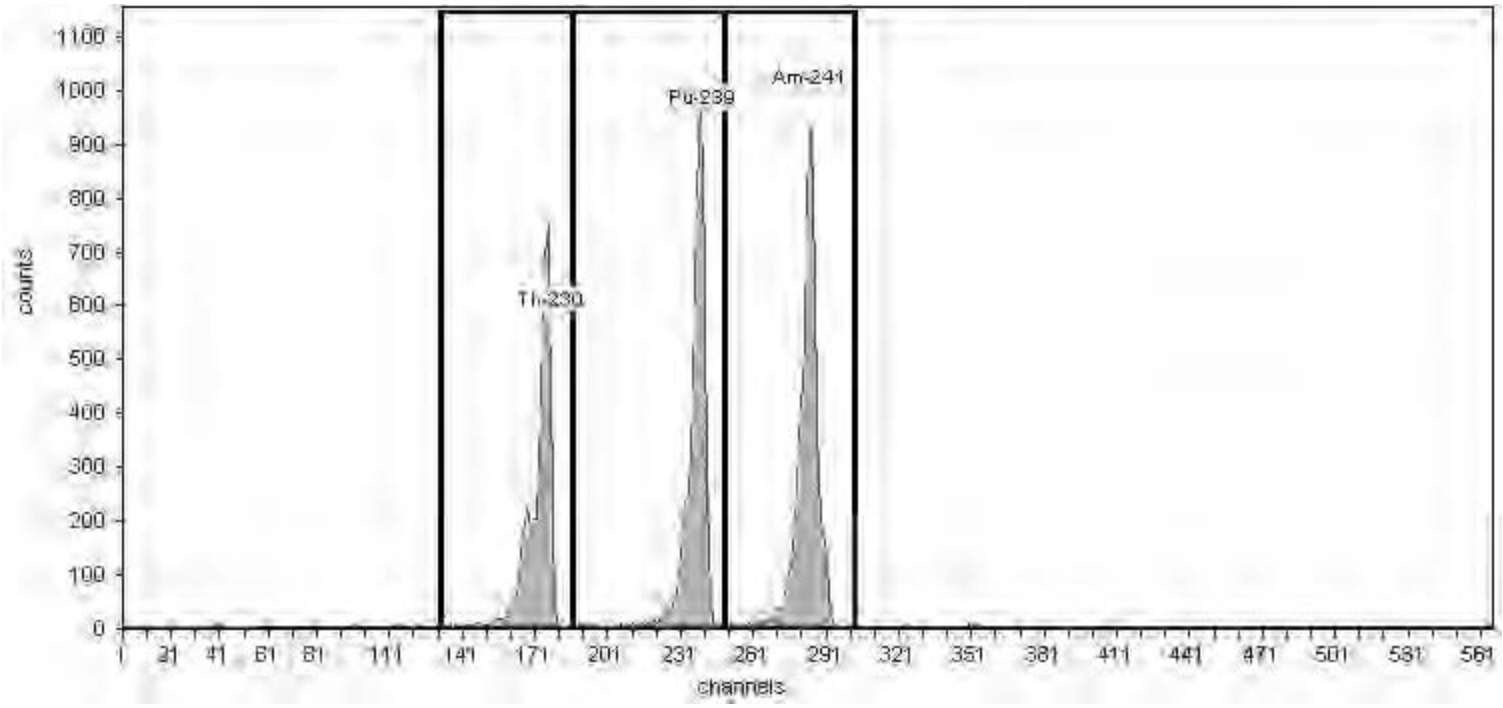
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 11/15/2017 11:48:38AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9792;AV160-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.55% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.35	5,225.00	87.08
Pu-239	240	5,155.40	186	249	37.56	6,237.00	103.95
Am-241	284	5,485.70	249	303	38.40	6,917.00	115.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:49:37PM 11/15/2017

Calibration

Sample Name: ICV-9884;AV161-20171115
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 11/15/2017 12:49:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

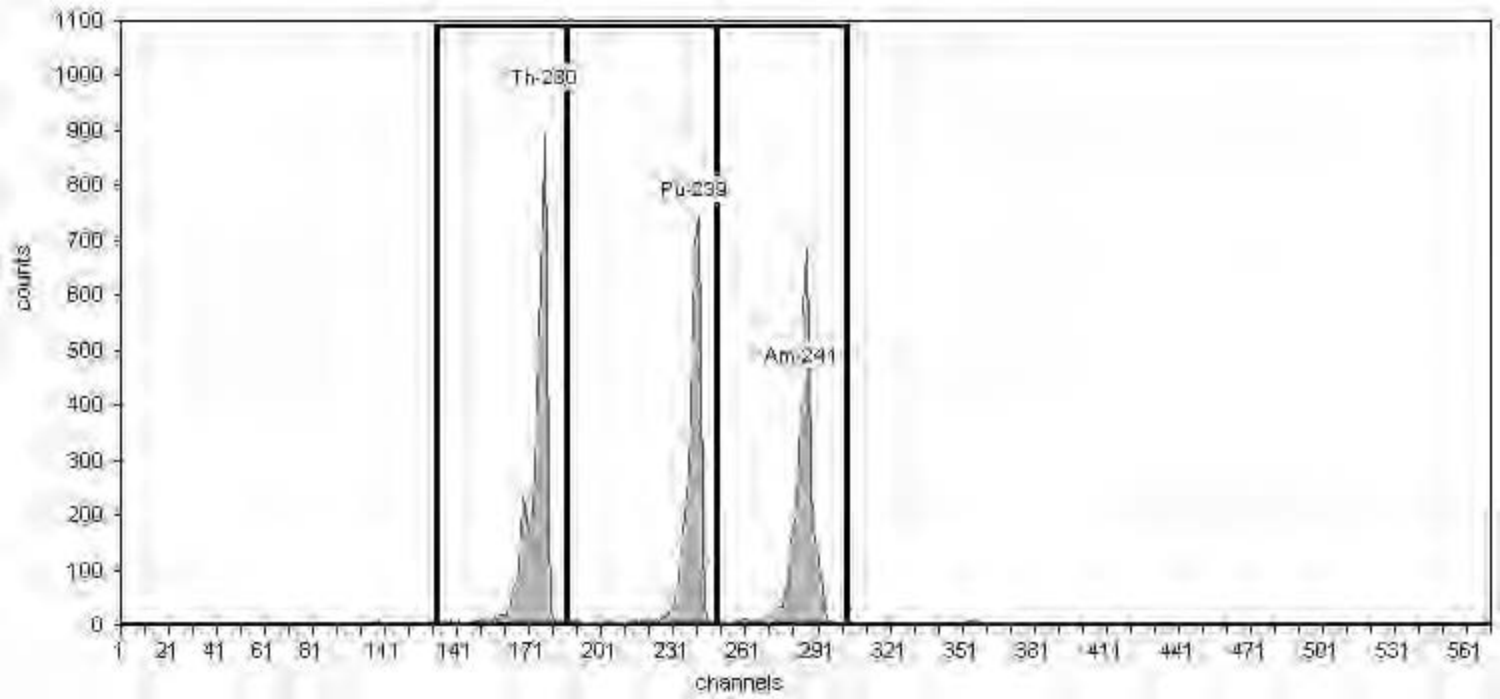
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 11/15/2017 11:49:14AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9884;AV161-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 21.49% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.46	5,213.00	86.88
Pu-239	240	5,155.40	186	249	32.26	4,160.00	69.33
Am-241	284	5,485.70	249	303	30.78	4,270.00	71.17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:10:53PM 11/15/2017

Calibration

Sample Name: ICV-9794;AV164-20171115
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 11/15/2017 2:10:50PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

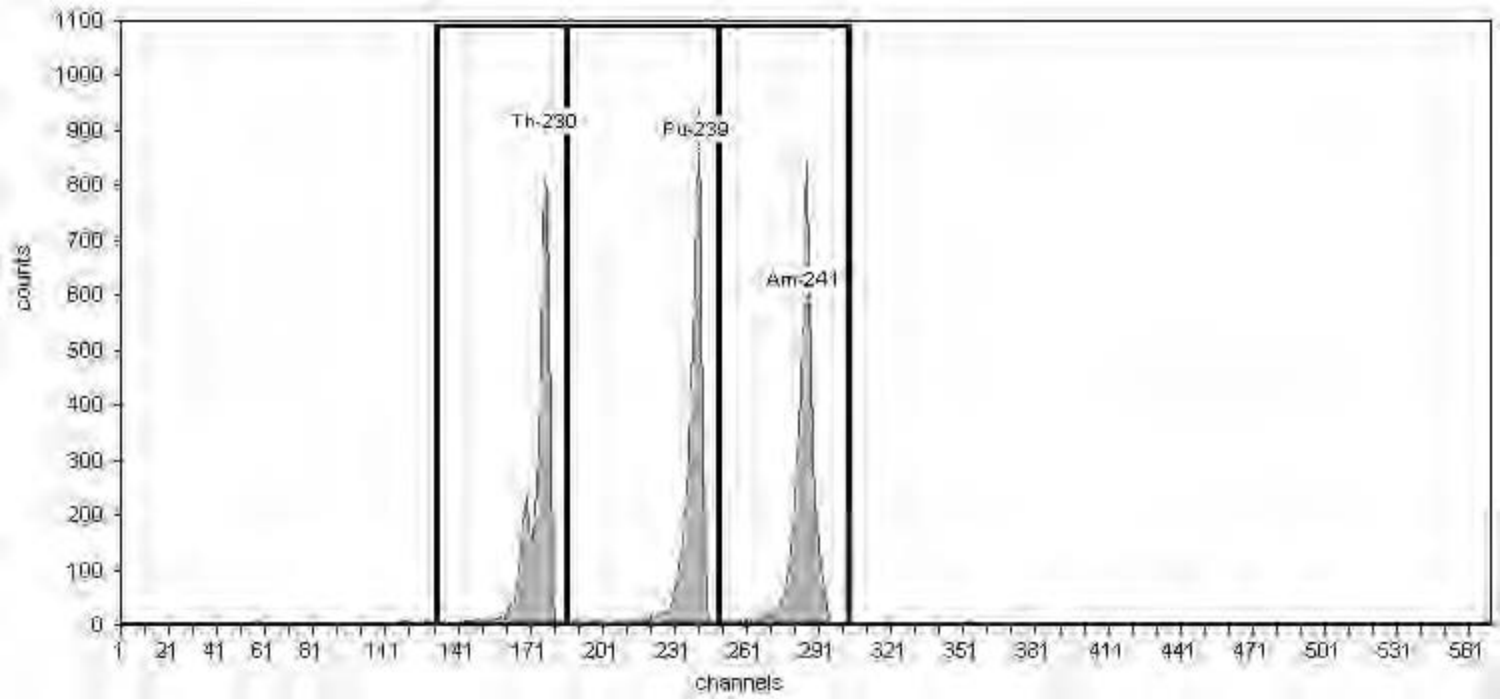
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 11/15/2017 1:10:17PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9794;AV164-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.52% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.01	5,058.00	84.30
Pu-239	240	5,155.40	186	249	31.87	5,129.00	85.48
Am-241	284	5,485.70	249	303	31.52	5,369.00	89.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:43PM 11/15/2017

Calibration

Sample Name: ICV-8875;AV165-20171115
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 11/15/2017 2:11:40PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

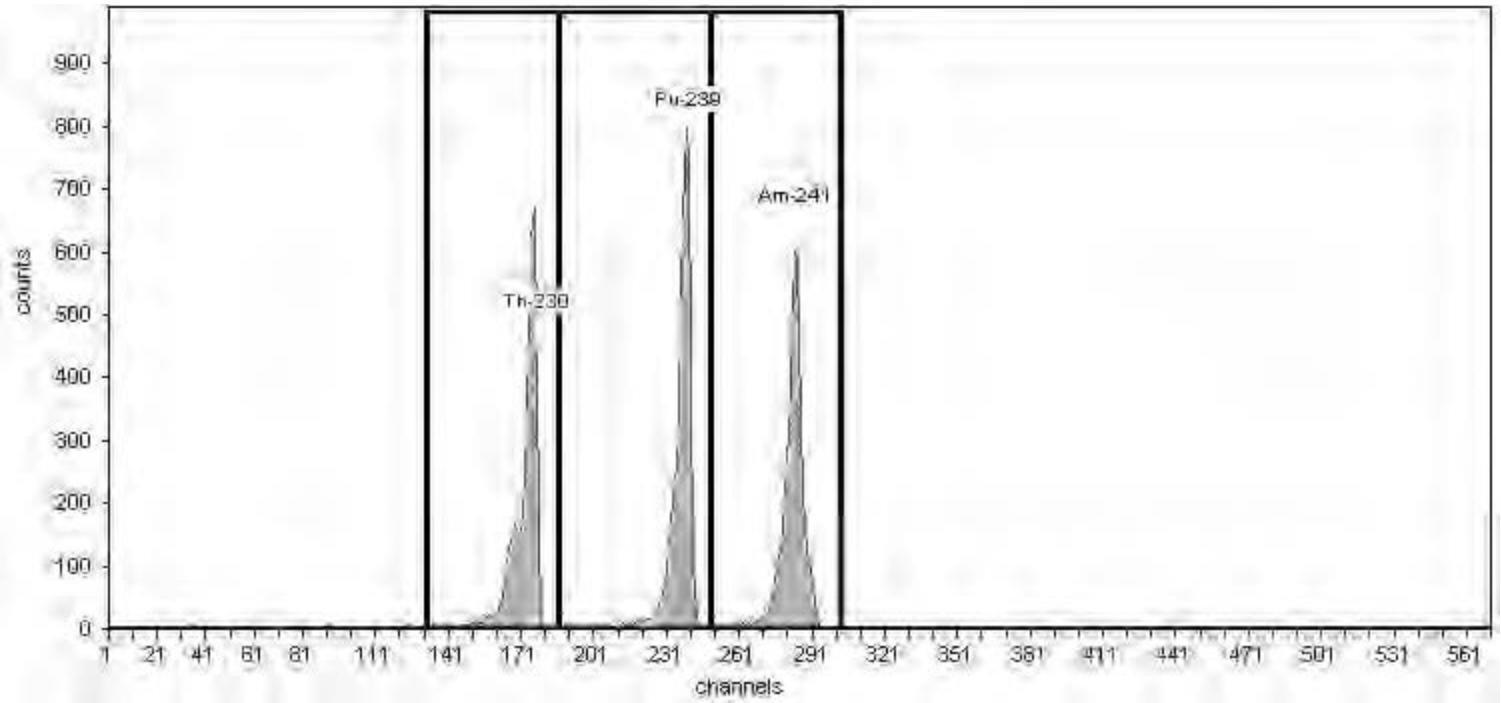
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 11/15/2017 1:11:27PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV165-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.66% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.10	4,262.00	71.03
Pu-239	240	5,155.40	186	249	34.85	4,855.00	80.92
Am-241	284	5,485.70	249	303	36.71	4,326.00	72.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:12:00PM 11/15/2017

Calibration

Sample Name: ICV-7107;AV166-20171115
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 11/15/2017 2:11:58PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

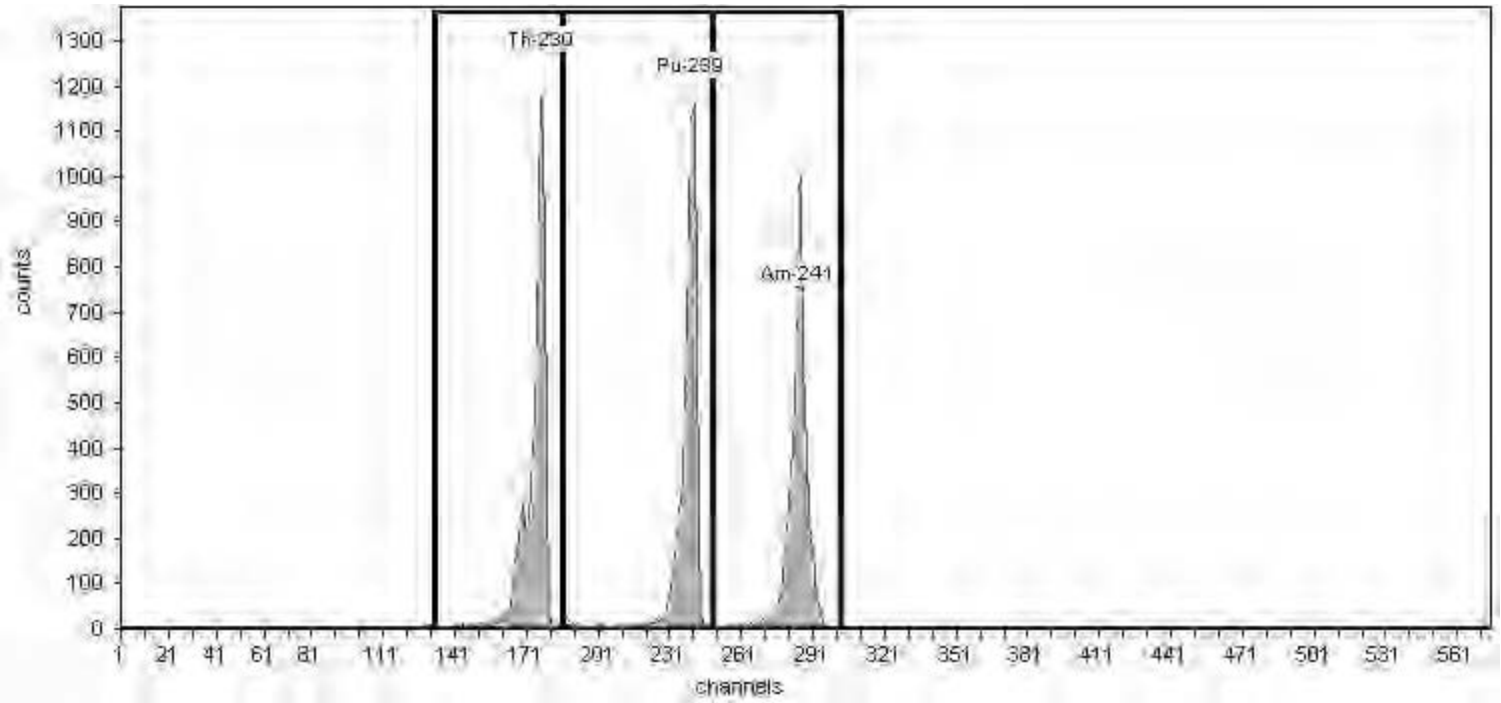
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 11/15/2017 1:11:46PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV166-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.75% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.86	6,687.00	111.45
Pu-239	240	5,155.40	186	249	34.18	6,583.00	109.72
Am-241	284	5,485.70	249	303	31.85	6,321.00	105.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:10:44PM 11/15/2017

Calibration

Sample Name: ICV-9793;AV167-20171115
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 11/15/2017 2:10:42PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

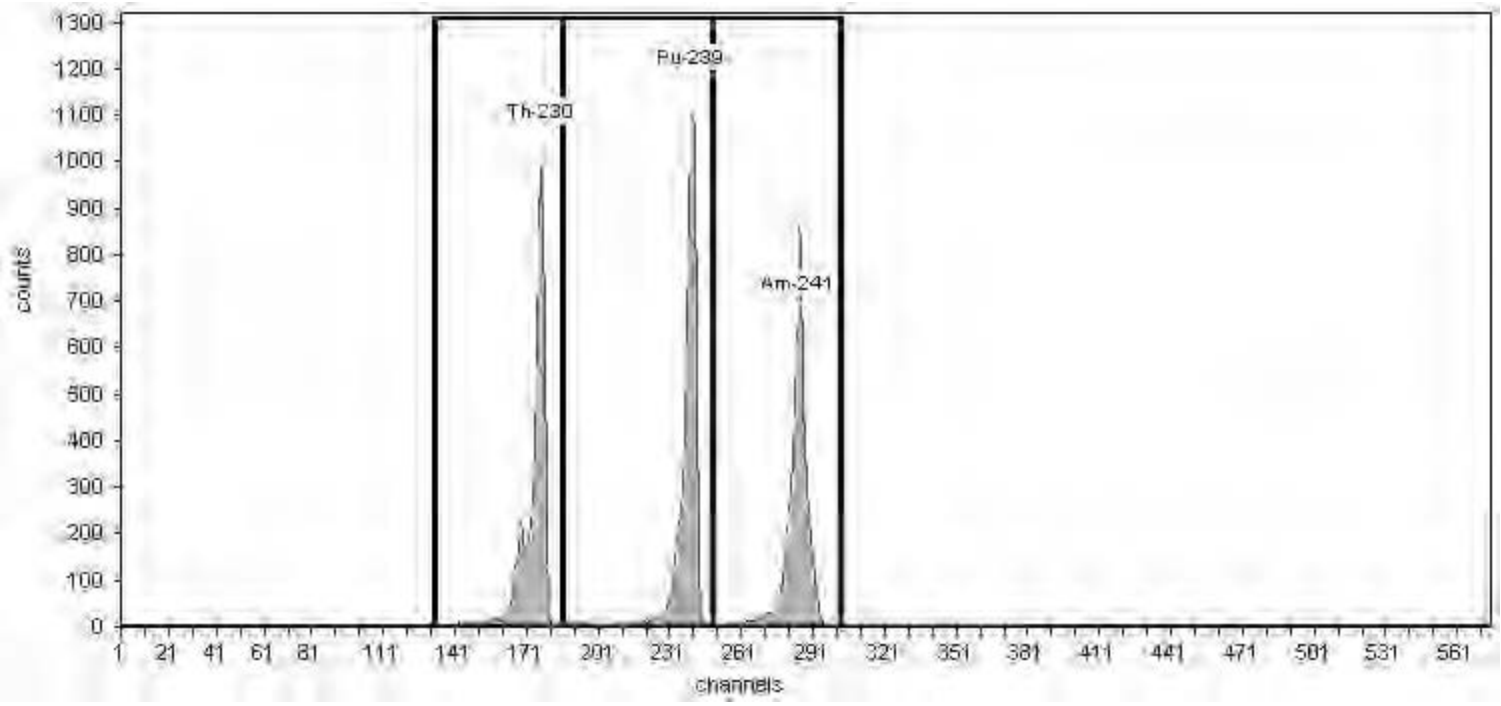
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 11/15/2017 1:09:57PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV167-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.62% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.81	5,446.00	90.77
Pu-239	240	5,155.40	186	249	31.65	5,955.00	99.25
Am-241	284	5,485.70	249	303	32.95	5,611.00	93.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:12:35PM 11/15/2017

Calibration

Sample Name: ICV-8876;AV171-20171115
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 11/15/2017 2:12:32PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

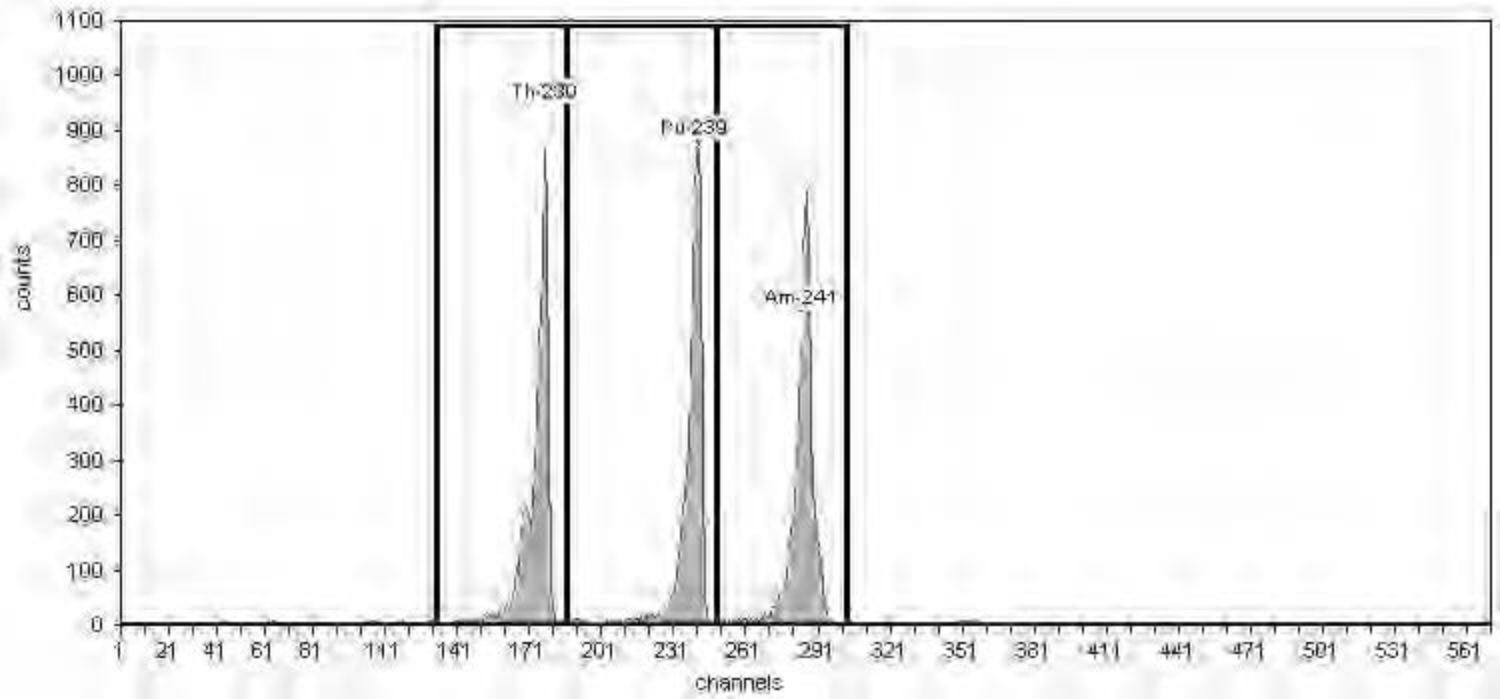
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 11/15/2017 1:12:27PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8876;AV171-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.19% +/- 0.37% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.04	5,494.00	91.57
Pu-239	240	5,155.40	186	249	34.34	5,361.00	89.35
Am-241	284	5,485.70	249	303	35.38	5,510.00	91.83

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:12:54PM 11/15/2017

Calibration

Sample Name: ICV-8874;AV172-20171115
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 11/15/2017 2:12:52PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

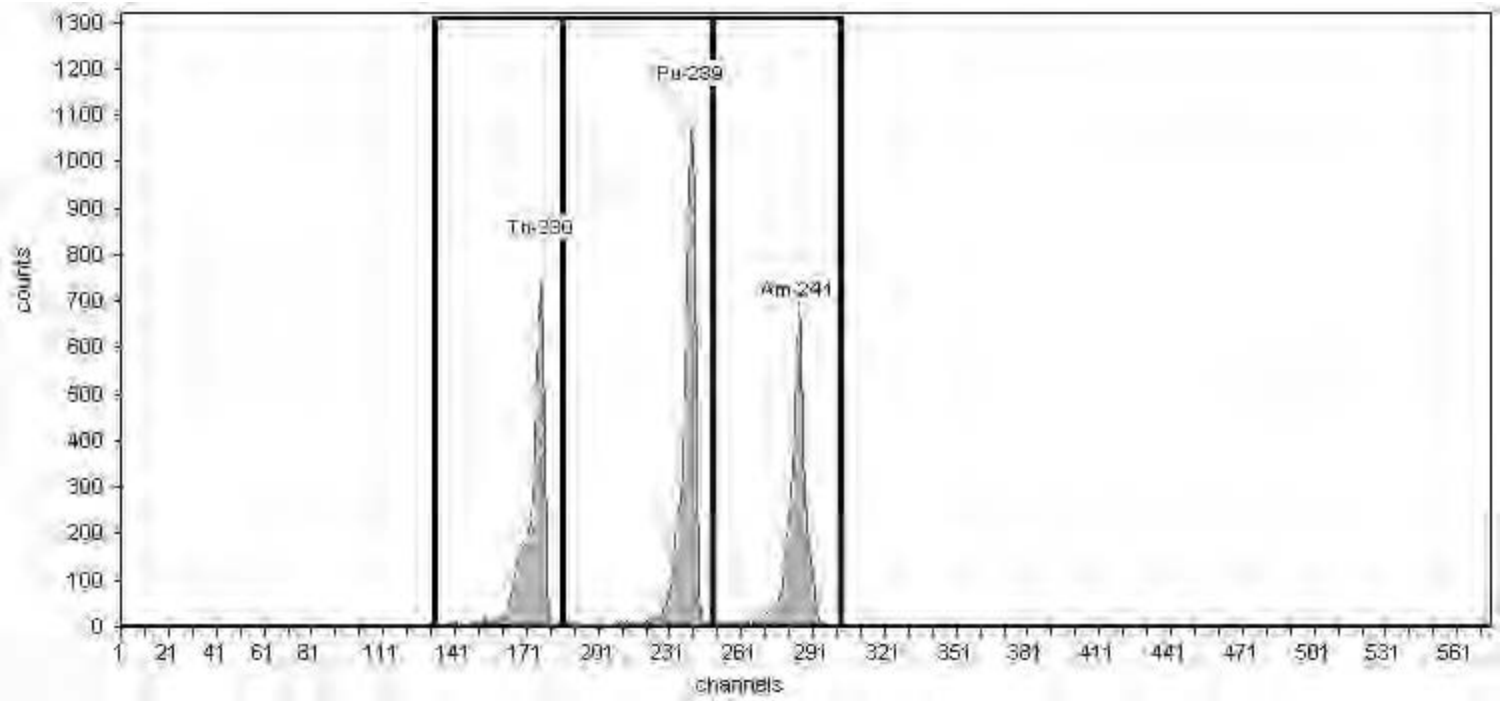
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 11/15/2017 1:12:46PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV172-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.83	4,555.00	75.92
Pu-239	240	5,155.40	186	249	33.34	5,984.00	99.73
Am-241	284	5,485.70	249	303	34.14	4,681.00	78.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:15PM 11/15/2017

Calibration

Sample Name: ICV-8879;AV173-20171115
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 11/15/2017 2:13:13PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

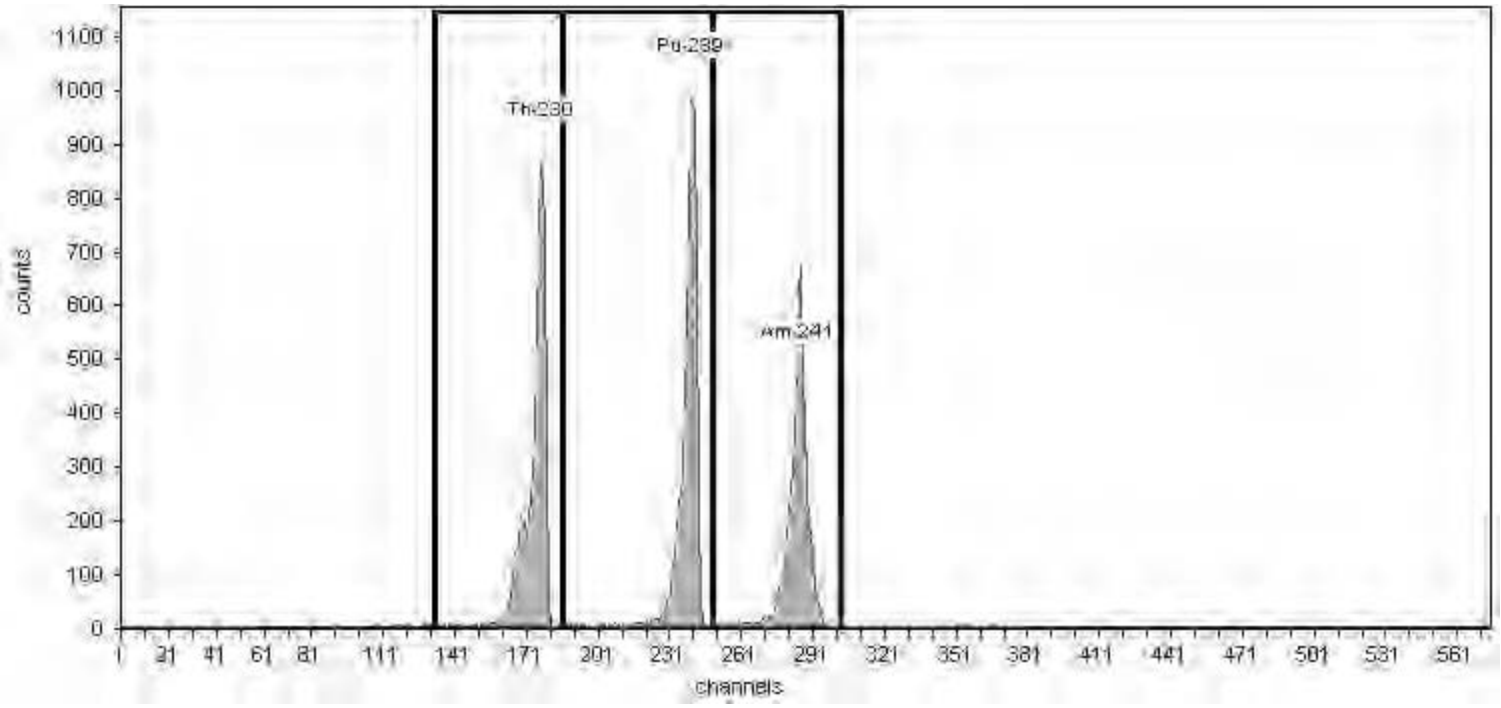
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 11/15/2017 1:13:10PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8879;AV173-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.47% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.77	5,507.00	91.78
Pu-239	240	5,155.40	186	249	35.73	5,849.00	97.48
Am-241	284	5,485.70	249	303	35.27	4,651.00	77.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:10:21PM 11/15/2017

Calibration

Sample Name: ICV-9886;AV174-20171115
Description:
Detector: AV174

Analyst: 60040
Analysis Date: 11/15/2017 2:10:18PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

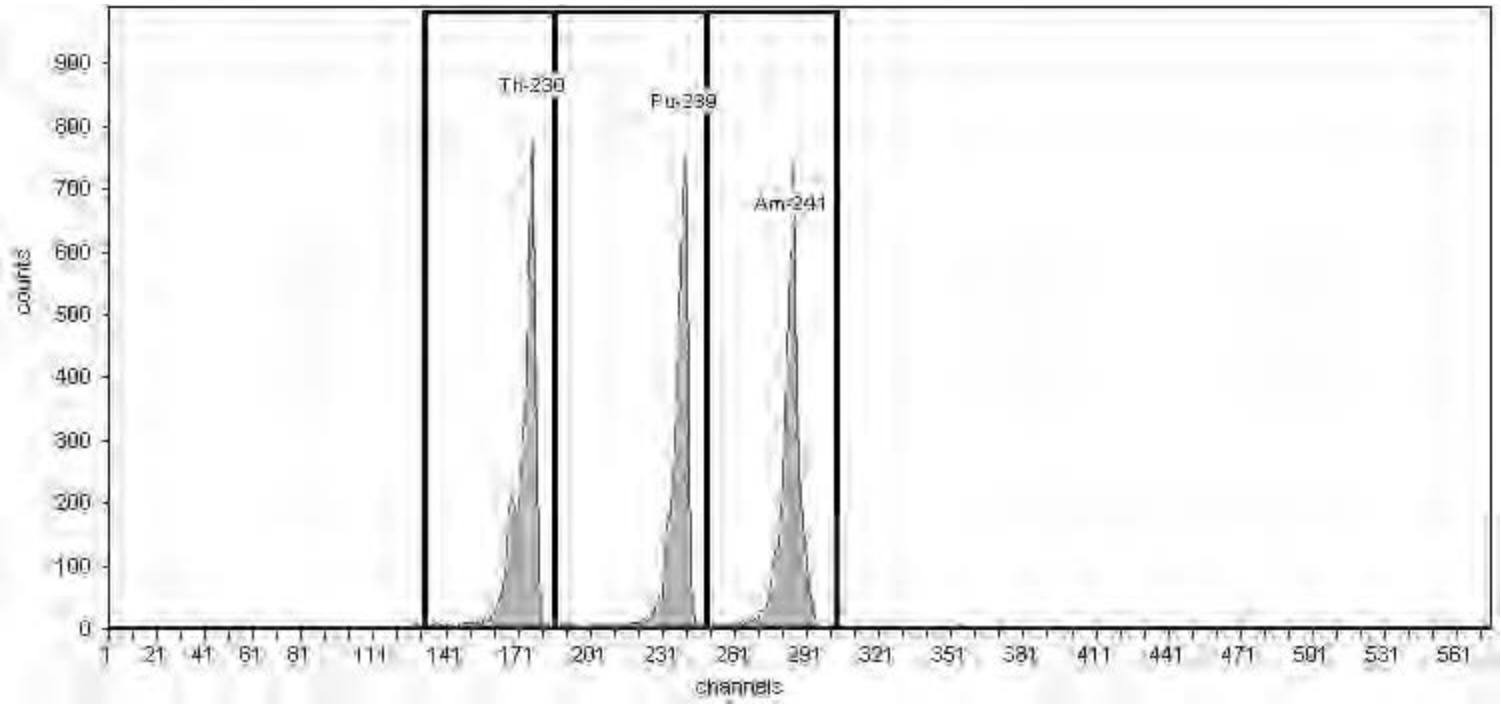
Detector: AV174 , SN: 50-112Y5
Acquisition Start Date: 11/15/2017 1:08:59PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV174-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.91% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.69	5,004.00	83.40
Pu-239	240	5,155.40	186	249	35.59	4,600.00	76.67
Am-241	284	5,485.70	249	303	32.99	4,772.00	79.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:03PM 11/15/2017

Calibration

Sample Name: ICV-9794;AV187-20171115
Description:
Detector: AV187

Analyst: 60040
Analysis Date: 11/15/2017 3:38:00PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

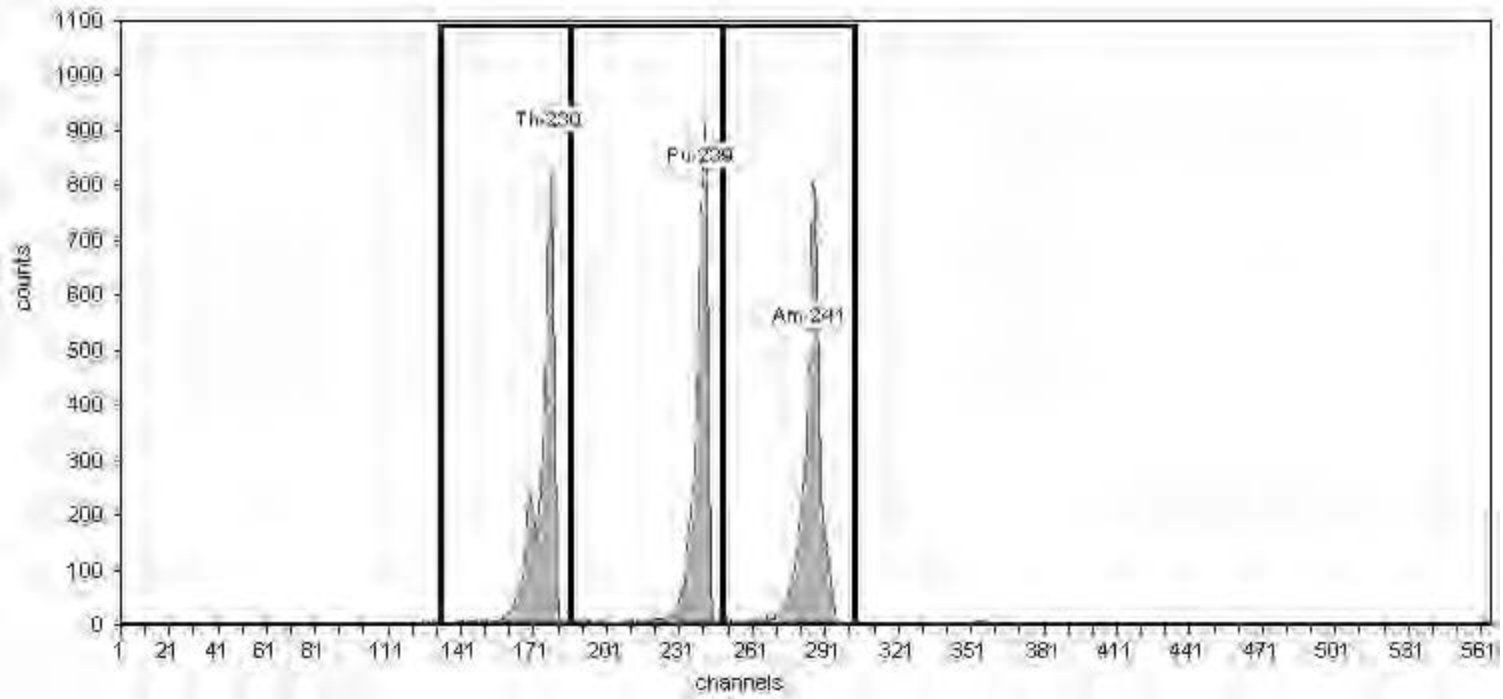
Detector: AV187 , SN: 50-119I2
Acquisition Start Date: 11/15/2017 2:30:42PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9794;AV187-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 21.54% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.00	5,052.00	84.20
Pu-239	240	5,155.40	186	249	31.81	5,030.00	83.83
Am-241	284	5,485.70	249	303	33.75	5,481.00	91.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:36:55PM 11/15/2017

Calibration

Sample Name: ICV-8875;AV188-20171115
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 11/15/2017 3:36:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

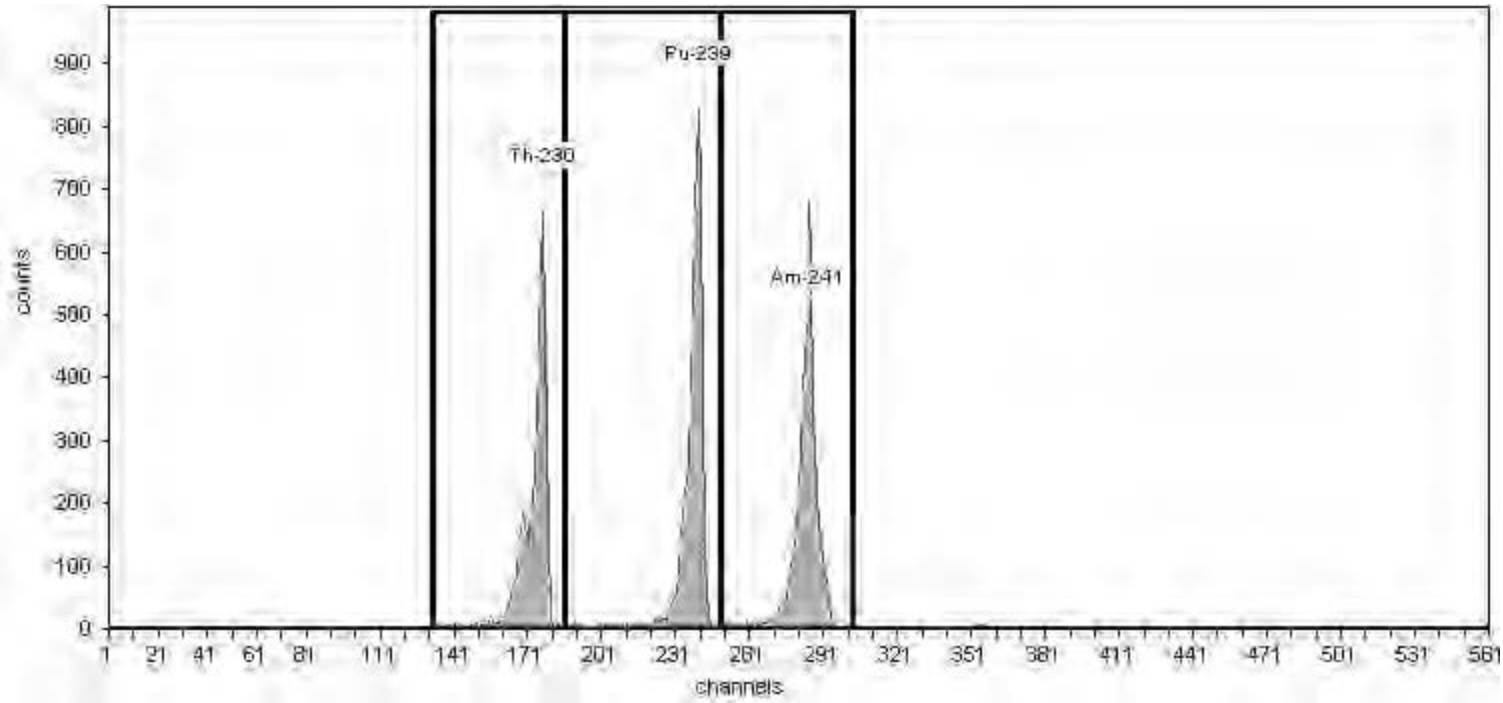
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 11/15/2017 2:27:34PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV188-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.58% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.80	4,152.00	69.20
Pu-239	240	5,155.40	186	249	34.62	4,794.00	79.90
Am-241	284	5,485.70	249	303	32.45	4,456.00	74.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:37:04PM 11/15/2017

Calibration

Sample Name: ICV-7107;AV189-20171115
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 11/15/2017 3:37:02PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

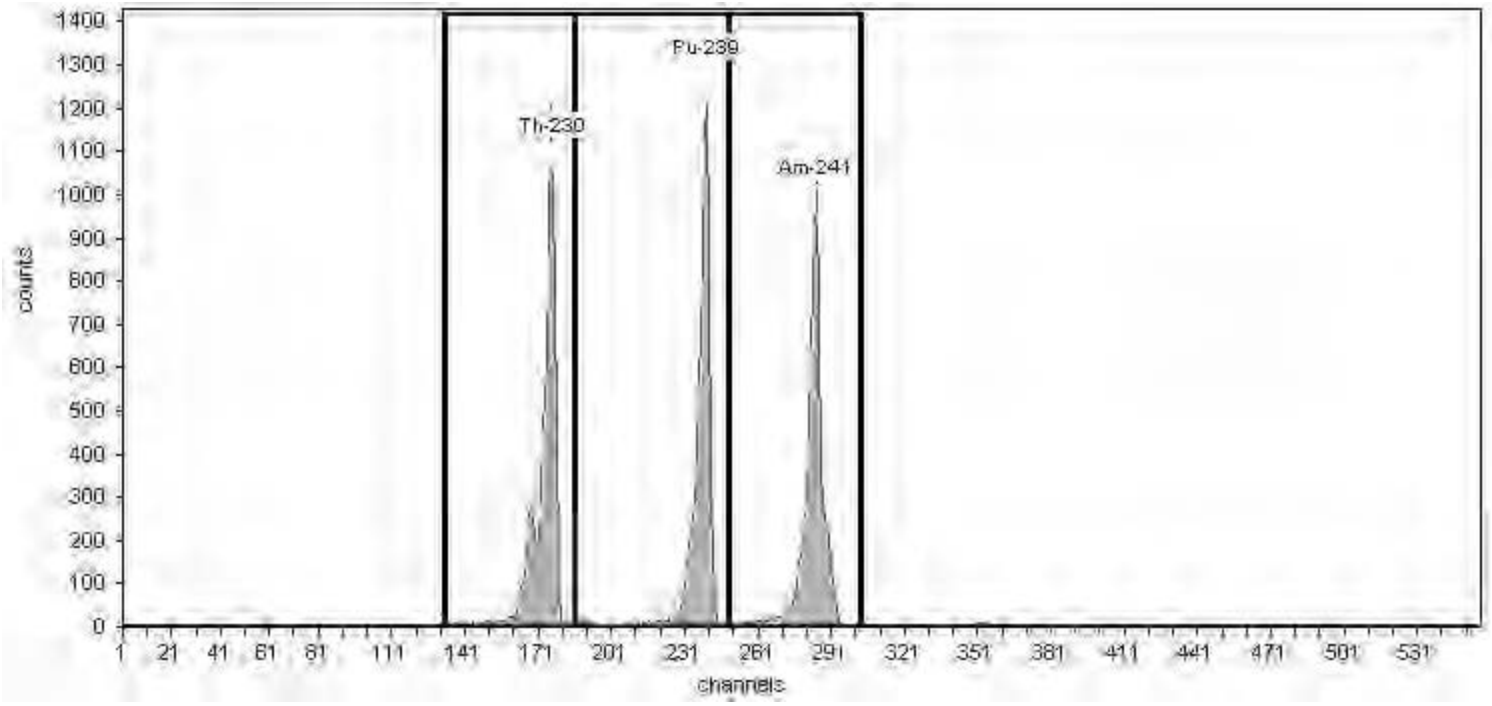
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 11/15/2017 2:27:56PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV189-20171115

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.98% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.84	6,735.00	112.25
Pu-239	240	5,155.40	186	249	31.66	6,585.00	109.75
Am-241	284	5,485.70	249	303	30.62	6,442.00	107.37

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:12PM 11/15/2017

Calibration

Sample Name: ICV-9793;AV190-20171115
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 11/15/2017 3:38:09PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

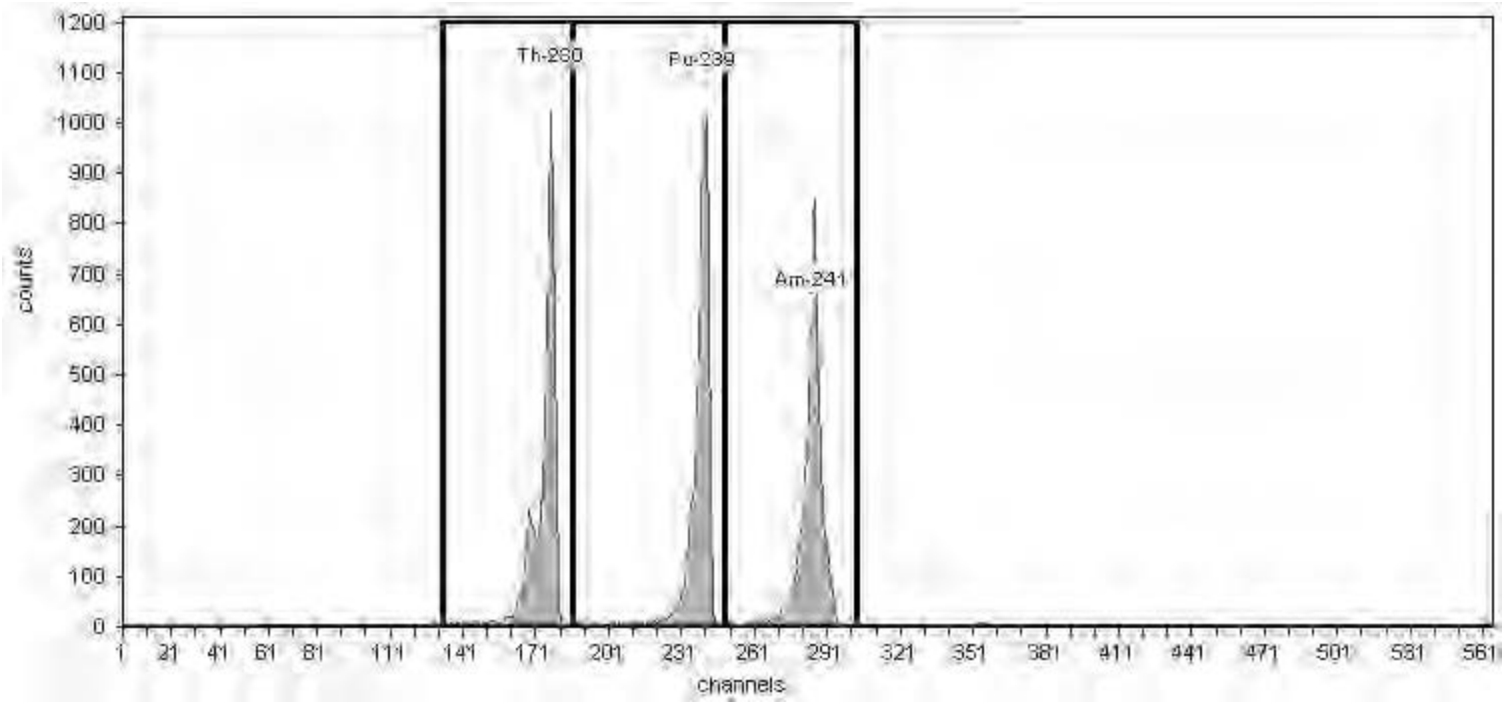
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 11/15/2017 2:30:59PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV190-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.94% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.60	5,677.00	94.62
Pu-239	240	5,155.40	186	249	34.33	5,930.00	98.83
Am-241	284	5,485.70	249	303	33.59	5,626.00	93.77

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:20PM 11/15/2017

Calibration

Sample Name: ICV-9817;AV191-20171115
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 11/15/2017 3:38:17PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

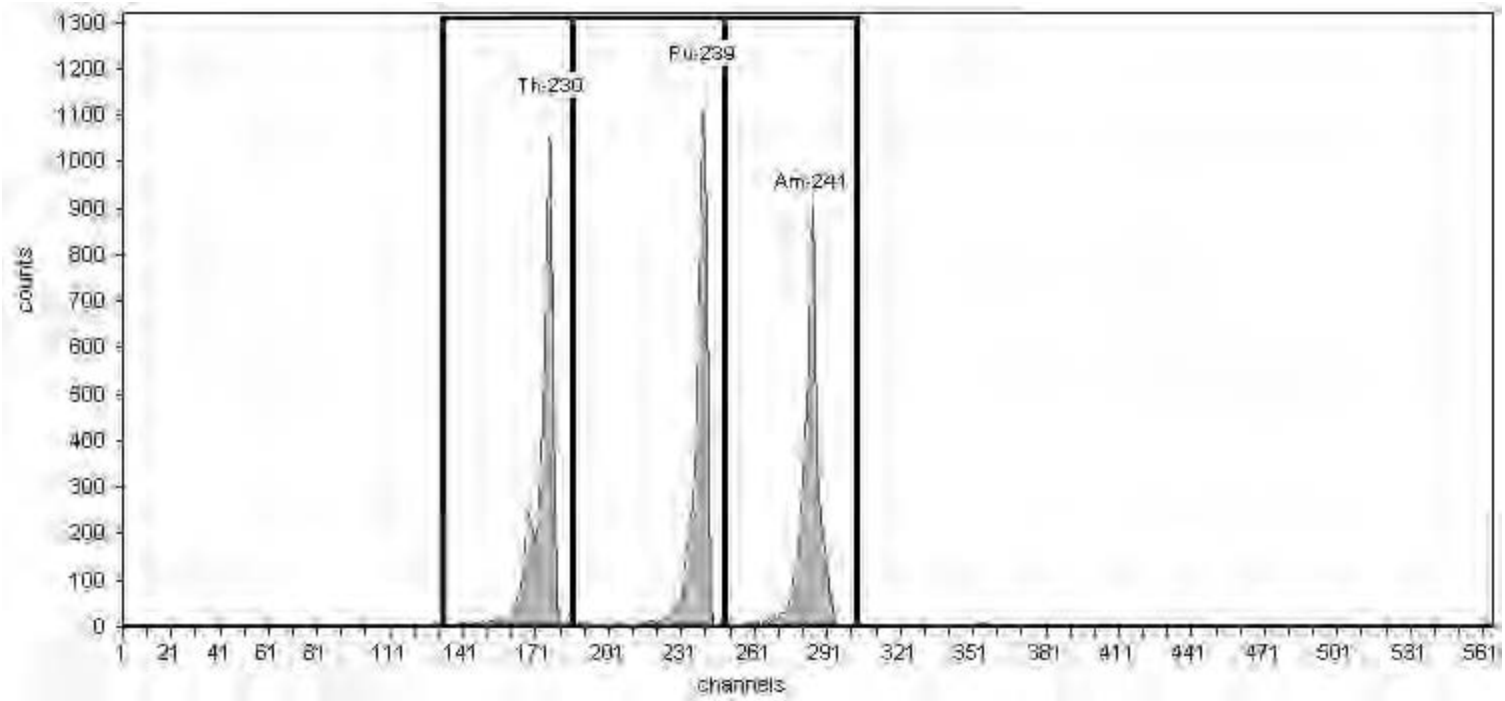
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 11/15/2017 2:31:22PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9817;AV191-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.80% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.30	6,251.00	104.18
Pu-239	240	5,155.40	186	249	30.56	5,775.00	96.25
Am-241	284	5,485.70	249	303	30.50	5,875.00	97.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:38:28PM 11/15/2017

Calibration

Sample Name: ICV-9885;AV192-20171115
Description:
Detector: AV192

Analyst: 60040
Analysis Date: 11/15/2017 3:38:25PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

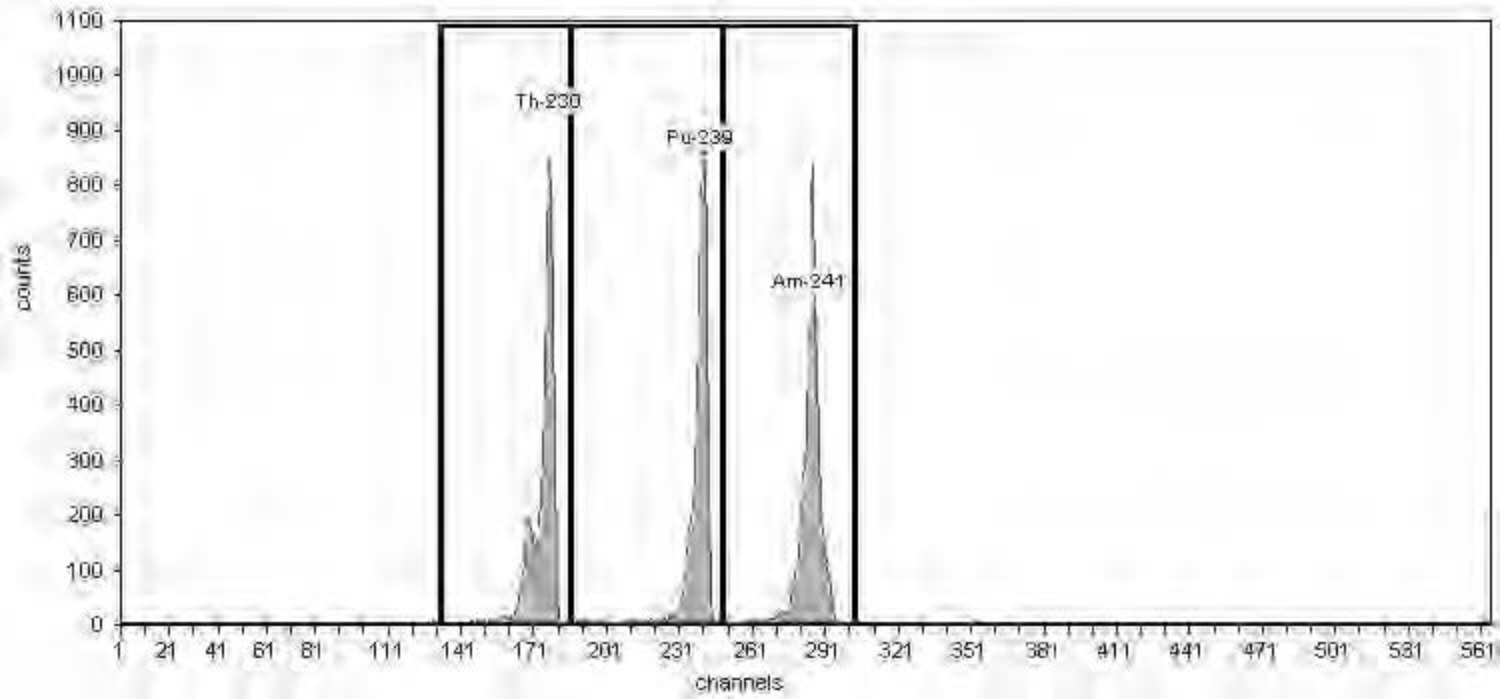
Detector: AV192 , SN: 50-119J7
Acquisition Start Date: 11/15/2017 2:31:38PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV192-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.77% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.08	4,773.00	79.55
Pu-239	240	5,155.40	186	249	31.05	4,623.00	77.05
Am-241	284	5,485.70	249	303	31.03	5,031.00	83.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:18:51AM 11/16/2017

Calibration

Sample Name: ICV-9817;AV206-20171115
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 11/16/2017 8:18:49AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

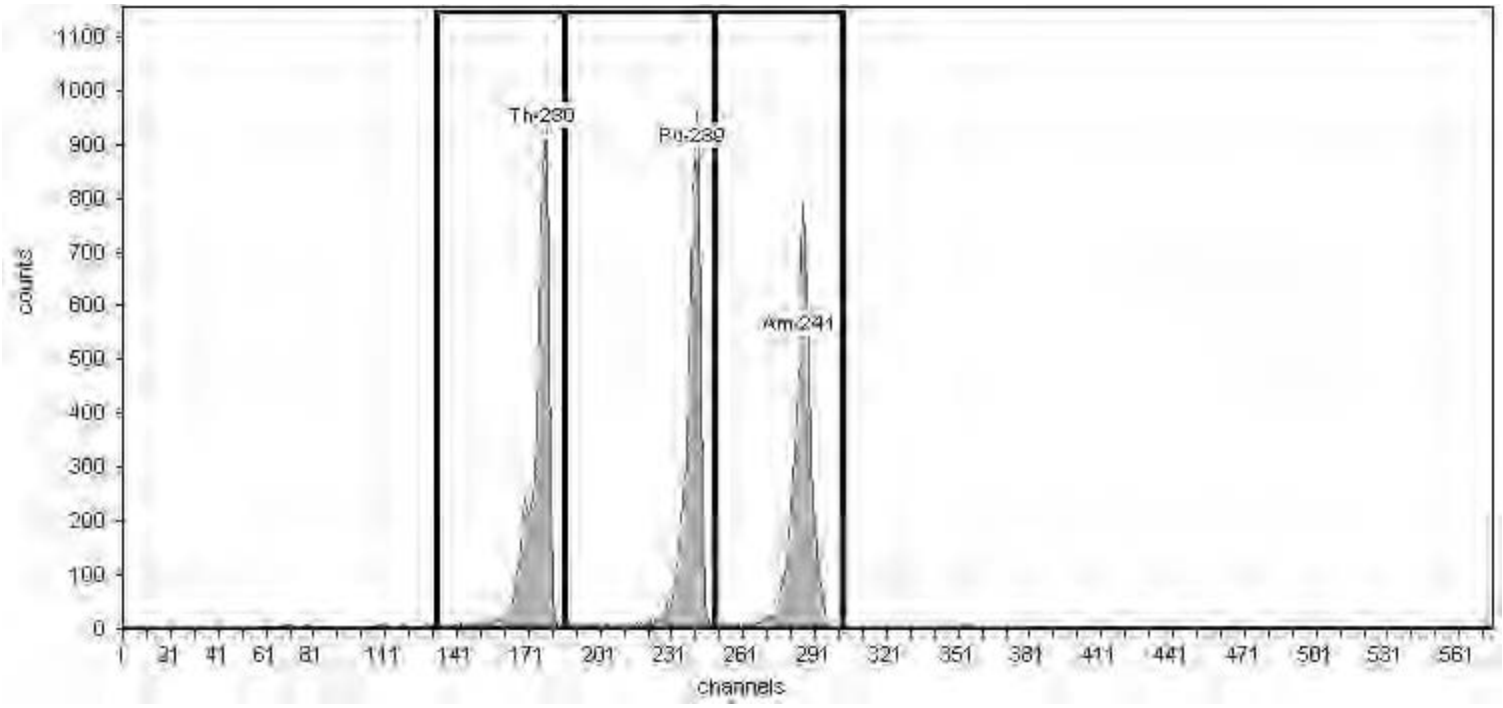
Detector: AV206 , SN: 5604420
Acquisition Start Date: 11/15/2017 3:53:18PM

Live Time: 60.00 min.
Real Time: 60.04 min.

Efficiency Calibration Name: ICV-9817;AV206-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.74% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.17	6,251.00	104.18
Pu-239	240	5,155.40	186	249	37.57	5,837.00	97.28
Am-241	284	5,485.70	249	303	39.88	5,773.00	96.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:17:33AM 11/16/2017

Calibration

Sample Name: ICV-9520;AV208-20171115
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 11/16/2017 8:17:30AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

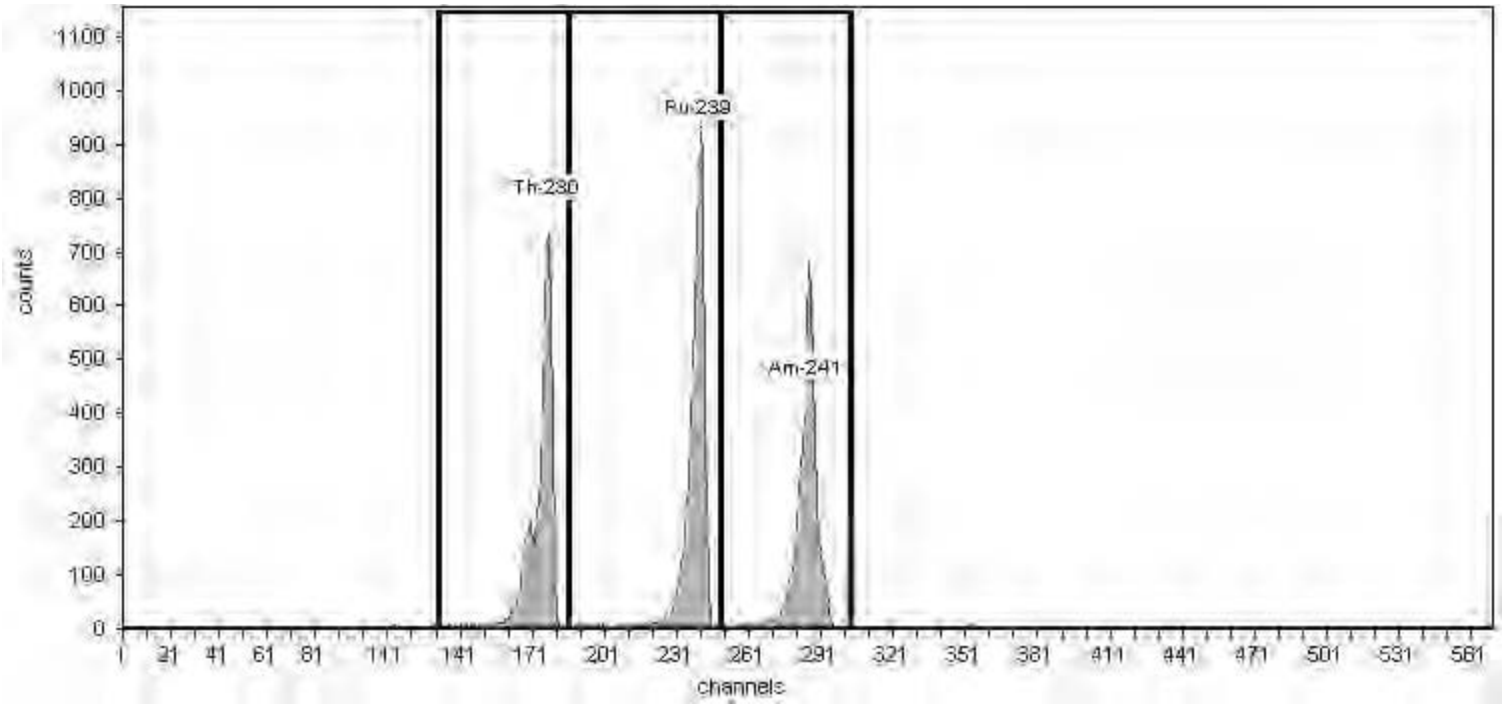
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 11/15/2017 3:50:36PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9520;AV208-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.79% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.82	4,776.00	79.60
Pu-239	240	5,155.40	186	249	35.87	5,834.00	97.23
Am-241	284	5,485.70	249	303	34.38	4,677.00	77.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:22:49PM 11/16/2017

Calibration

Sample Name: ICV-8879;AV211-20171116
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 11/16/2017 12:22:46PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

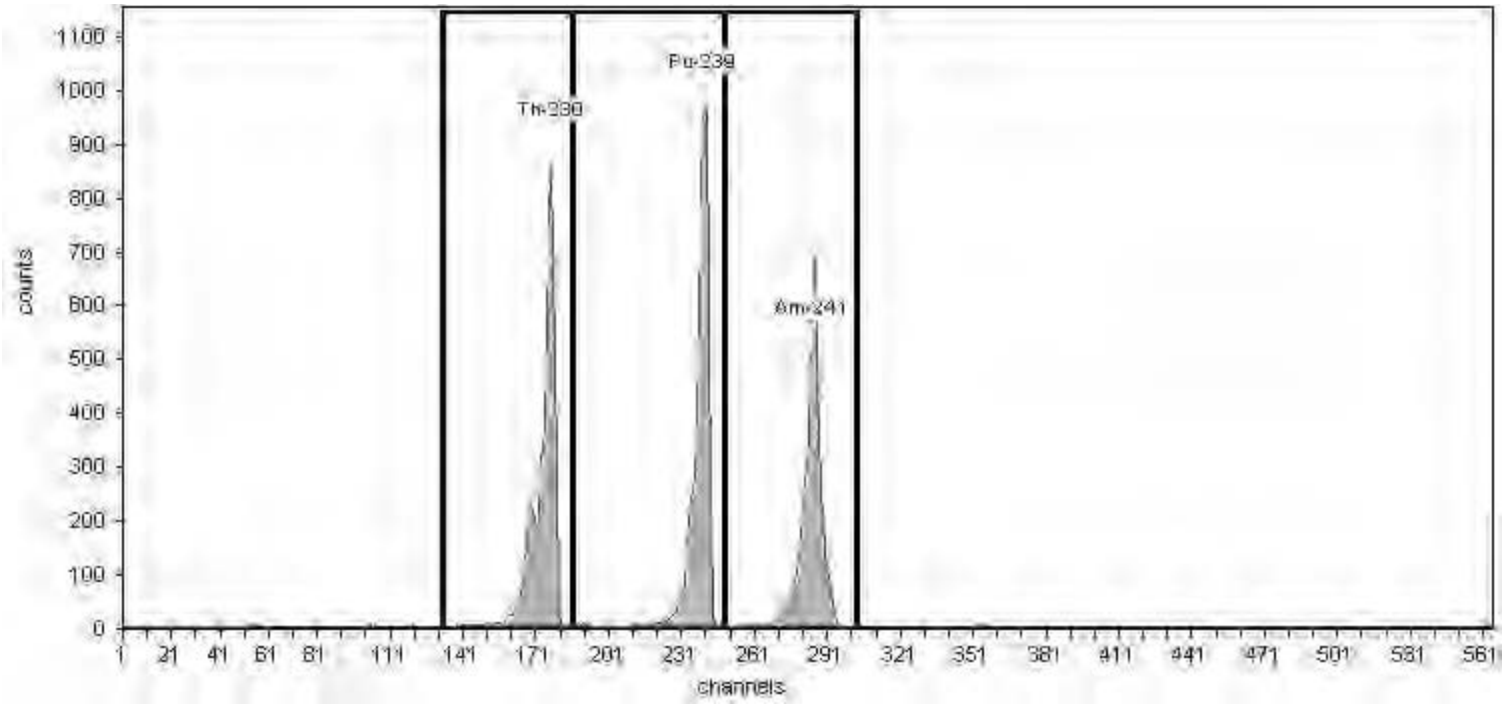
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 11/16/2017 11:19:33AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8879;AV211-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.39% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.48	5,492.00	91.53
Pu-239	240	5,155.40	186	249	34.39	5,731.00	95.52
Am-241	284	5,485.70	249	303	33.75	4,711.00	78.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:18:26AM 11/16/2017

Calibration

Sample Name: ICV-9886;AV212-20171115
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 11/16/2017 8:18:23AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

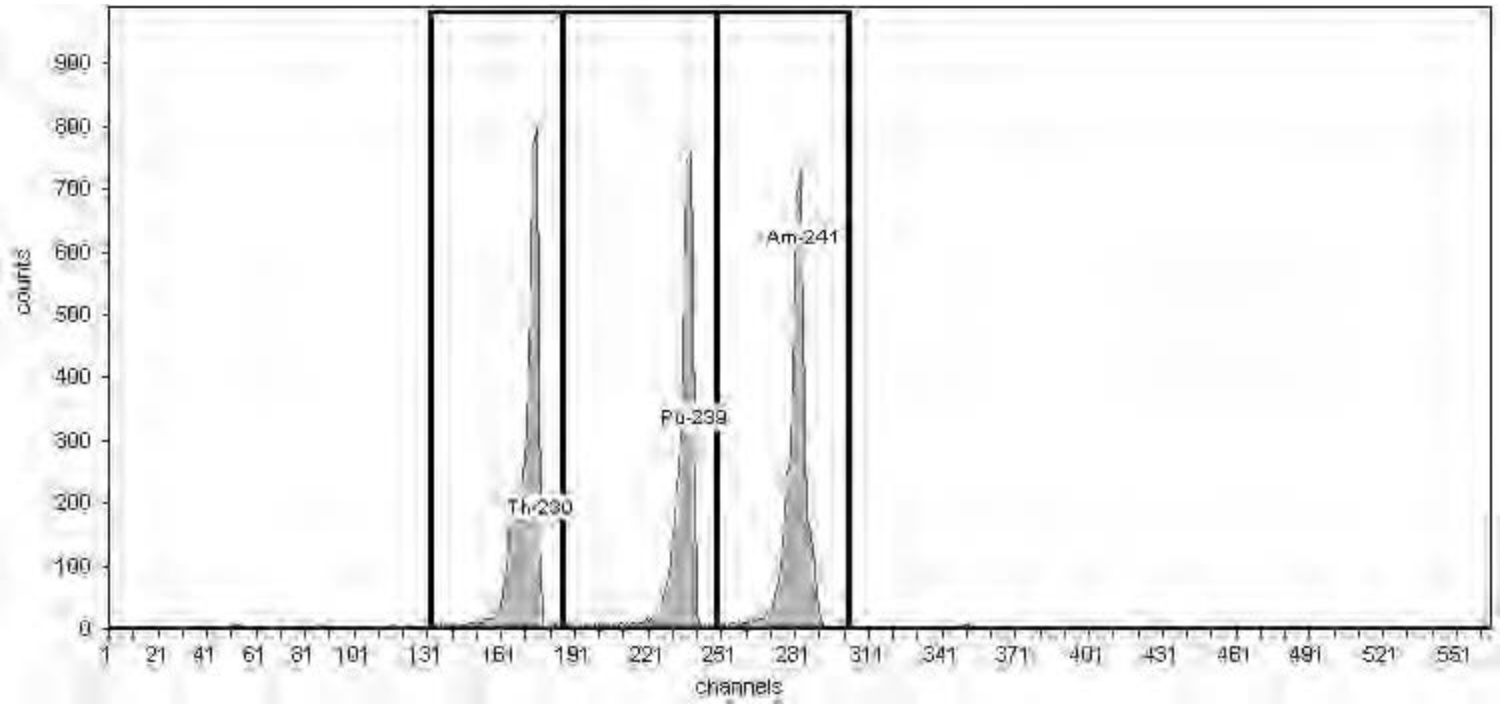
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 11/15/2017 3:52:45PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9886;AV212-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.56% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.48	5,058.00	84.30
Pu-239	240	5,155.40	186	249	34.94	4,675.00	77.92
Am-241	284	5,485.70	249	303	35.51	5,066.00	84.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:18:14AM 11/16/2017

Calibration

Sample Name: ICV-9792;AV213-20171115
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 11/16/2017 8:18:12AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

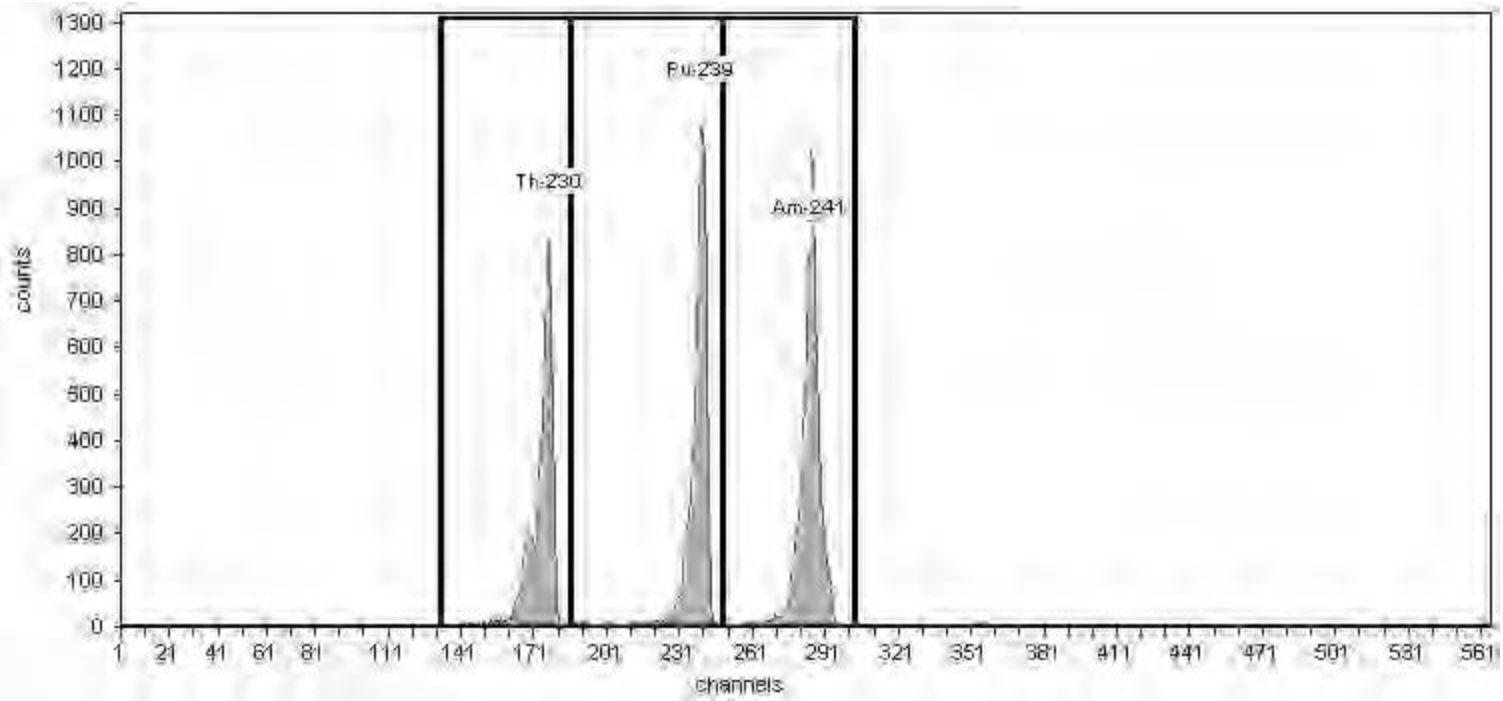
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 11/15/2017 3:52:26PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9792;AV213-2017111

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.11% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.19	5,418.00	90.30
Pu-239	240	5,155.40	186	249	34.36	6,318.00	105.30
Am-241	284	5,485.70	249	303	37.65	7,075.00	117.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:45:17AM 11/16/2017

Calibration

Sample Name: ICV-8877;AV215-20171116
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 11/16/2017 9:45:14AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

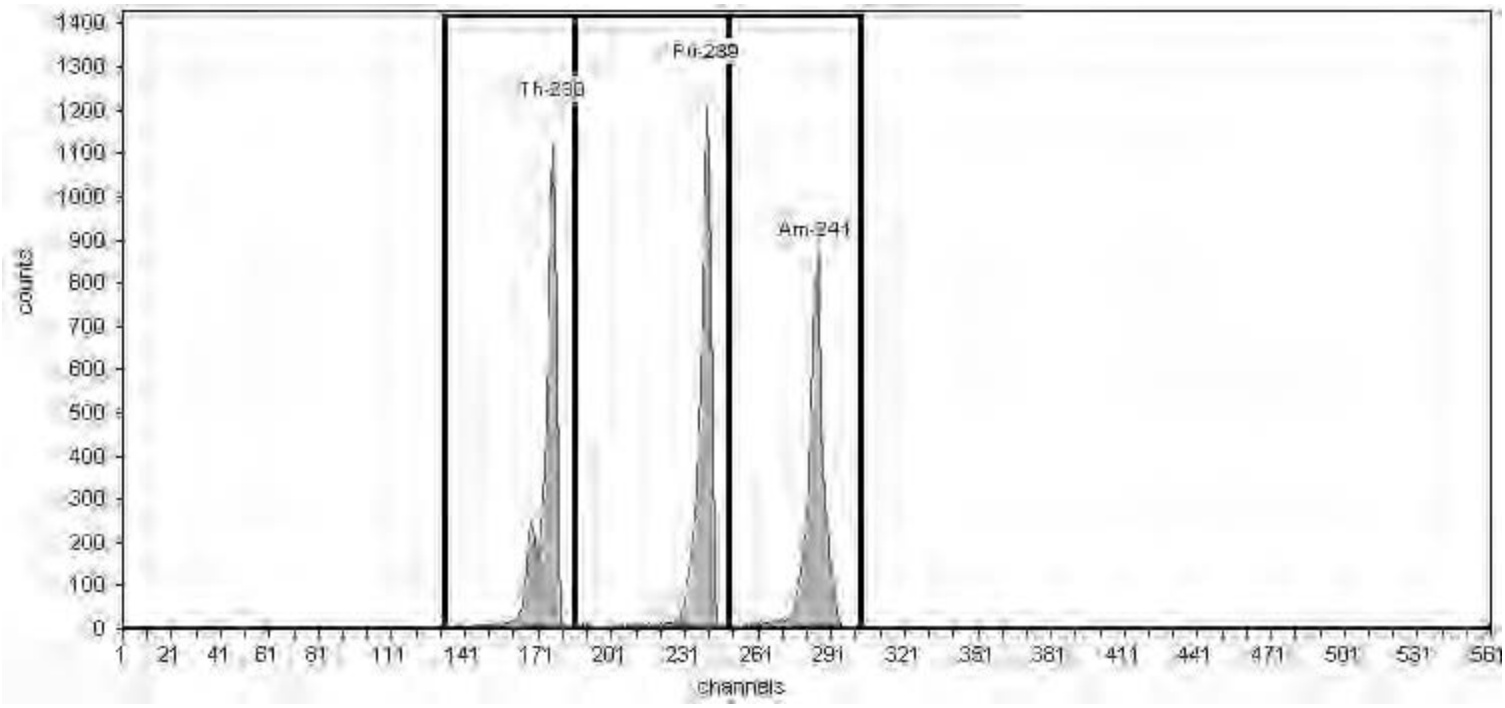
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 11/16/2017 8:34:20AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8877;AV215-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.86% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.22	6,180.00	103.00
Pu-239	240	5,155.40	186	249	31.32	6,348.00	105.80
Am-241	284	5,485.70	249	303	31.03	5,942.00	99.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:45:08AM 11/16/2017

Calibration

Sample Name: ICV-9795;AV216-20171116
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 11/16/2017 9:45:05AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

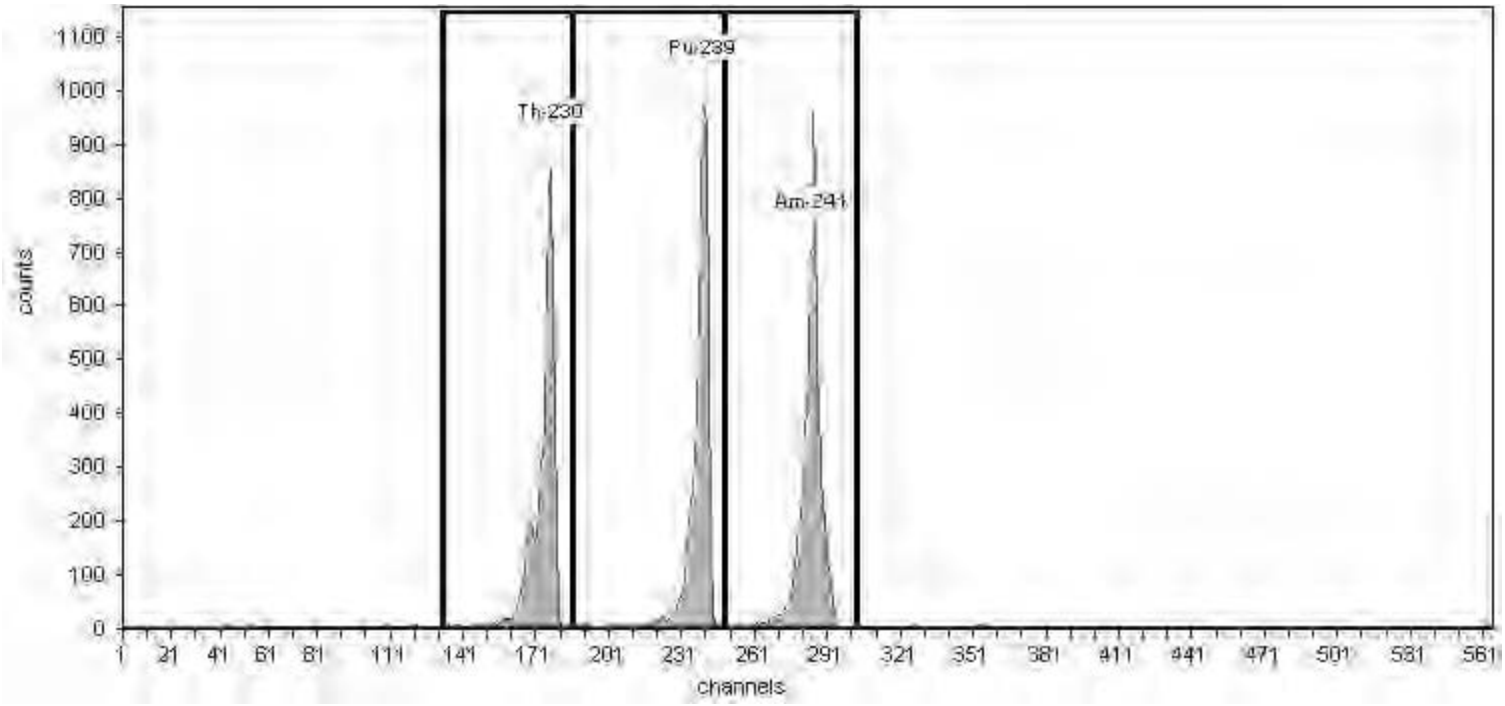
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 11/16/2017 8:34:01AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9795;AV216-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.77% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.69	5,257.00	87.62
Pu-239	240	5,155.40	186	249	32.93	5,609.00	93.48
Am-241	284	5,485.70	249	303	30.30	5,985.00	99.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:44:57AM 11/16/2017

Calibration

Sample Name: ICV-9794;AV217-20171116
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 11/16/2017 9:44:55AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

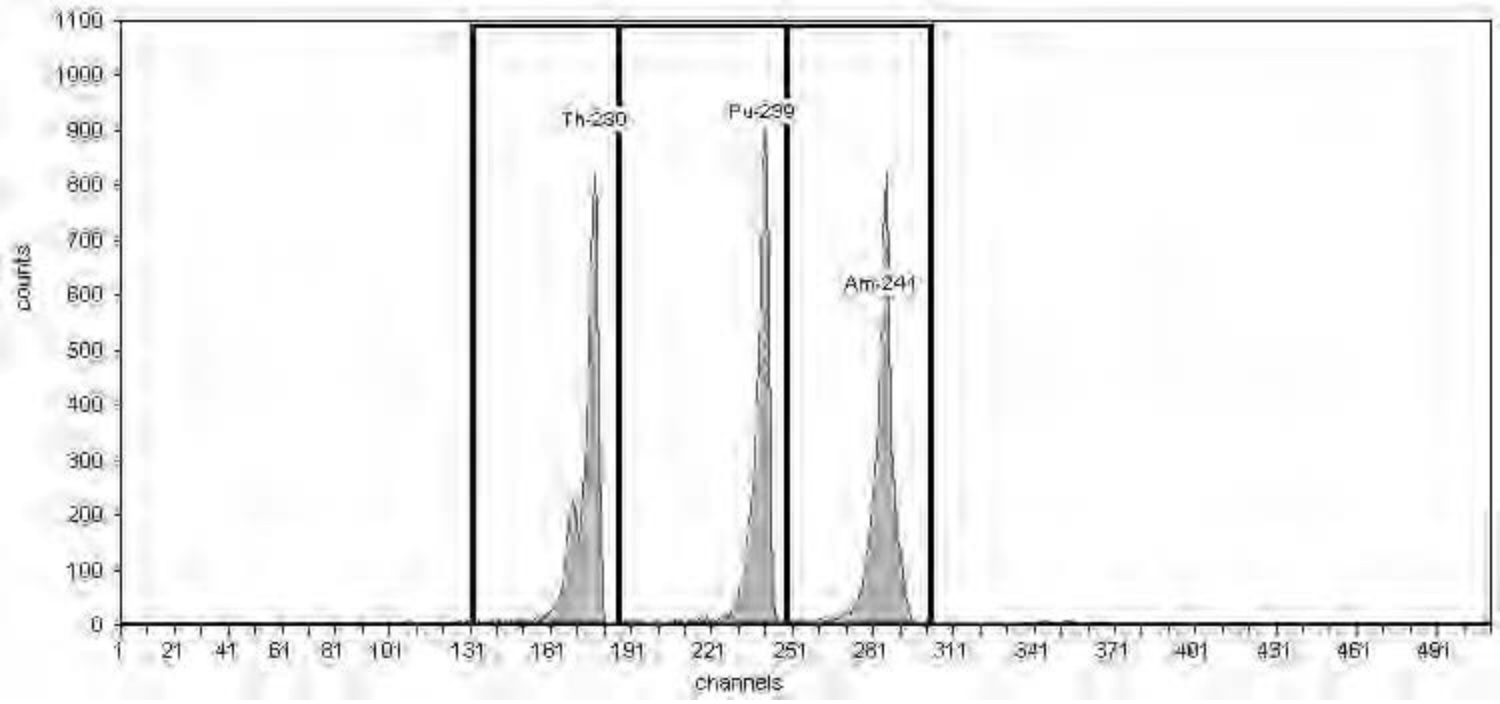
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 11/16/2017 8:33:44AM

Live Time: 60.00 min.
Real Time: 60.03 min.

Efficiency Calibration Name: ICV-9794;AV217-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.38% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.52	5,166.00	86.10
Pu-239	240	5,155.40	186	249	30.38	4,939.00	82.32
Am-241	284	5,485.70	249	303	32.85	5,344.00	89.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:45:25AM 11/16/2017

Calibration

Sample Name: ICV-8875;AV218-20171116
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 11/16/2017 9:45:23AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

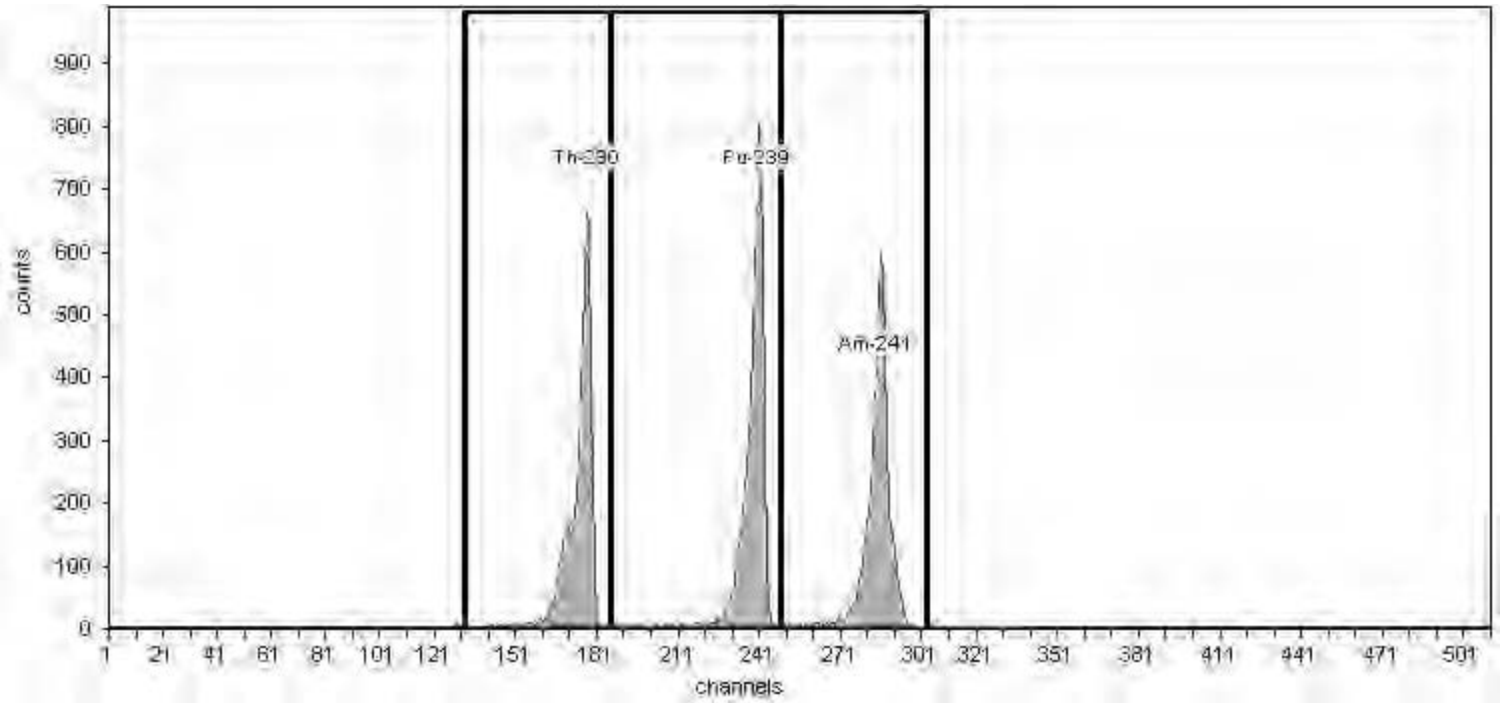
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 11/16/2017 8:34:40AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8875;AV218-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.12% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.85	4,167.00	69.45
Pu-239	240	5,155.40	186	249	33.43	4,703.00	78.38
Am-241	284	5,485.70	249	303	35.90	4,232.00	70.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:45:35AM 11/16/2017

Calibration

Sample Name: ICV-7107;AV219-20171116
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 11/16/2017 9:45:32AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

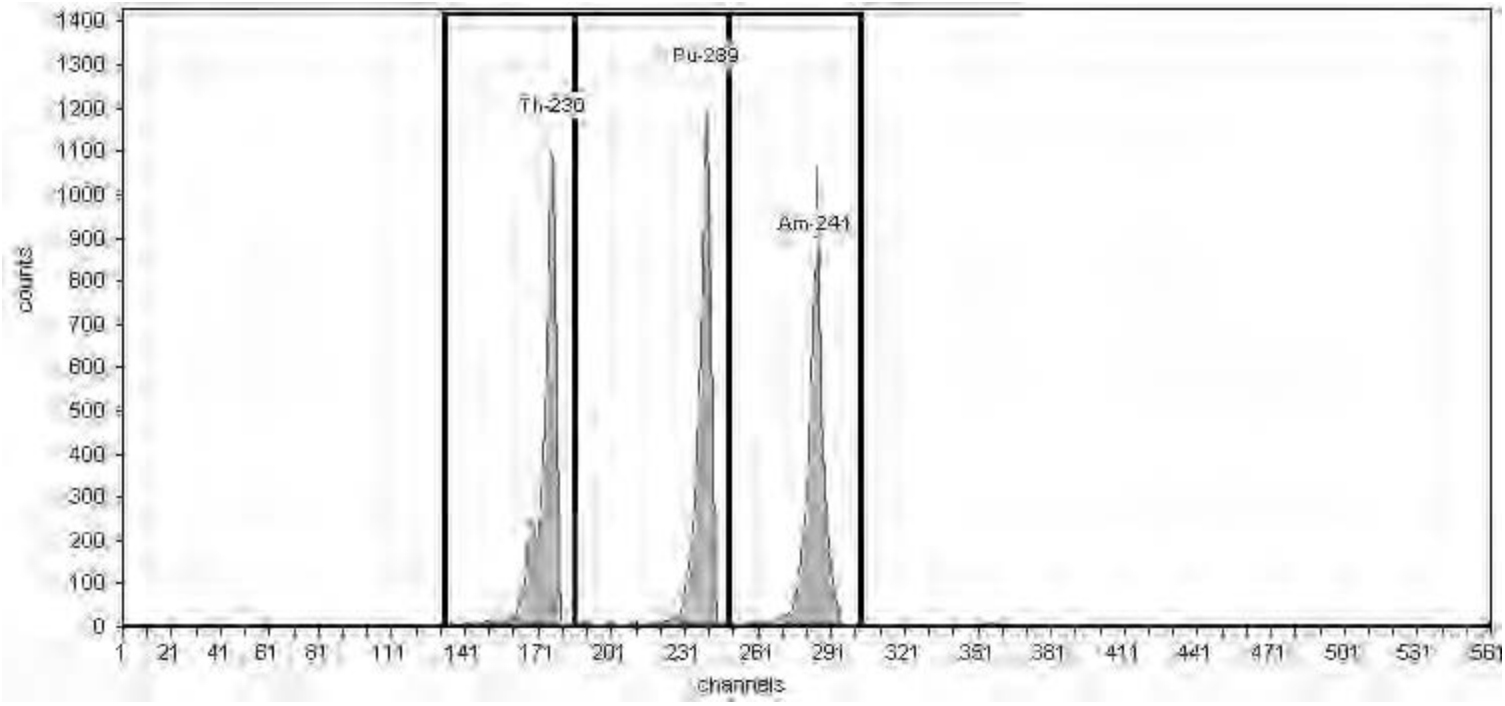
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 11/16/2017 8:34:58AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-7107;AV219-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.79% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.14	6,617.00	110.28
Pu-239	240	5,155.40	186	249	33.26	6,579.00	109.65
Am-241	284	5,485.70	249	303	30.40	6,430.00	107.17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:44:49AM 11/16/2017

Calibration

Sample Name: ICV-9793;AV220-20171116
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 11/16/2017 9:44:46AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

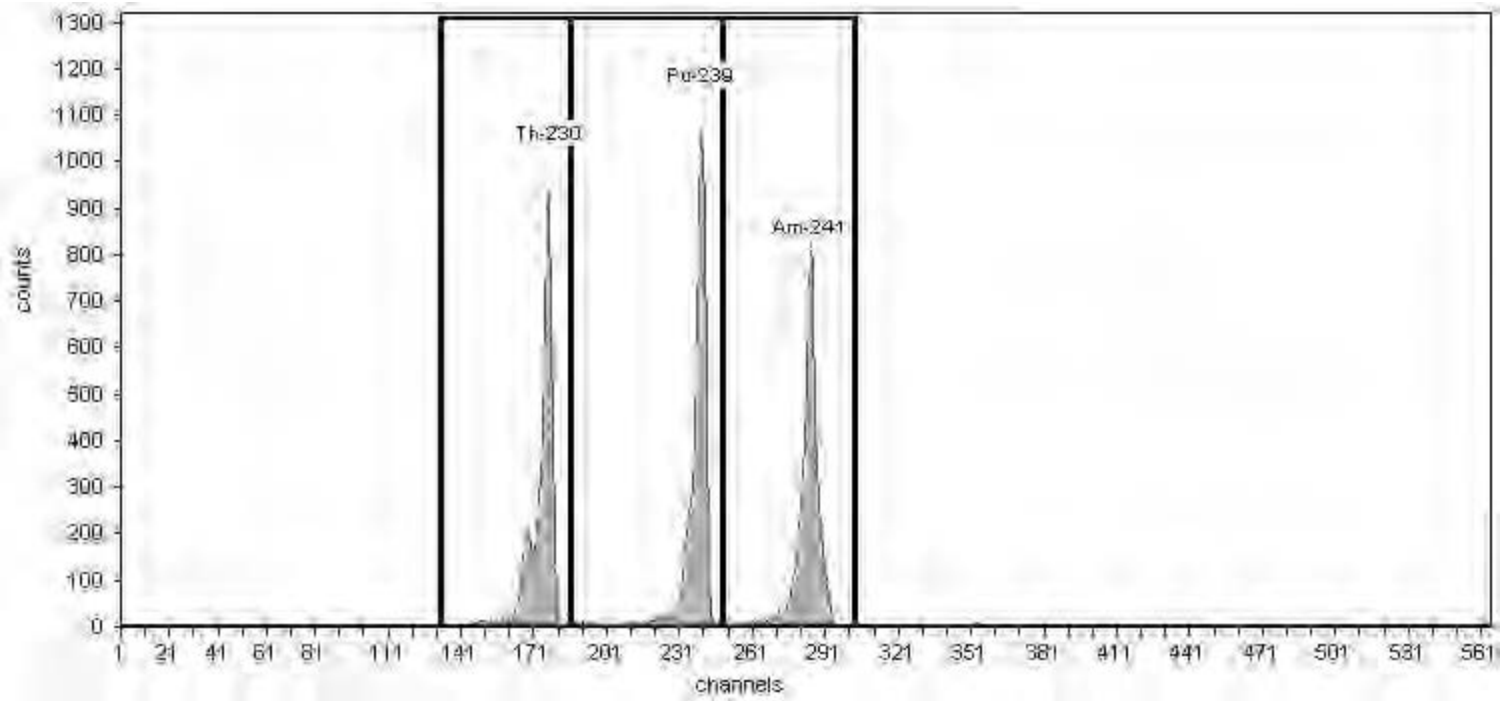
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 11/16/2017 8:33:19AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9793;AV220-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.29% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.81	5,505.00	91.75
Pu-239	240	5,155.40	186	249	31.47	5,763.00	96.05
Am-241	284	5,485.70	249	303	32.02	5,496.00	91.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:44:32AM 11/16/2017

Calibration

Sample Name: ICV-9885;AV222-20171116
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 11/16/2017 9:44:29AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

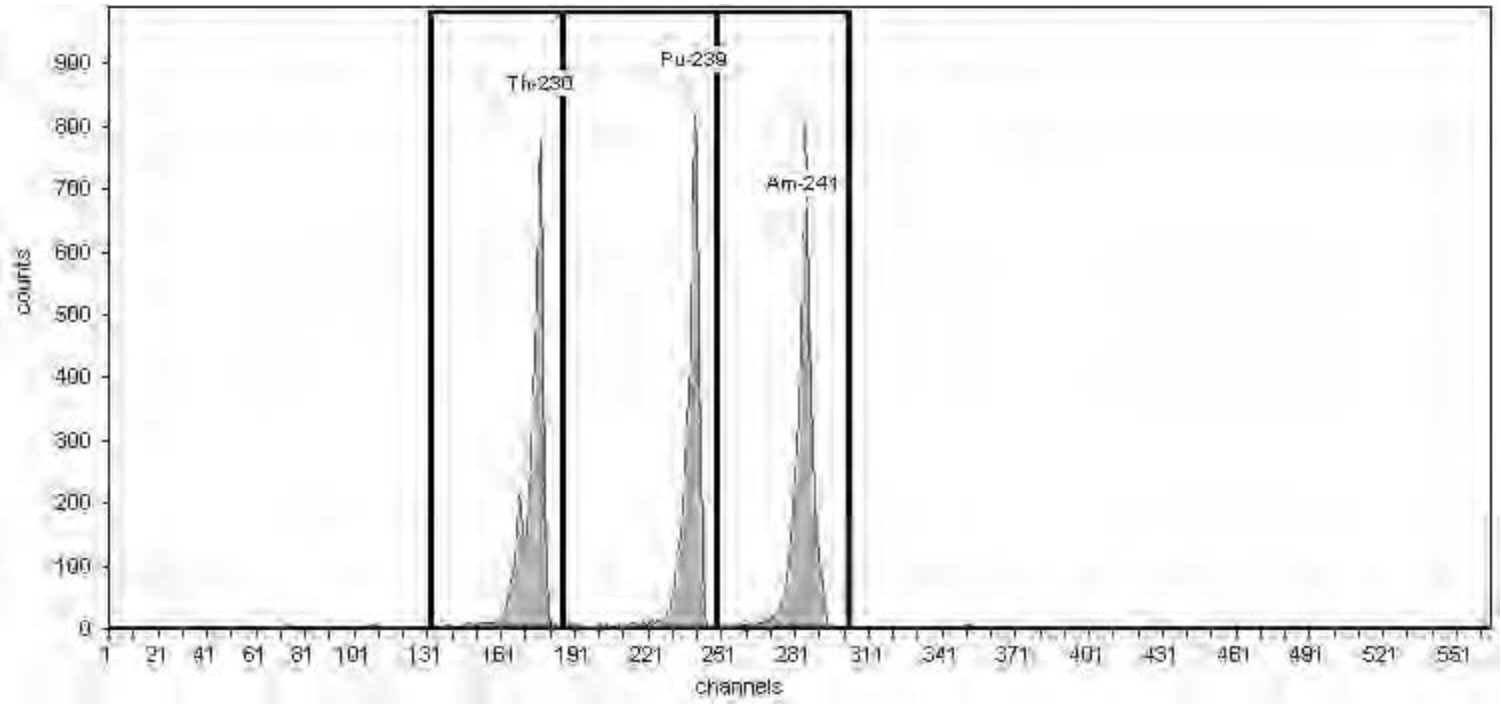
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 11/16/2017 8:32:42AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-9885;AV222-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.88% +/- 0.47% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.29	4,770.00	79.50
Pu-239	240	5,155.40	186	249	31.47	4,607.00	76.78
Am-241	284	5,485.70	249	303	33.58	5,118.00	85.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:46:14AM 11/16/2017

Calibration

Sample Name: ICV-8874;AV225-20171116
Description:
Detector: AV225

Analyst: 60040
Analysis Date: 11/16/2017 9:46:11AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

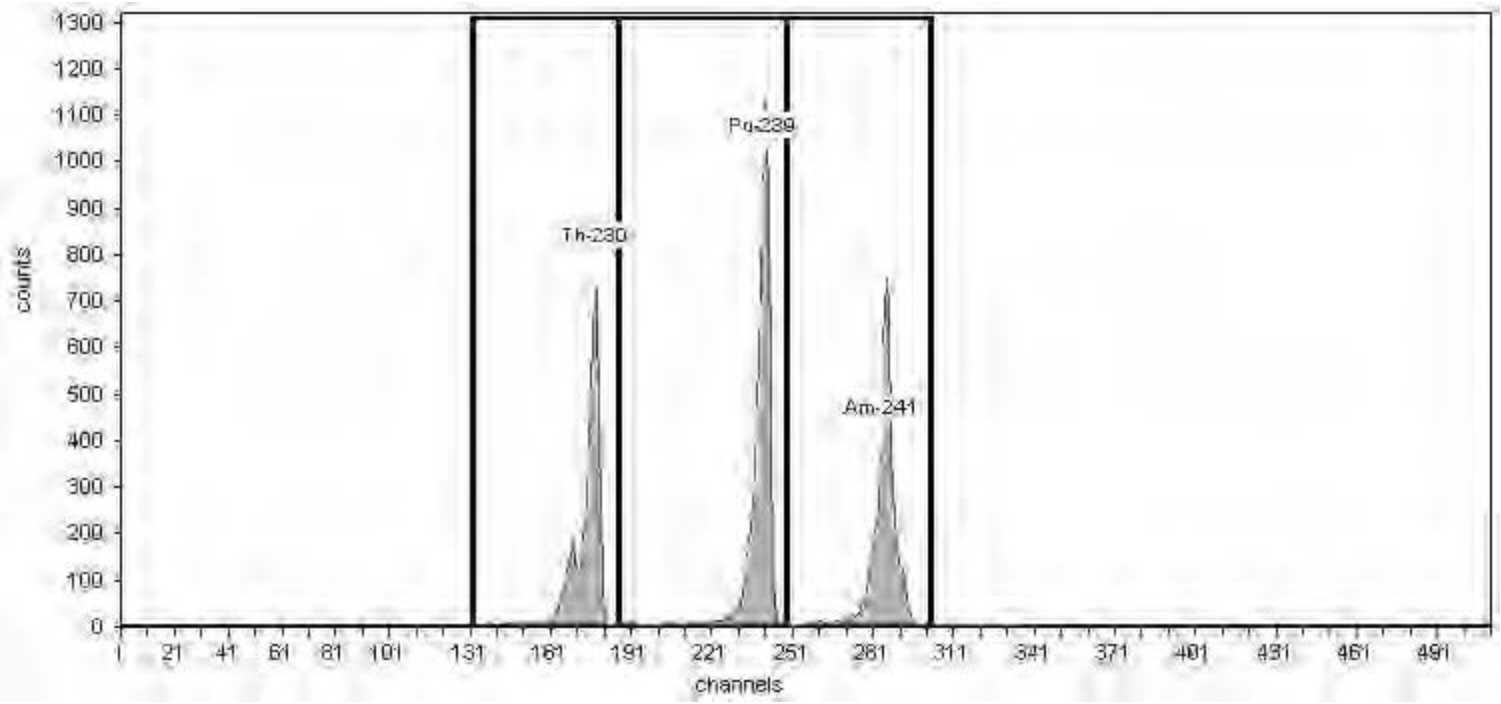
Detector: AV225 , SN: 50-117J7
Acquisition Start Date: 11/16/2017 8:36:09AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: ICV-8874;AV225-20171116

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.14% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.22	4,429.00	73.82
Pu-239	240	5,155.40	186	249	32.15	6,035.00	100.58
Am-241	284	5,485.70	249	303	28.90	4,679.00	77.98

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:21:46PM 8/14/2018

Calibration

Sample Name: CCV-7107;AV1-08142018c
Description:
Detector: AV1

Calibration Date: 8/14/2018 3:10:30PM
Analyst: 60040

Source Info

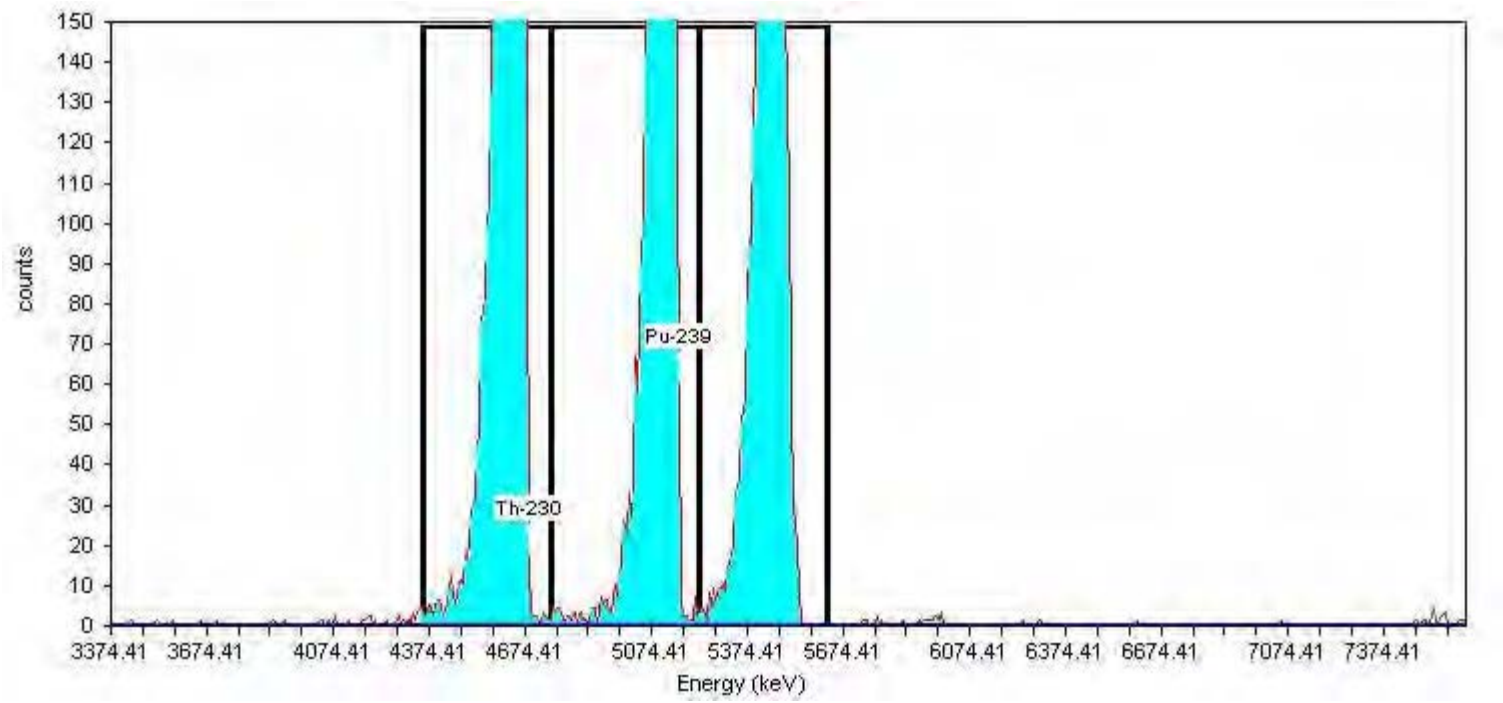
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 8/14/2018 2:05:28PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 23.85% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,305.00	105.08
Pu-239	240	5.16	186	249	0.00	6,479.00	107.98
Am-241	284	5.49	249	303	0.00	6,108.00	101.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:21:58PM 8/14/2018

Calibration

Sample Name: CCV-8877;AV3-08142018b
Description:
Detector: AV3

Calibration Date: 8/14/2018 3:10:42PM
Analyst: 60040

Source Info

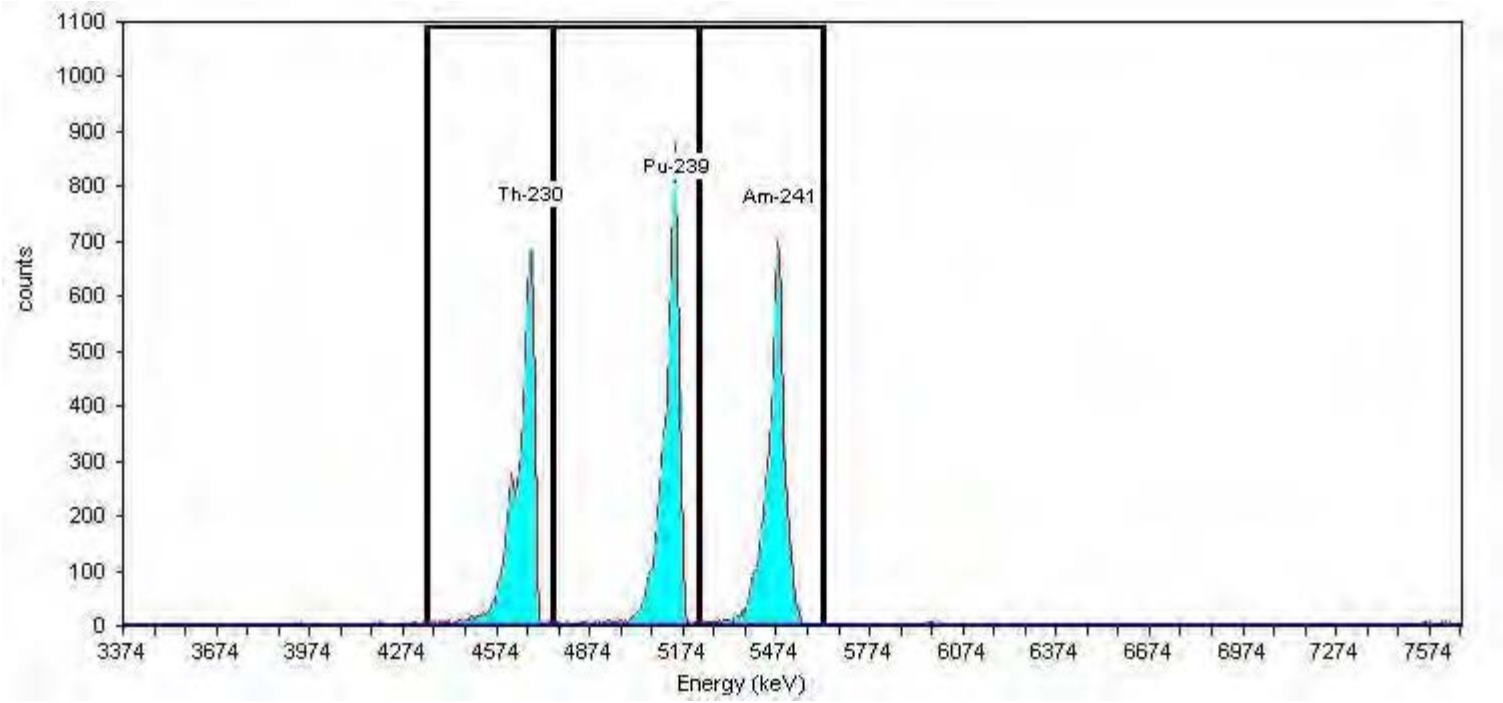
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 8/14/2018 2:06:15PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 24.45% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,866.00	97.77
Pu-239	240	5.16	186	249	0.00	6,391.00	106.52
Am-241	284	5.49	249	303	0.00	5,952.00	99.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:22:11PM 8/14/2018

Calibration

Sample Name: CCV-9520;AV4-08142018c
Description:
Detector: AV4

Calibration Date: 8/14/2018 3:11:40PM
Analyst: 60040

Source Info

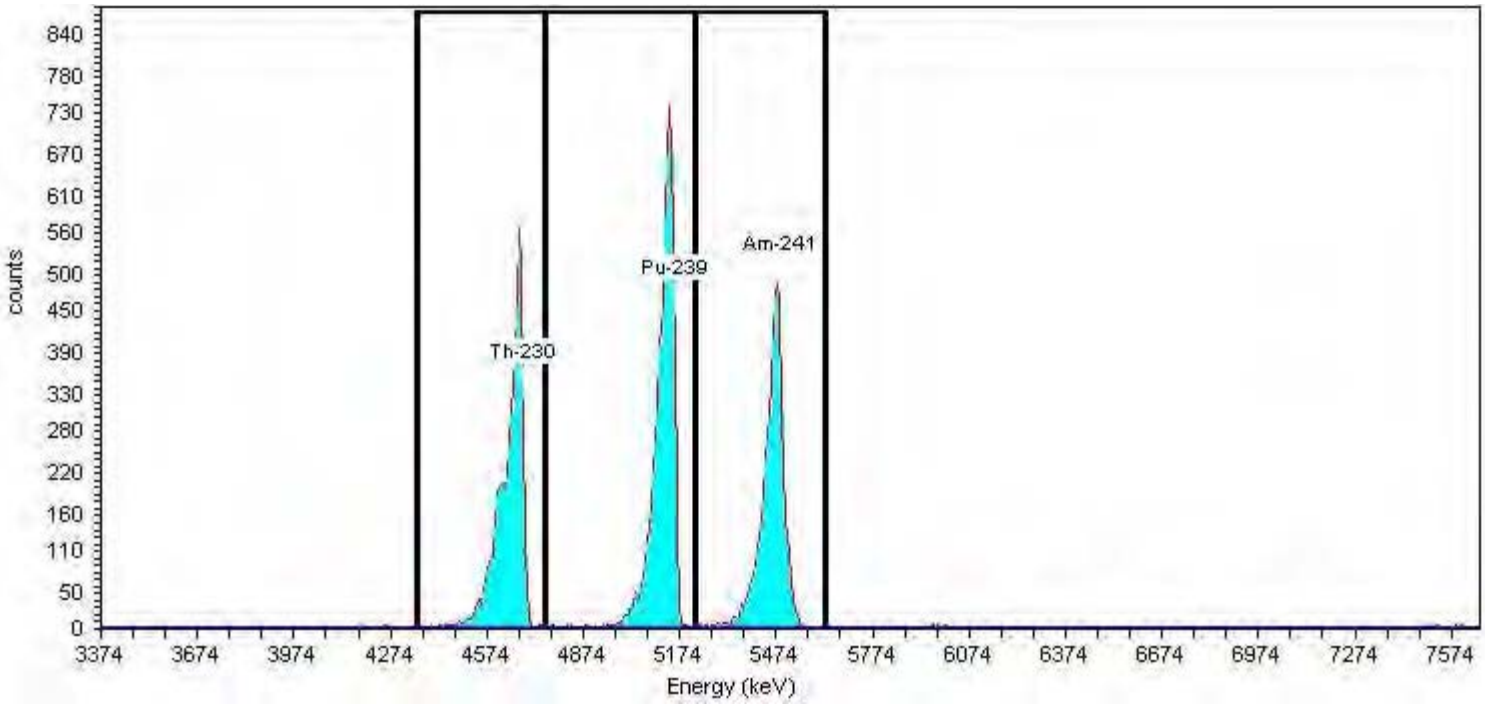
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 8/14/2018 2:07:30PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 22.97% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,670.00	77.83
Pu-239	240	5.16	186	249	0.00	5,705.00	95.08
Am-241	284	5.49	249	303	0.00	4,392.00	73.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:22:24PM 8/14/2018

Calibration

Sample Name: CCV-9793;AV7-08142018a
Description:
Detector: AV7

Calibration Date: 8/14/2018 3:12:20PM
Analyst: 60040

Source Info

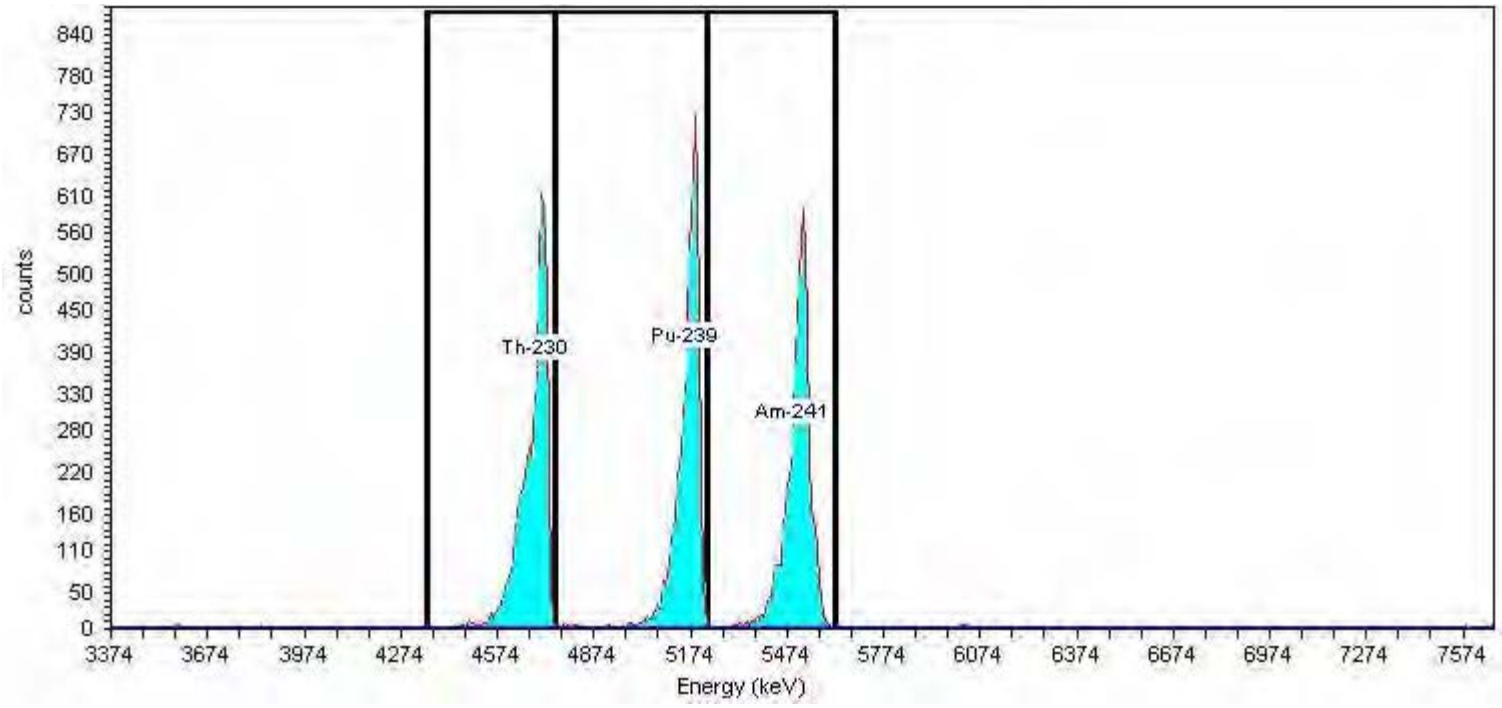
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 8/14/2018 2:08:02PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 22.53% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,330.00	88.83
Pu-239	240	5.16	186	249	0.00	5,607.00	93.45
Am-241	284	5.49	249	303	0.00	5,275.00	87.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:00PM 8/14/2018

Calibration

Sample Name: CCV-9795;AV8-08142018a
Description:
Detector: AV8

Calibration Date: 8/14/2018 3:12:40PM
Analyst: 60040

Source Info

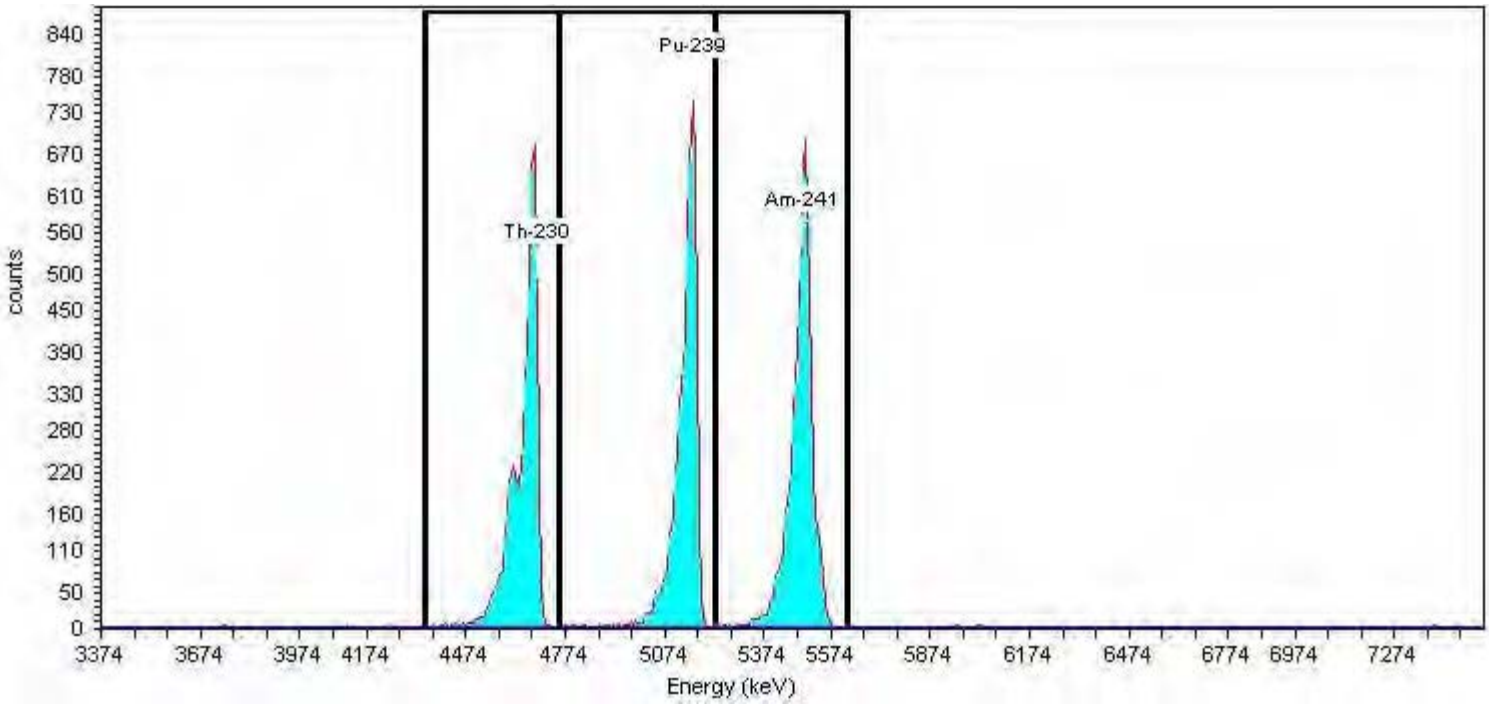
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 8/14/2018 2:08:37PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.85% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,439.00	90.64
Pu-239	240	5.16	186	249	0.00	5,595.00	93.24
Am-241	284	5.49	249	303	0.00	5,857.00	97.61

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:12:26PM 8/14/2018

Calibration

Sample Name: CCV-9817;AV24-08142018
Description:
Detector: AV24

Calibration Date: 8/14/2018 5:12:23PM
Analyst: 60040

Source Info

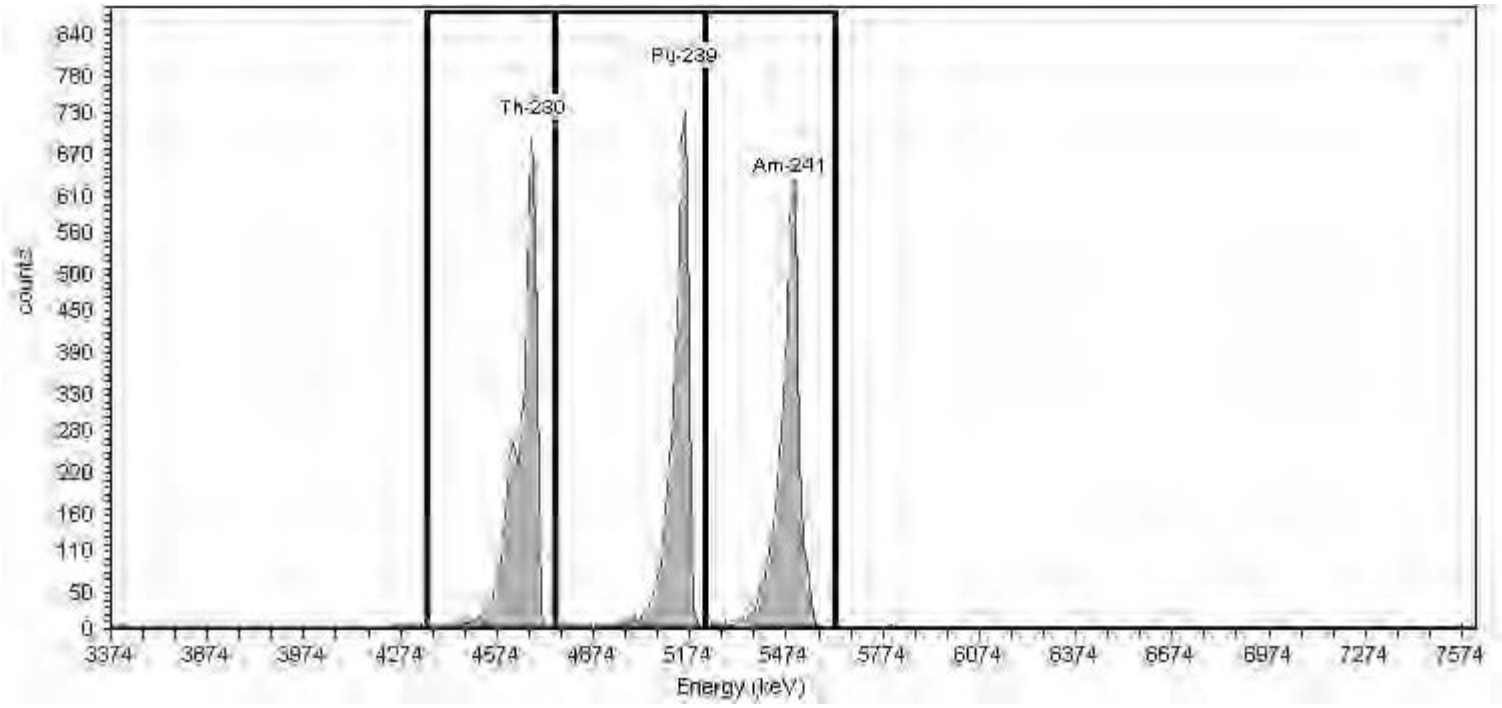
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 8/14/2018 4:04:53PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.39% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,840.00	97.33
Pu-239	240	5.16	186	249	0.00	5,469.00	91.15
Am-241	284	5.49	249	303	0.00	5,532.00	92.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:12:38PM 8/14/2018

Calibration

Sample Name: CCV-1368446;AV44-08142018
Description:
Detector: AV44

Calibration Date: 8/14/2018 5:12:35PM
Analyst: 60040

Source Info

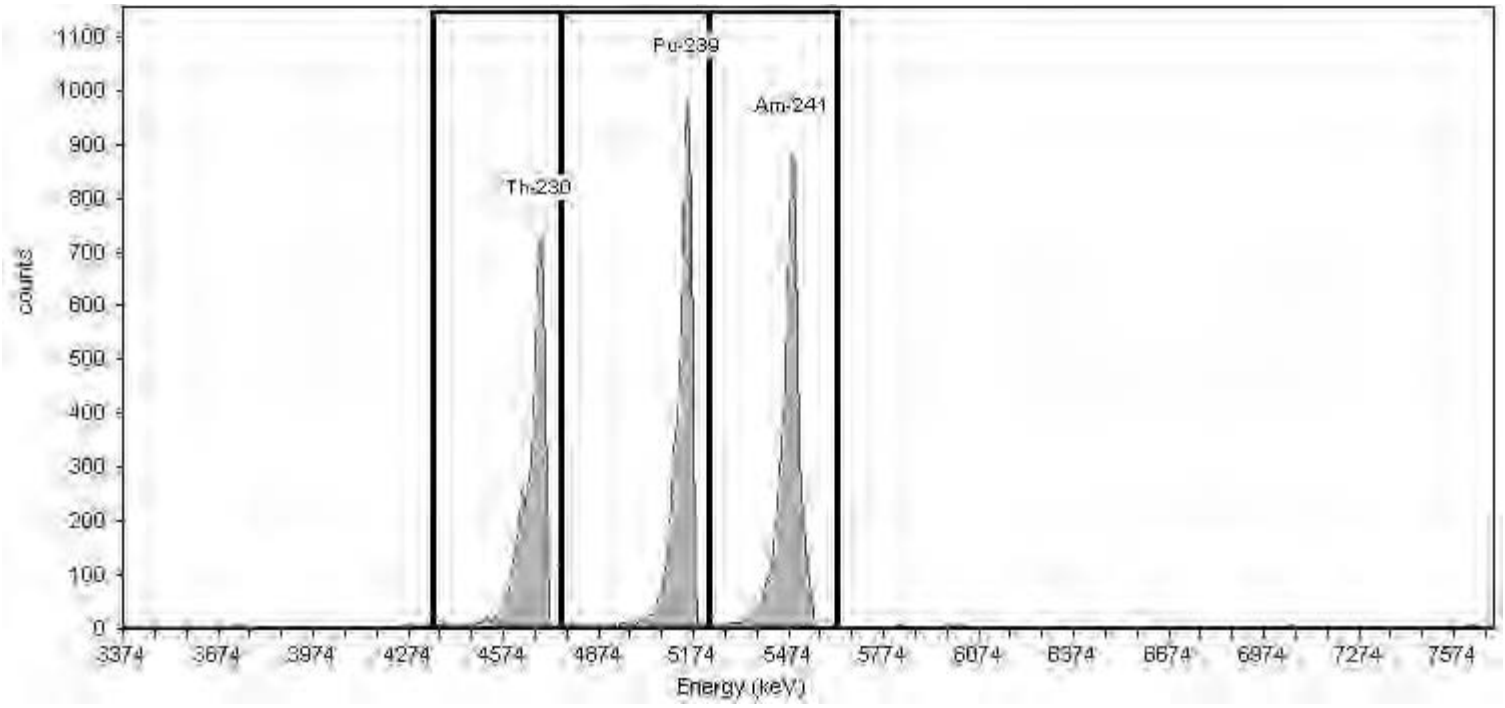
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 8/14/2018 4:05:26PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.32% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,900.00	98.33
Pu-239	240	5.16	186	249	0.00	6,705.00	111.75
Am-241	284	5.49	249	303	0.00	7,011.00	116.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:12:50PM 8/14/2018

Calibration

Sample Name: CCV-1368447;AV45-08142018
Description:
Detector: AV45

Calibration Date: 8/14/2018 5:12:47PM
Analyst: 60040

Source Info

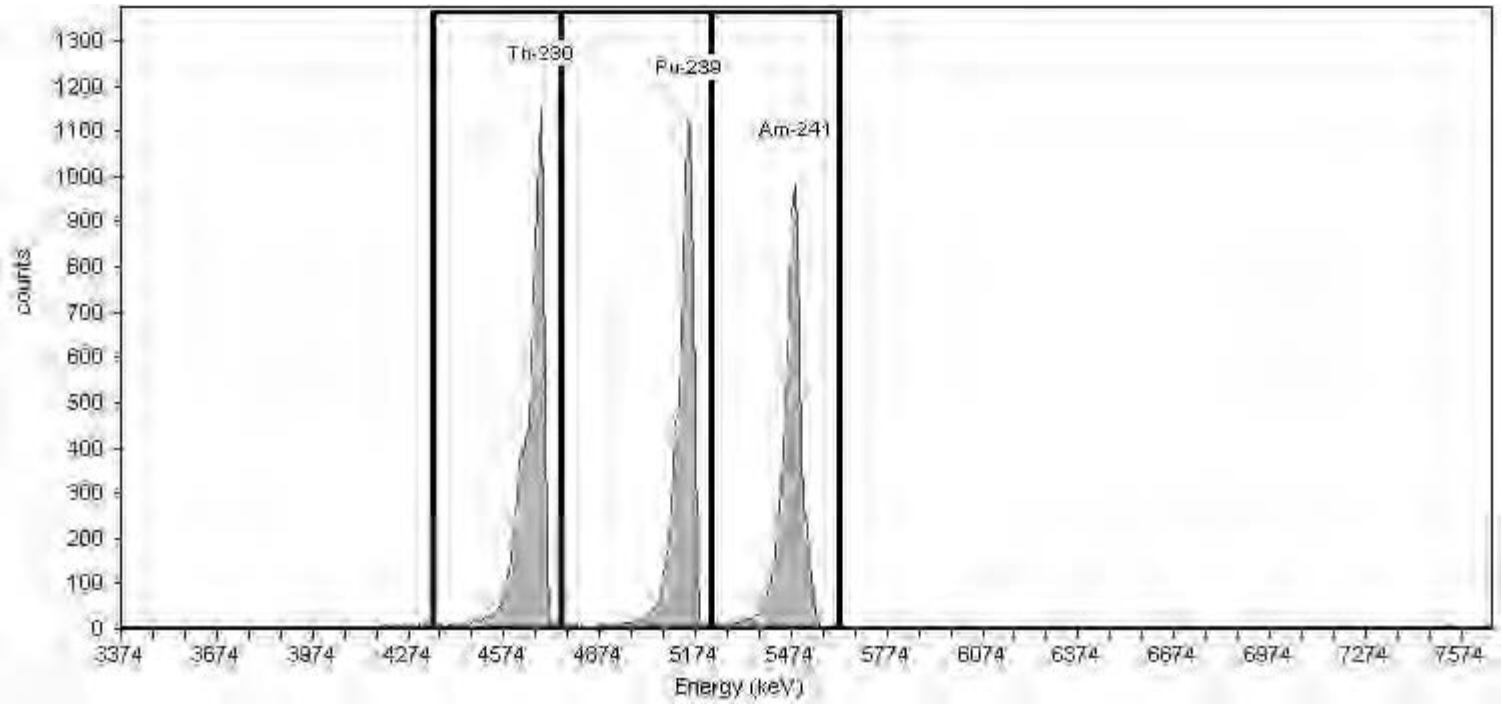
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 8/14/2018 4:05:50PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.87% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	9,389.00	156.48
Pu-239	240	5.16	186	249	0.00	8,530.00	142.17
Am-241	284	5.49	249	303	0.00	8,118.00	135.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:13:23PM 8/14/2018

Calibration

Sample Name: CCV-1370622;AV47-08142018
Description:
Detector: AV47

Calibration Date: 8/14/2018 5:13:19PM
Analyst: 60040

Source Info

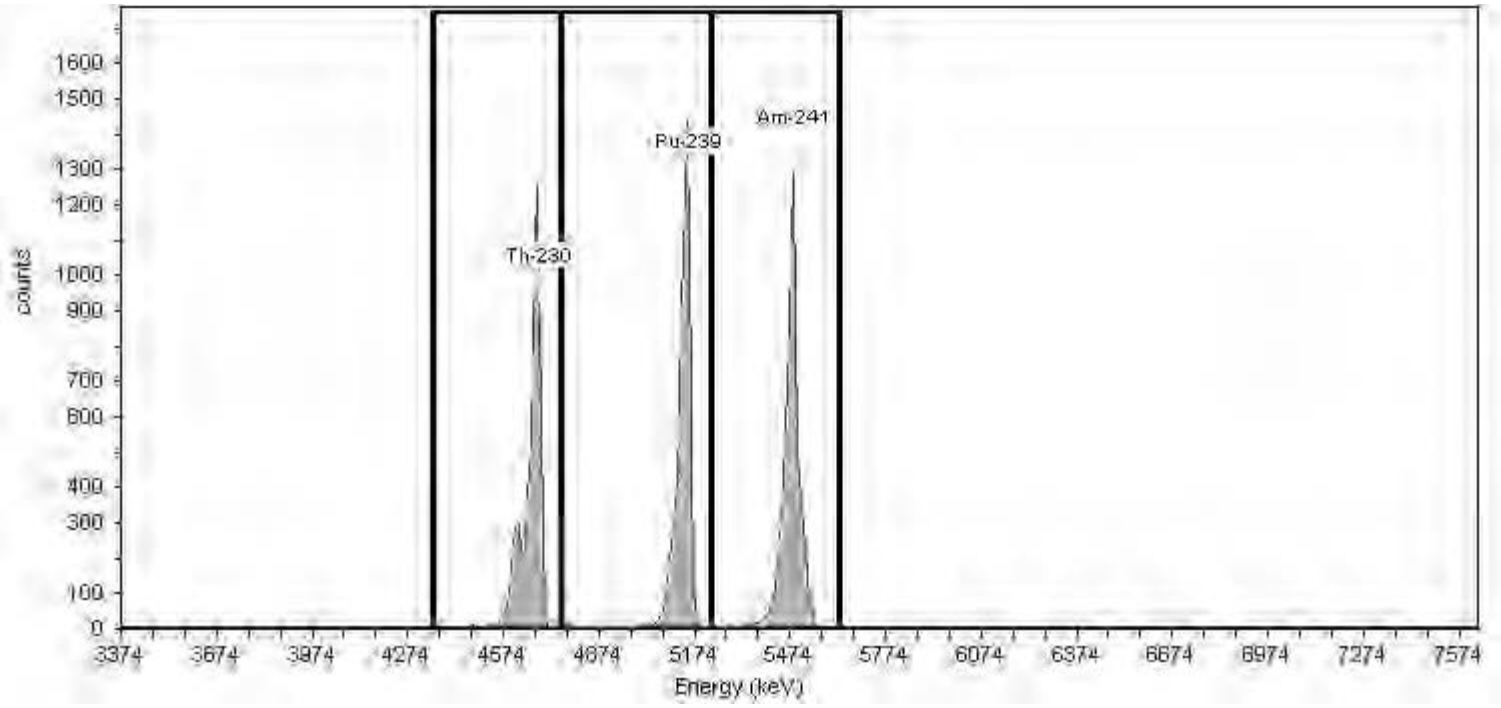
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV47 , SN: 46-032336
Acquisition Start Date: 8/14/2018 4:06:33PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.70% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,126.00	118.77
Pu-239	240	5.16	186	249	0.00	7,594.00	126.57
Am-241	284	5.49	249	303	0.00	7,792.00	129.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:13:33PM 8/14/2018

Calibration

Sample Name: CCV-1370619;AV48-08142018
Description:
Detector: AV48

Calibration Date: 8/14/2018 5:13:30PM
Analyst: 60040

Source Info

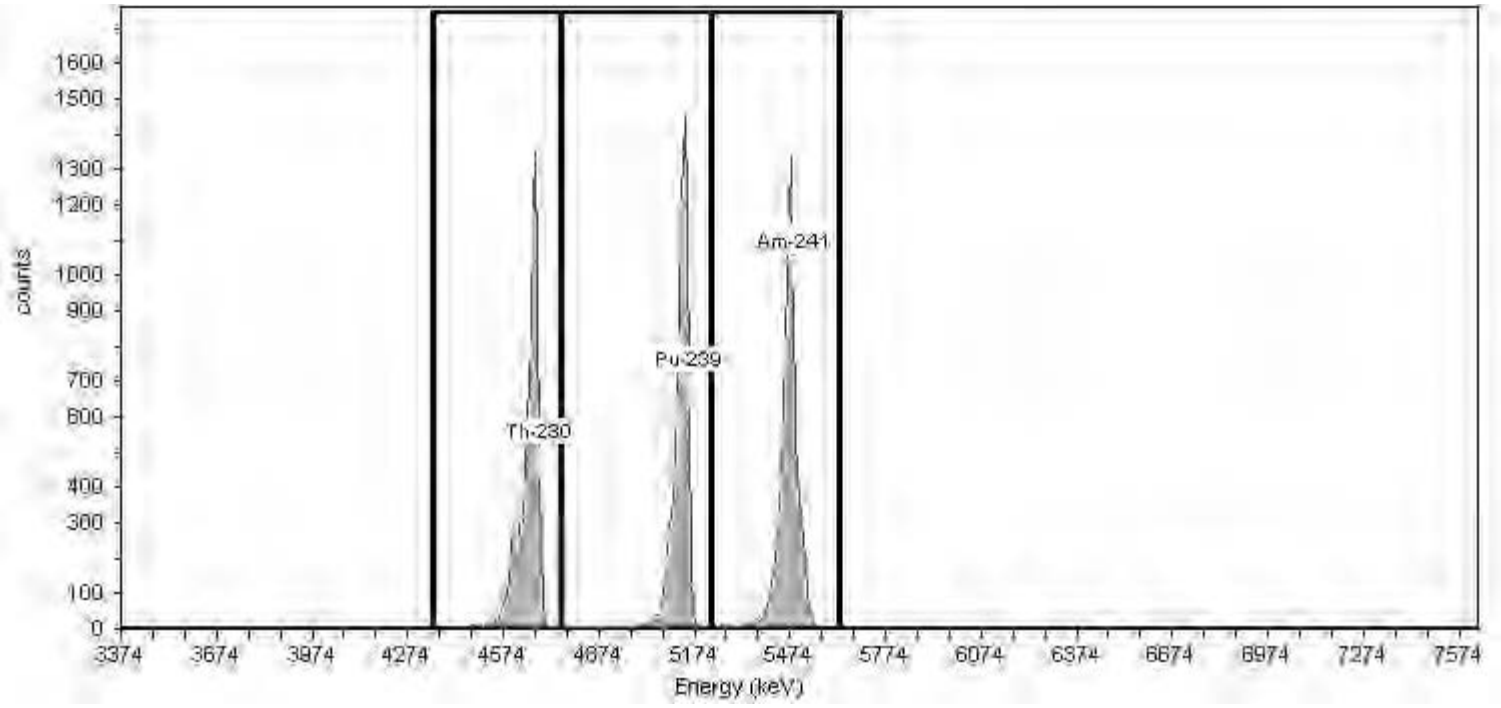
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV48 , SN: 46-033P6
Acquisition Start Date: 8/14/2018 4:07:04PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.19% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,945.00	132.42
Pu-239	240	5.16	186	249	0.00	7,915.00	131.92
Am-241	284	5.49	249	303	0.00	8,395.00	139.92

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:24:13PM 8/15/2018

Calibration

Sample Name: CCV-9792;AV54-08152018
Description:
Detector: AV54

Calibration Date: 8/15/2018 3:24:09PM
Analyst: 60040

Source Info

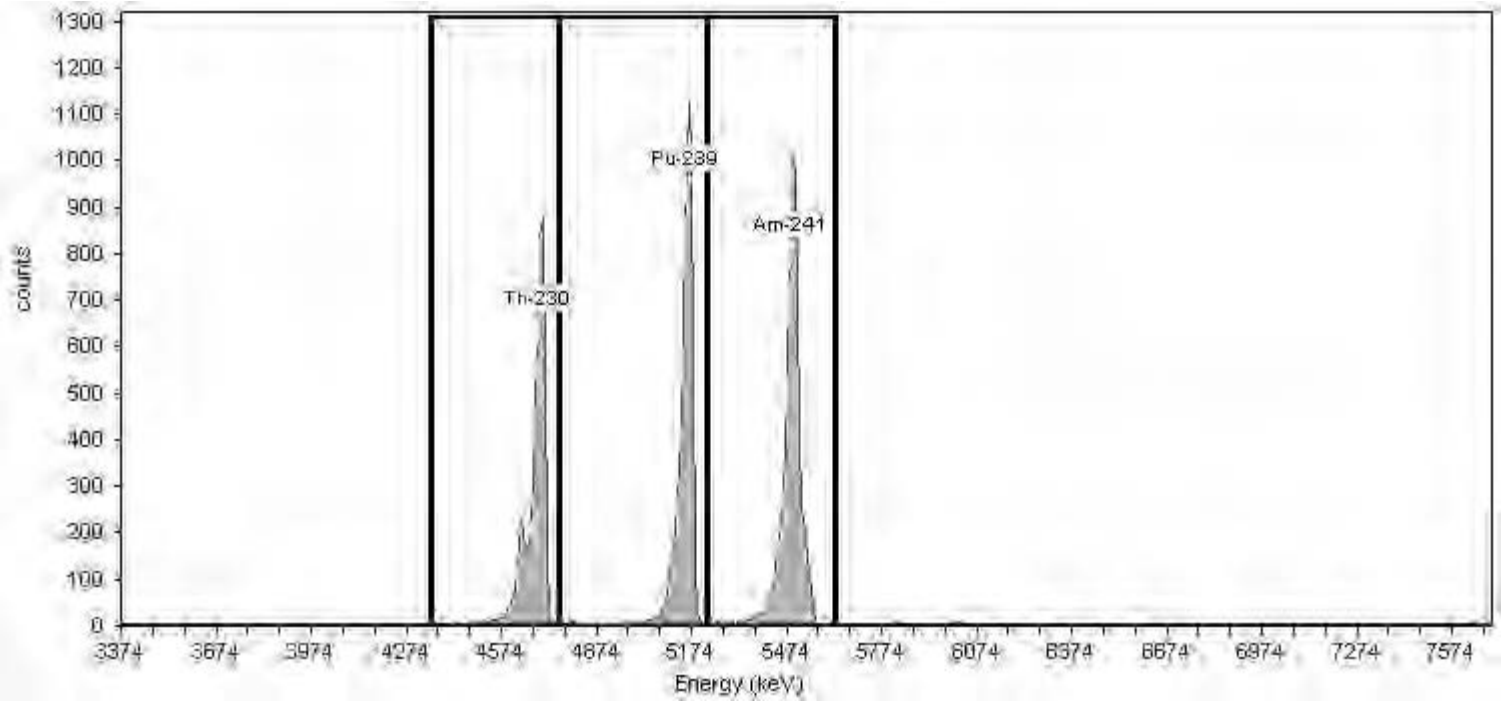
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 46-033P4
Acquisition Start Date: 8/15/2018 2:17:43PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 23.44% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,367.00	89.45
Pu-239	240	5.16	186	249	0.00	6,119.00	101.98
Am-241	284	5.49	249	303	0.00	6,801.00	113.35

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:13:21PM 8/15/2018

Calibration

Sample Name: CCV-9793;AV55-08152018
Description:
Detector: AV55

Calibration Date: 8/15/2018 2:13:16PM
Analyst: 60040

Source Info

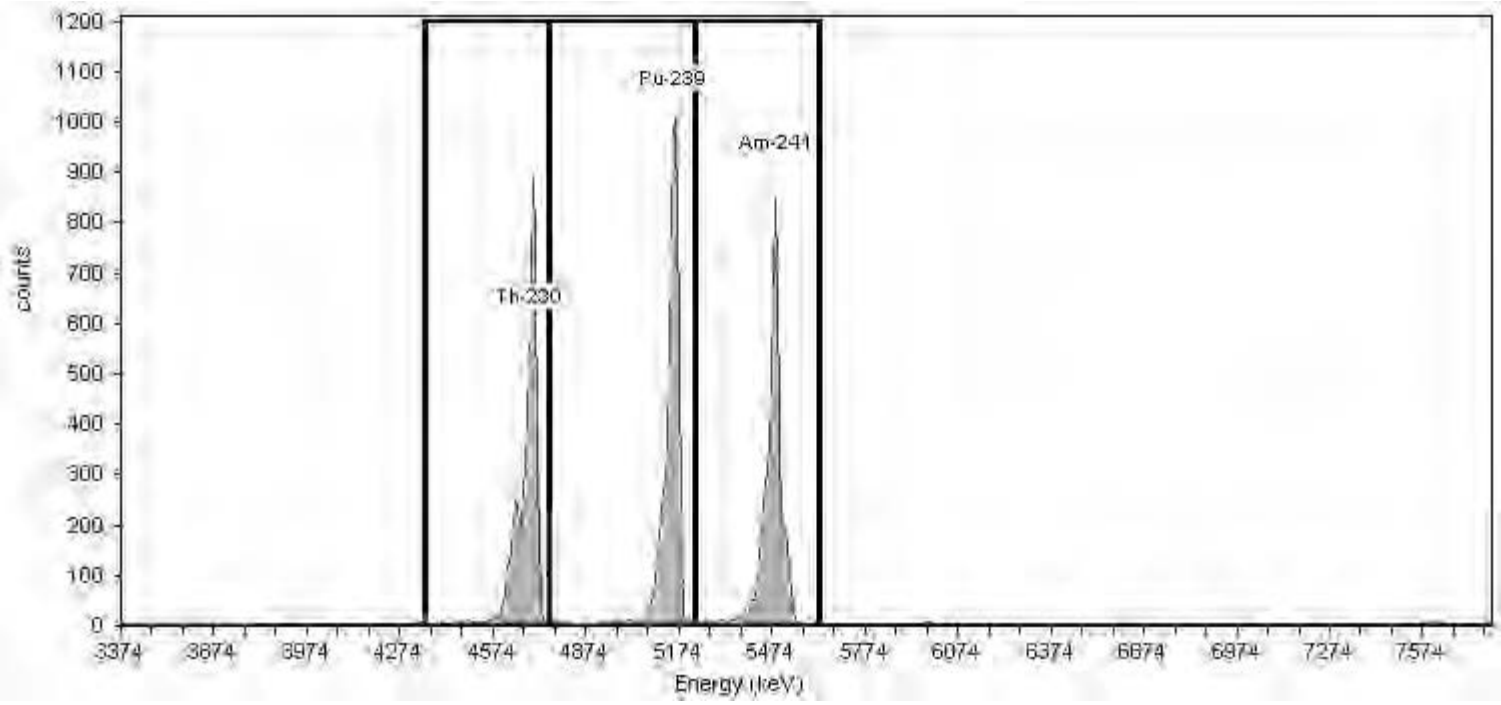
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 8/15/2018 12:57:59PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 22.80% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,434.00	90.57
Pu-239	240	5.16	186	249	0.00	5,628.00	93.80
Am-241	284	5.49	249	303	0.00	5,344.00	89.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:14:26PM 8/15/2018

Calibration

Sample Name: CCV-9795;AV56-08152018
Description:
Detector: AV56

Calibration Date: 8/15/2018 2:14:22PM
Analyst: 60040

Source Info

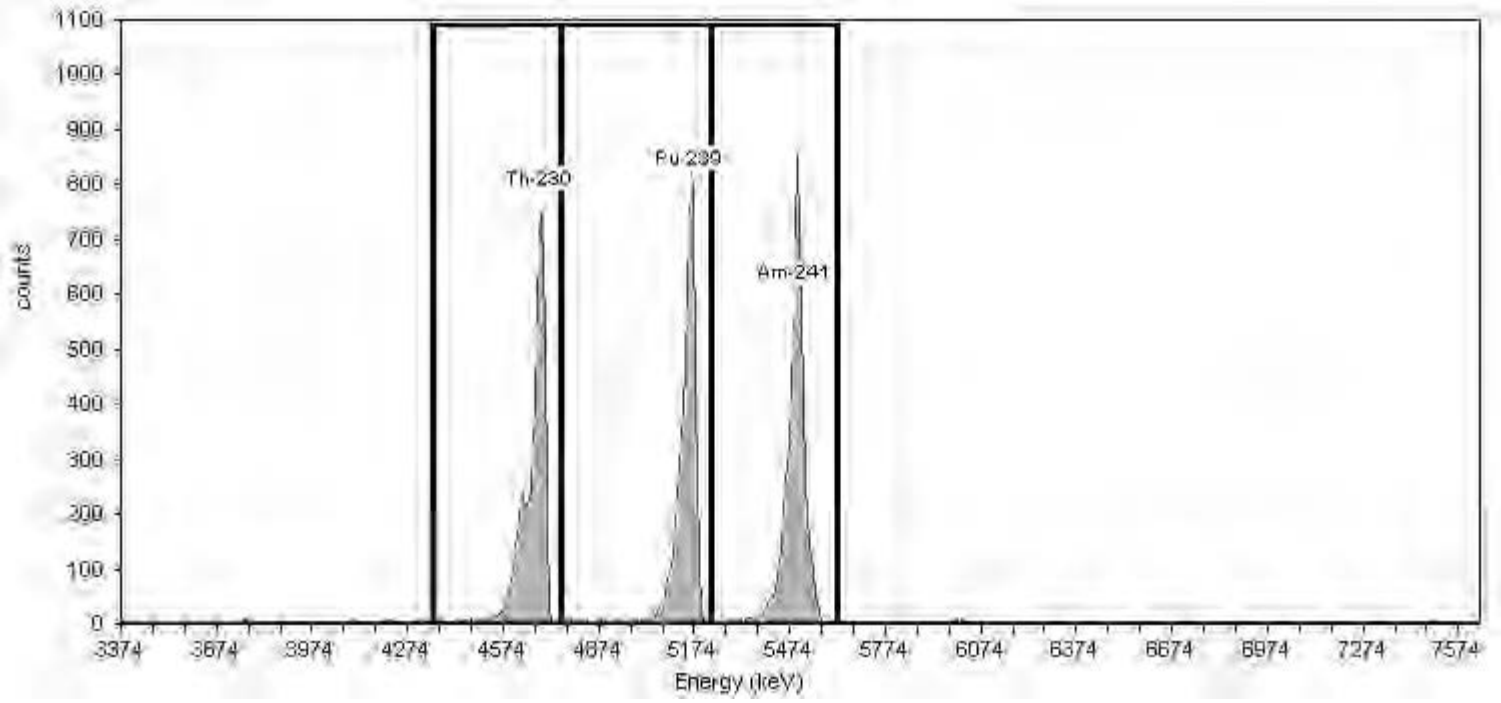
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 8/15/2018 12:58:27PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.26% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,284.00	88.07
Pu-239	240	5.16	186	249	0.00	5,407.00	90.12
Am-241	284	5.49	249	303	0.00	5,814.00	96.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:15:04PM 8/15/2018

Calibration

Sample Name: CCV-9885;AV58-08152018
Description:
Detector: AV58

Calibration Date: 8/15/2018 2:15:01PM
Analyst: 60040

Source Info

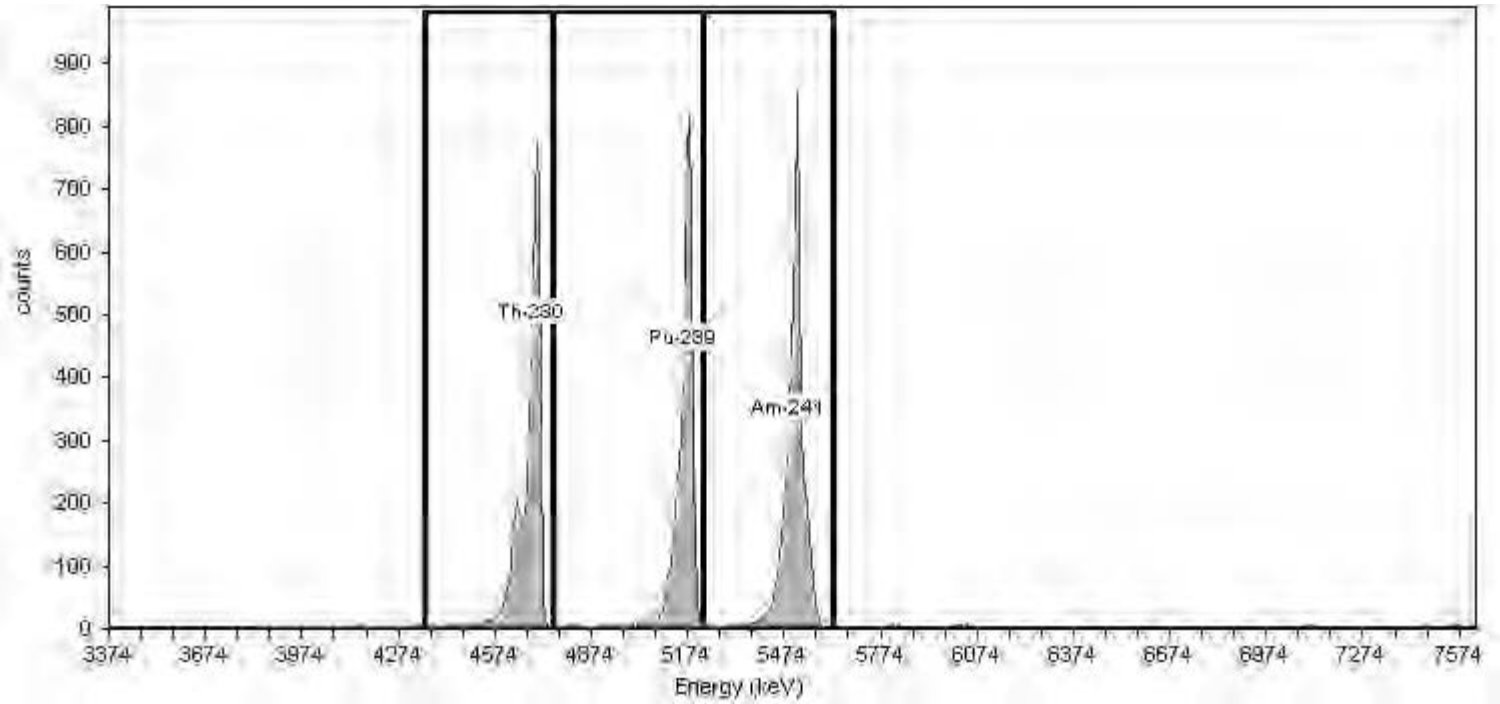
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 8/15/2018 12:59:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 24.03% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,779.00	79.65
Pu-239	240	5.16	186	249	0.00	4,674.00	77.90
Am-241	284	5.49	249	303	0.00	5,127.00	85.45

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:34:16PM 8/14/2018

Calibration

Sample Name: CCV-1368447;AV62-08142018
Description:
Detector: AV62

Calibration Date: 8/14/2018 6:34:13PM
Analyst: 60040

Source Info

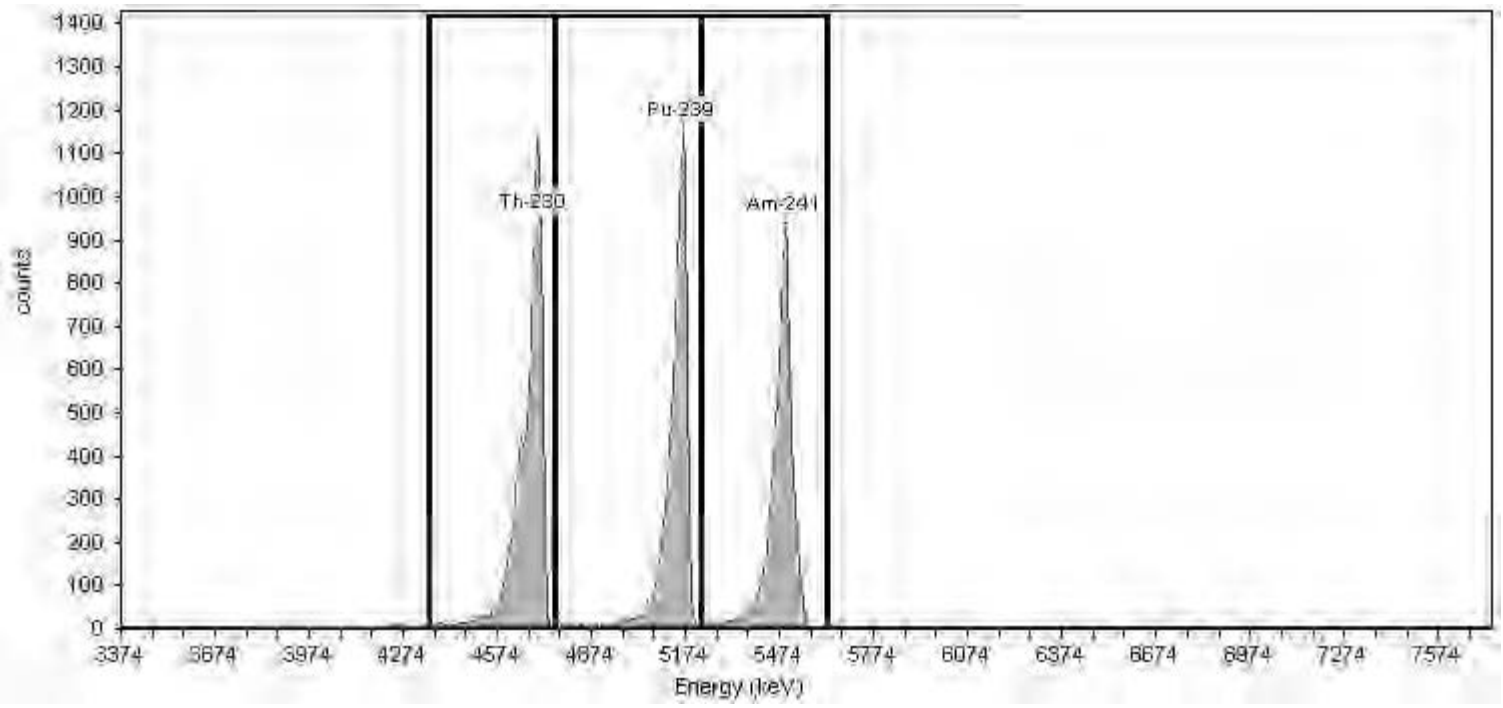
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 8/14/2018 5:25:06PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 28.44% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	9,661.00	161.02
Pu-239	240	5.16	186	249	0.00	8,785.00	146.42
Am-241	284	5.49	249	303	0.00	8,132.00	135.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:34:43PM 8/14/2018

Calibration

Sample Name: CCV-1370622;AV64-08142018
Description:
Detector: AV64

Calibration Date: 8/14/2018 6:34:40PM
Analyst: 60040

Source Info

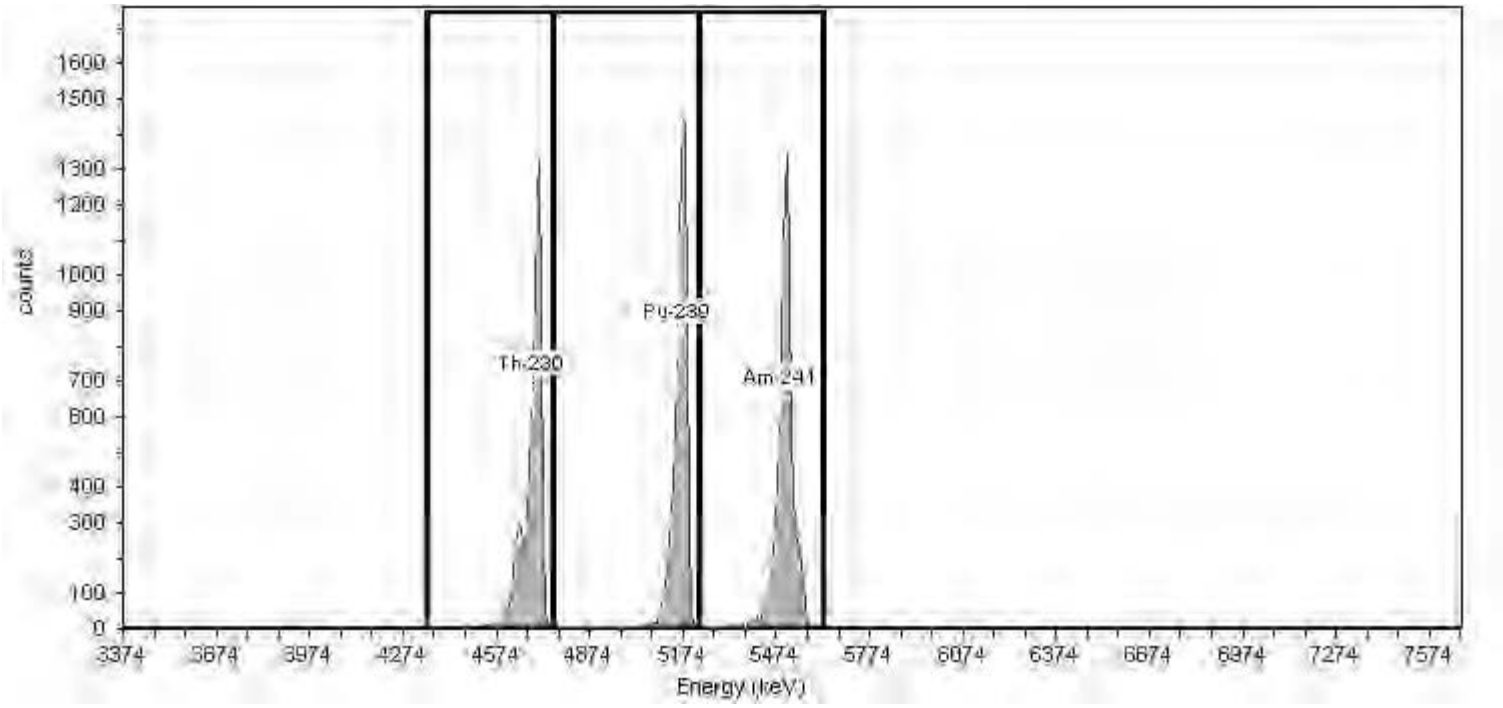
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV64 , SN: 43-028v3
Acquisition Start Date: 8/14/2018 5:25:45PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 27.91% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,667.00	127.78
Pu-239	240	5.16	186	249	0.00	7,866.00	131.10
Am-241	284	5.49	249	303	0.00	7,995.00	133.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:34:54PM 8/14/2018

Calibration

Sample Name: CCV-1370619;AV65-08142018
Description:
Detector: AV65

Calibration Date: 8/14/2018 6:34:51PM
Analyst: 60040

Source Info

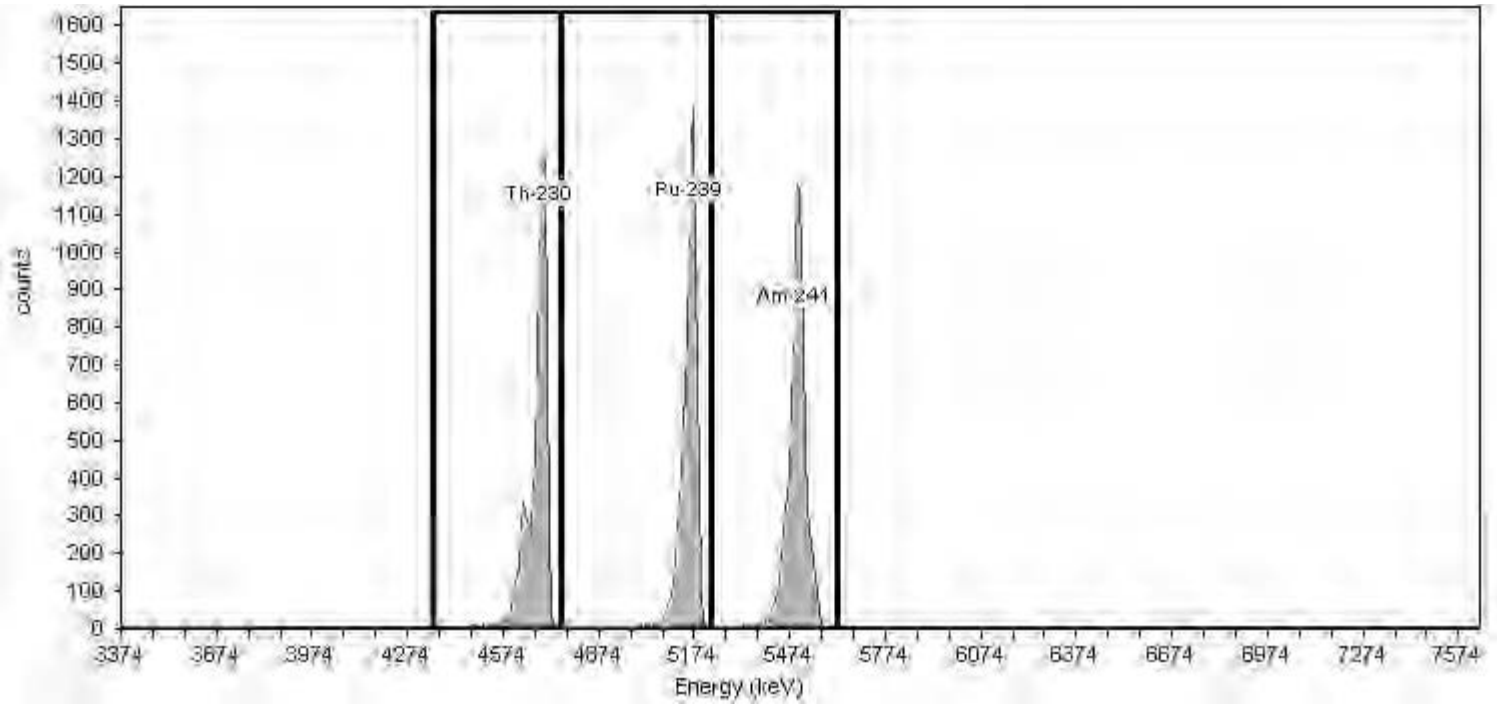
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 8/14/2018 5:26:07PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 27.39% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,965.00	132.75
Pu-239	240	5.16	186	249	0.00	7,966.00	132.77
Am-241	284	5.49	249	303	0.00	8,505.00	141.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:35:08PM 8/14/2018

Calibration

Sample Name: CCV-1370620;AV66-08142018
Description:
Detector: AV66

Calibration Date: 8/14/2018 6:35:04PM
Analyst: 60040

Source Info

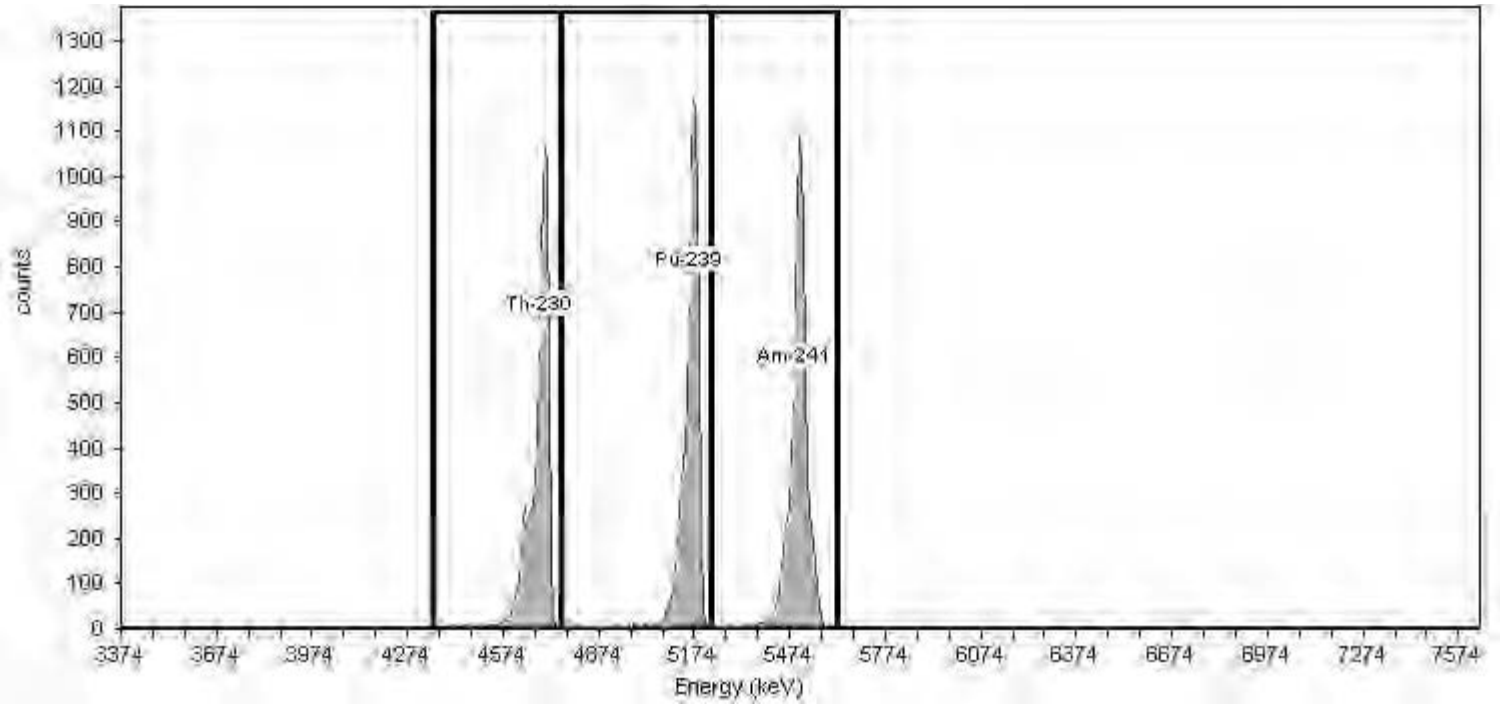
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 8/14/2018 5:26:18PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.02% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,745.00	112.42
Pu-239	240	5.16	186	249	0.00	6,954.00	115.90
Am-241	284	5.49	249	303	0.00	7,236.00	120.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:35:49PM 8/14/2018

Calibration

Sample Name: CCV-8874;AV69-08142018
Description:
Detector: AV69

Calibration Date: 8/14/2018 6:35:45PM
Analyst: 60040

Source Info

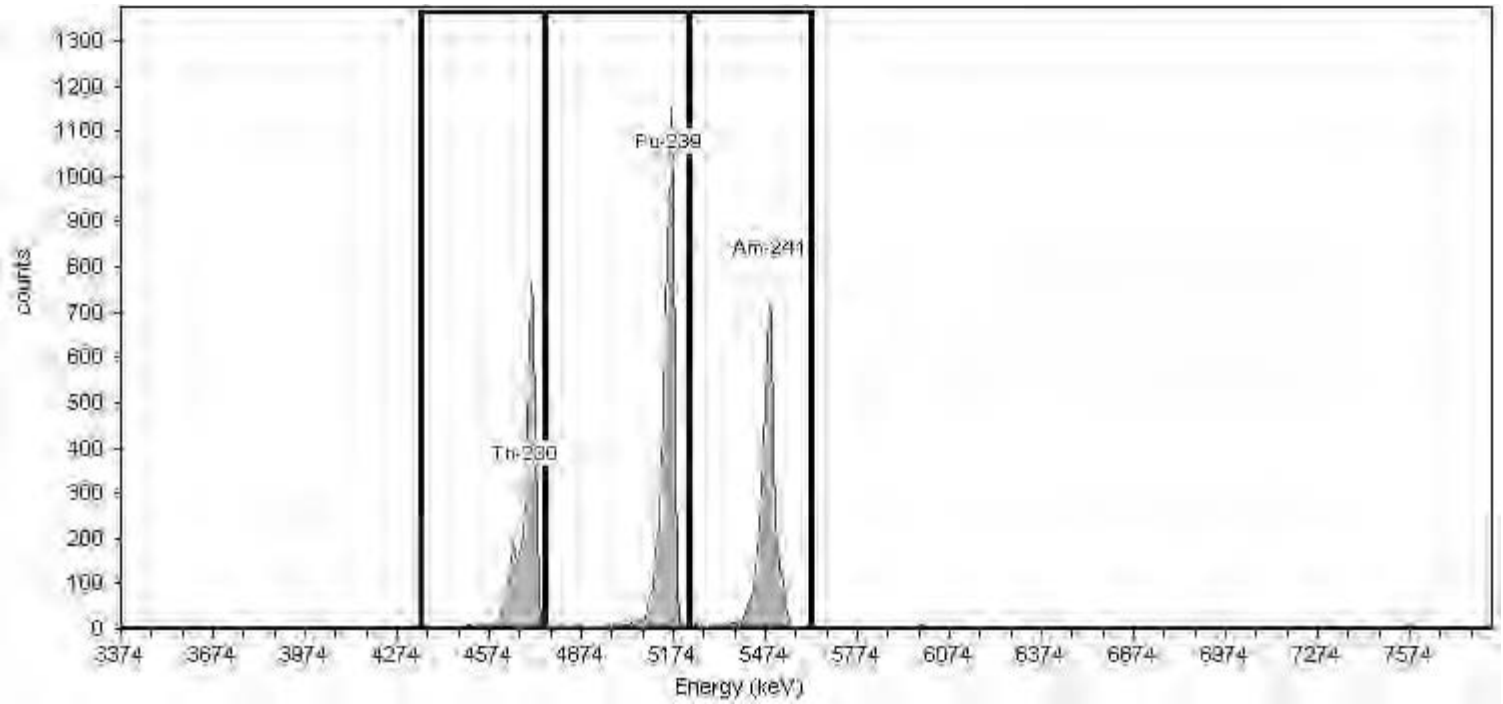
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 8/14/2018 5:27:05PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.40% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,565.00	76.08
Pu-239	240	5.16	186	249	0.00	6,055.00	100.92
Am-241	284	5.49	249	303	0.00	4,658.00	77.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:01PM 8/14/2018

Calibration

Sample Name: CCV-8877;AV70-08142018
Description:
Detector: AV70

Calibration Date: 8/14/2018 6:35:58PM
Analyst: 60040

Source Info

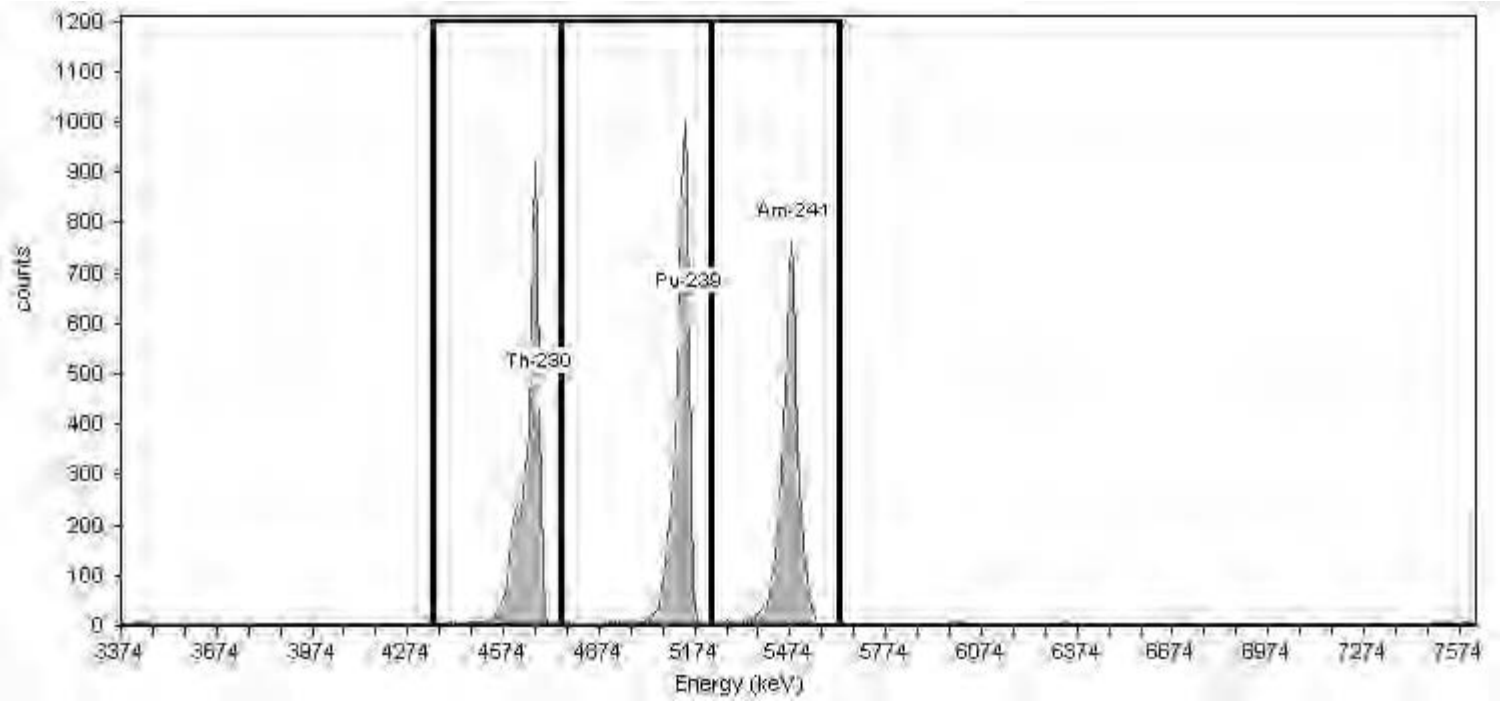
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 8/14/2018 5:27:29PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 24.44% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,041.00	100.68
Pu-239	240	5.16	186	249	0.00	6,254.00	104.23
Am-241	284	5.49	249	303	0.00	5,859.00	97.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:17PM 8/14/2018

Calibration

Sample Name: CCV-9520;AV71-08142018
Description:
Detector: AV71

Calibration Date: 8/14/2018 6:36:14PM
Analyst: 60040

Source Info

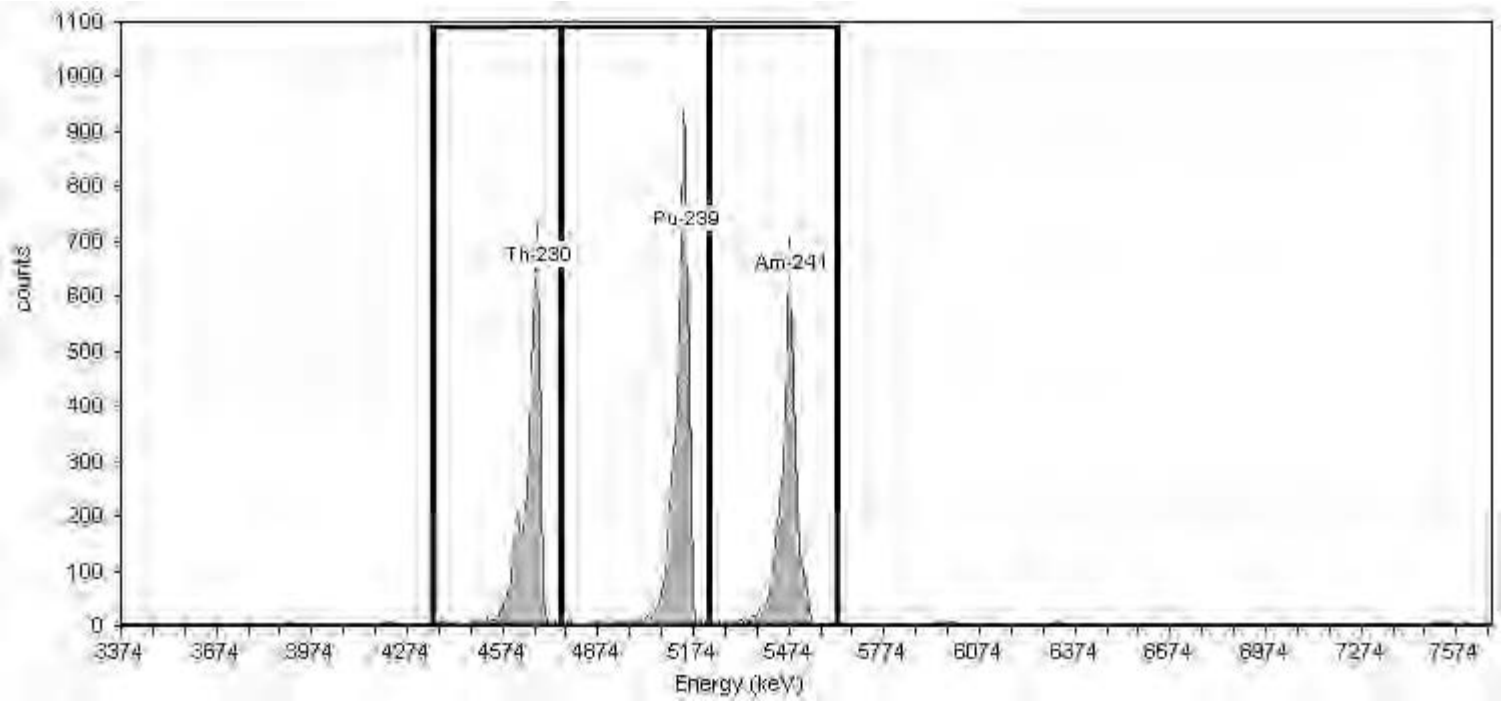
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 8/14/2018 5:28:29PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.94% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,659.00	77.65
Pu-239	240	5.16	186	249	0.00	5,640.00	94.00
Am-241	284	5.49	249	303	0.00	4,437.00	73.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:32PM 8/14/2018

Calibration

Sample Name: CCV-9792;AV72-08142018
Description:
Detector: AV72

Calibration Date: 8/14/2018 6:36:29PM
Analyst: 60040

Source Info

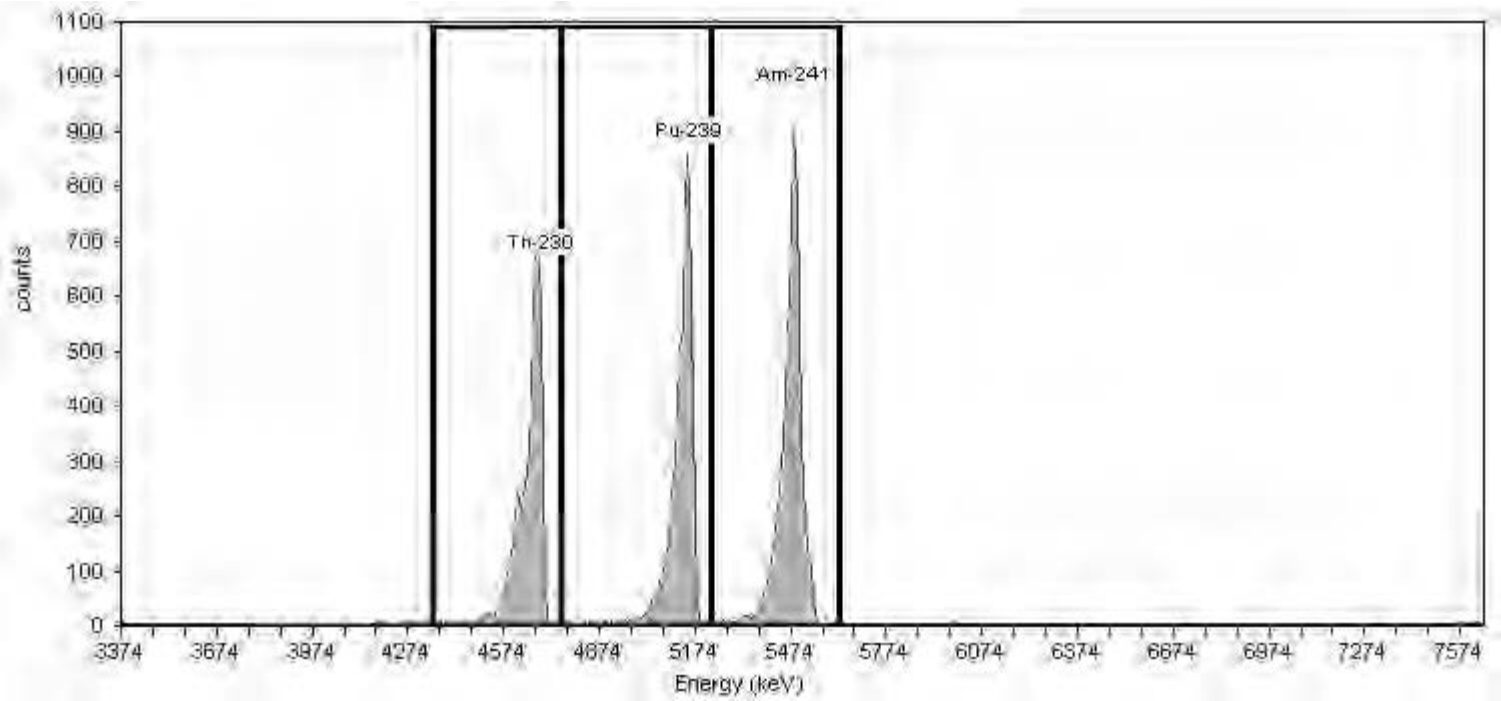
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 8/14/2018 5:28:55PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 24.50% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,662.00	94.37
Pu-239	240	5.16	186	249	0.00	6,299.00	104.98
Am-241	284	5.49	249	303	0.00	7,153.00	119.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:36:47PM 8/14/2018

Calibration

Sample Name: CCV-9793;AV73-08142018
Description:
Detector: AV73

Calibration Date: 8/14/2018 6:36:43PM
Analyst: 60040

Source Info

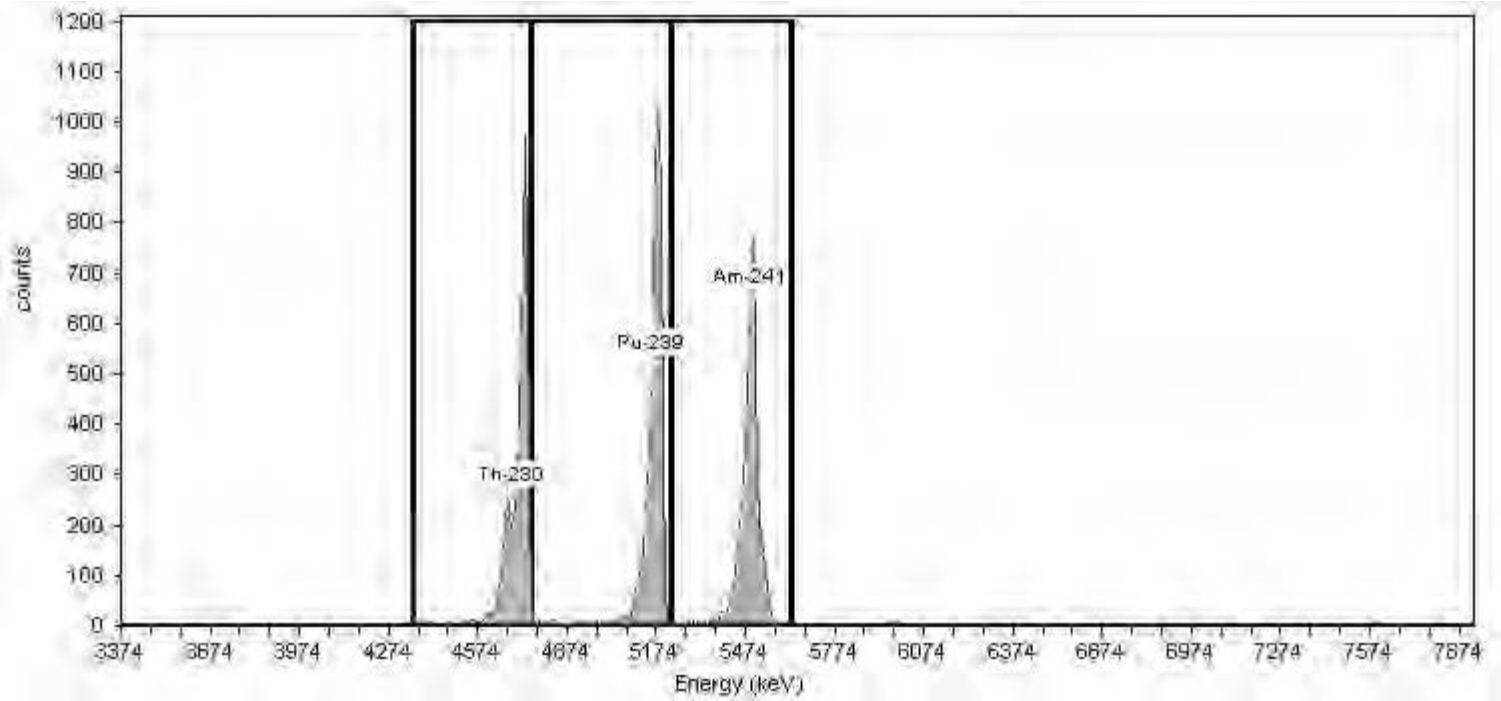
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV73 , SN: 46-03321
Acquisition Start Date: 8/14/2018 5:29:19PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 22.99% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,551.00	92.52
Pu-239	240	5.16	186	249	0.00	5,741.00	95.68
Am-241	284	5.49	249	303	0.00	5,254.00	87.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:09PM 8/14/2018

Calibration

Sample Name: CCV-9795;AV74-08142018
Description:
Detector: AV74

Calibration Date: 8/14/2018 6:37:05PM
Analyst: 60040

Source Info

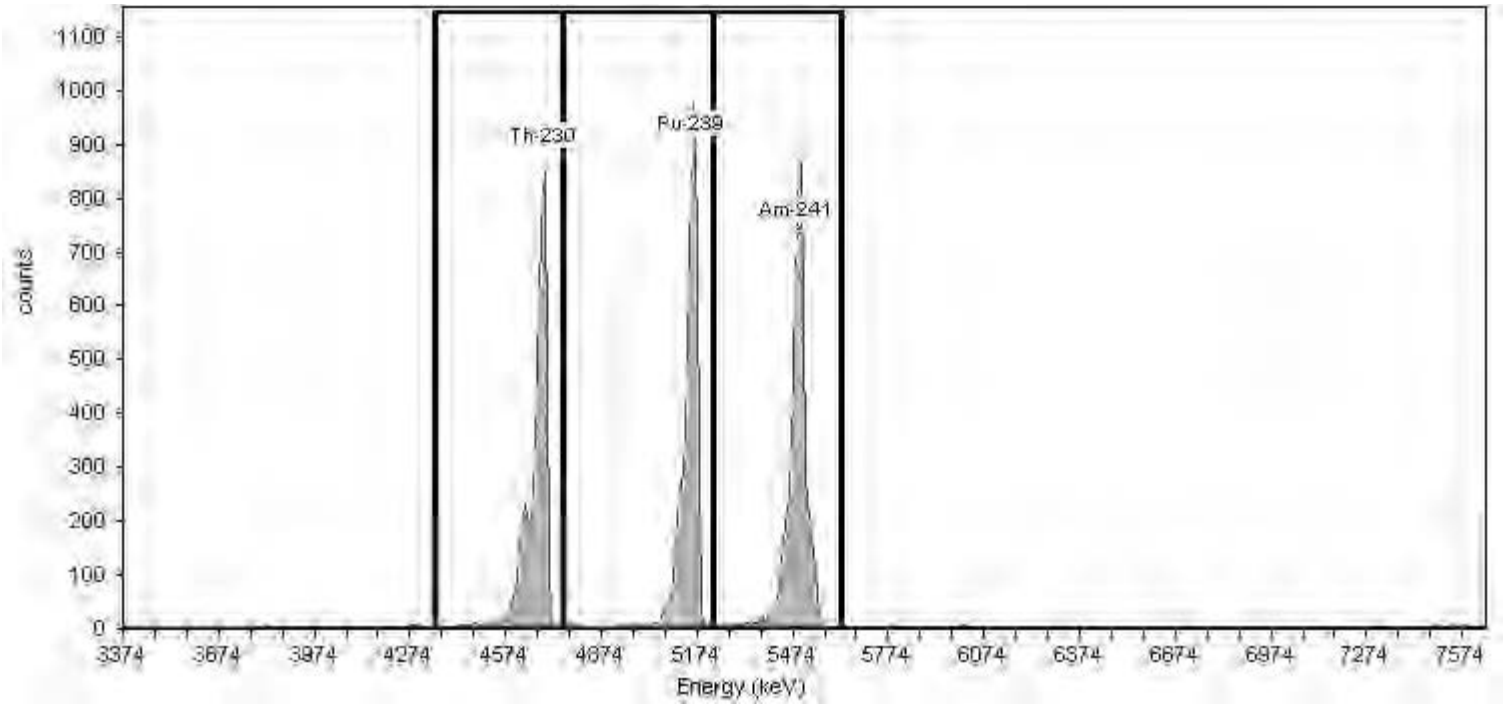
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 8/14/2018 5:29:46PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.86% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,423.00	90.38
Pu-239	240	5.16	186	249	0.00	5,544.00	92.40
Am-241	284	5.49	249	303	0.00	5,924.00	98.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:21PM 8/14/2018

Calibration

Sample Name: CCV-9817;AV75-08142018
Description:
Detector: AV75

Calibration Date: 8/14/2018 6:37:17PM
Analyst: 60040

Source Info

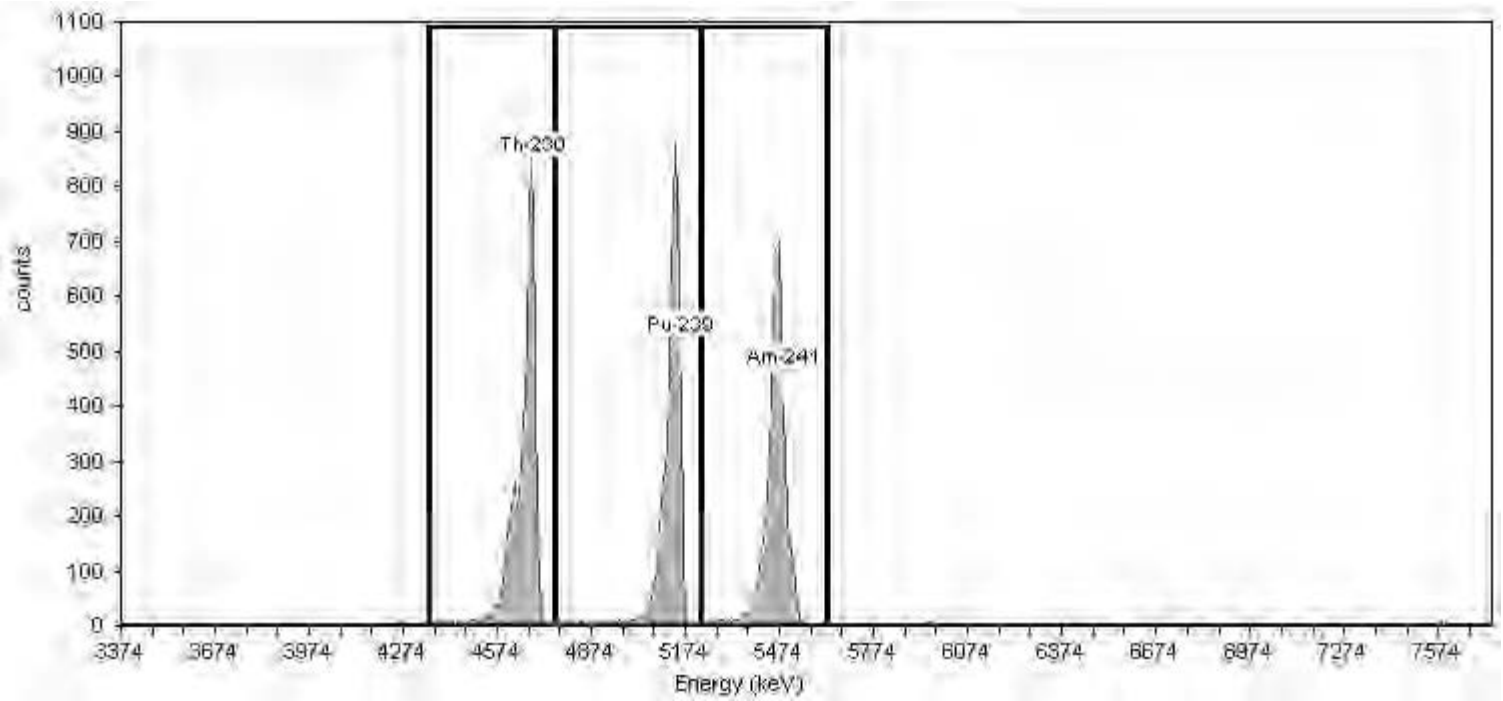
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV75 , SN: 51-082B4
Acquisition Start Date: 8/14/2018 5:30:05PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 22.35% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,922.00	98.70
Pu-239	240	5.16	186	249	0.00	5,469.00	91.15
Am-241	284	5.49	249	303	0.00	5,411.00	90.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:37:33PM 8/14/2018

Calibration

Sample Name: CCV-1368446;AV77-08142018
Description:
Detector: AV77

Calibration Date: 8/14/2018 6:37:30PM
Analyst: 60040

Source Info

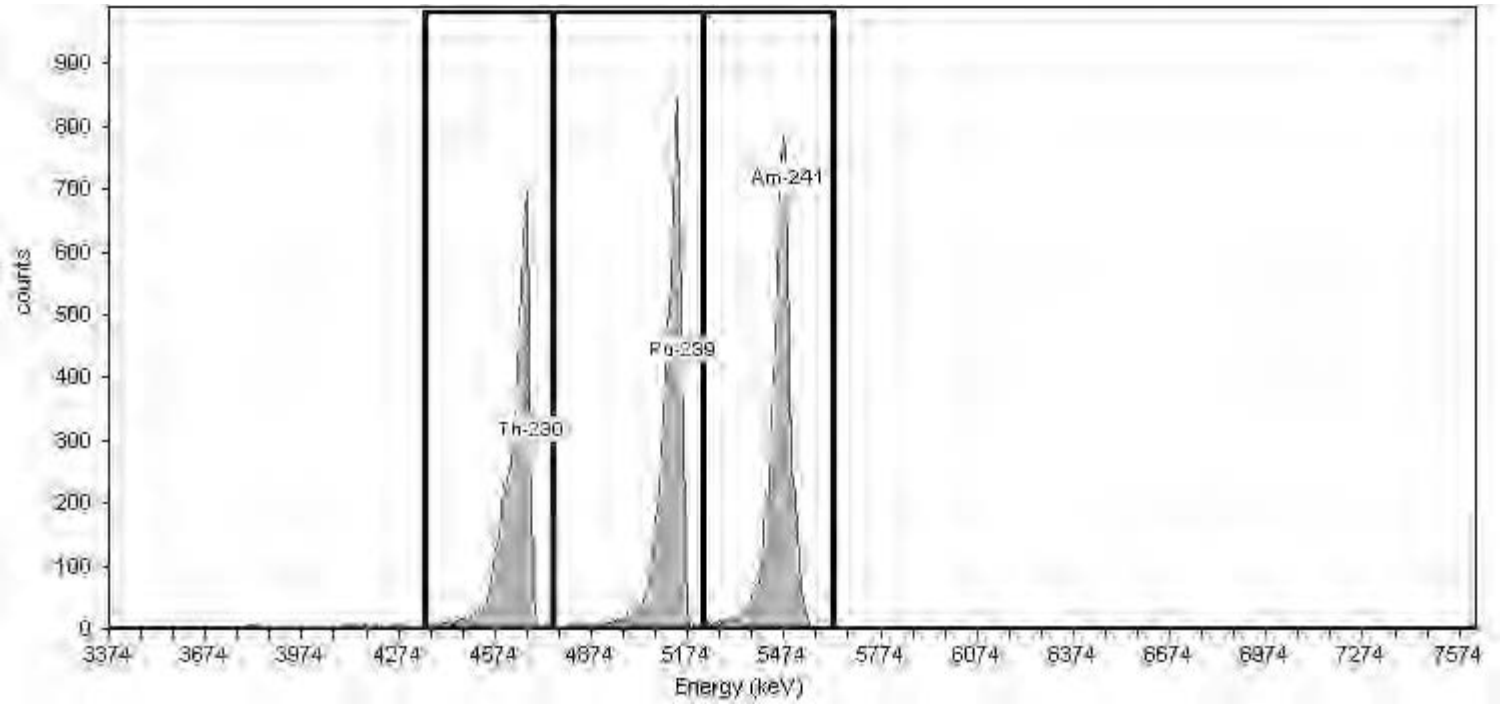
Certificate ID: 108001_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/6/2017 11:00:00AM
Description:

Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 8/14/2018 5:31:06PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.30% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,102.00	101.70
Pu-239	240	5.16	186	249	0.00	6,542.00	109.03
Am-241	284	5.49	249	303	0.00	6,963.00	116.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:59:47AM 8/15/2018

Calibration

Sample Name: CCV-1368447;AV78-08142018
Description:
Detector: AV78

Calibration Date: 8/15/2018 9:59:42AM
Analyst: 60040

Source Info

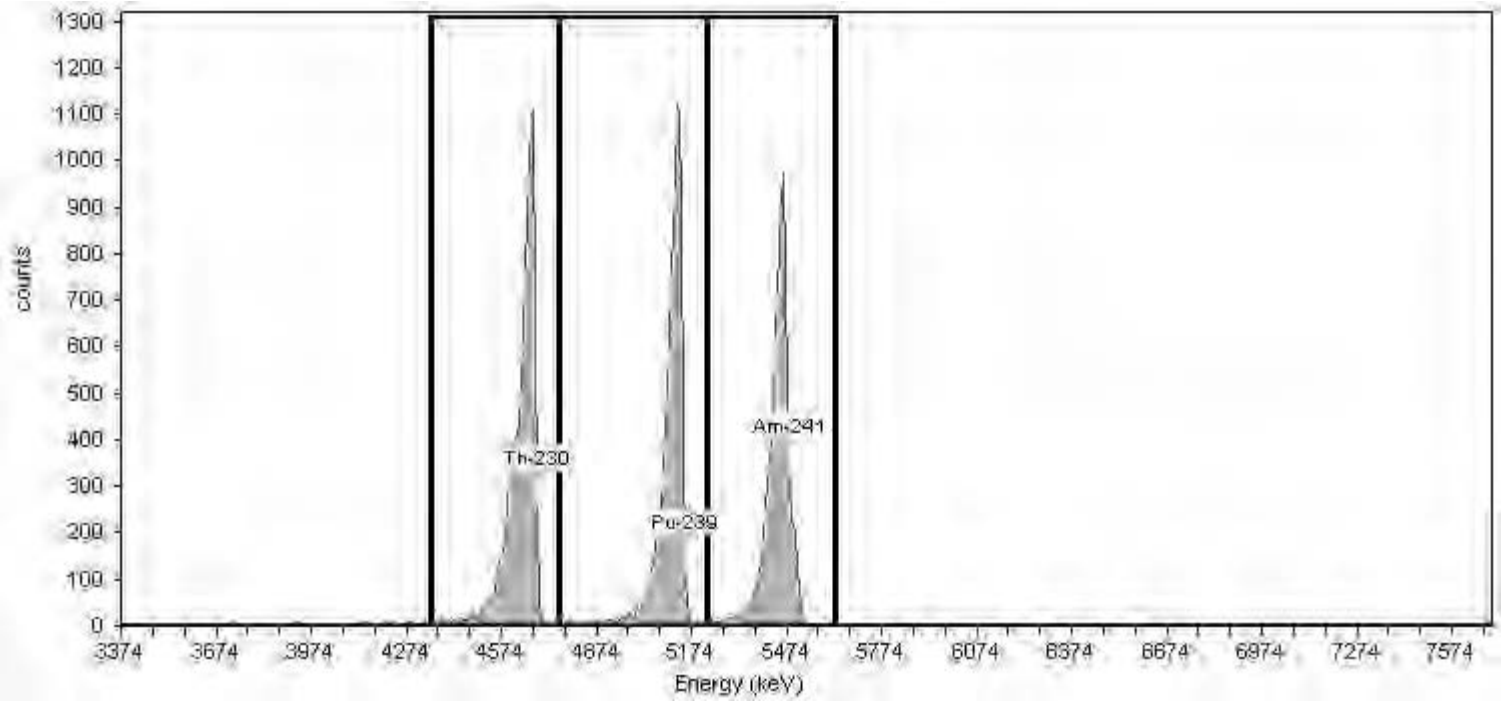
Certificate ID: 108002_00001
Prepared by: Eckert & Ziegler

Certification Date: 12/1/2017 11:00:00AM
Description:

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 8/14/2018 6:50:46PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.52% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	9,337.00	155.62
Pu-239	240	5.16	186	249	0.00	8,546.00	142.43
Am-241	284	5.49	249	303	0.00	7,832.00	130.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:00:11AM 8/15/2018

Calibration

Sample Name: CCV-1370621;AV79-08142018
Description:
Detector: AV79

Calibration Date: 8/15/2018 10:00:07AM
Analyst: 60040

Source Info

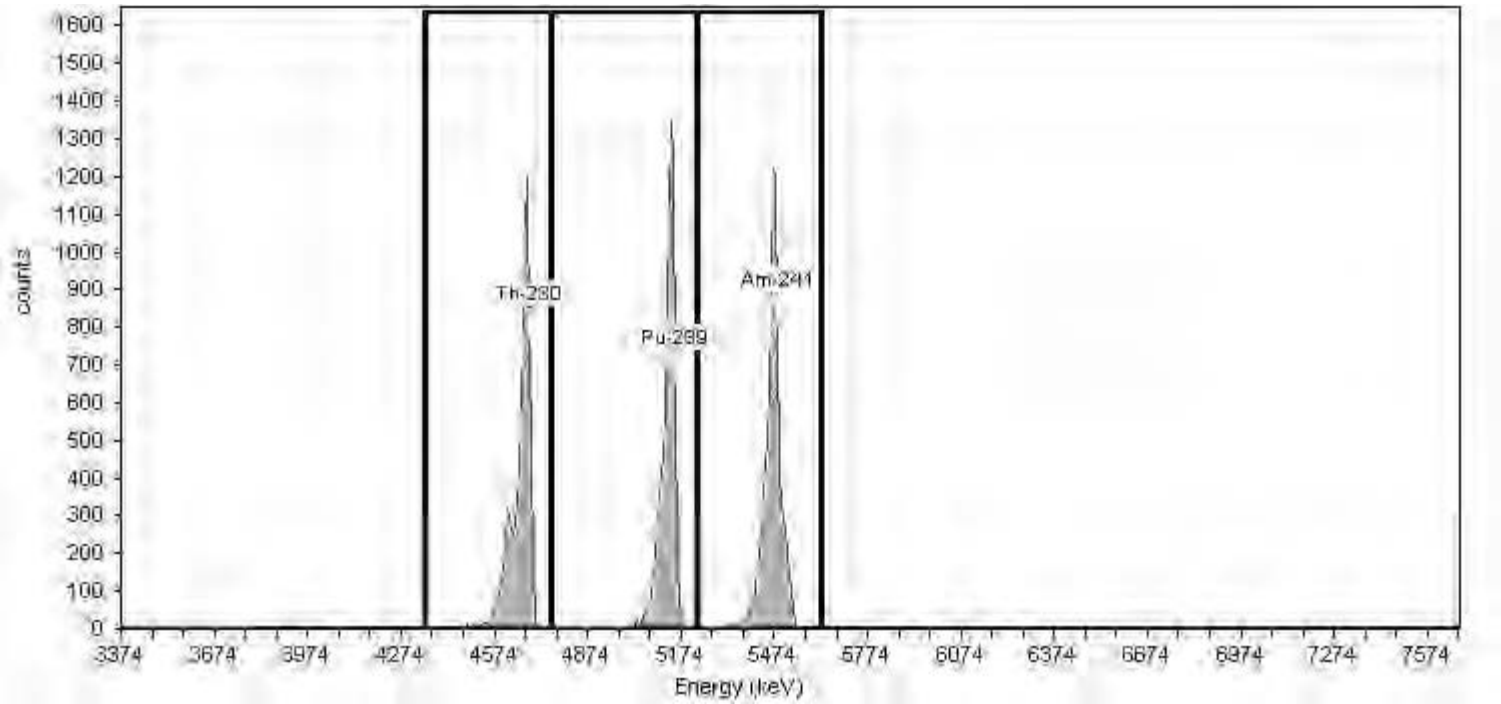
Certificate ID: 108345_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 8/14/2018 6:51:27PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.24% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,103.00	118.38
Pu-239	240	5.16	186	249	0.00	7,511.00	125.18
Am-241	284	5.49	249	303	0.00	7,869.00	131.15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:00:22AM 8/15/2018

Calibration

Sample Name: CCV-1370622;AV80-08142018
Description:
Detector: AV80

Calibration Date: 8/15/2018 10:00:18AM
Analyst: 60040

Source Info

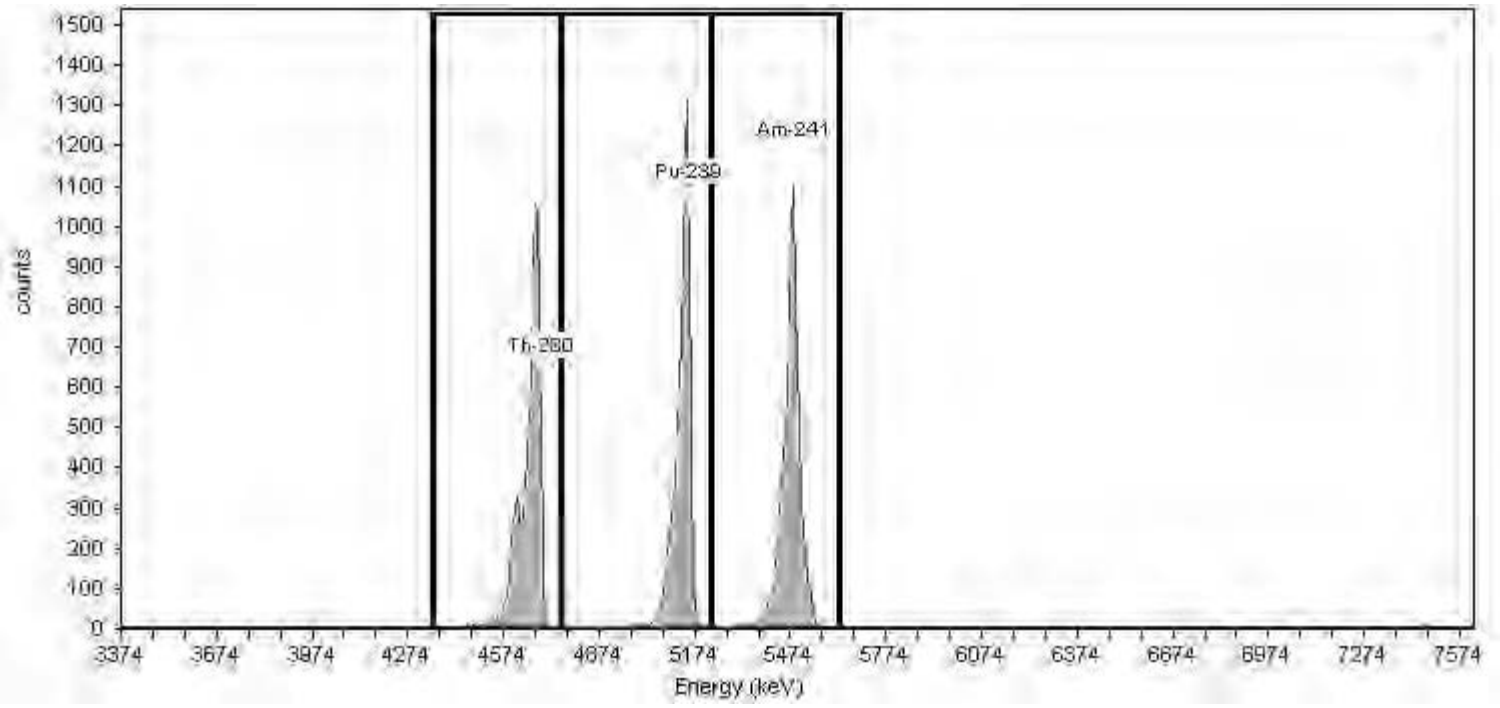
Certificate ID: 108346_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/22/2018 11:00:00AM
Description:

Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 8/14/2018 6:51:50PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.31% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,190.00	119.83
Pu-239	240	5.16	186	249	0.00	7,523.00	125.38
Am-241	284	5.49	249	303	0.00	7,467.00	124.45

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:00:33AM 8/15/2018

Calibration

Sample Name: CCV-1370619;AV81-08142018
Description:
Detector: AV81

Calibration Date: 8/15/2018 10:00:30AM
Analyst: 60040

Source Info

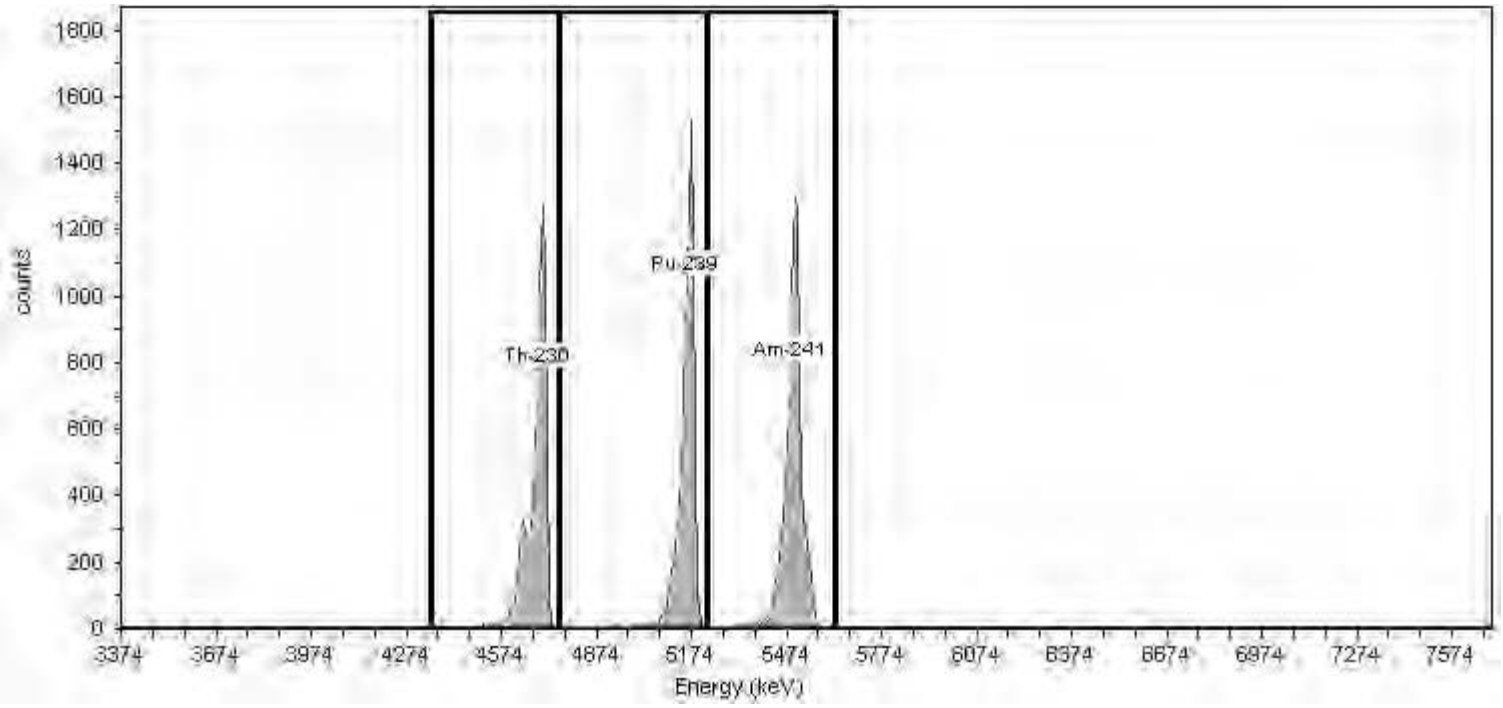
Certificate ID: 108347_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00AM
Description:

Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 8/14/2018 6:53:25PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 27.23% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	7,651.00	127.52
Pu-239	240	5.16	186	249	0.00	8,040.00	134.00
Am-241	284	5.49	249	303	0.00	8,616.00	143.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:00:46AM 8/15/2018

Calibration

Sample Name: CCV-1370620;AV82-08142018
Description:
Detector: AV82

Calibration Date: 8/15/2018 10:00:42AM
Analyst: 60040

Source Info

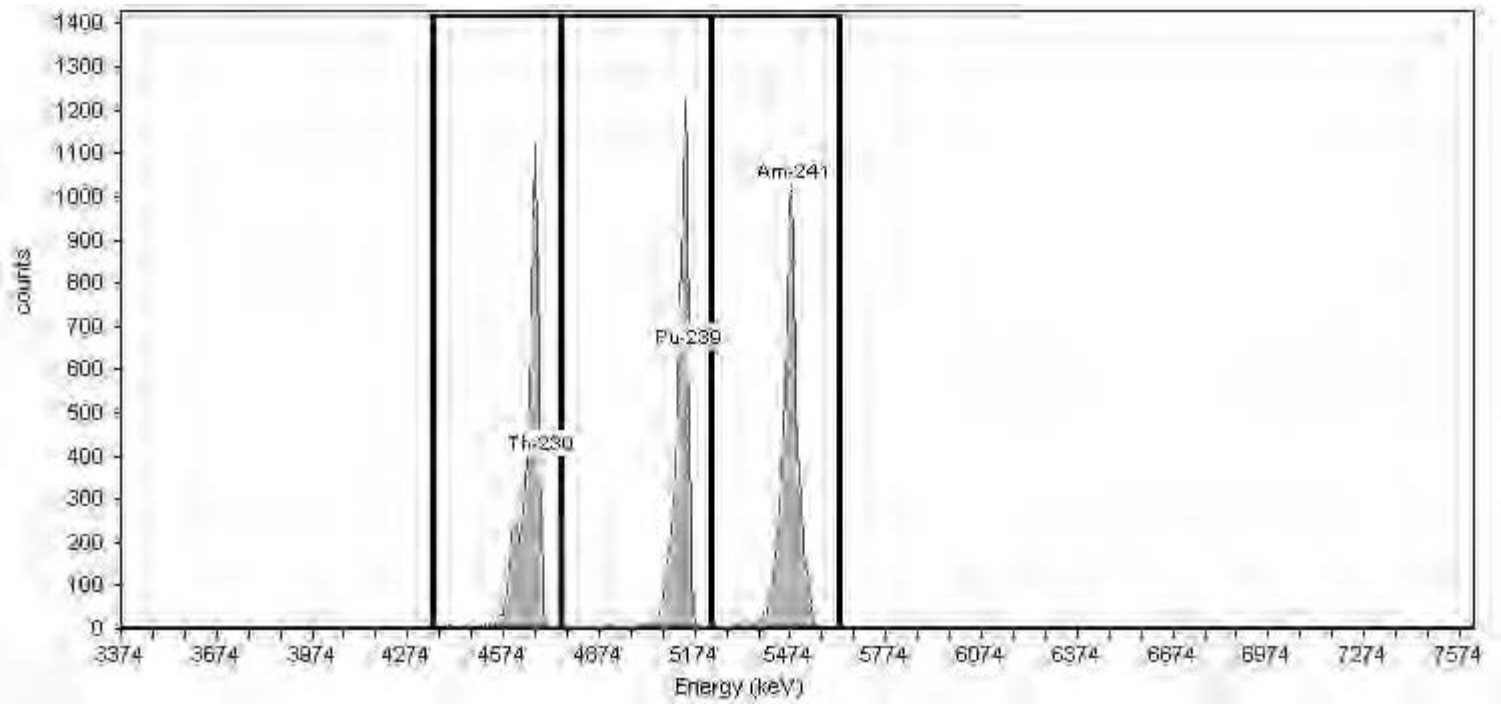
Certificate ID: 108348_00001
Prepared by: Eckert & Ziegler

Certification Date: 1/23/2018 11:00:00PM
Description:

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 8/14/2018 6:53:34PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.00% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,595.00	109.92
Pu-239	240	5.16	186	249	0.00	6,514.00	108.57
Am-241	284	5.49	249	303	0.00	7,034.00	117.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:00:56AM 8/15/2018

Calibration

Sample Name: CCV-7107;AV83-08142018
Description:
Detector: AV83

Calibration Date: 8/15/2018 10:00:52AM
Analyst: 60040

Source Info

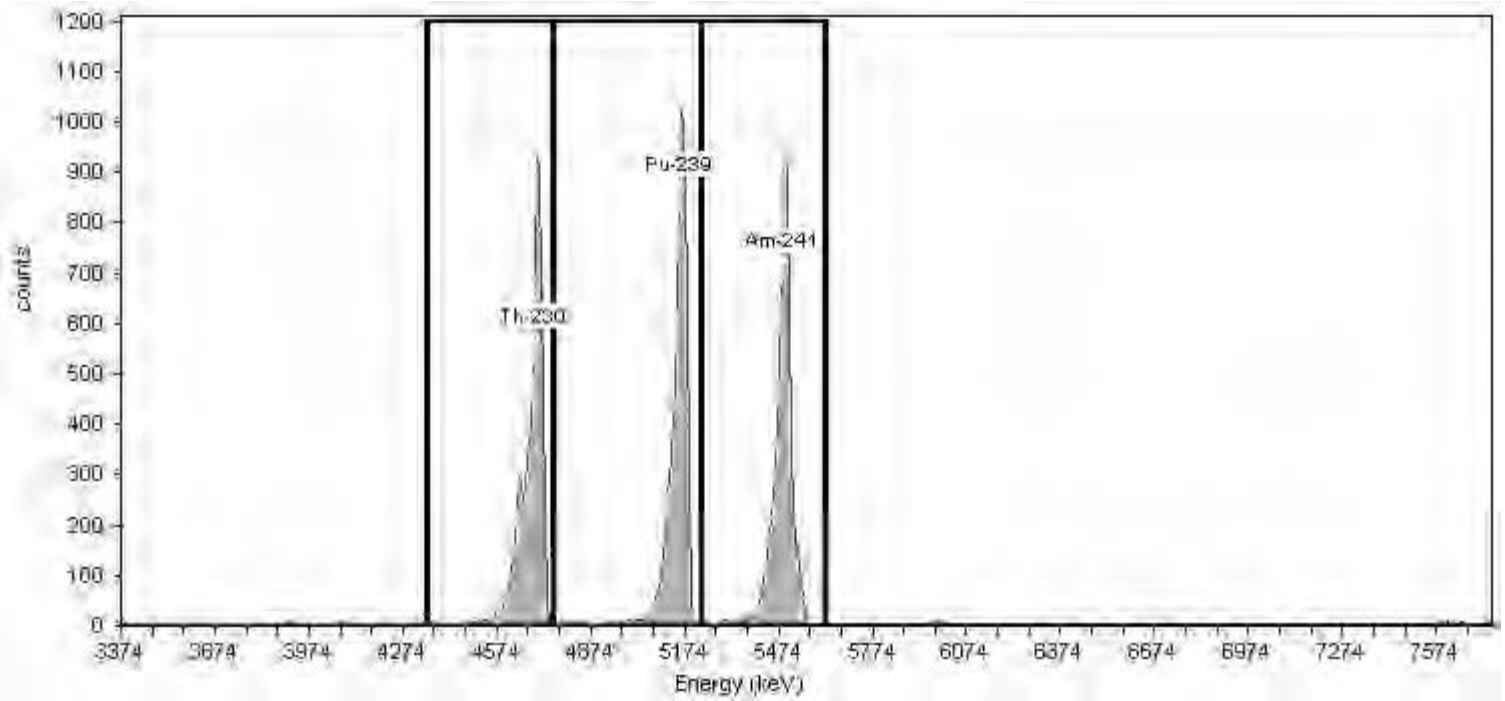
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 8/14/2018 6:54:06PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 24.86% +/- 0.39% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,688.00	111.47
Pu-239	240	5.16	186	249	0.00	6,572.00	109.53
Am-241	284	5.49	249	303	0.00	6,405.00	106.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:01:41AM 8/15/2018

Calibration

Sample Name: CCV-8877;AV85-08142018a
Description:
Detector: AV85

Calibration Date: 8/15/2018 10:01:36AM
Analyst: 60040

Source Info

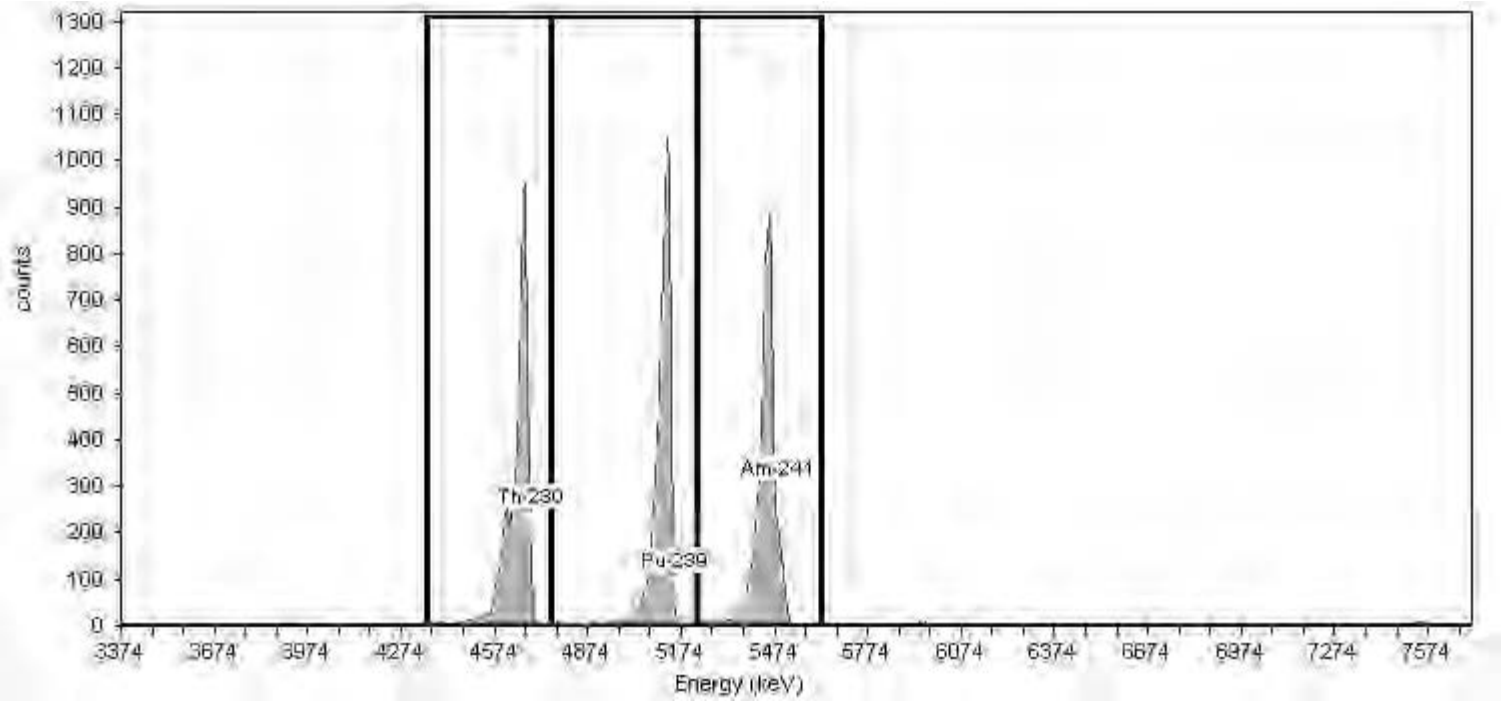
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 8/14/2018 6:56:59PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 24.79% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	6,102.00	101.70
Pu-239	240	5.16	186	249	0.00	6,278.00	104.63
Am-241	284	5.49	249	303	0.00	6,029.00	100.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:01:28AM 8/15/2018

Calibration

Sample Name: CCV-9520;AV86-08142018
Description:
Detector: AV86

Calibration Date: 8/15/2018 10:01:25AM
Analyst: 60040

Source Info

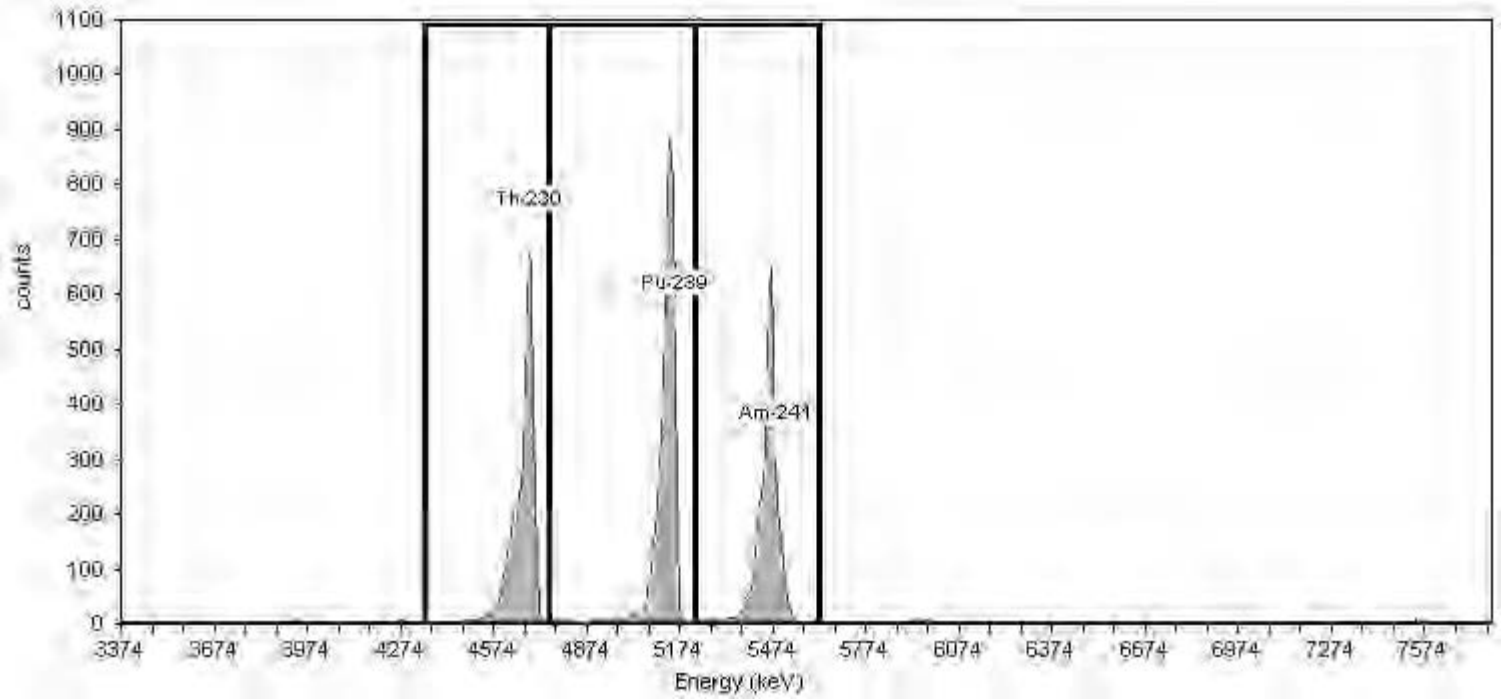
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 8/14/2018 6:55:54PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 22.80% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,602.00	76.70
Pu-239	240	5.16	186	249	0.00	5,516.00	91.93
Am-241	284	5.49	249	303	0.00	4,522.00	75.37

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:02:04AM 8/15/2018

Calibration

Sample Name: CCV-9793;AV88-08142018
Description:
Detector: AV88

Calibration Date: 8/15/2018 10:02:00AM
Analyst: 60040

Source Info

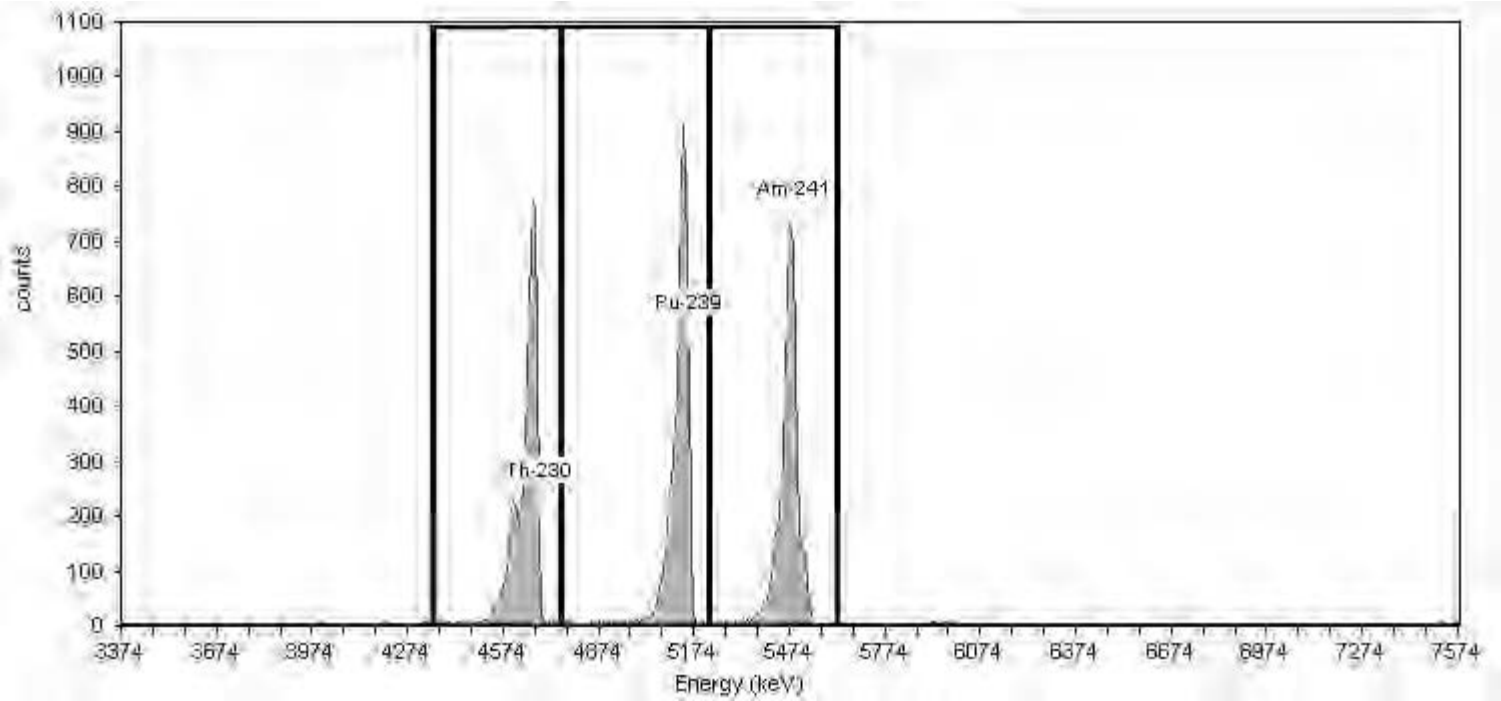
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 8/14/2018 6:57:53PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 22.73% +/- 0.40% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	5,436.00	90.60
Pu-239	240	5.16	186	249	0.00	5,718.00	95.30
Am-241	284	5.49	249	303	0.00	5,206.00	86.77

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:02:36AM 8/15/2018

Calibration

Sample Name: CCV-9885;AV91-08142018
Description:
Detector: AV91

Calibration Date: 8/15/2018 10:02:32AM
Analyst: 60040

Source Info

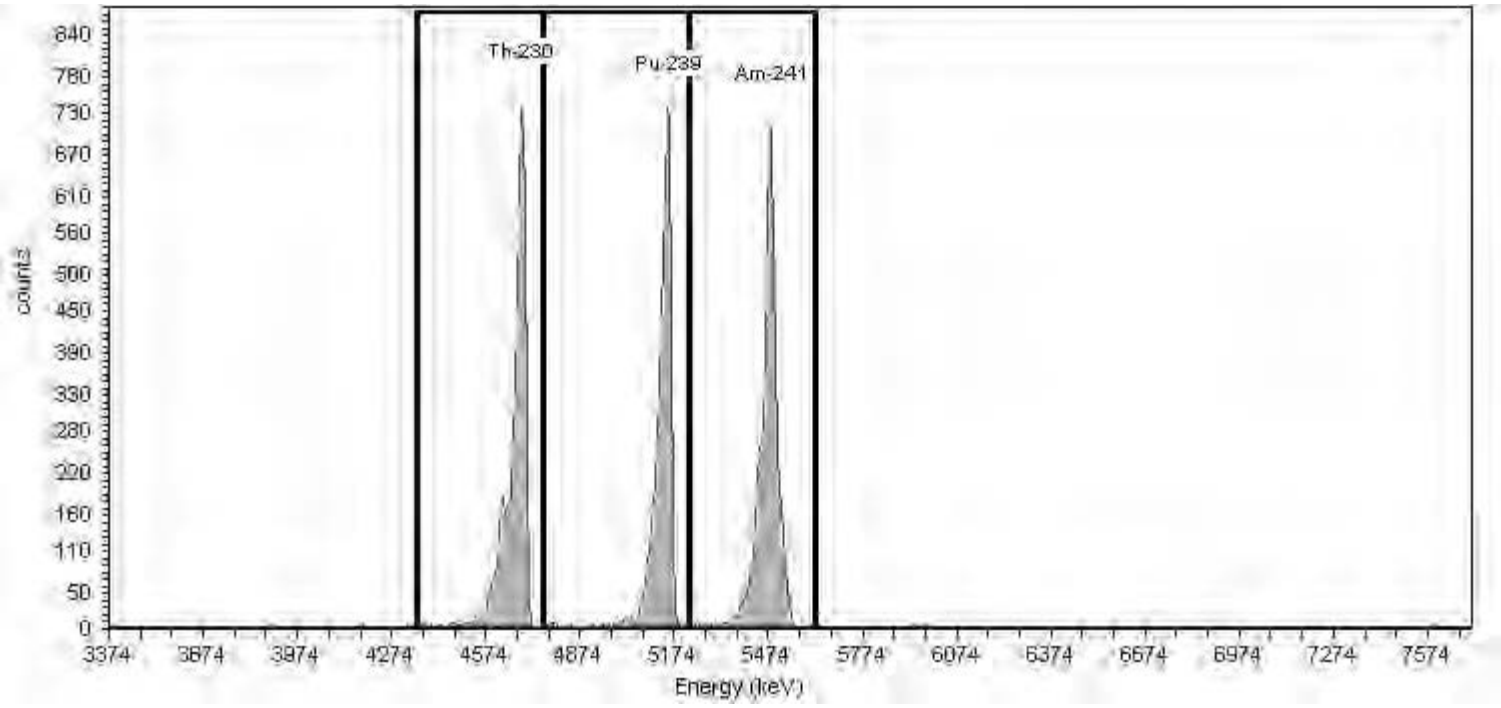
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 8/14/2018 6:59:40PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 23.83% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	0.00	4,747.00	79.12
Pu-239	240	5.16	186	249	0.00	4,591.00	76.52
Am-241	284	5.49	249	303	0.00	5,120.00	85.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:44:55PM 8/27/2018

Calibration

Sample Name: CCV-8874;AV148-20180822
Description:
Detector: AV148

Analyst: 60040
Analysis Date: 8/22/2018 12:29:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

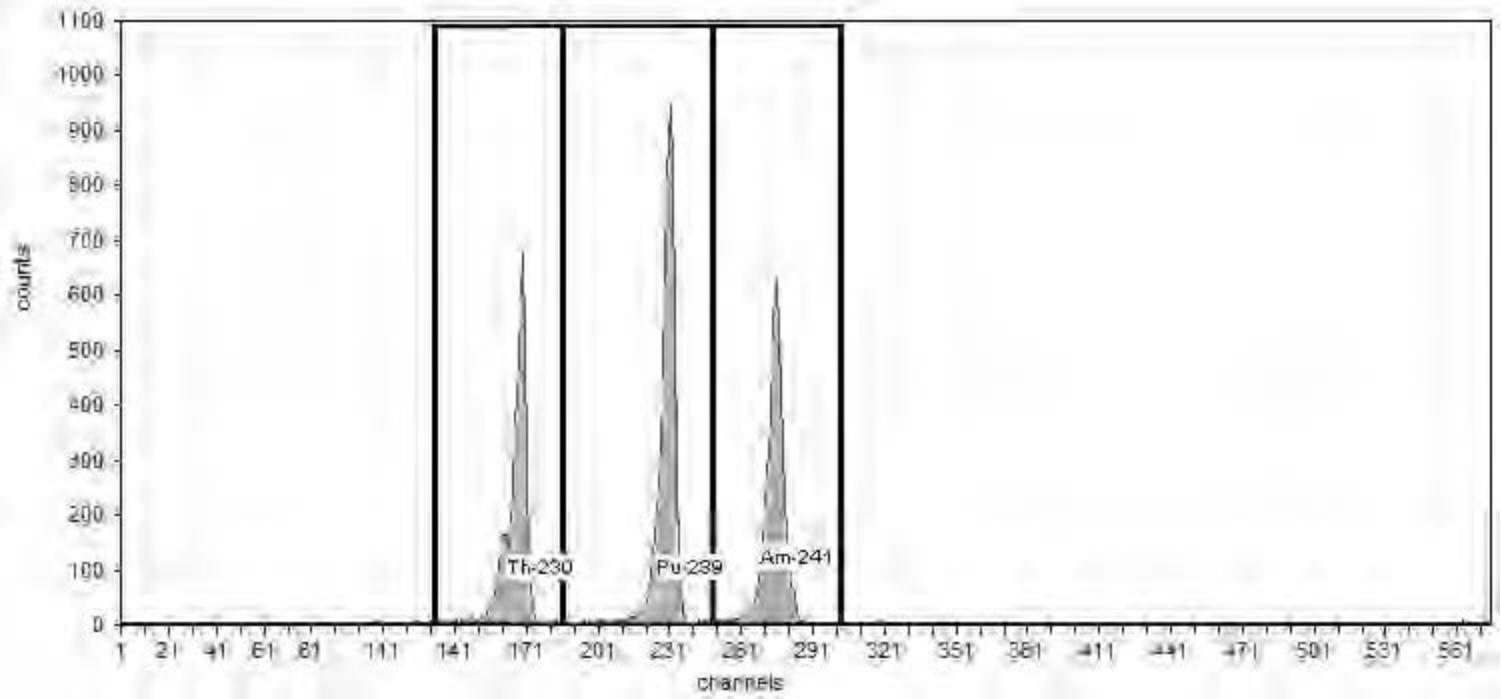
Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 8/22/2018 11:19:01AM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-8874;AV148-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.99% +/- 0.49% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	36.96	4,472.00	74.53
Pu-239	240	5,155.40	186	249	38.26	5,855.00	97.58
Am-241	284	5,485.70	249	303	41.87	4,709.00	78.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:37:27PM 8/23/2018

Calibration

Sample Name: CCV-8877;AV151-20180823
Description:
Detector: AV151

Analyst: 60040
Analysis Date: 8/23/2018 4:37:26PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

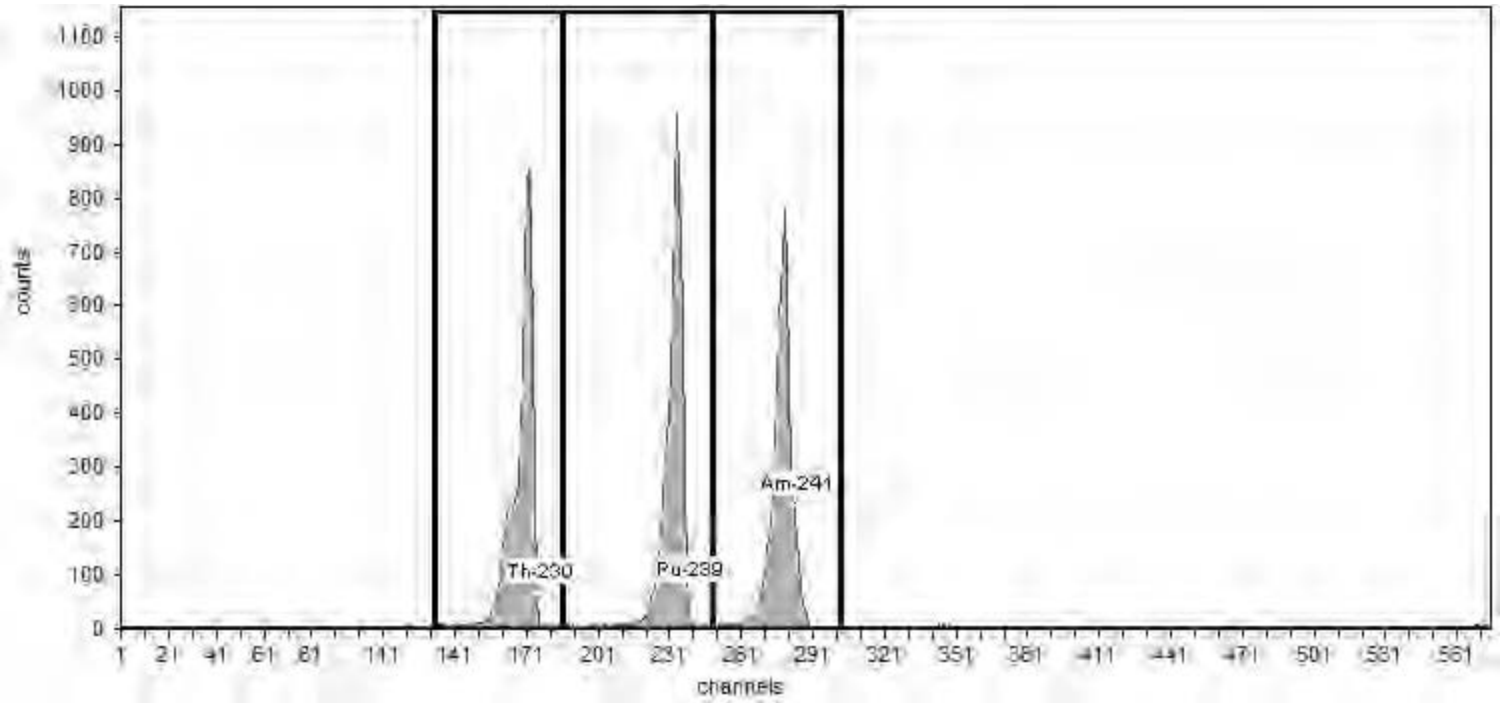
Detector: AV151 , SN: 50-05/R5
Acquisition Start Date: 8/23/2018 2:40:06AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV151-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.30% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.99	6,016.00	100.27
Pu-239	240	5,155.40	186	249	38.48	6,172.00	102.87
Am-241	284	5,485.70	249	303	43.72	5,854.00	97.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:29:58PM 8/22/2018

Calibration

Sample Name: CCV-9520;AV152-20180822
Description:
Detector: AV152

Analyst: 60040
Analysis Date: 8/22/2018 12:29:57PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

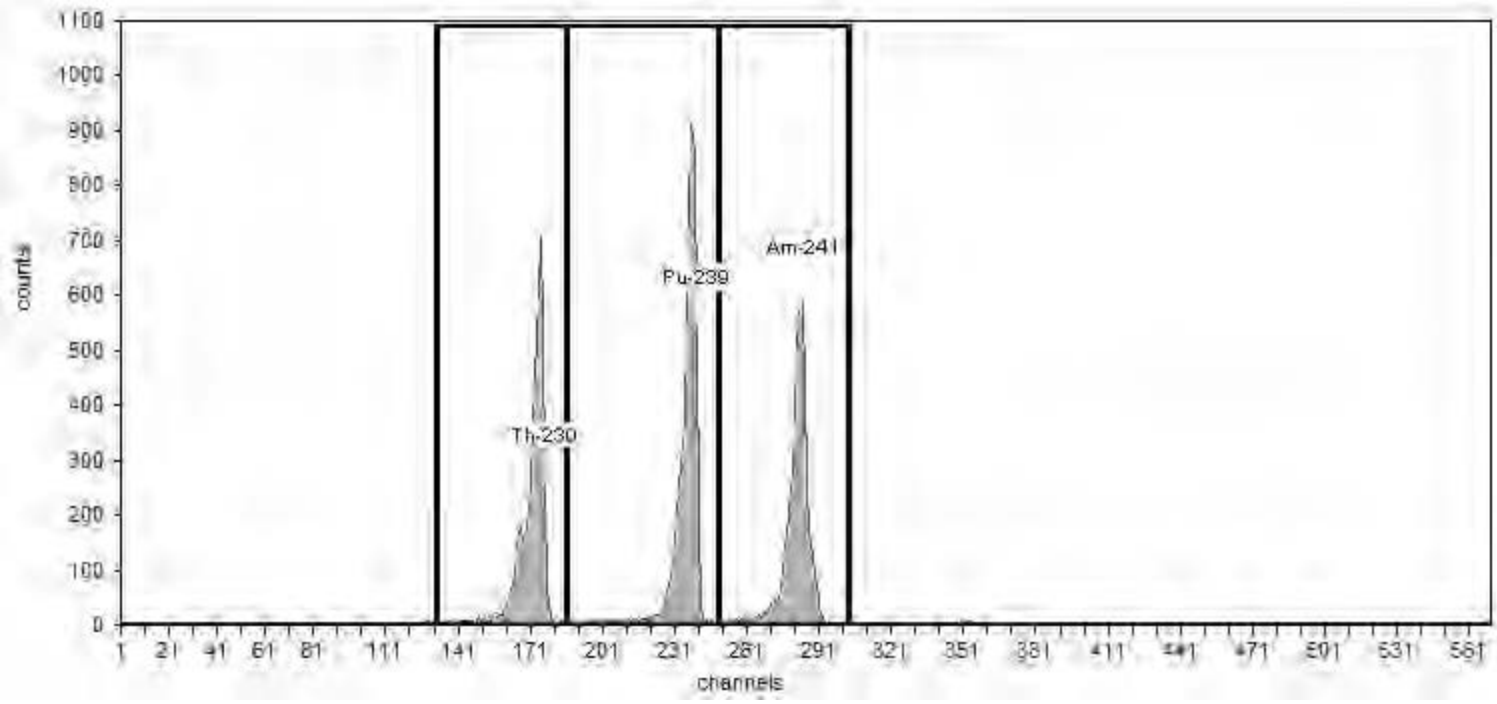
Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 8/22/2018 11:19:47AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV152-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.86% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.99	4,619.00	76.98
Pu-239	240	5,155.40	186	249	35.21	5,586.00	93.10
Am-241	284	5,485.70	249	303	41.67	4,478.00	74.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:37:31PM 8/23/2018

Calibration

Sample Name: CCV-8879;AV153-20180823
Description:
Detector: AV153

Analyst: 60040
Analysis Date: 8/23/2018 4:37:30PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

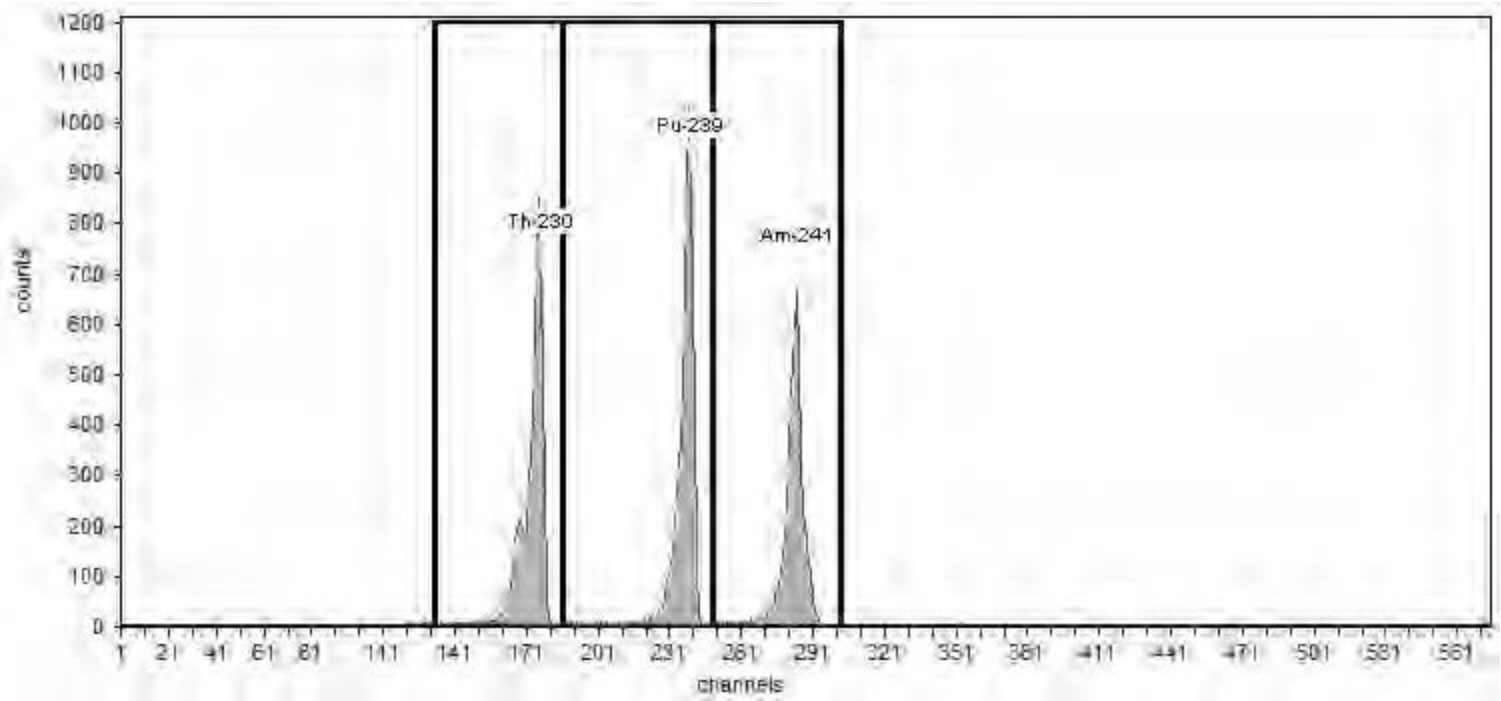
Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 8/23/2018 2:40:22AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8879;AV153-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.25% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.01	5,456.00	90.93
Pu-239	240	5,155.40	186	249	32.90	5,817.00	96.95
Am-241	284	5,485.70	249	303	37.42	4,572.00	76.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:06PM 8/22/2018

Calibration

Sample Name: CCV-9792;AV154-20180822
Description:
Detector: AV154

Analyst: 60040
Analysis Date: 8/22/2018 12:30:05PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

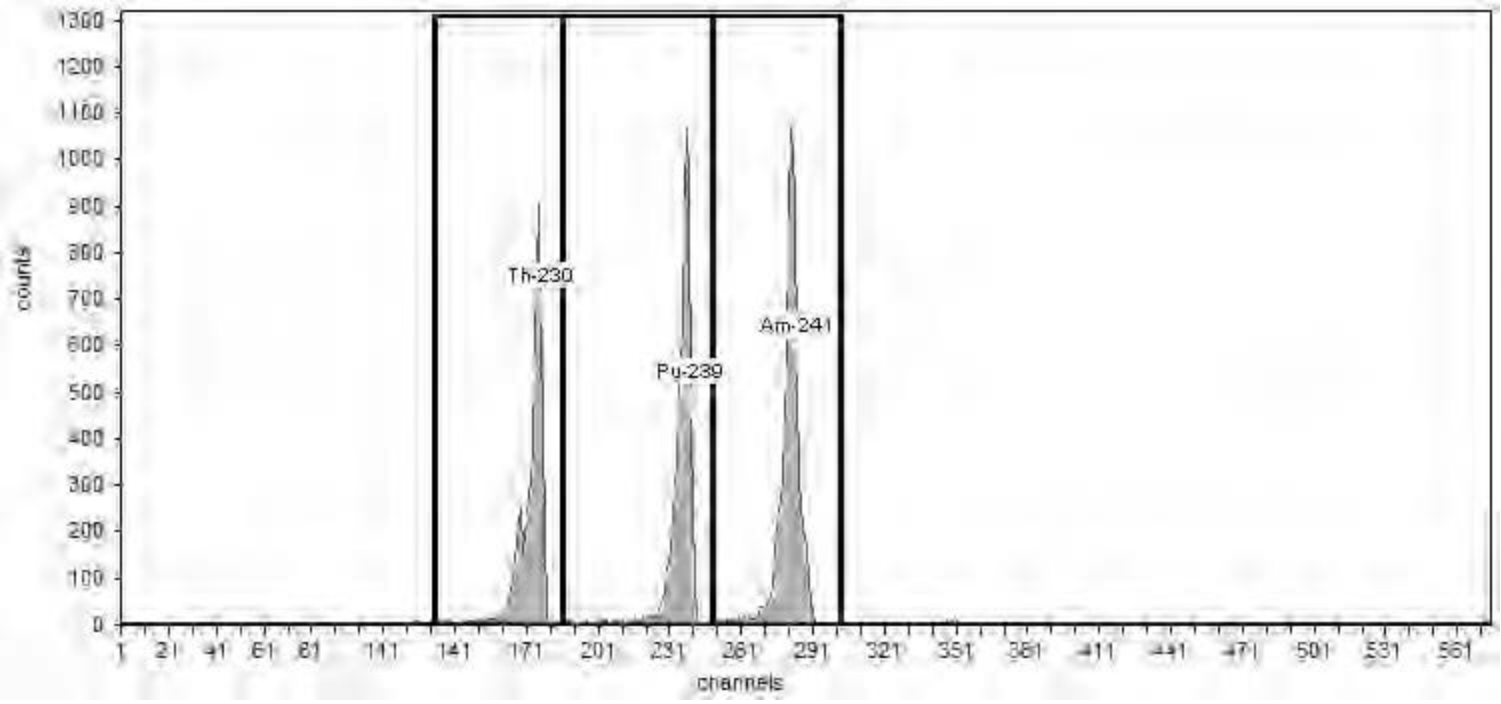
Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 8/22/2018 11:20:18AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9792;AV154-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.30% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.89	5,301.00	88.35
Pu-239	240	5,155.40	186	249	33.20	6,063.00	101.05
Am-241	284	5,485.70	249	303	31.09	6,812.00	113.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:45:13PM 8/27/2018

Calibration

Sample Name: CCV-9794;AV156-20180822
Description:
Detector: AV156

Analyst: 60040
Analysis Date: 8/22/2018 12:30:09PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

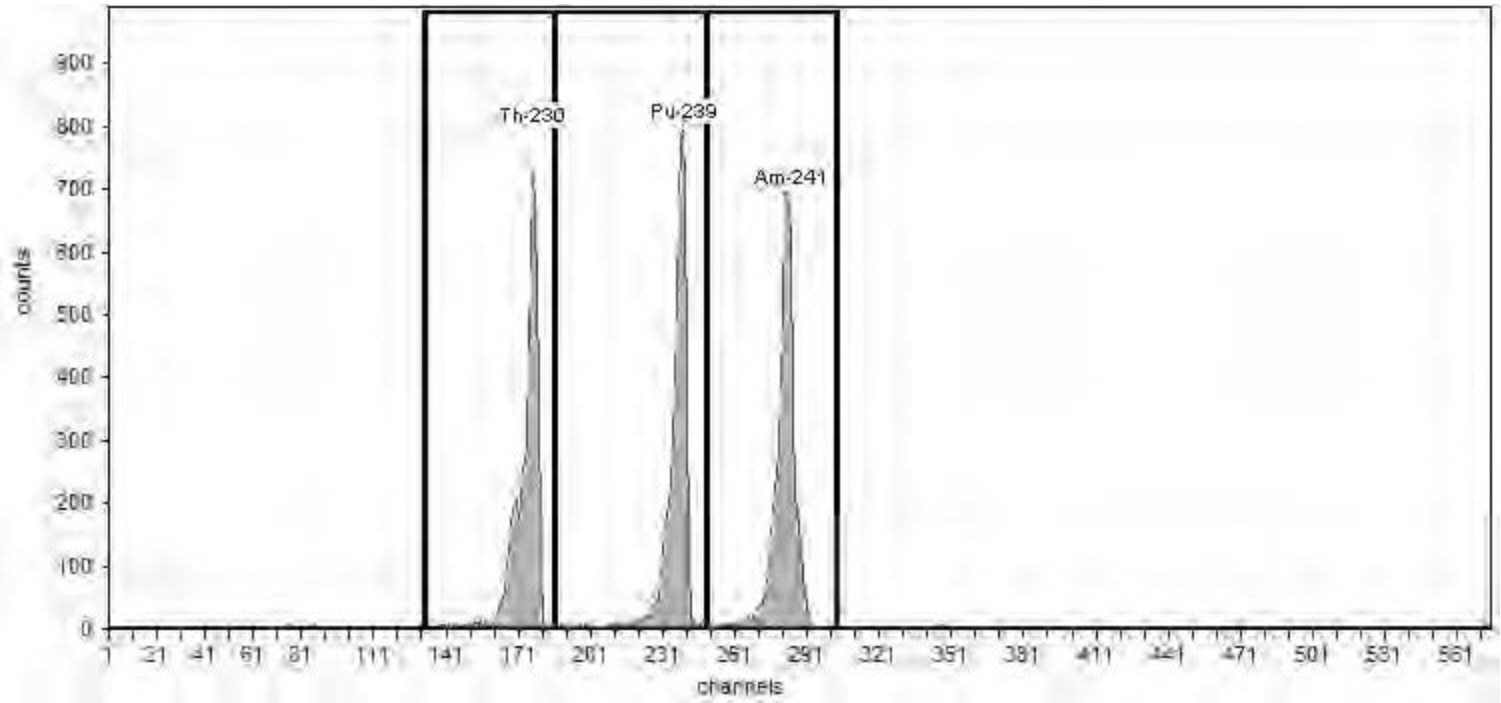
Detector: AV156 , SN: 49-155n4
Acquisition Start Date: 8/22/2018 11:20:48AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9794;AV156-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 20.85% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.20	4,869.00	81.15
Pu-239	240	5,155.40	186	249	34.90	4,986.00	83.10
Am-241	284	5,485.70	249	303	38.06	5,213.00	86.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:18PM 8/22/2018

Calibration

Sample Name: CCV-9817;AV158-20180822
Description:
Detector: AV158

Analyst: 60040
Analysis Date: 8/22/2018 12:30:17PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

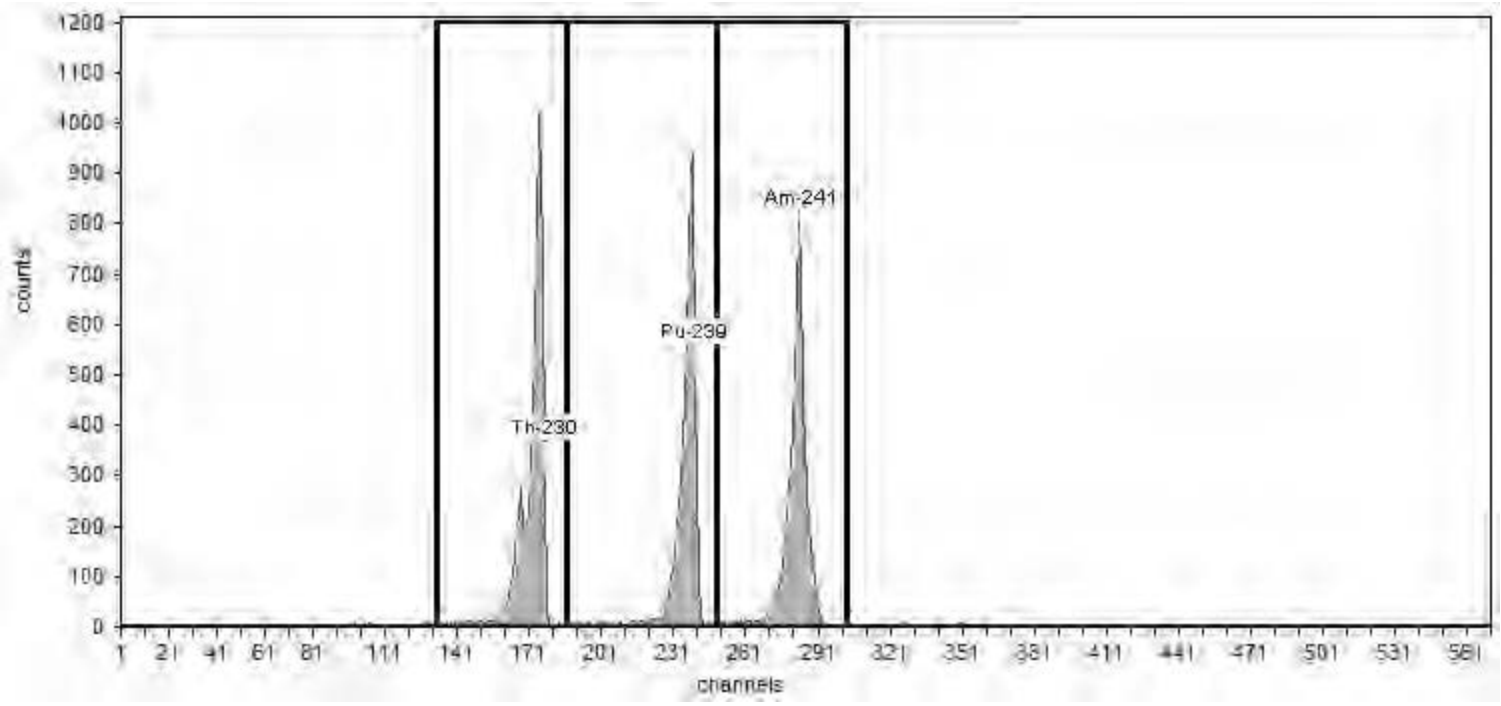
Detector: AV158 , SN: 50-05/II4
Acquisition Start Date: 8/22/2018 11:21:19AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9817;AV158-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.17% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.65	5,907.00	98.45
Pu-239	240	5,155.40	186	249	33.06	5,311.00	88.52
Am-241	284	5,485.70	249	303	34.22	5,445.00	90.75

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:23PM 8/22/2018

Calibration

Sample Name: CCV-9884;AV159-20180822
Description:
Detector: AV159

Analyst: 60040
Analysis Date: 8/22/2018 12:30:22PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

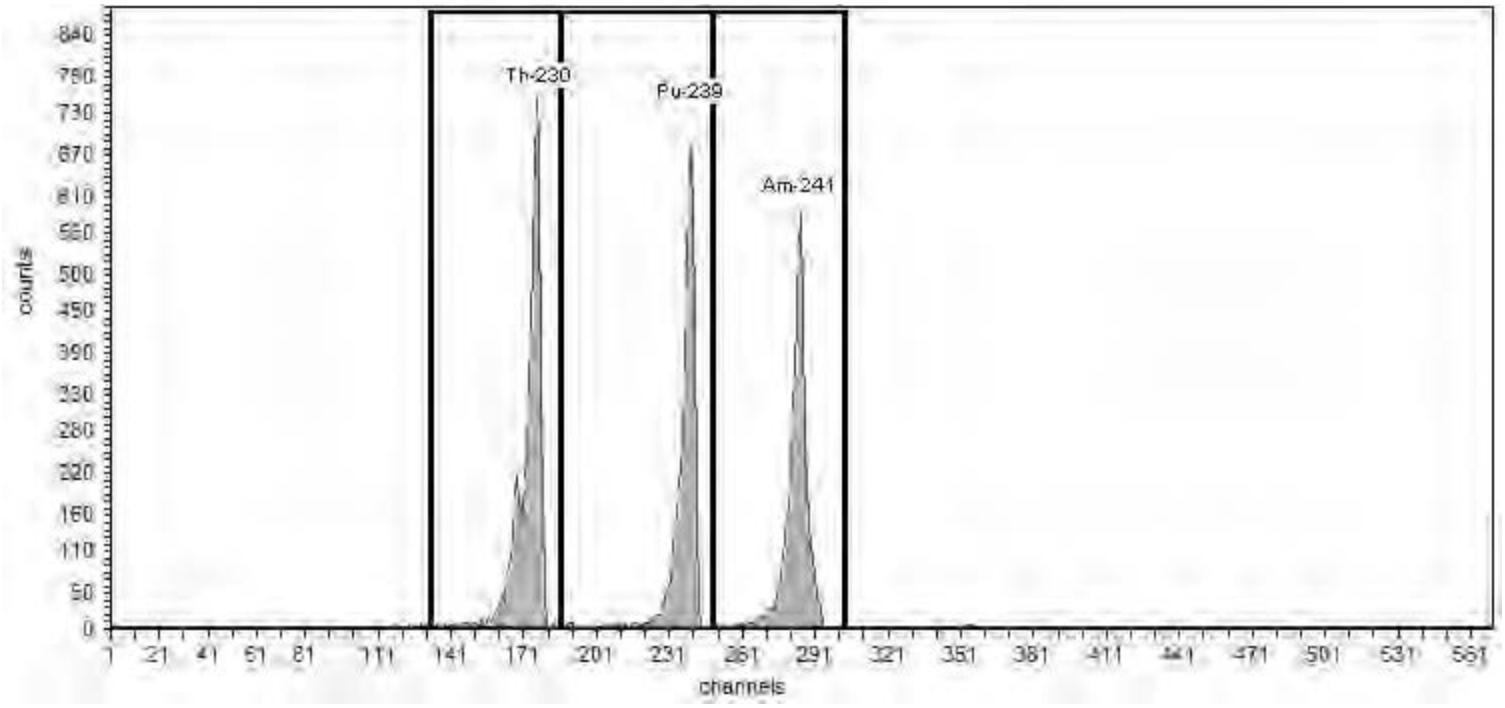
Detector: AV159 , SN: 50-05/II5
Acquisition Start Date: 8/22/2018 11:21:32AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV159-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.56% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.13	4,996.00	83.27
Pu-239	240	5,155.40	186	249	34.32	4,026.00	67.10
Am-241	284	5,485.70	249	303	36.96	4,021.00	67.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:35PM 8/22/2018

Calibration

Sample Name: CCV-9885;AV160-20180822
Description:
Detector: AV160

Analyst: 60040
Analysis Date: 8/22/2018 12:30:34PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

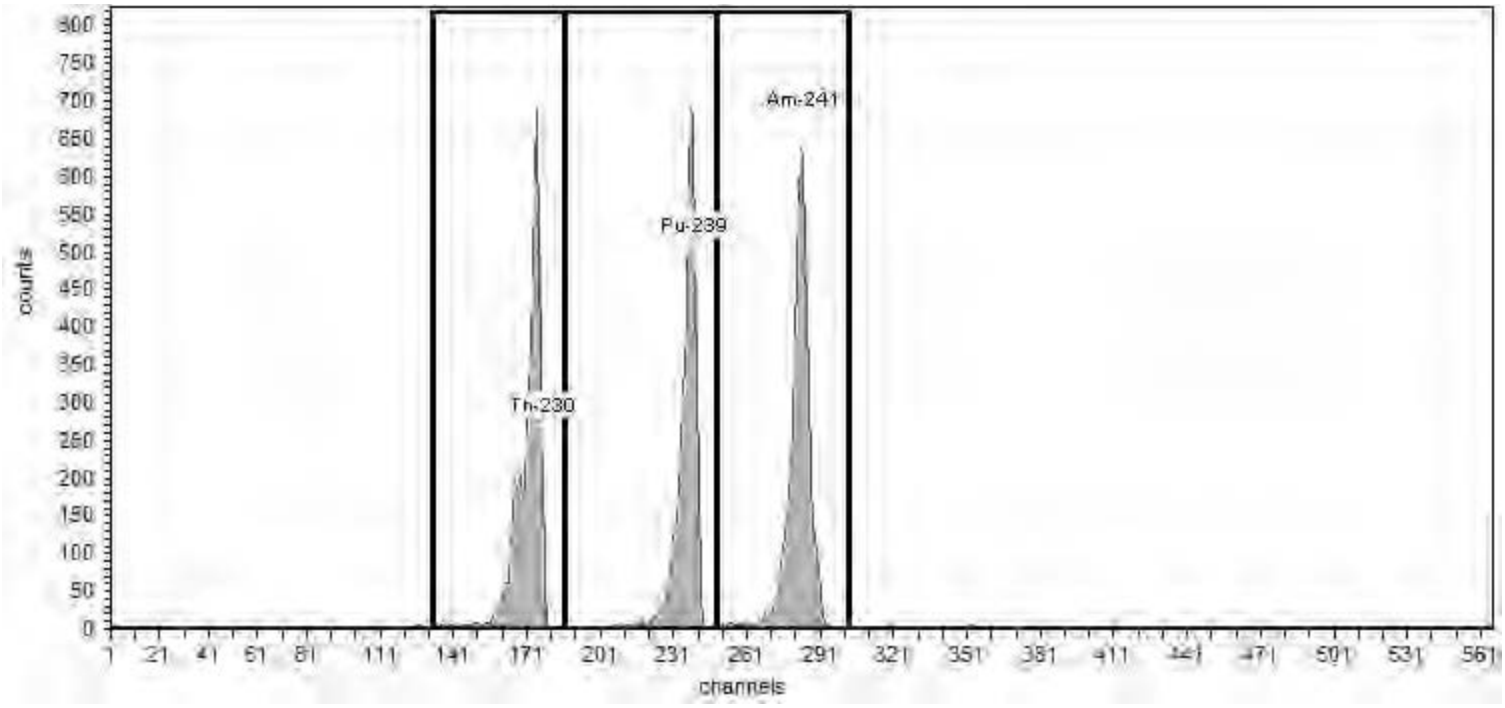
Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 8/22/2018 11:21:53AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9885;AV160-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.99% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.03	4,675.00	77.92
Pu-239	240	5,155.40	186	249	37.51	4,377.00	72.95
Am-241	284	5,485.70	249	303	41.51	4,894.00	81.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:30:41PM 8/22/2018

Calibration

Sample Name: CCV-9886;AV161-20180822
Description:
Detector: AV161

Analyst: 60040
Analysis Date: 8/22/2018 12:30:40PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82247-334
Prepared by: Analytics
Description:

Certification Date: 6/10/2010 12:00:00PM

Acquisition

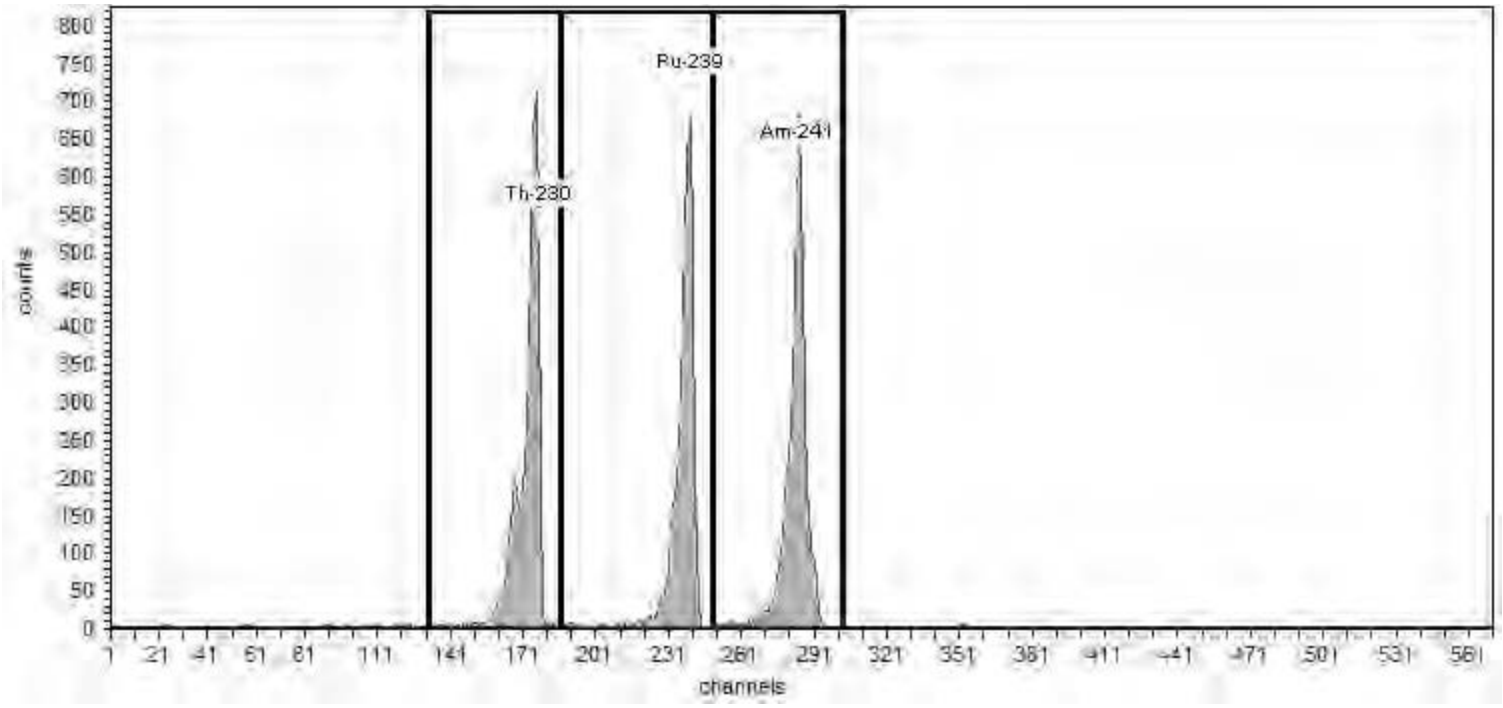
Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 8/22/2018 11:22:04AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9886;AV161-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.93% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.50	4,719.00	78.65
Pu-239	240	5,155.40	186	249	38.37	4,434.00	73.90
Am-241	284	5,485.70	249	303	34.09	4,575.00	76.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:45:39PM 8/27/2018

Calibration

Sample Name: CCV-8875;AV164-20180823
Description:
Detector: AV164

Analyst: 60040
Analysis Date: 8/23/2018 4:37:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

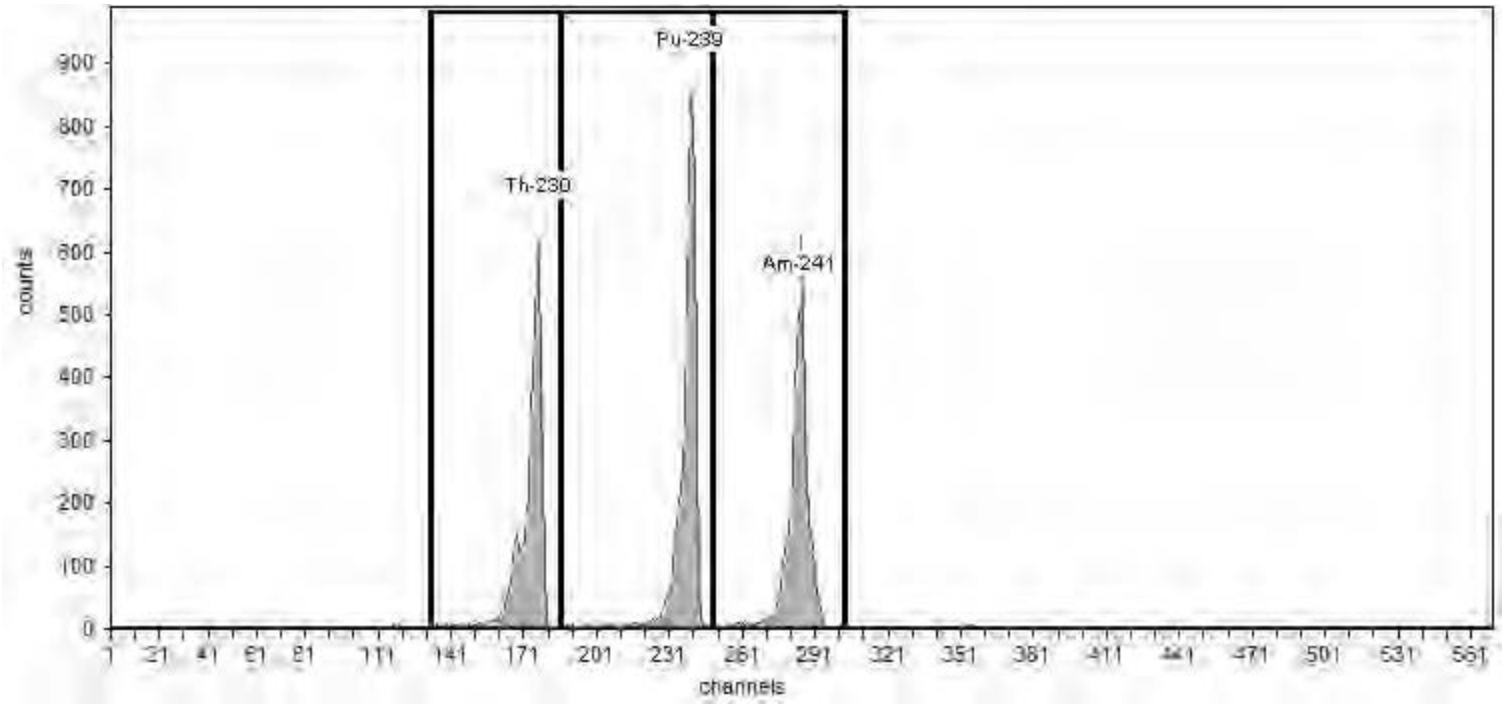
Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 8/23/2018 2:40:44AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV164-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.47% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.77	3,980.00	66.33
Pu-239	240	5,155.40	186	249	31.21	4,623.00	77.05
Am-241	284	5,485.70	249	303	32.89	4,100.00	68.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:45:47PM 8/27/2018

Calibration

Sample Name: CCV-8876;AV165-20180822
Description:
Detector: AV165

Analyst: 60040
Analysis Date: 8/22/2018 2:11:13PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

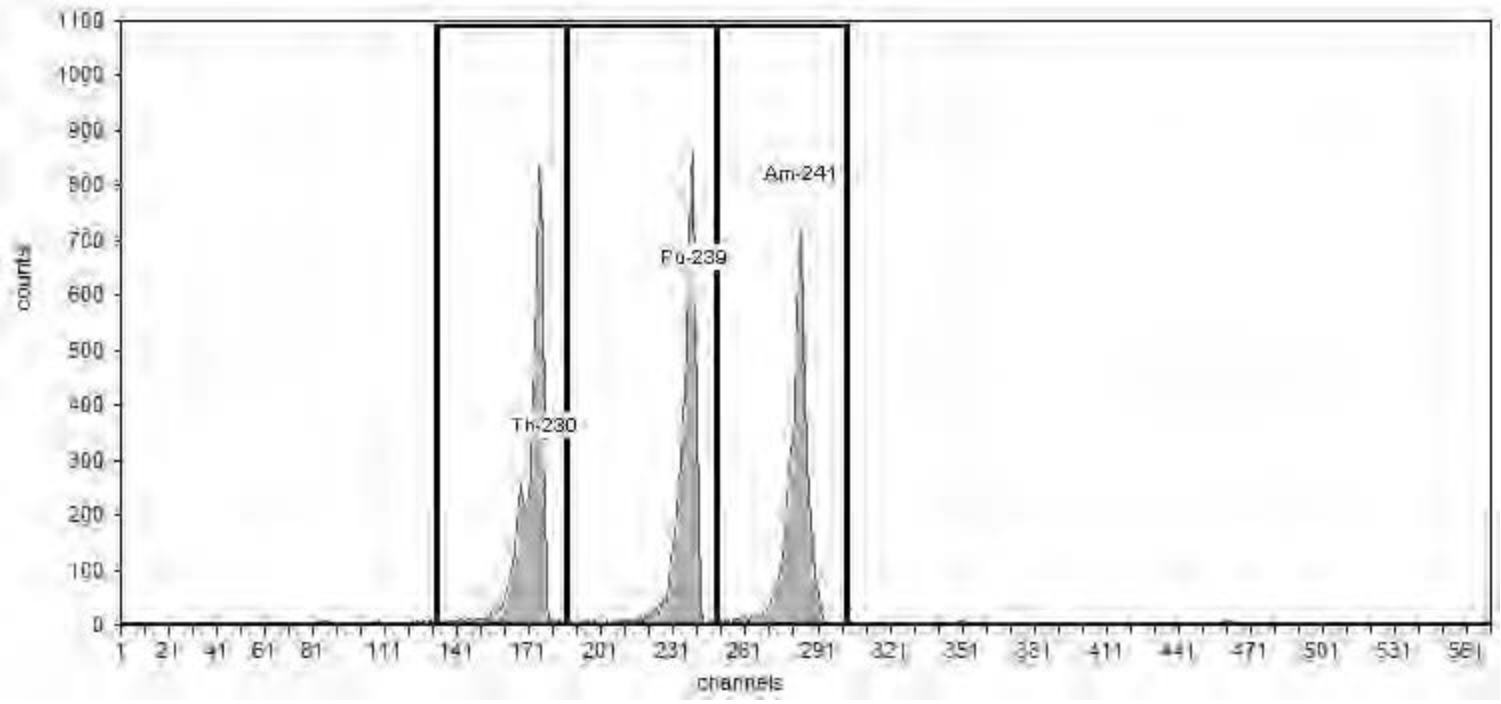
Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 8/22/2018 12:40:49PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8876;AV165-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.20% +/- 0.37% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.85	5,537.00	92.28
Pu-239	240	5,155.40	186	249	35.97	5,407.00	90.12
Am-241	284	5,485.70	249	303	36.33	5,435.00	90.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:18PM 8/22/2018

Calibration

Sample Name: CCV-8877;AV166-20180822
Description:
Detector: AV166

Analyst: 60040
Analysis Date: 8/22/2018 2:11:17PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

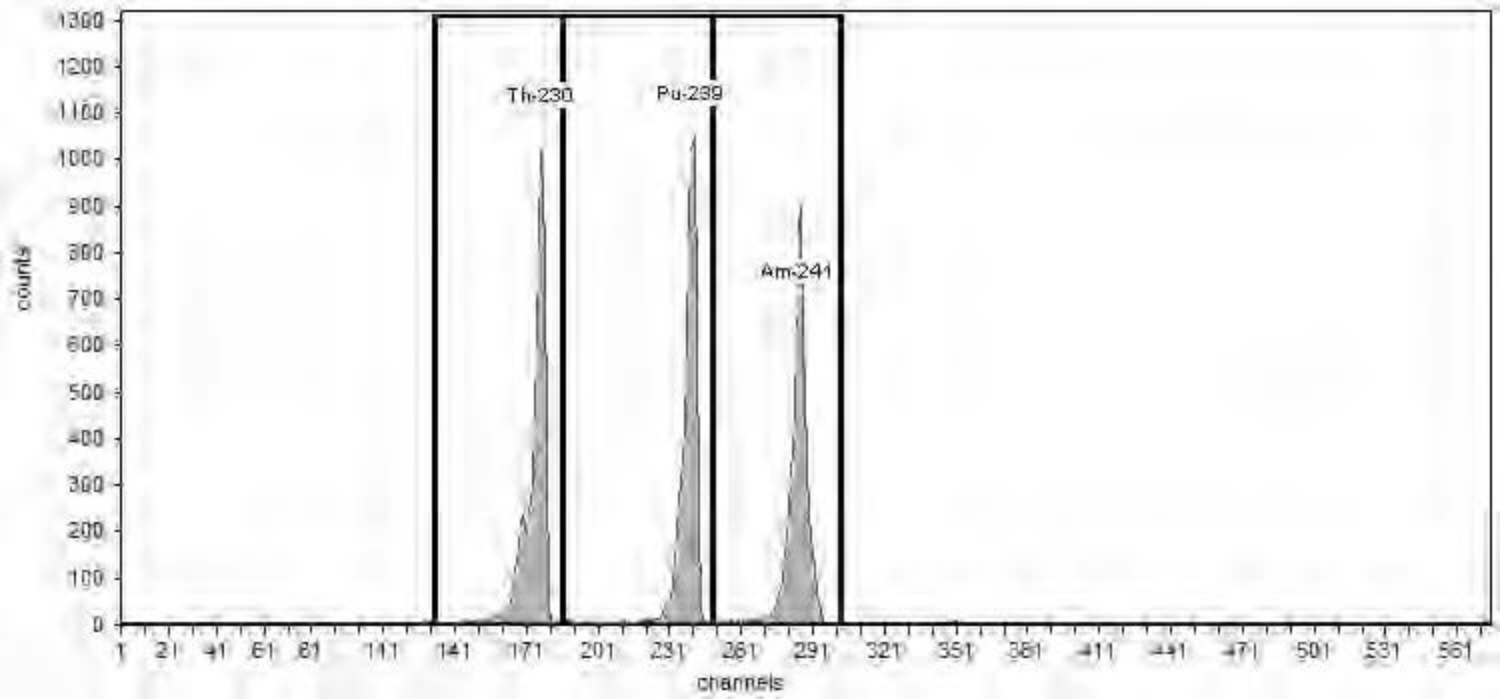
Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 8/22/2018 12:41:02PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV166-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.29% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.87	6,060.00	101.00
Pu-239	240	5,155.40	186	249	34.48	6,124.00	102.07
Am-241	284	5,485.70	249	303	34.14	5,843.00	97.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:37:40PM 8/23/2018

Calibration

Sample Name: CCV-9520;AV167-20180823
Description:
Detector: AV167

Analyst: 60040
Analysis Date: 8/23/2018 4:37:39PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

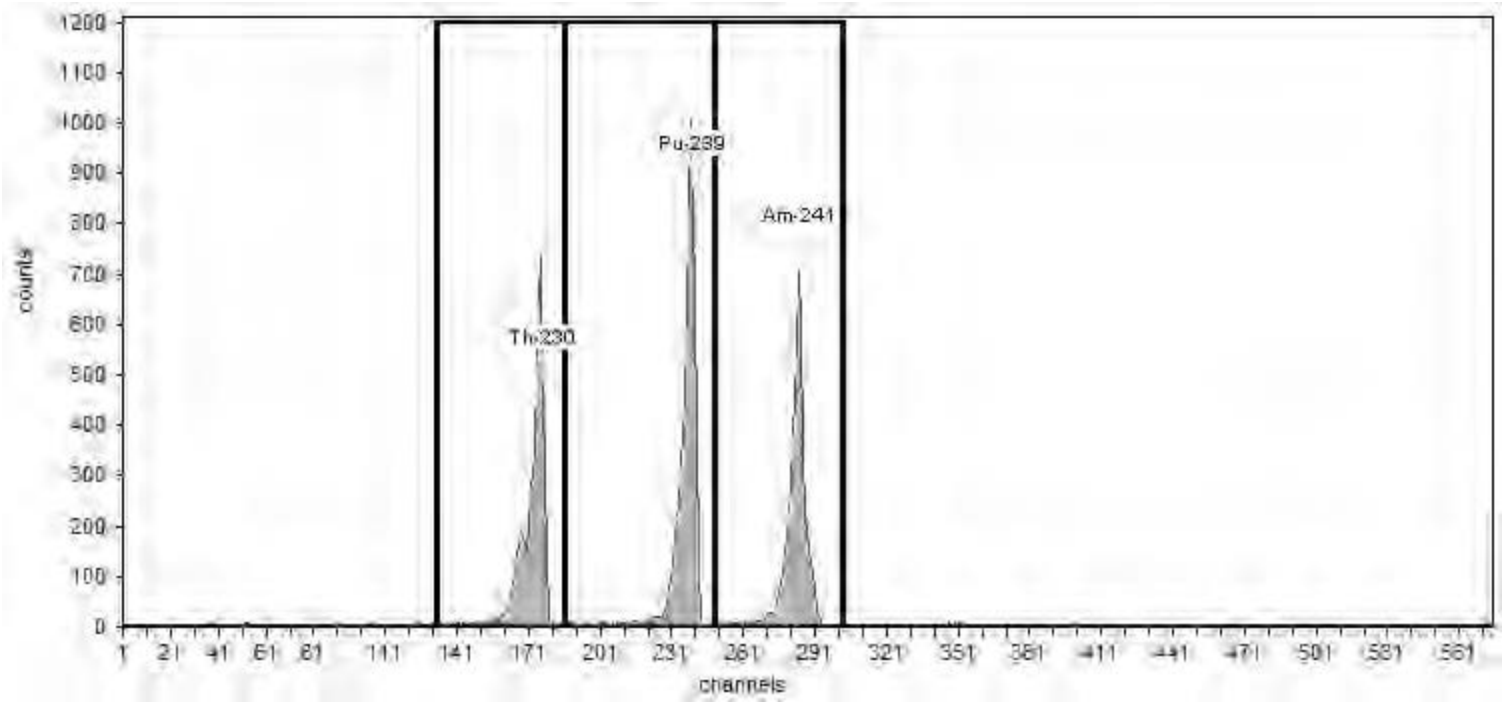
Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 8/23/2018 2:41:03AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV167-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.76% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.76	4,549.00	75.82
Pu-239	240	5,155.40	186	249	32.41	5,628.00	93.80
Am-241	284	5,485.70	249	303	31.35	4,450.00	74.17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:45:55PM 8/27/2018

Calibration

Sample Name: CCV-9794;AV171-20180822
Description:
Detector: AV171

Analyst: 60040
Analysis Date: 8/22/2018 2:11:24PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82242-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

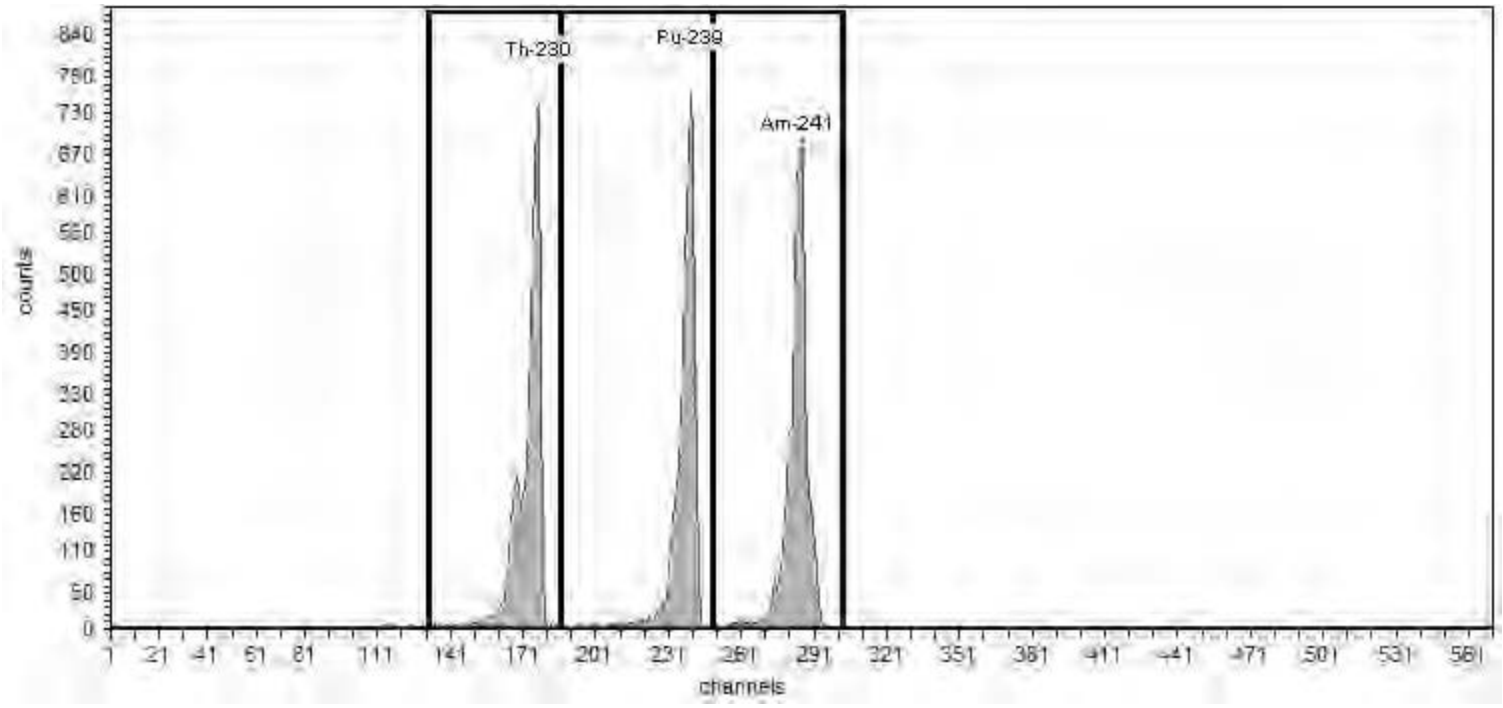
Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 8/22/2018 12:41:34PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9794;AV171-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.76% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.32	5,010.00	83.50
Pu-239	240	5,155.40	186	249	36.63	4,795.00	79.92
Am-241	284	5,485.70	249	303	35.88	5,186.00	86.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:28PM 8/22/2018

Calibration

Sample Name: CCV-9795;AV172-20180822
Description:
Detector: AV172

Analyst: 60040
Analysis Date: 8/22/2018 2:11:27PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

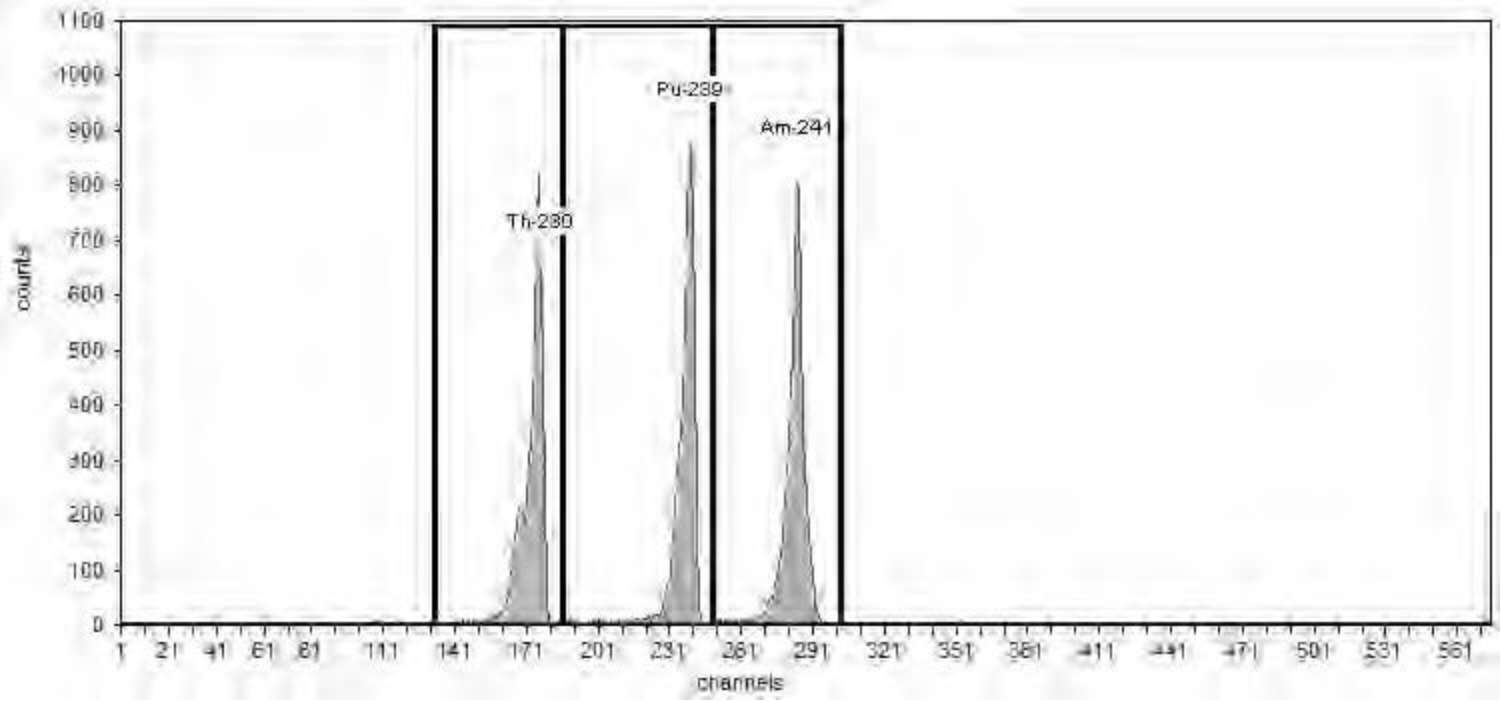
Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 8/22/2018 12:41:45PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9795;AV172-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.11% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.65	5,268.00	87.80
Pu-239	240	5,155.40	186	249	36.98	5,463.00	91.05
Am-241	284	5,485.70	249	303	36.17	5,674.00	94.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:32PM 8/22/2018

Calibration

Sample Name: CCV-9817;AV173-20180822
Description:
Detector: AV173

Analyst: 60040
Analysis Date: 8/22/2018 2:11:31PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

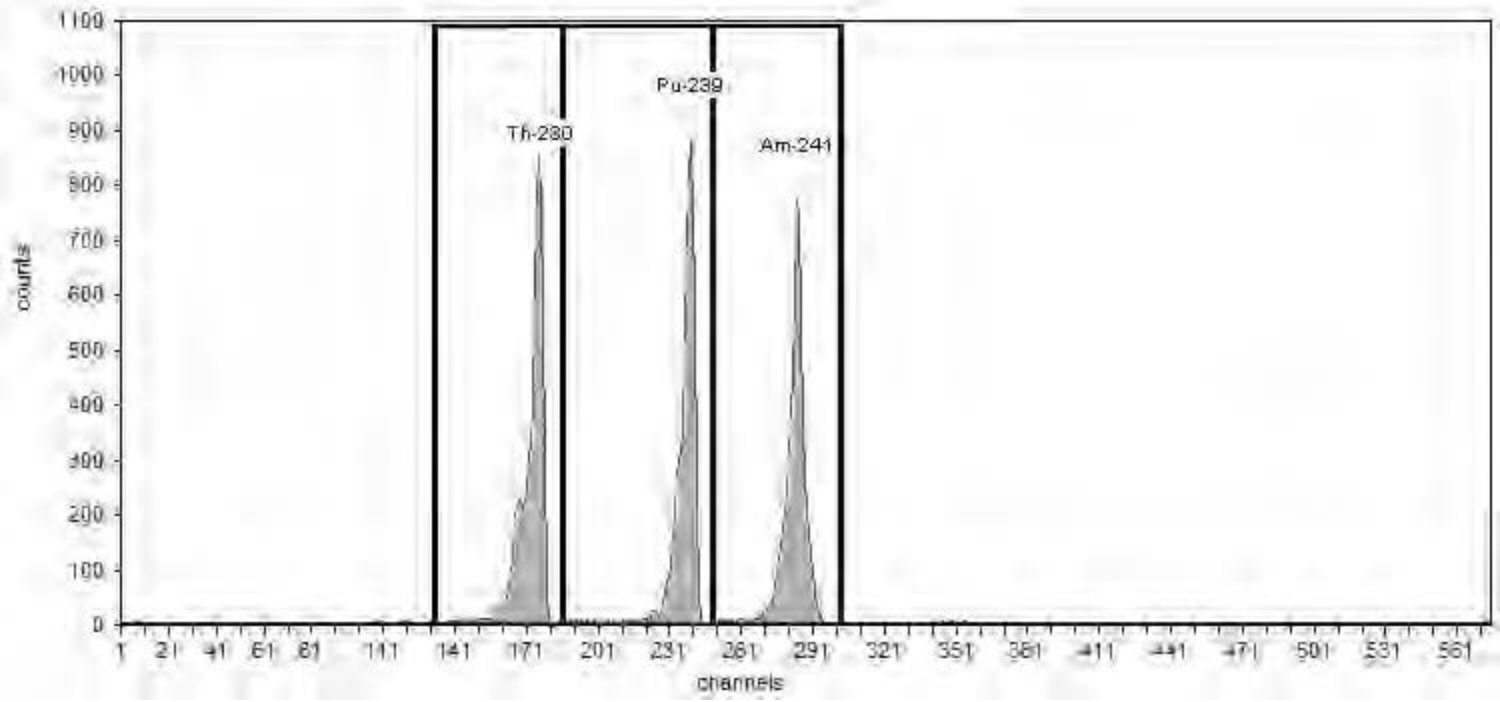
Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 8/22/2018 12:41:57PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9817;AV173-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.50% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.54	5,944.00	99.07
Pu-239	240	5,155.40	186	249	36.36	5,502.00	91.70
Am-241	284	5,485.70	249	303	35.64	5,474.00	91.23

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:11:35PM 8/22/2018

Calibration

Sample Name: CCV-9884;AV174-20180822
Description:
Detector: AV174

Analyst: 60040
Analysis Date: 8/22/2018 2:11:35PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

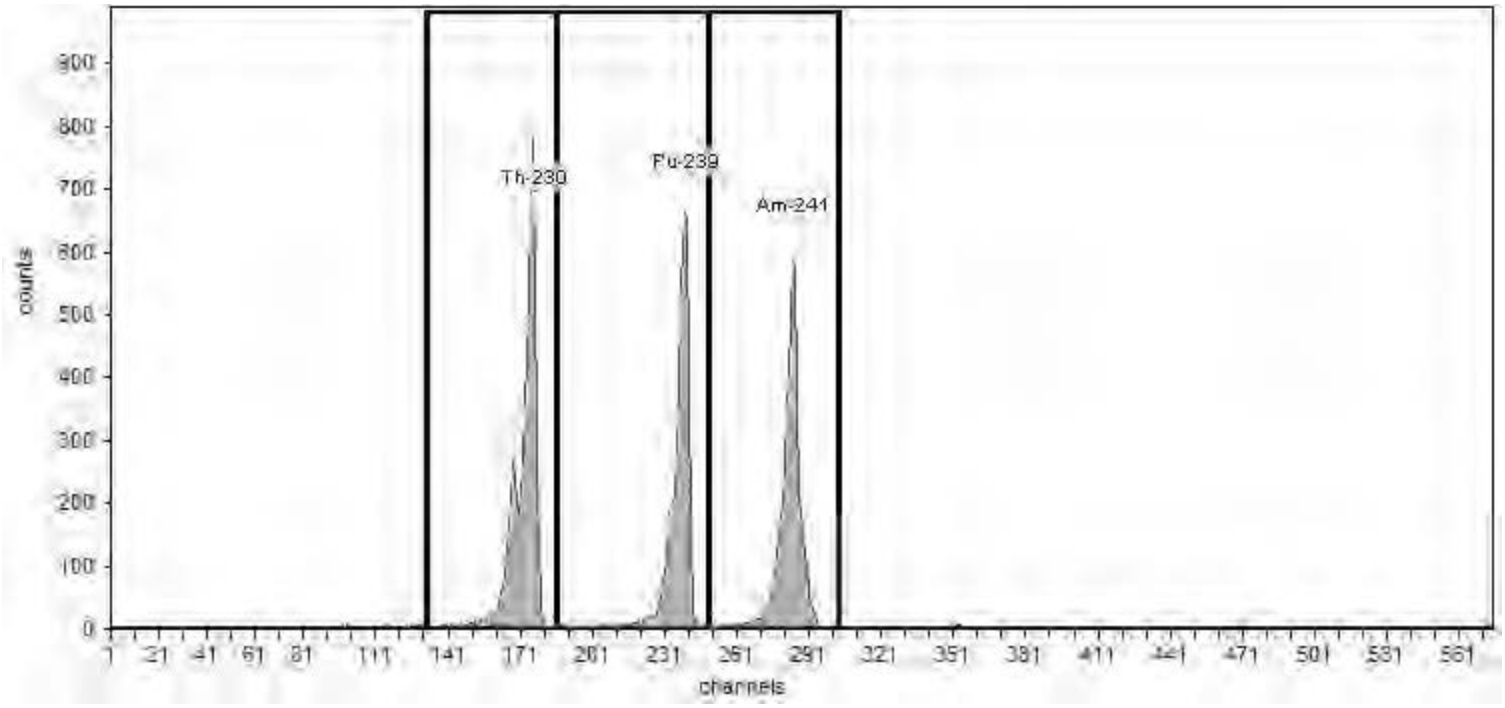
Detector: AV174 , SN: 50-112Y5
Acquisition Start Date: 8/22/2018 12:42:21PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV174-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.13% +/- 0.42% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.38	5,184.00	86.40
Pu-239	240	5,155.40	186	249	34.18	4,137.00	68.95
Am-241	284	5,485.70	249	303	37.66	4,088.00	68.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:27:14PM 8/22/2018

Calibration

Sample Name: CCV-8875;AV187-20180822
Description:
Detector: AV187

Analyst: 60040
Analysis Date: 8/22/2018 4:27:12PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

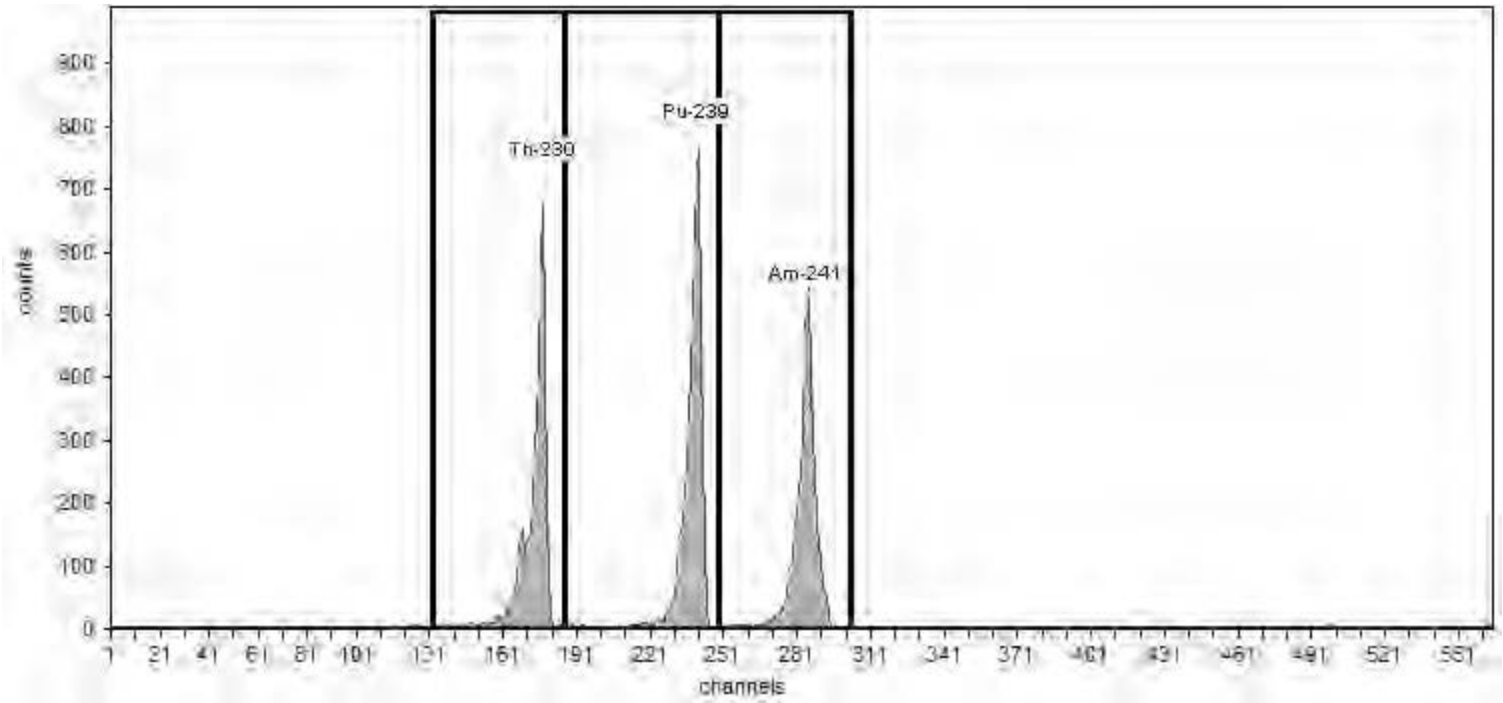
Detector: AV187 , SN: 50-119I2
Acquisition Start Date: 8/22/2018 2:19:02PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV187-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.50% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.38	3,968.00	66.13
Pu-239	240	5,155.40	186	249	36.57	4,672.00	77.87
Am-241	284	5,485.70	249	303	34.29	4,093.00	68.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:27:18PM 8/22/2018

Calibration

Sample Name: CCV-8876;AV188-20180822
Description:
Detector: AV188

Analyst: 60040
Analysis Date: 8/22/2018 4:27:17PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

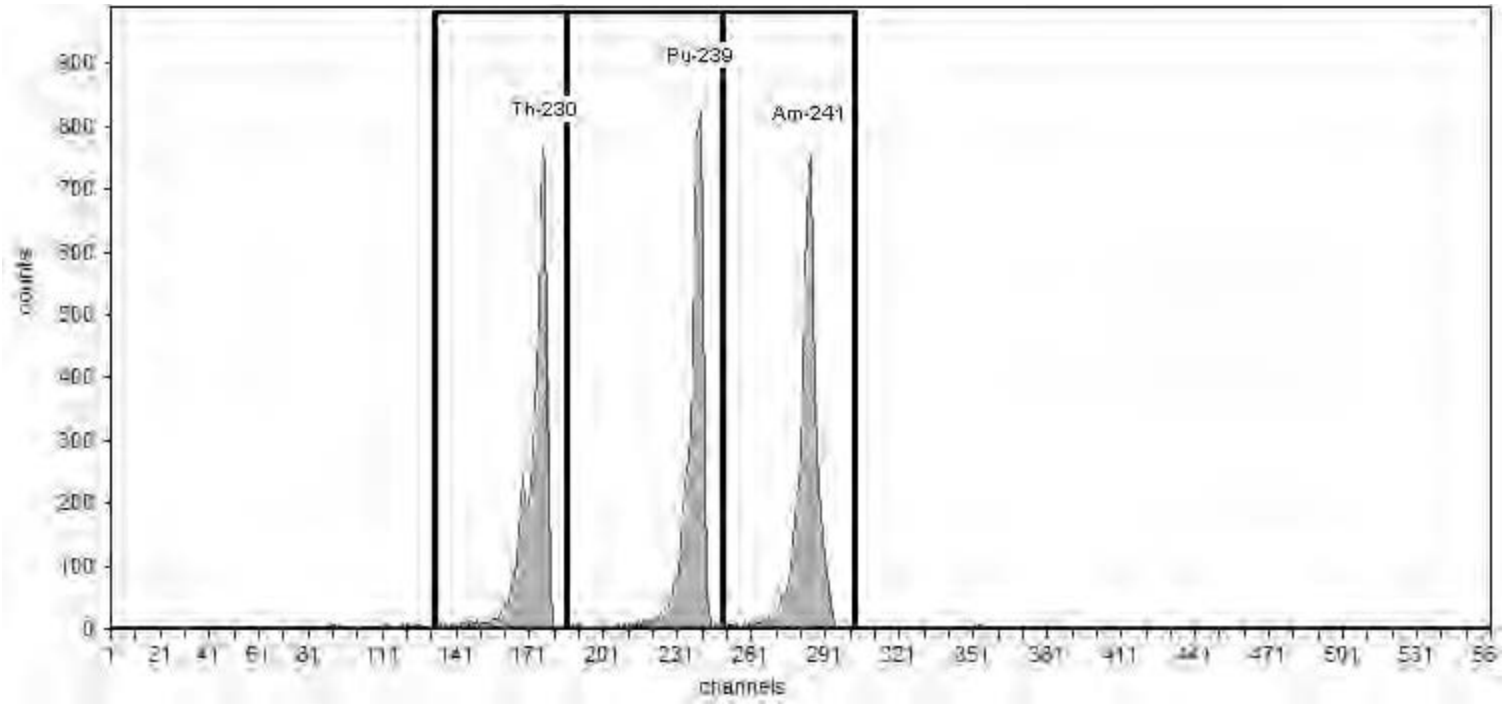
Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 8/22/2018 2:20:20PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8876;AV188-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 20.77% +/- 0.36% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	35.41	5,422.00	90.37
Pu-239	240	5,155.40	186	249	34.36	5,151.00	85.85
Am-241	284	5,485.70	249	303	36.55	5,459.00	90.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:46:18PM 8/27/2018

Calibration

Sample Name: CCV-8877;AV189-20180822
Description:
Detector: AV189

Analyst: 60040
Analysis Date: 8/22/2018 4:27:21PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

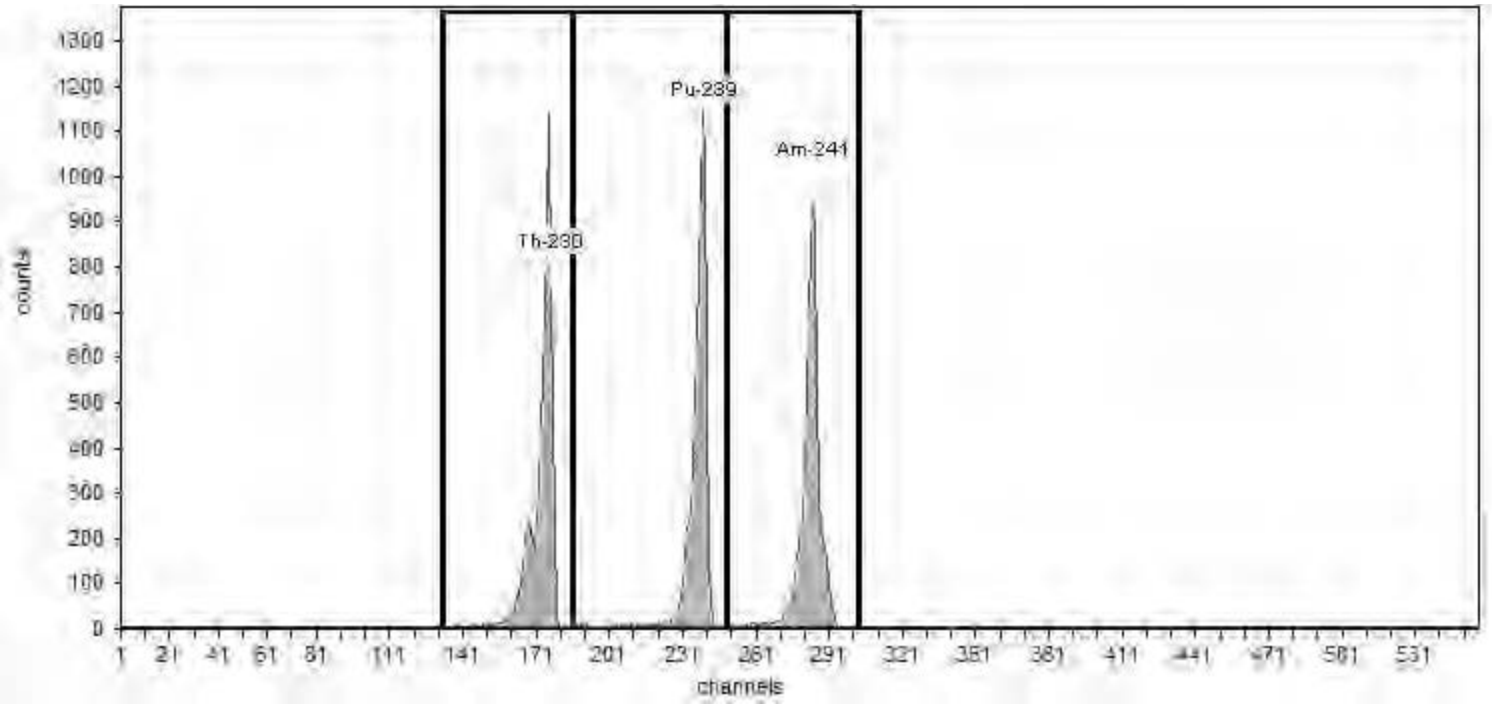
Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 8/22/2018 2:20:31PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV189-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.78% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	27.83	6,128.00	102.13
Pu-239	240	5,155.40	186	249	32.45	6,325.00	105.42
Am-241	284	5,485.70	249	303	32.29	5,951.00	99.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:27:26PM 8/22/2018

Calibration

Sample Name: CCV-9520;AV190-20180822
Description:
Detector: AV190

Analyst: 60040
Analysis Date: 8/22/2018 4:27:25PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

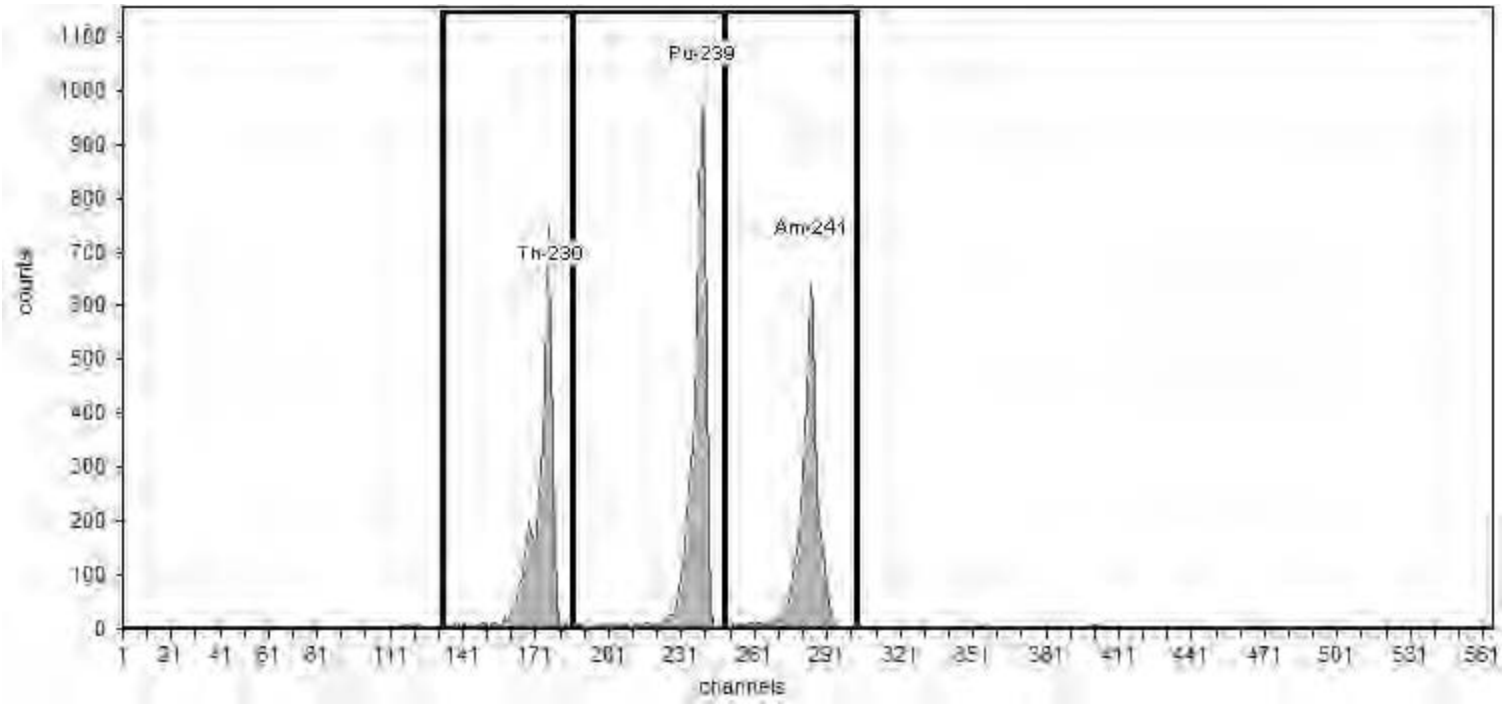
Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 8/22/2018 2:20:57PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV190-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.00% +/- 0.44% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.69	4,625.00	77.08
Pu-239	240	5,155.40	186	249	34.02	5,679.00	94.65
Am-241	284	5,485.70	249	303	36.90	4,474.00	74.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:27:29PM 8/22/2018

Calibration

Sample Name: CCV-8879;AV191-20180822
Description:
Detector: AV191

Analyst: 60040
Analysis Date: 8/22/2018 4:27:28PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

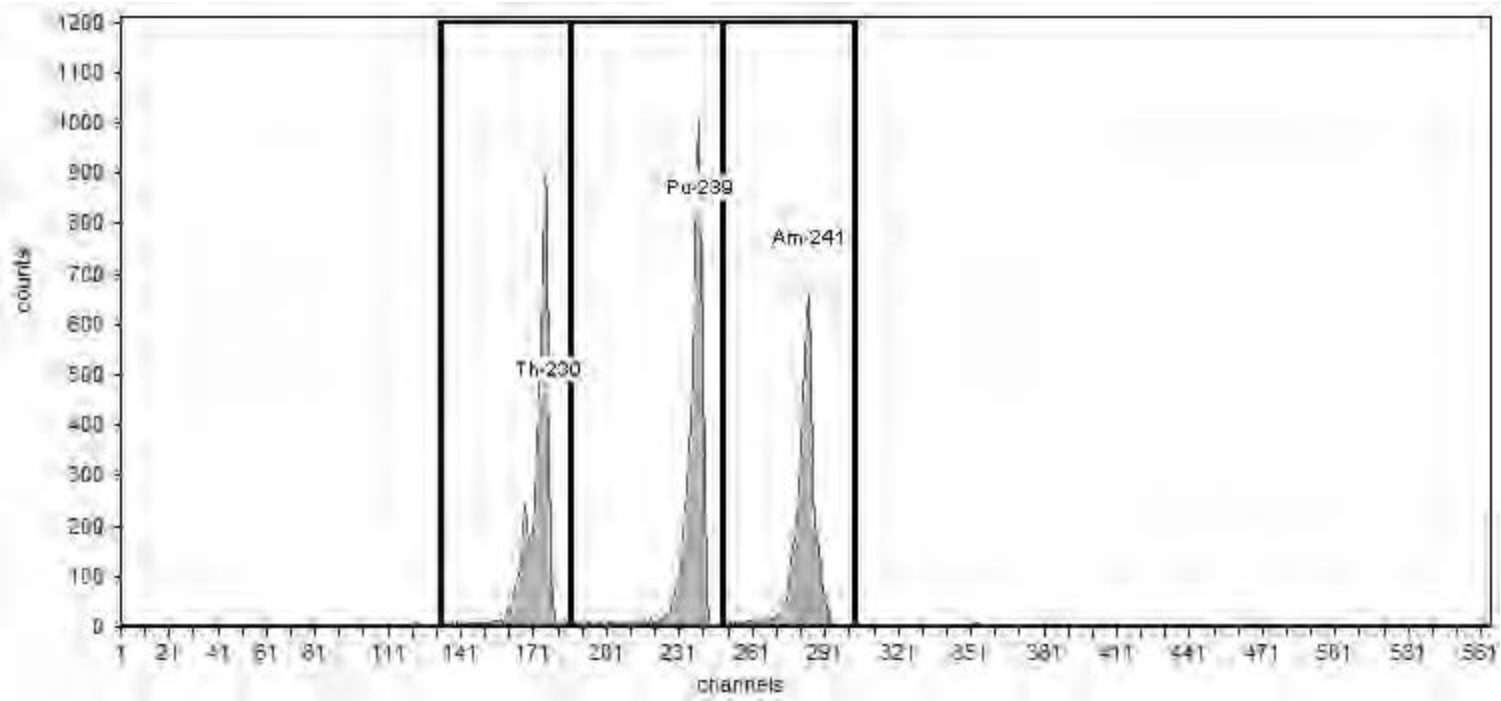
Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 8/22/2018 2:21:12PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8879;AV191-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.02% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.22	5,423.00	90.38
Pu-239	240	5,155.40	186	249	32.78	5,687.00	94.78
Am-241	284	5,485.70	249	303	36.04	4,559.00	75.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:27:39PM 8/22/2018

Calibration

Sample Name: CCV-9792;AV192-20180822a
Description:
Detector: AV192

Analyst: 60040
Analysis Date: 8/22/2018 4:27:38PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

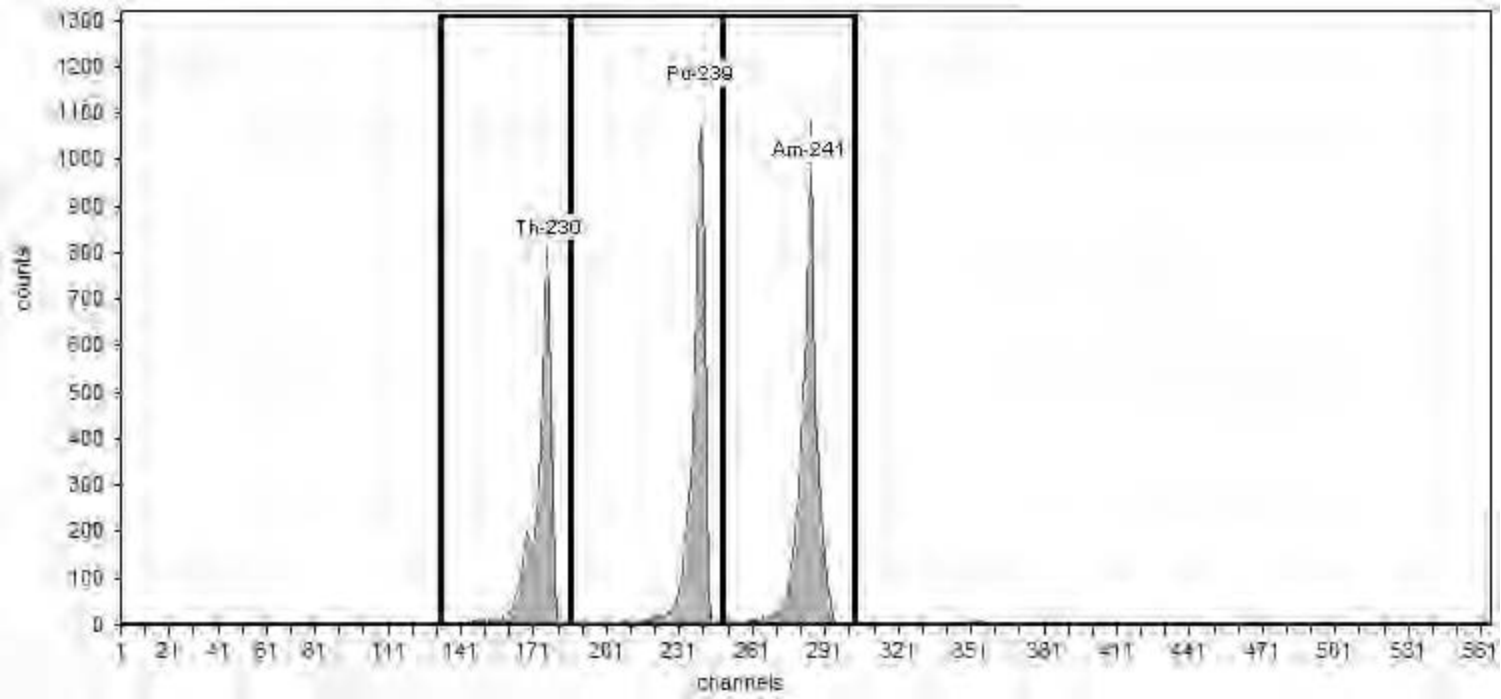
Detector: AV192 , SN: 50-119J7
Acquisition Start Date: 8/22/2018 2:27:26PM

Live Time: 60.00 min.
Real Time: 60.01 min.

Efficiency Calibration Name: CCV-9792;AV192-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.20% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.38	5,163.00	86.05
Pu-239	240	5,155.40	186	249	34.13	6,040.00	100.67
Am-241	284	5,485.70	249	303	32.06	6,884.00	114.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:48:03PM 8/22/2018

Calibration

Sample Name: CCV-8879;AV206-20180822
Description:
Detector: AV206

Analyst: 60040
Analysis Date: 8/22/2018 8:48:02PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82238-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

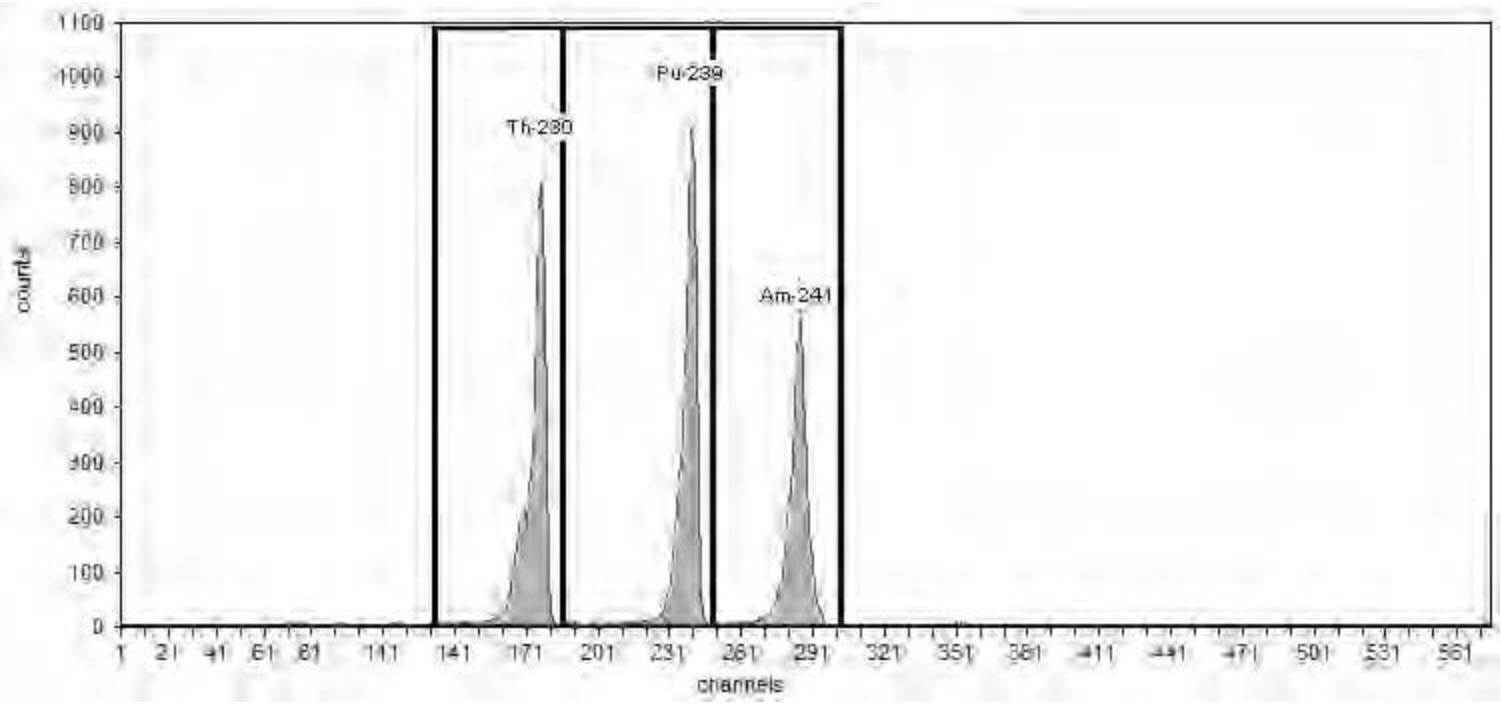
Detector: AV206 , SN: 5604420
Acquisition Start Date: 8/22/2018 4:35:58PM

Live Time: 60.00 min.
Real Time: 60.06 min.

Efficiency Calibration Name: CCV-8879;AV206-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.58% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.84	5,686.00	94.77
Pu-239	240	5,155.40	186	249	40.20	5,748.00	95.80
Am-241	284	5,485.70	249	303	39.52	4,611.00	76.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:28:20AM 8/23/2018

Calibration

Sample Name: CCV-9793;AV208-20180823
Description:
Detector: AV208

Analyst: 60040
Analysis Date: 8/23/2018 2:28:19AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82241-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

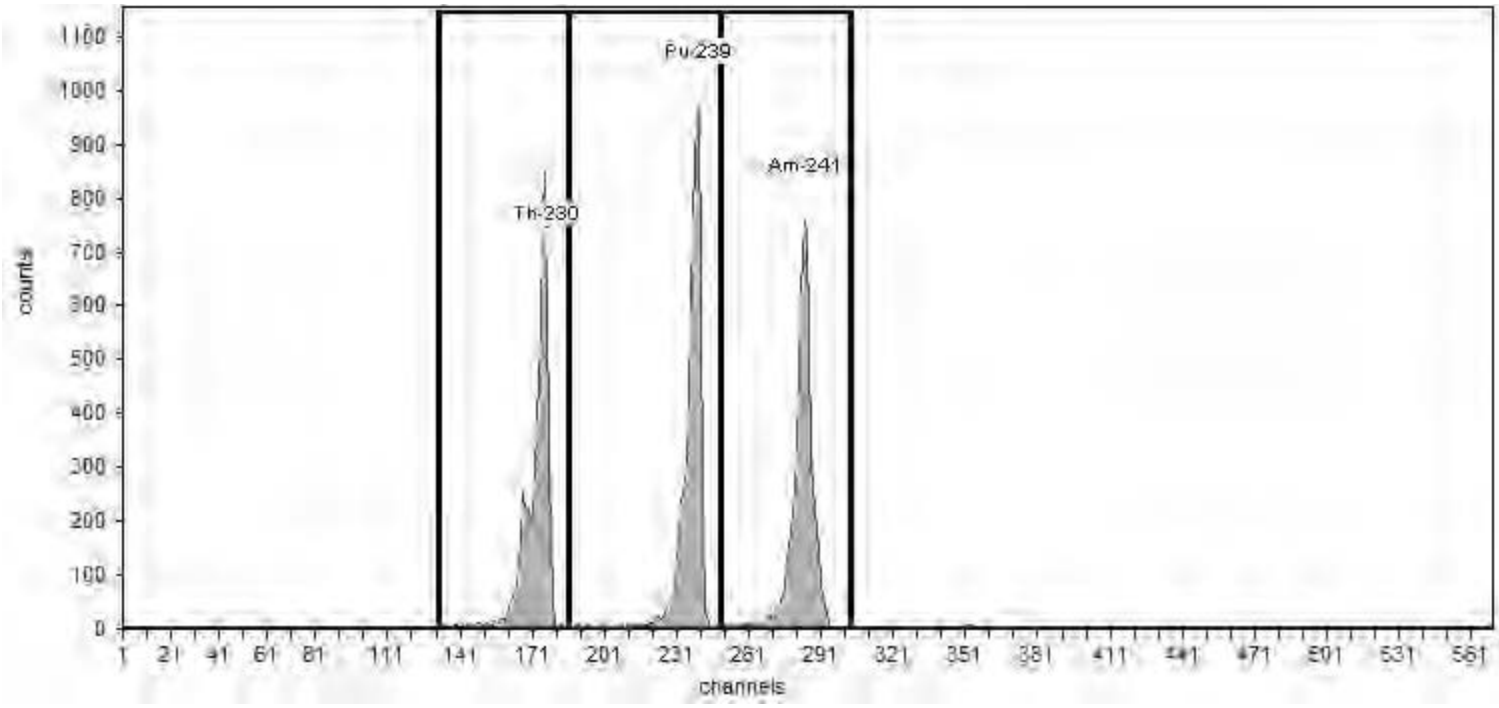
Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 8/23/2018 12:55:29AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9793;AV208-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.85% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.47	5,554.00	92.57
Pu-239	240	5,155.40	186	249	37.01	6,028.00	100.47
Am-241	284	5,485.70	249	303	39.49	5,587.00	93.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:46PM 8/22/2018

Calibration

Sample Name: CCV-9817;AV211-20180822
Description:
Detector: AV211

Analyst: 60040
Analysis Date: 8/22/2018 8:47:45PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82244-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

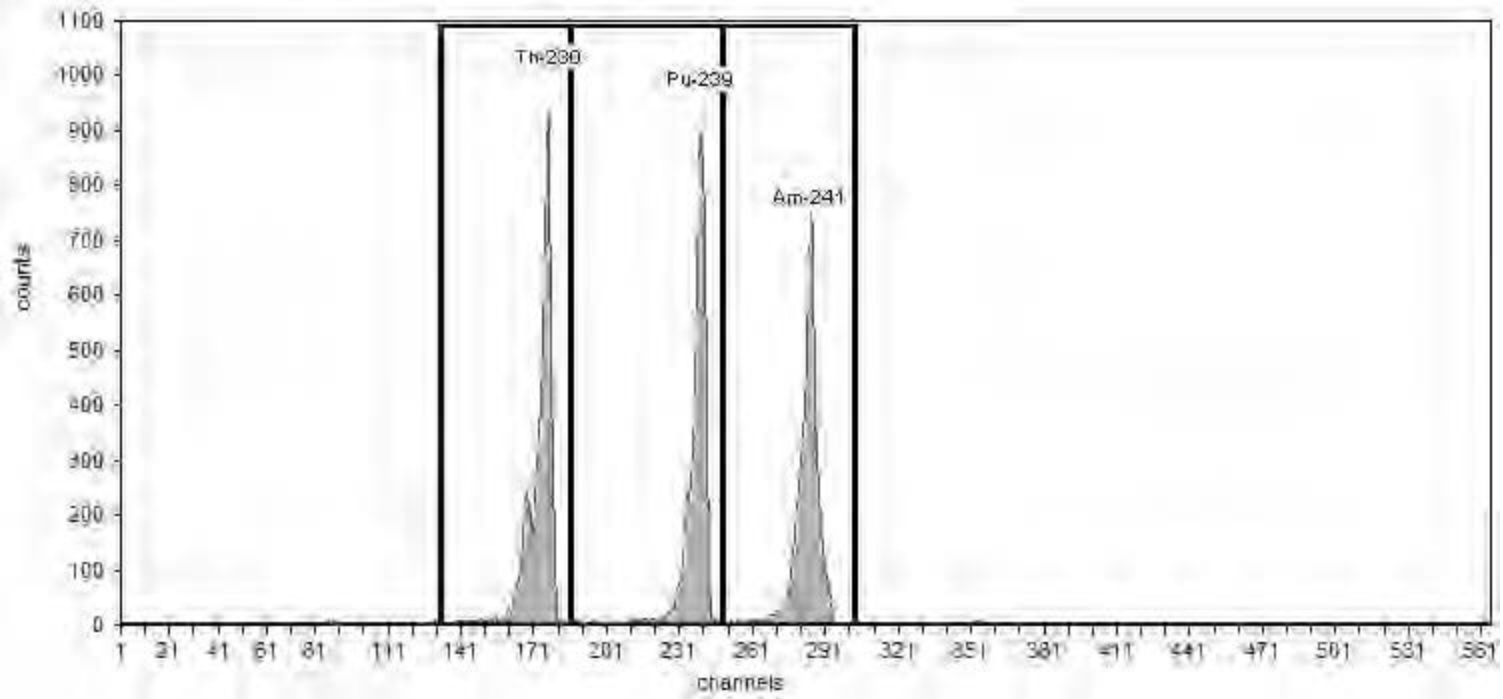
Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 8/22/2018 4:37:46PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9817;AV211-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 21.94% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	1,962.27	5,796.00	96.60
Pu-239	240	5,155.40	186	249	34.65	5,325.00	88.75
Am-241	284	5,485.70	249	303	34.04	5,377.00	89.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:50PM 8/22/2018

Calibration

Sample Name: CCV-9884;AV212-20180822
Description:
Detector: AV212

Analyst: 60040
Analysis Date: 8/22/2018 8:47:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82245-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

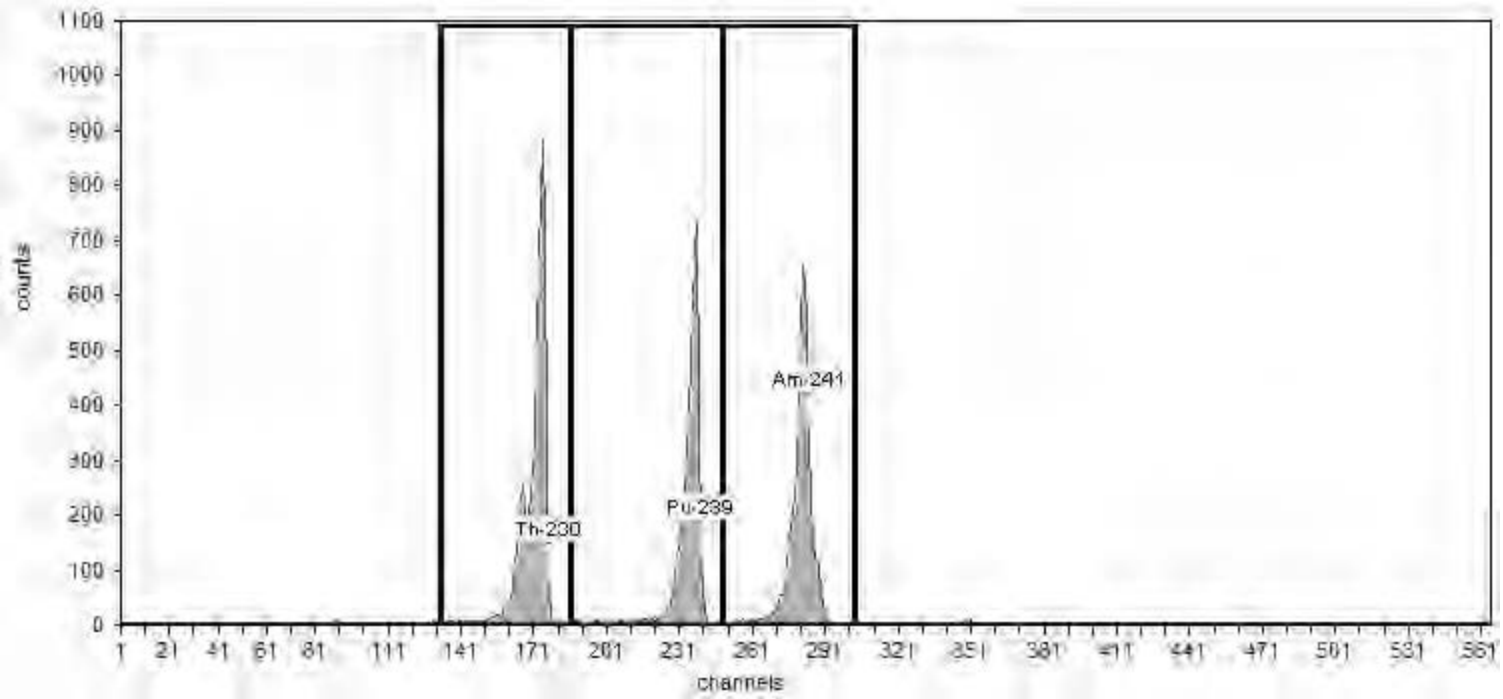
Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 8/22/2018 4:38:00PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9884;AV212-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.19% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.48	5,406.00	90.10
Pu-239	240	5,155.40	186	249	32.68	4,276.00	71.27
Am-241	284	5,485.70	249	303	34.93	4,400.00	73.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:53PM 8/22/2018

Calibration

Sample Name: CCV-9885;AV213-20180822
Description:
Detector: AV213

Analyst: 60040
Analysis Date: 8/22/2018 8:47:52PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82246-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

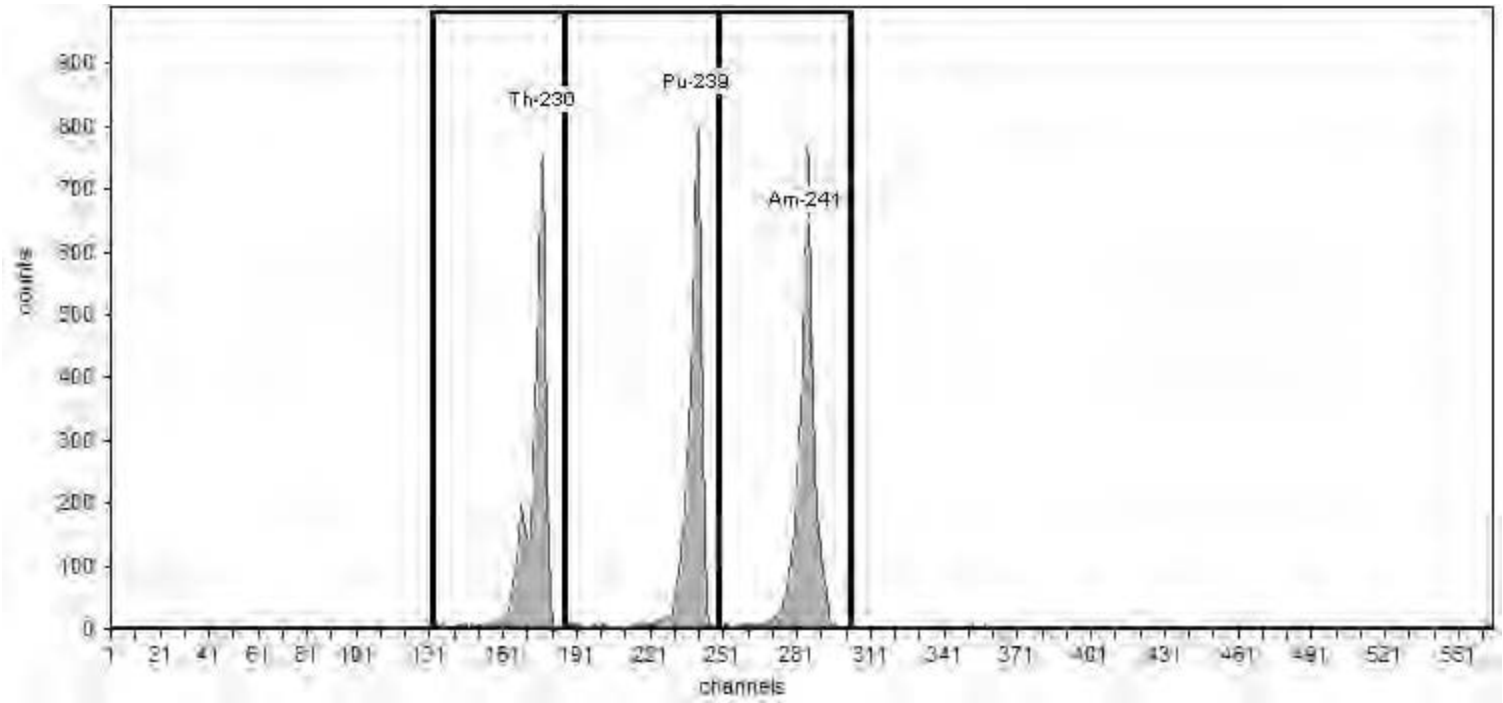
Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 8/22/2018 4:38:11PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9885;AV213-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 23.71% +/- 0.46% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	32.64	4,719.00	78.65
Pu-239	240	5,155.40	186	249	35.40	4,631.00	77.18
Am-241	284	5,485.70	249	303	34.03	5,034.00	83.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:34:42PM 8/22/2018

Calibration

Sample Name: CCV-7107;AV215--20180822
Description:
Detector: AV215

Analyst: 60040
Analysis Date: 8/22/2018 10:34:41PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82232-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

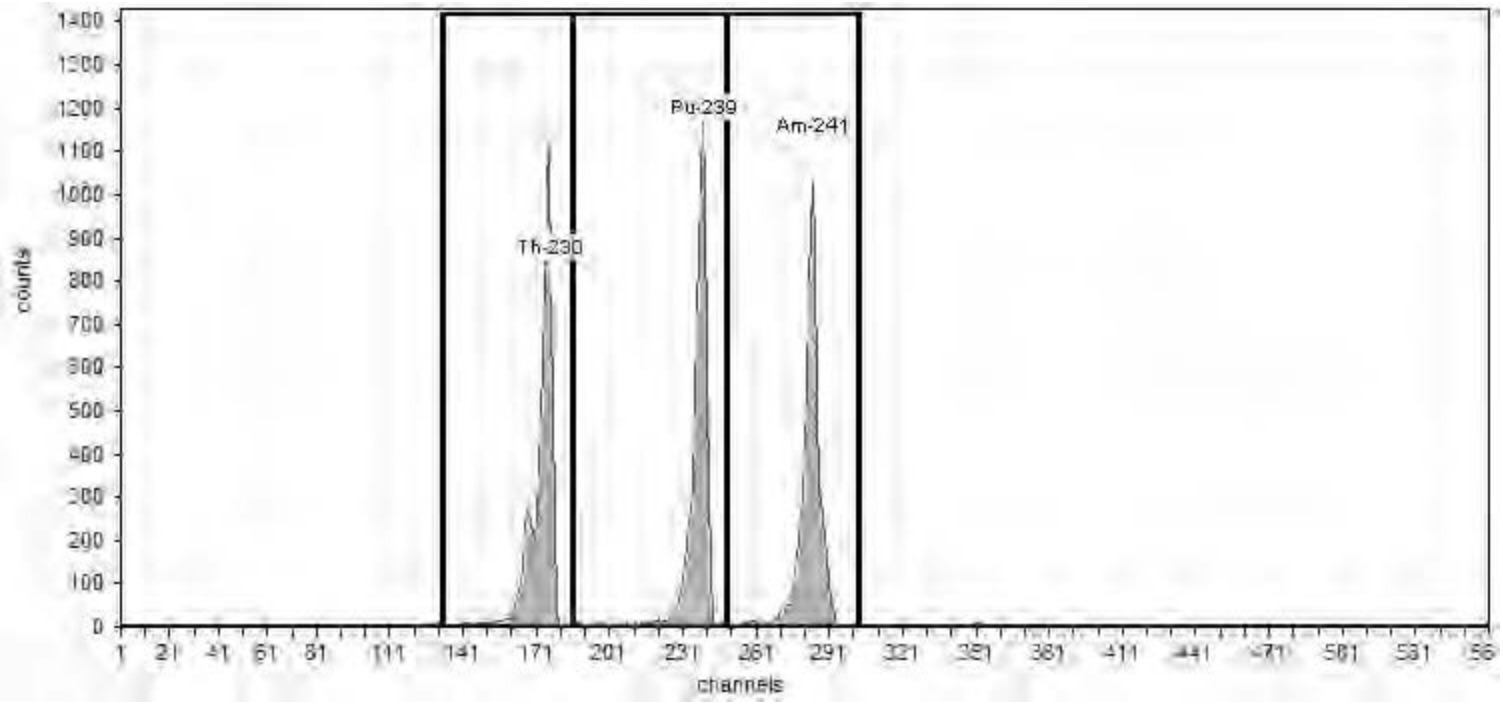
Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 8/22/2018 9:23:51PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-7107;AV215--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.89% +/- 0.39% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	30.72	6,650.00	110.83
Pu-239	240	5,155.40	186	249	32.82	6,590.00	109.83
Am-241	284	5,485.70	249	303	30.01	6,451.00	107.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:34:47PM 8/22/2018

Calibration

Sample Name: CCV-8874;AV216--20180822
Description:
Detector: AV216

Analyst: 60040
Analysis Date: 8/22/2018 10:34:46PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82233-334
Prepared by: Analytics
Description:

Certification Date: 6/3/2010 12:00:00PM

Acquisition

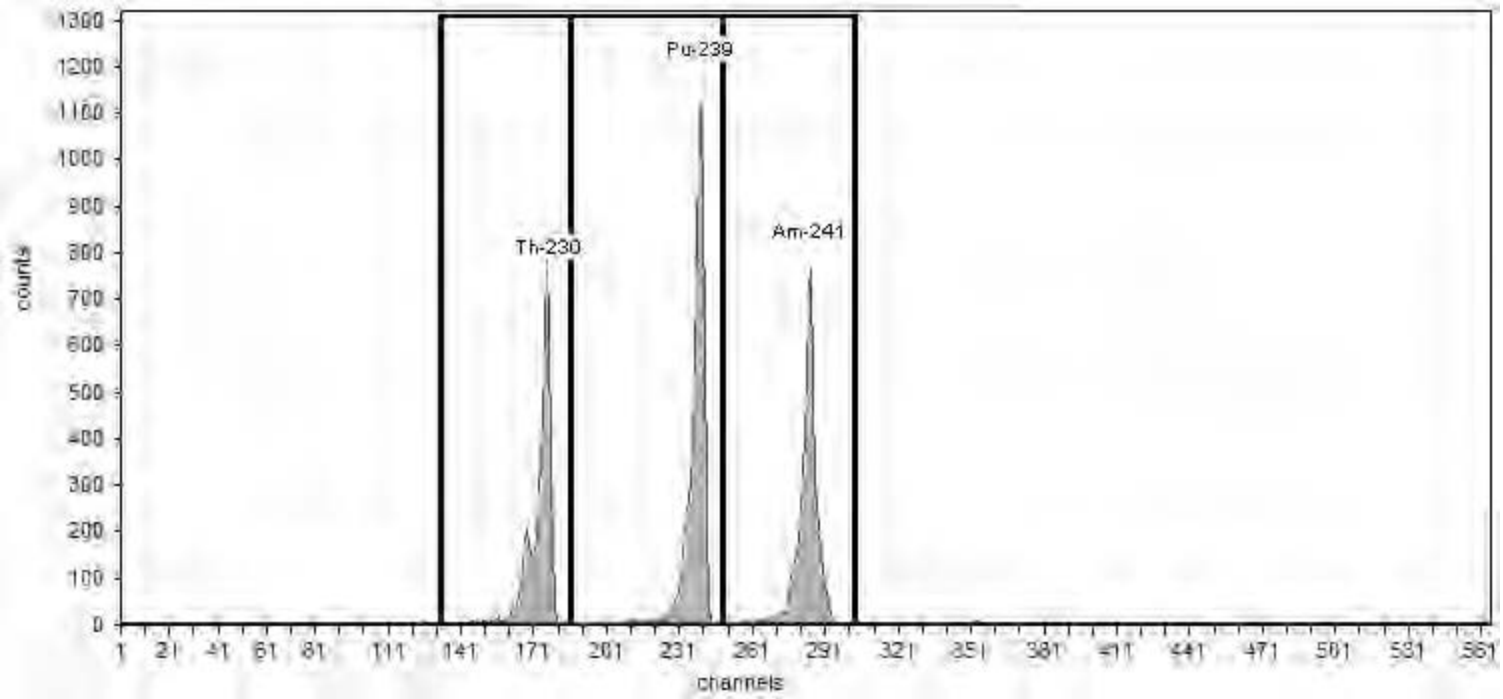
Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 8/22/2018 9:24:02PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8874;AV216--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 26.51% +/- 0.50% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	28.31	4,570.00	76.17
Pu-239	240	5,155.40	186	249	30.91	5,997.00	99.95
Am-241	284	5,485.70	249	303	31.76	4,768.00	79.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:02PM 8/27/2018

Calibration

Sample Name: CCV-8875;AV217--20180822
Description:
Detector: AV217

Analyst: 60040
Analysis Date: 8/22/2018 10:34:49PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82234-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

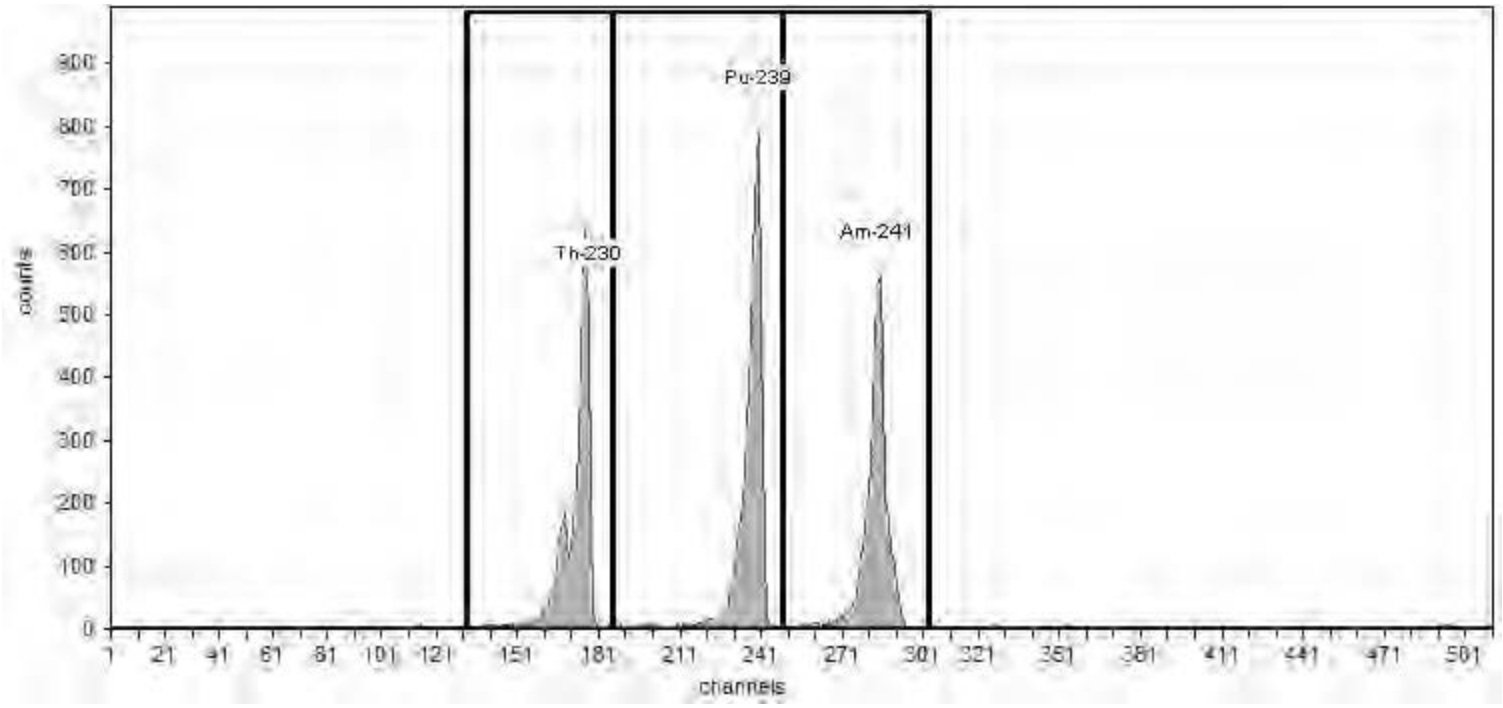
Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 8/22/2018 9:24:14PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8875;AV217--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.39% +/- 0.41% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.97	3,978.00	66.30
Pu-239	240	5,155.40	186	249	34.84	4,616.00	76.93
Am-241	284	5,485.70	249	303	37.65	4,060.00	67.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:34:54PM 8/22/2018

Calibration

Sample Name: CCV-8876;AV218--20180822
Description:
Detector: AV218

Analyst: 60040
Analysis Date: 8/22/2018 10:34:53PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82235-334
Prepared by: Analytics
Description:

Certification Date: 6/4/2010 12:00:00PM

Acquisition

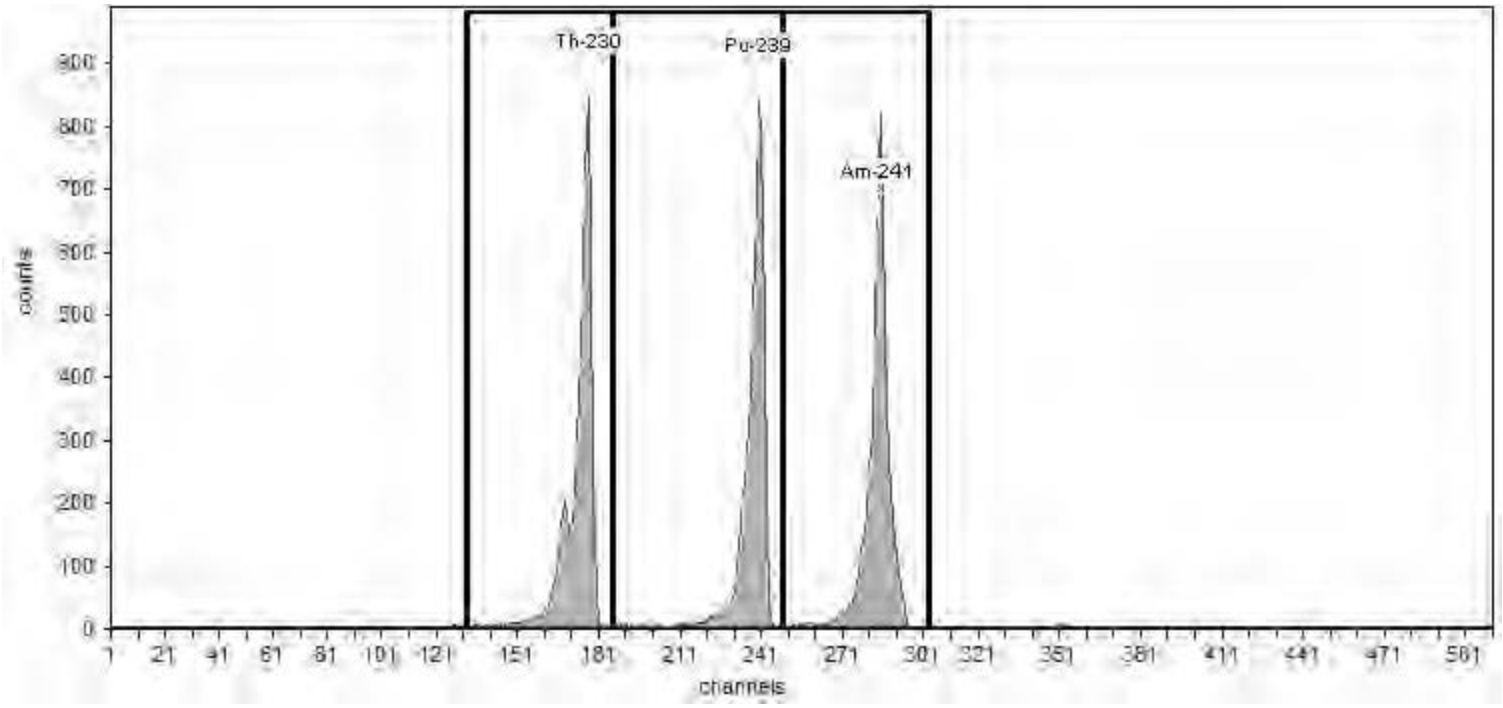
Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 8/22/2018 9:24:25PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8876;AV218--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 20.69% +/- 0.36% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.07	5,367.00	89.45
Pu-239	240	5,155.40	186	249	35.99	5,160.00	86.00
Am-241	284	5,485.70	249	303	34.21	5,444.00	90.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:34:58PM 8/22/2018

Calibration

Sample Name: CCV-8877;AV219--20180822
Description:
Detector: AV219

Analyst: 60040
Analysis Date: 8/22/2018 10:34:57PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82236-334
Prepared by: Analytics
Description:

Certification Date: 6/2/2010 12:00:00PM

Acquisition

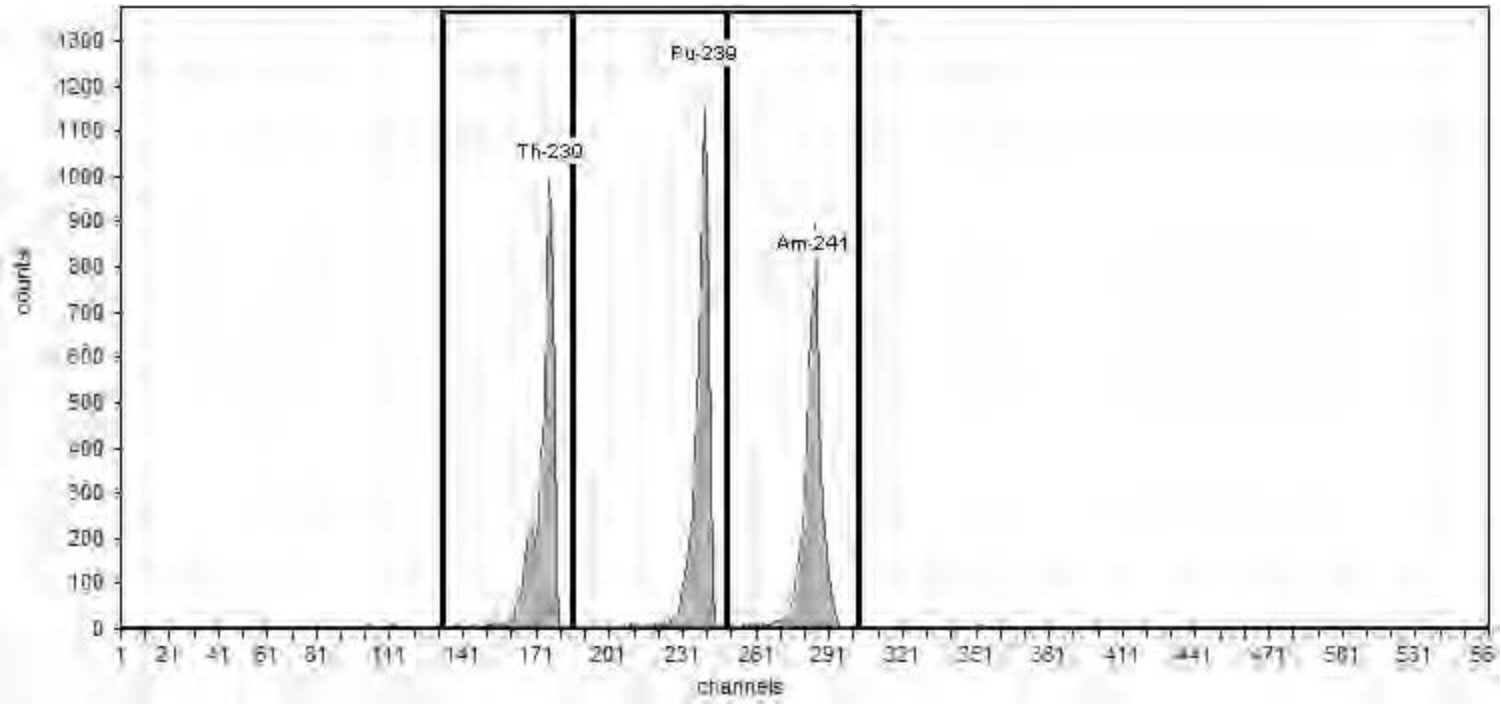
Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 8/22/2018 9:24:38PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-8877;AV219--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.28% +/- 0.40% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	29.56	5,907.00	98.45
Pu-239	240	5,155.40	186	249	32.27	6,274.00	104.57
Am-241	284	5,485.70	249	303	35.21	5,878.00	97.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:47:10PM 8/27/2018

Calibration

Sample Name: CCV-9520;AV220--20180822
Description:
Detector: AV220

Analyst: 60040
Analysis Date: 8/22/2018 10:35:00PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82237-334
Prepared by: Analytics
Description:

Certification Date: 6/1/2010 12:00:00PM

Acquisition

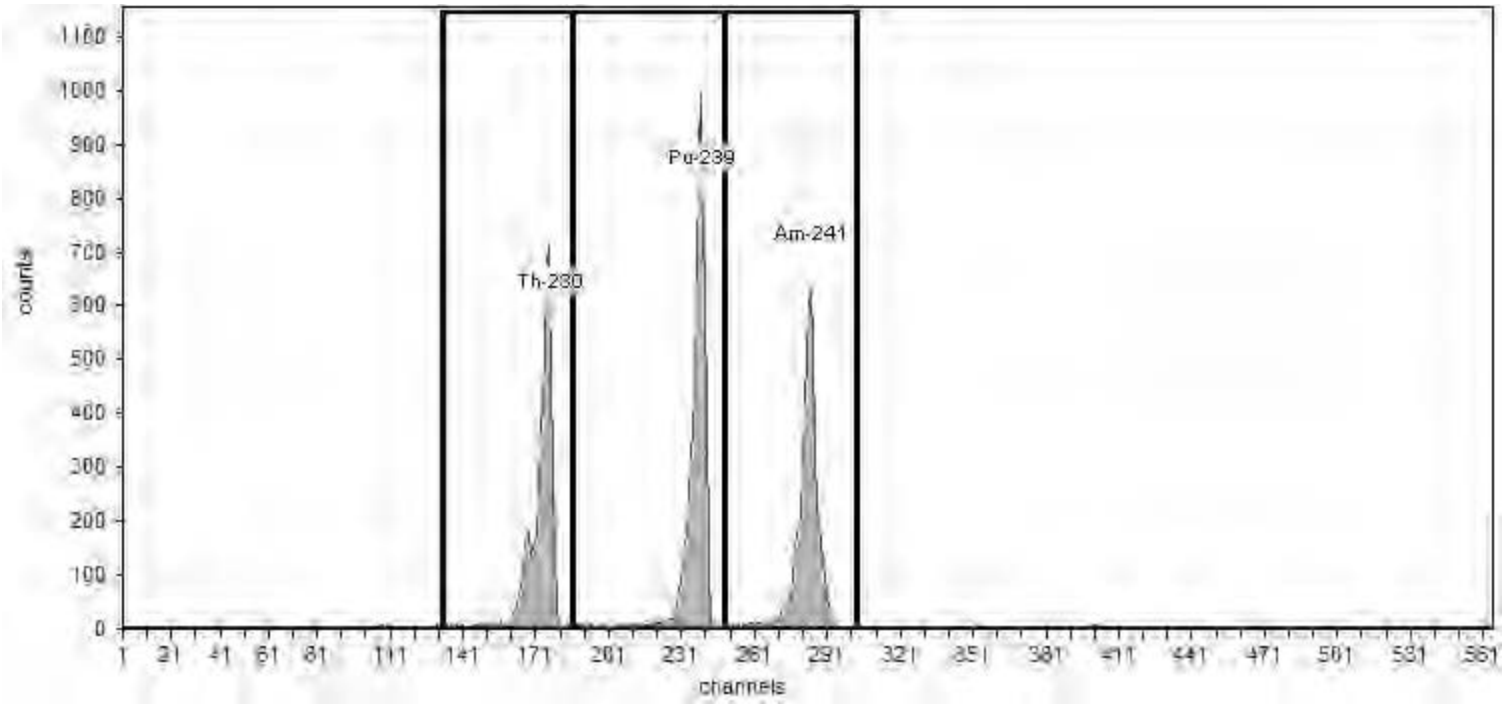
Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 8/22/2018 9:24:51PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9520;AV220--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 22.79% +/- 0.43% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	34.91	4,622.00	77.03
Pu-239	240	5,155.40	186	249	33.27	5,554.00	92.57
Am-241	284	5,485.70	249	303	37.62	4,458.00	74.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:28:35AM 8/23/2018

Calibration

Sample Name: CCV-9792;AV222-20180823
Description:
Detector: AV222

Analyst: 60040
Analysis Date: 8/23/2018 2:28:34AM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82240-334
Prepared by: Analytics
Description:

Certification Date: 6/8/2010 12:00:00PM

Acquisition

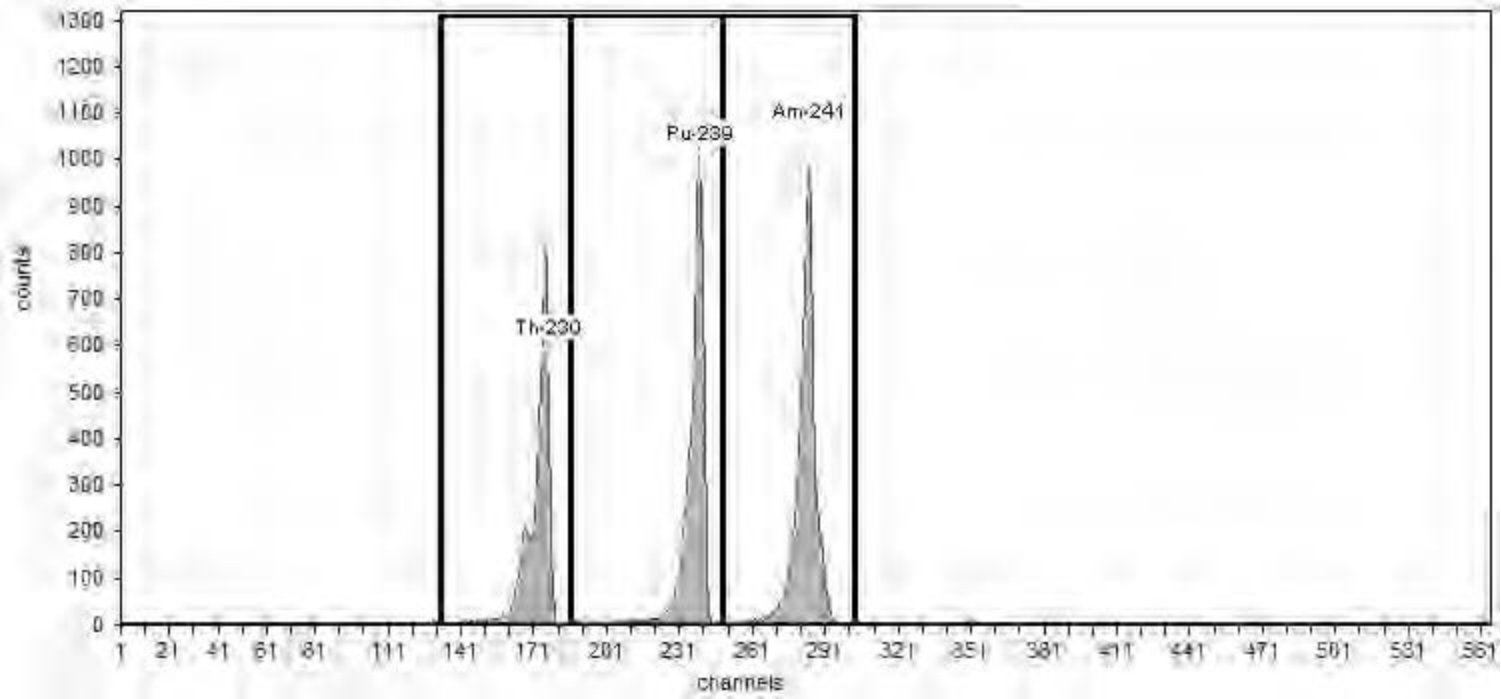
Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 8/23/2018 12:55:58AM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9792;AV222-201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.31% +/- 0.38% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	33.59	5,237.00	87.28
Pu-239	240	5,155.40	186	249	31.45	6,088.00	101.47
Am-241	284	5,485.70	249	303	37.13	6,855.00	114.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:35:08PM 8/22/2018

Calibration

Sample Name: CCV-9795;AV225--20180822
Description:
Detector: AV225

Analyst: 60040
Analysis Date: 8/22/2018 10:35:07PM
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 82243-334
Prepared by: Analytics
Description:

Certification Date: 6/9/2010 12:00:00PM

Acquisition

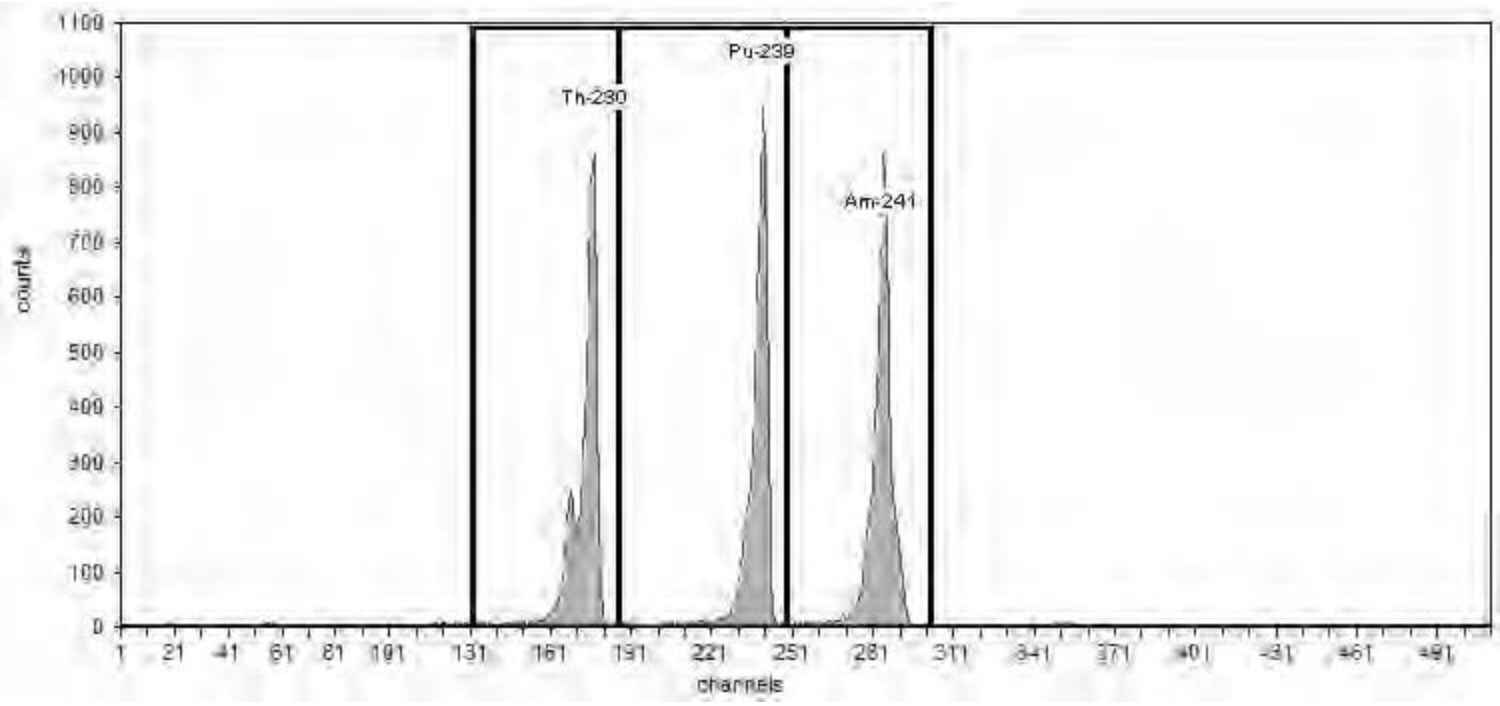
Detector: AV225 , SN: 50-117J7
Acquisition Start Date: 8/22/2018 9:25:30PM

Live Time: 60.00 min.
Real Time: 60.00 min.

Efficiency Calibration Name: CCV-9795;AV225--201808

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.24% +/- 0.45% TPU(2 sigma)



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy keV	ROI Start Channel	ROI End Channel	Peak FWHM keV	Gross Counts	Net Count Rate (cpm)
Th-230	177	4,687.50	132	186	31.44	5,328.00	88.80
Pu-239	240	5,155.40	186	249	33.60	5,455.00	90.92
Am-241	284	5,485.70	249	303	35.20	5,703.00	95.05

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:32:46AM 8/12/2018

Sample

Sample Name: ICB;AV1
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

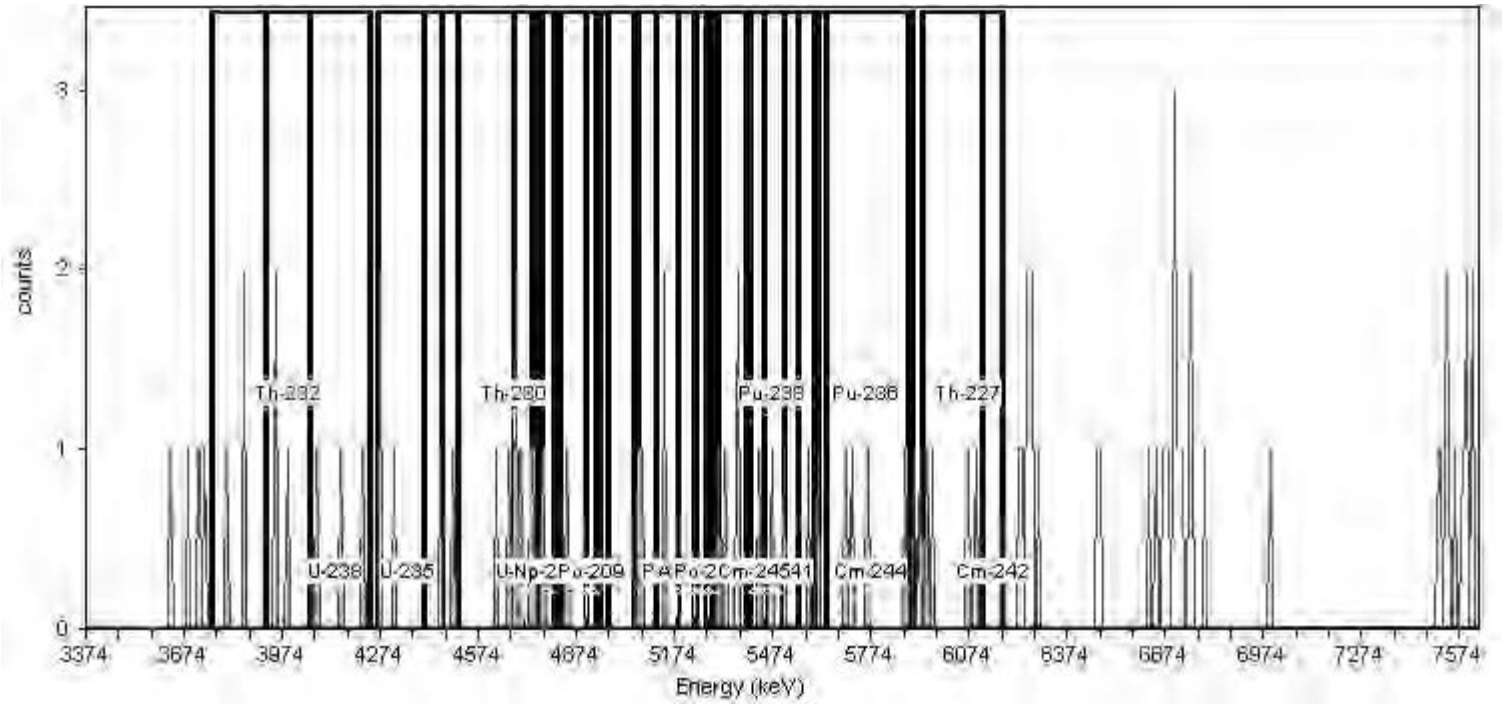
Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 8/11/2018 5:19:02PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	10.00	1.042E-002	3.455E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:33:31AM 8/12/2018

Sample

Sample Name: ICB;AV3
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

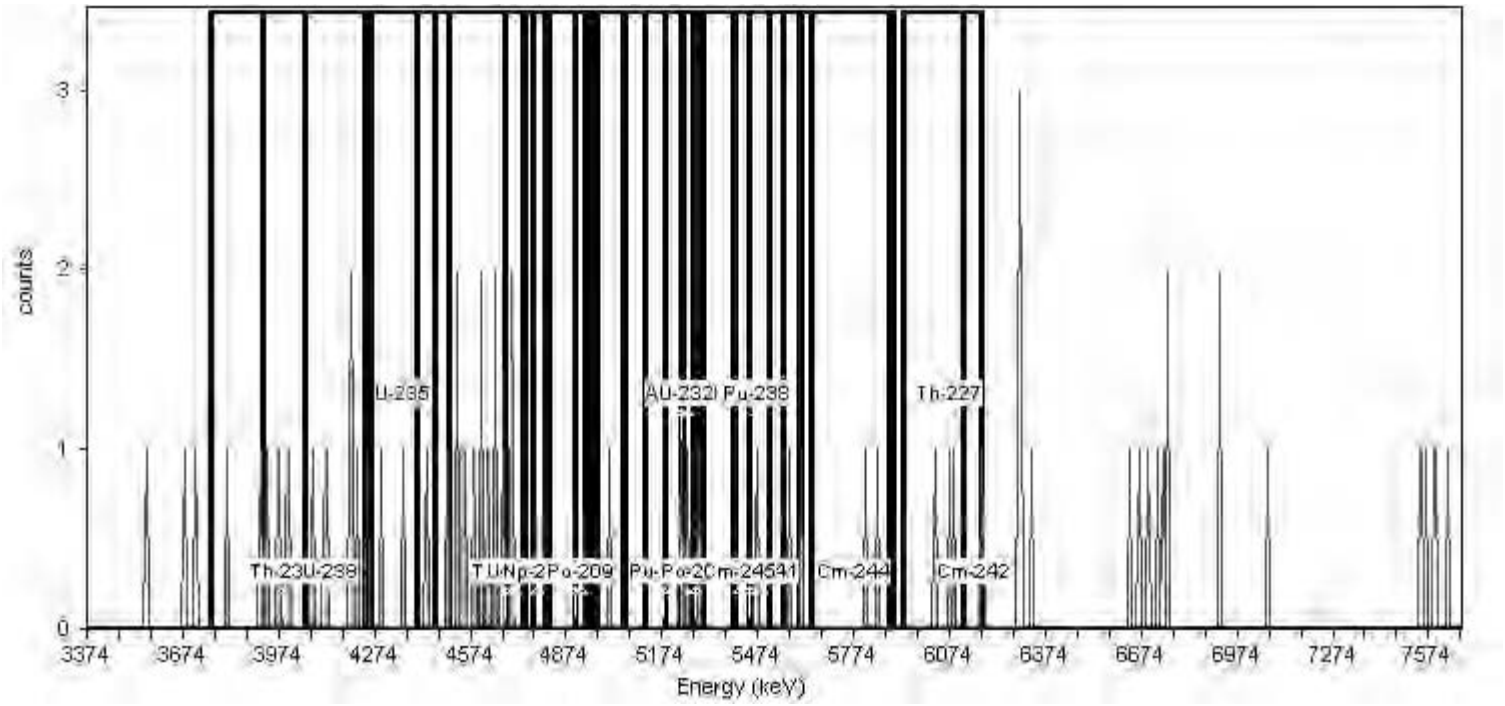
Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 8/11/2018 5:16:27PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 69.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	12.00	1.250E-002	3.756E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	15.00	1.563E-002	4.167E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:33:49AM 8/12/2018

Sample

Sample Name: ICB;AV4
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

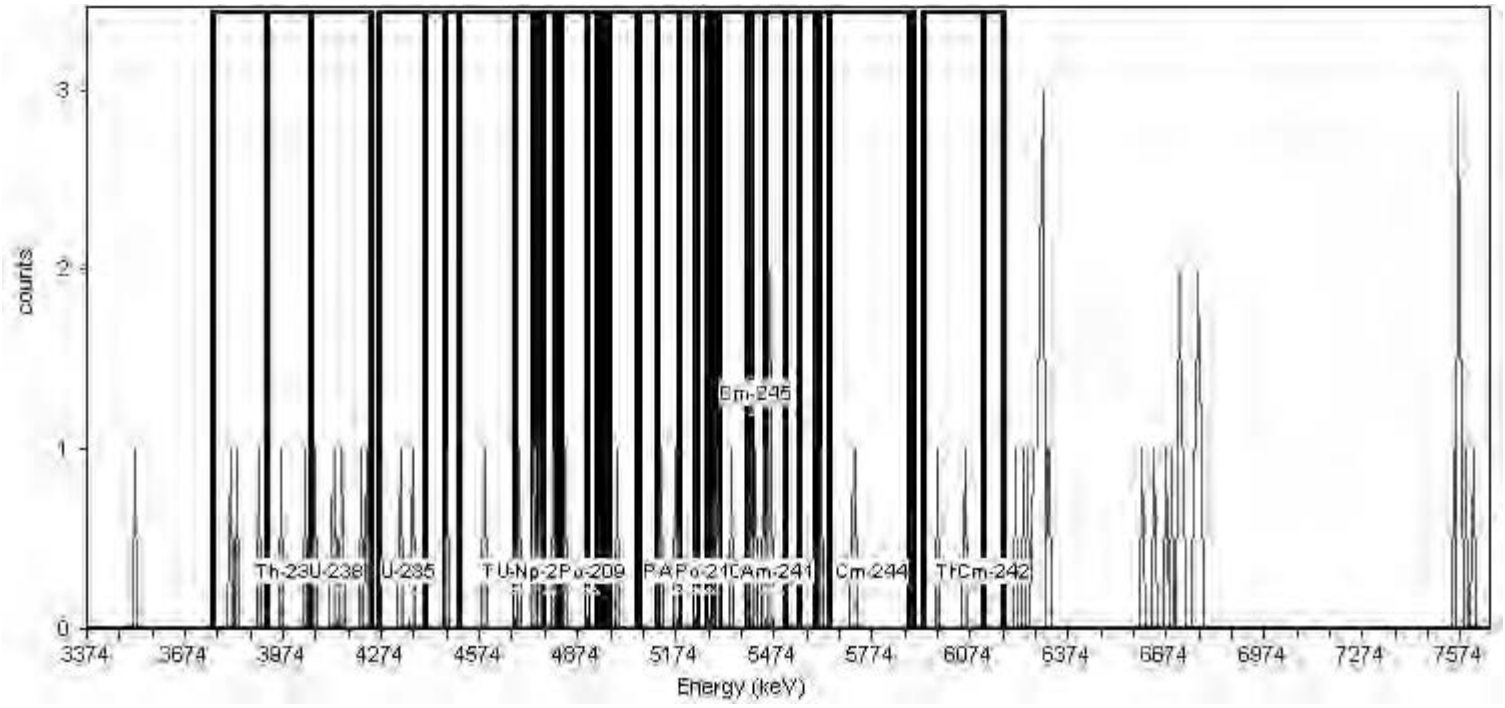
Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 8/11/2018 5:16:28PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 70.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:23:01AM 8/12/2018

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

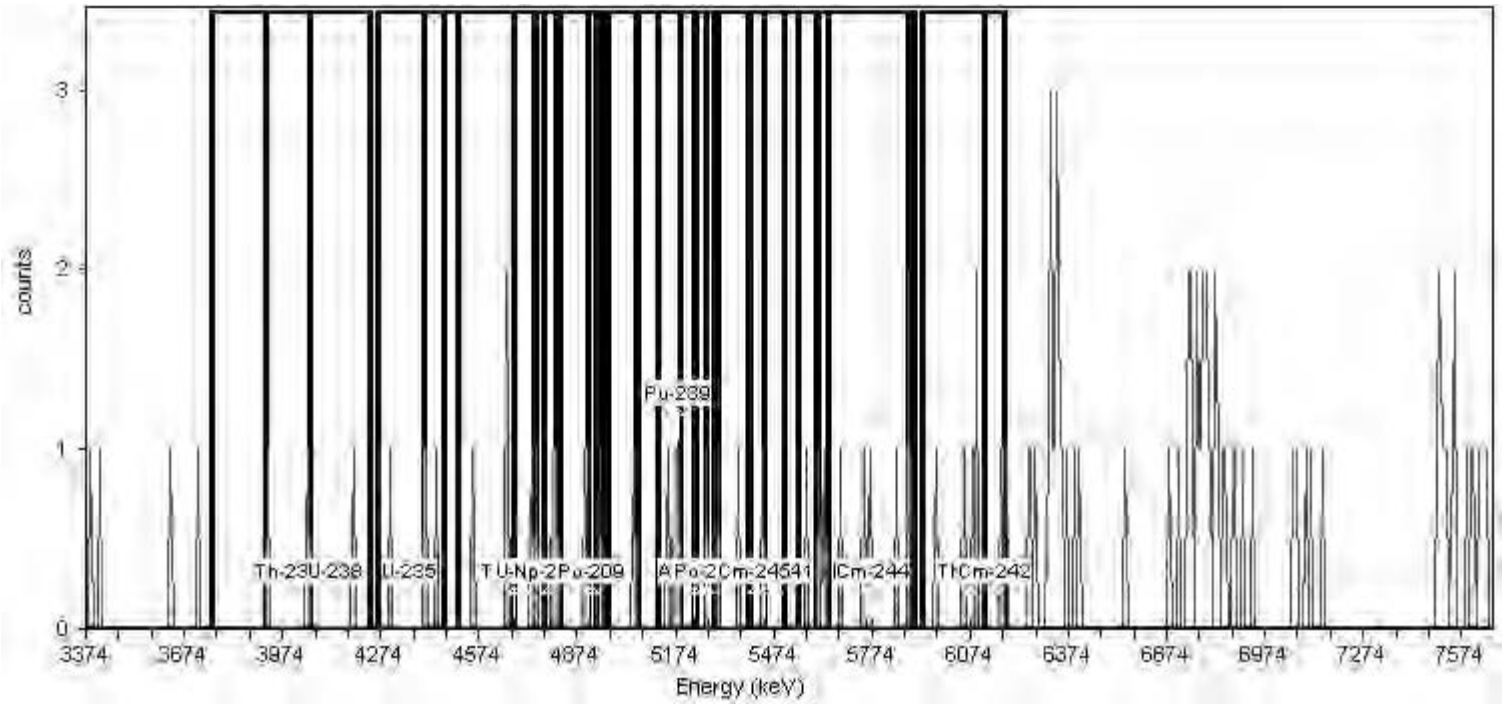
Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 8/11/2018 5:16:28PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV7-05142018
Calibration Date: 5/14/2018 6:26:13PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.98% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	4.00	4.167E-003	2.329E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:23:10AM 8/12/2018

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

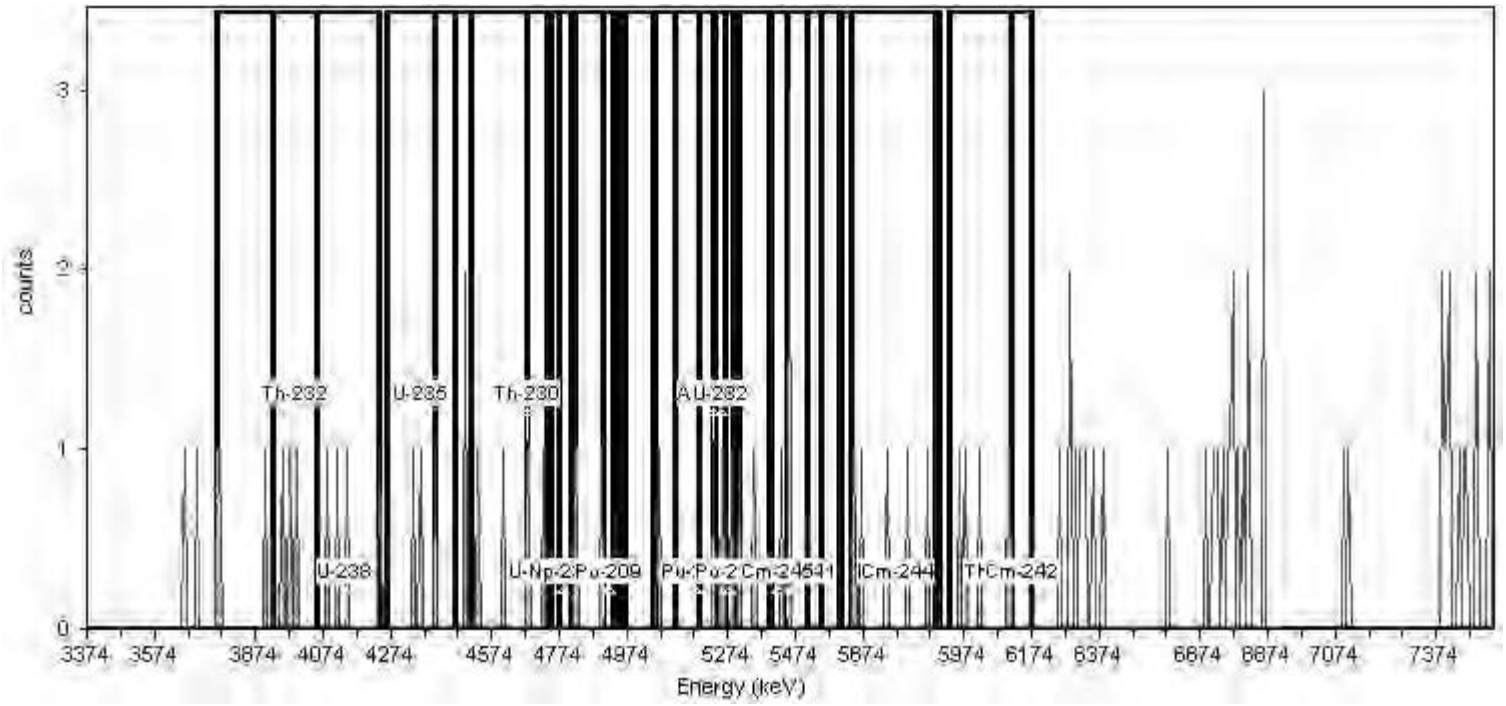
Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 8/11/2018 5:16:30PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV8-05142018
Calibration Date: 5/14/2018 6:26:27PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.96% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 86.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	4.00	4.167E-003	2.329E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:26:43AM 8/12/2018

Sample

Sample Name: ICB;AV24
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

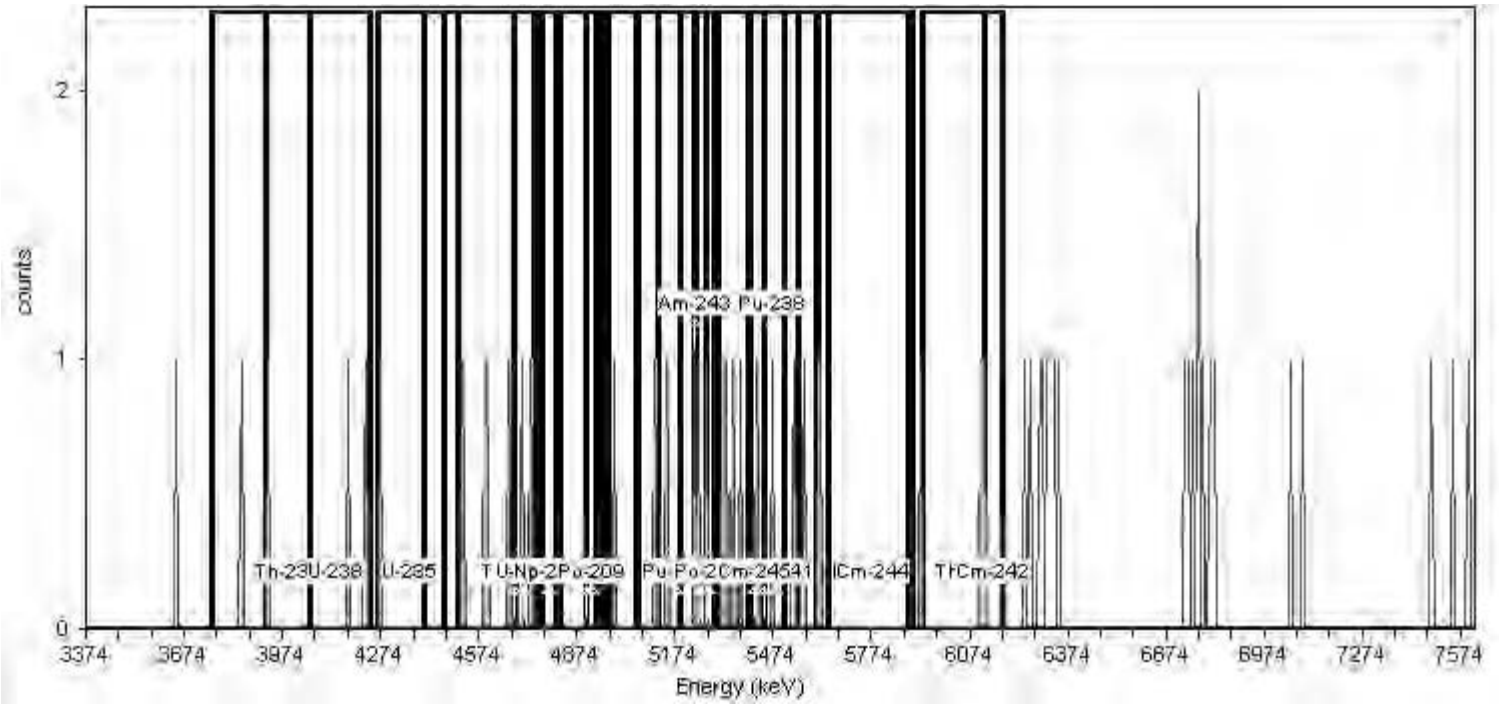
Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 8/11/2018 5:16:56PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV24-05142018
Calibration Date: 5/15/2018 12:28:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.21% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 54.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:40:12AM 8/14/2018

Sample

Sample Name: ICB;AV44
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

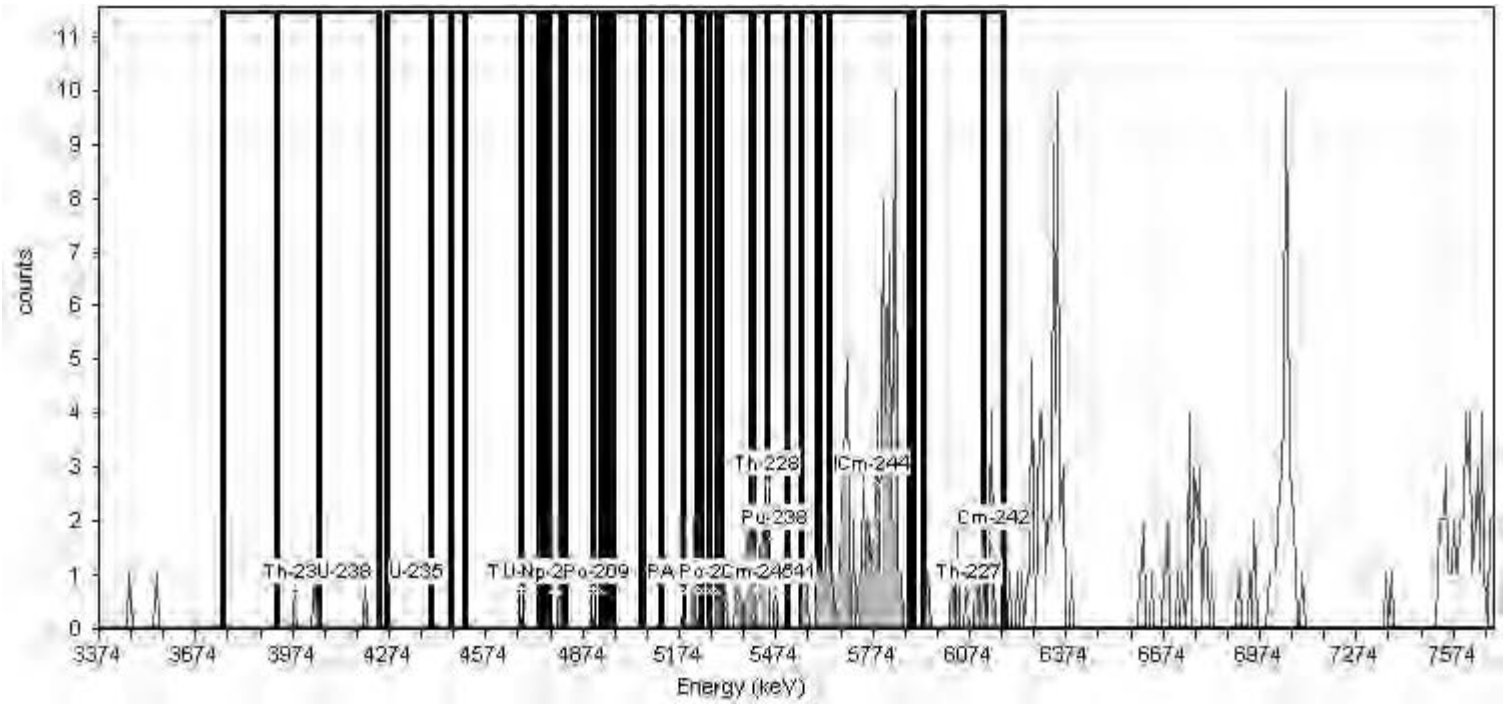
Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 8/13/2018 2:35:50PM
Live Time: 960.00 min.
Real Time: 960.64 min.
Calibration Name: IC-1368446;AV44-05142018
Calibration Date: 5/15/2018 12:26:50PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.49% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 298.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	20.00	2.083E-002	4.774E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	20.00	2.083E-002	4.774E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	80.00	8.333E-002	9.375E-003
Cm-244	5.78	5.64	5.90	75.00	7.812E-002	9.081E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:27:46AM 8/12/2018

Sample

Sample Name: ICB;AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

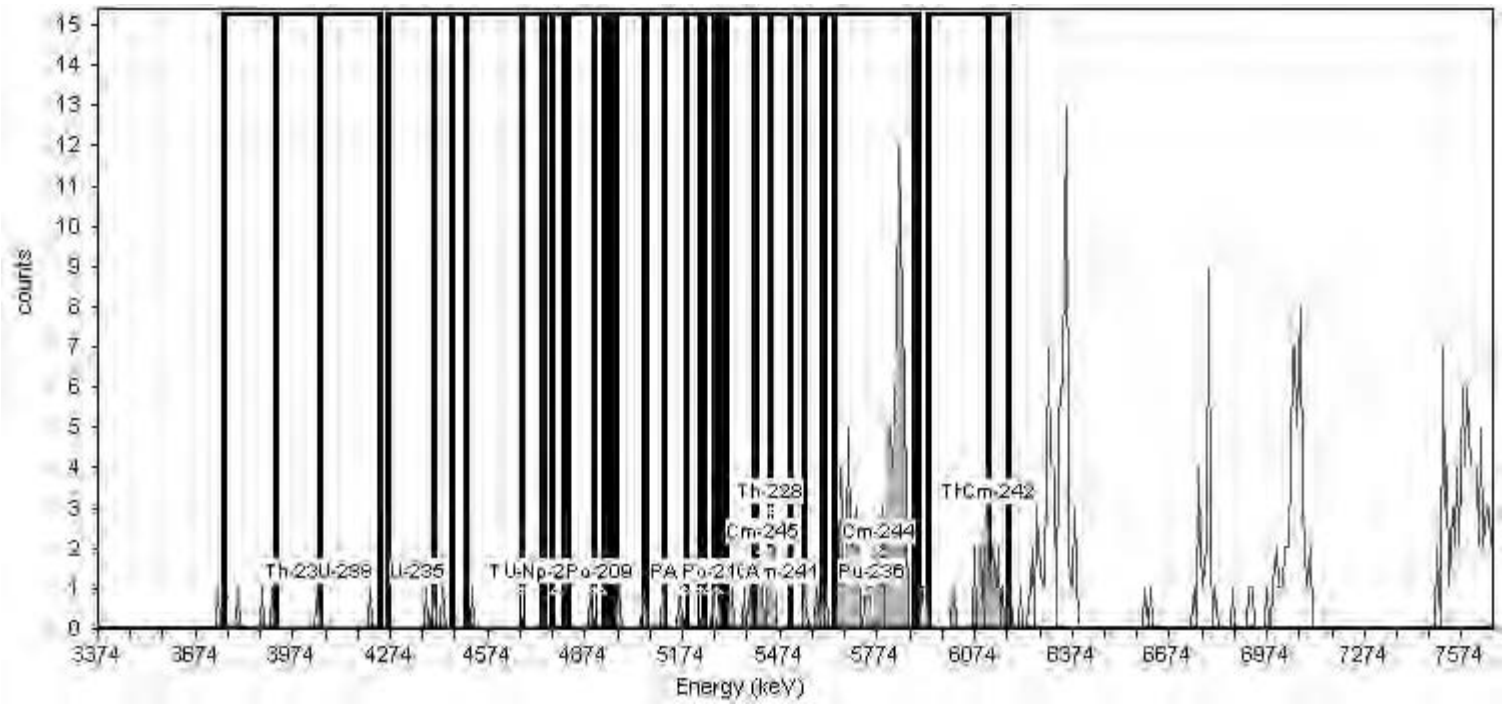
Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 8/11/2018 5:17:01PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-1368447;AV45-05142018a
Calibration Date: 5/15/2018 12:29:34PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.95% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 365.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	88.00	9.167E-002	9.827E-003
Cm-244	5.78	5.64	5.90	87.00	9.063E-002	9.772E-003
Th-227	6.07	5.93	6.18	20.00	2.083E-002	4.774E-003
Cm-242	6.15	6.12	6.18	8.00	8.333E-003	3.125E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:28:26AM 8/12/2018

Sample

Sample Name: ICB;AV47
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

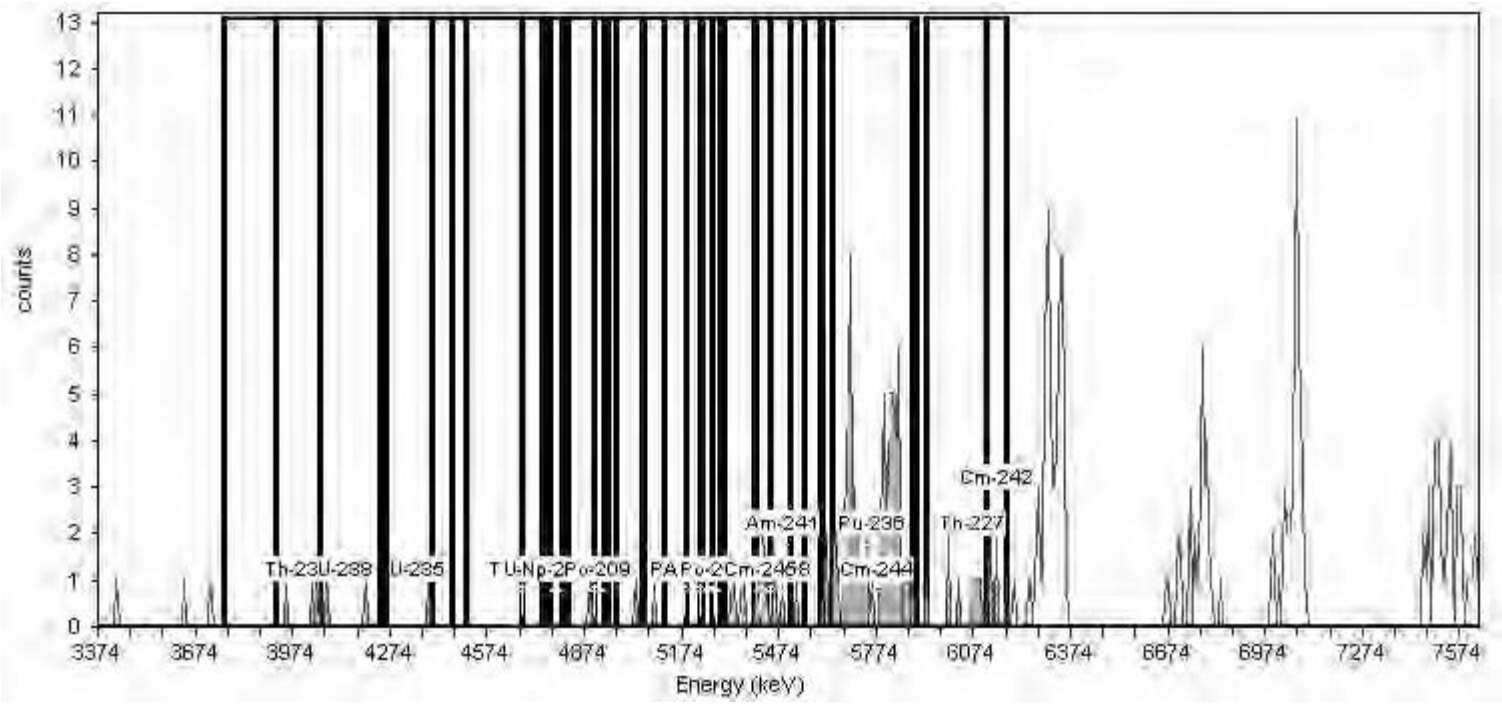
Acquisition

Detector: AV47 , SN: 46-032336
Acquisition Start Date: 8/11/2018 5:17:05PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-1370622;AV47-05142018
Calibration Date: 5/15/2018 12:27:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.02% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 280.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	71.00	7.396E-002	8.839E-003
Cm-244	5.78	5.64	5.90	69.00	7.188E-002	8.715E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:28:45AM 8/12/2018

Sample

Sample Name: ICB;AV48
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

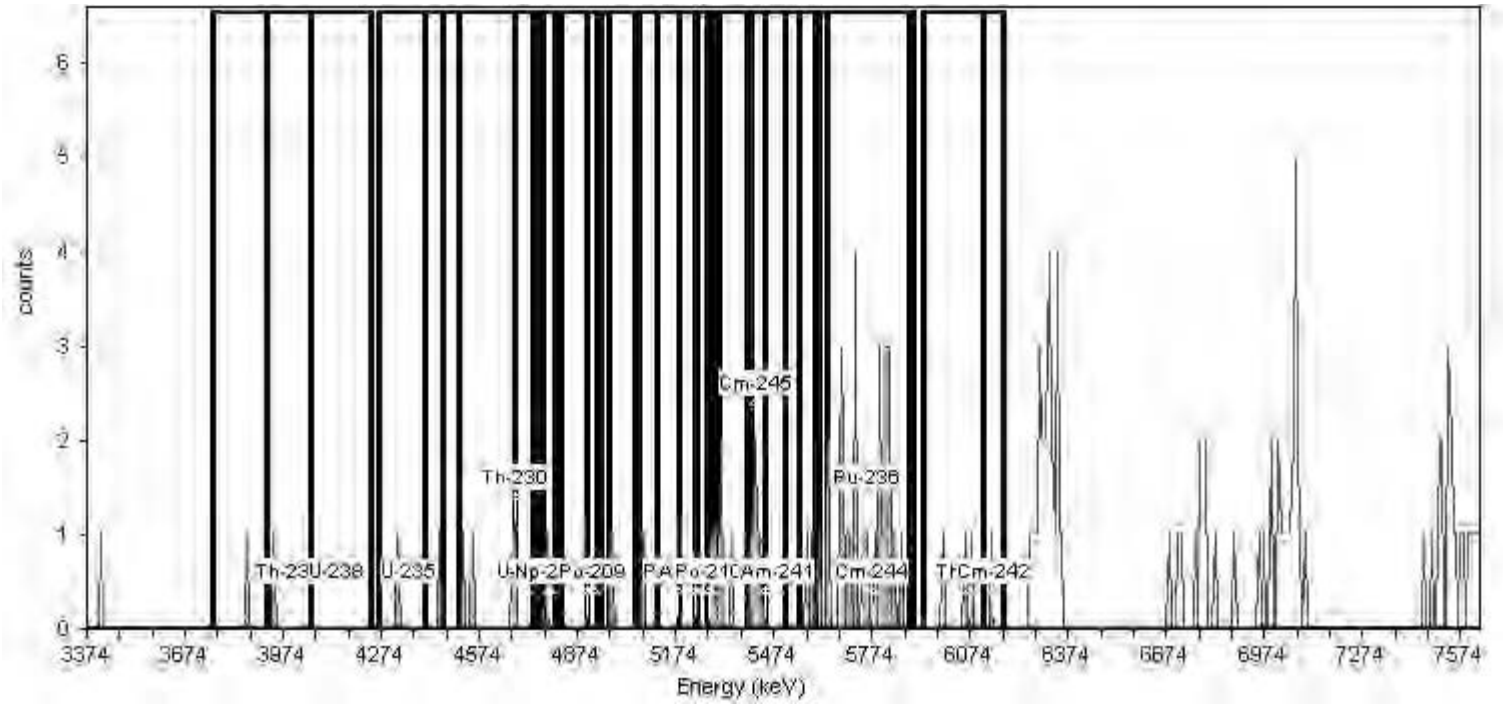
Acquisition

Detector: AV48 , SN: 46-033P6
Acquisition Start Date: 8/11/2018 5:17:06PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-1370619;AV48-05142018
Calibration Date: 5/15/2018 12:27:25PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.06% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 145.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	12.00	1.250E-002	3.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	32.00	3.333E-002	5.984E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:50:52AM 8/15/2018

Sample

Sample Name: ICB;AV54
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

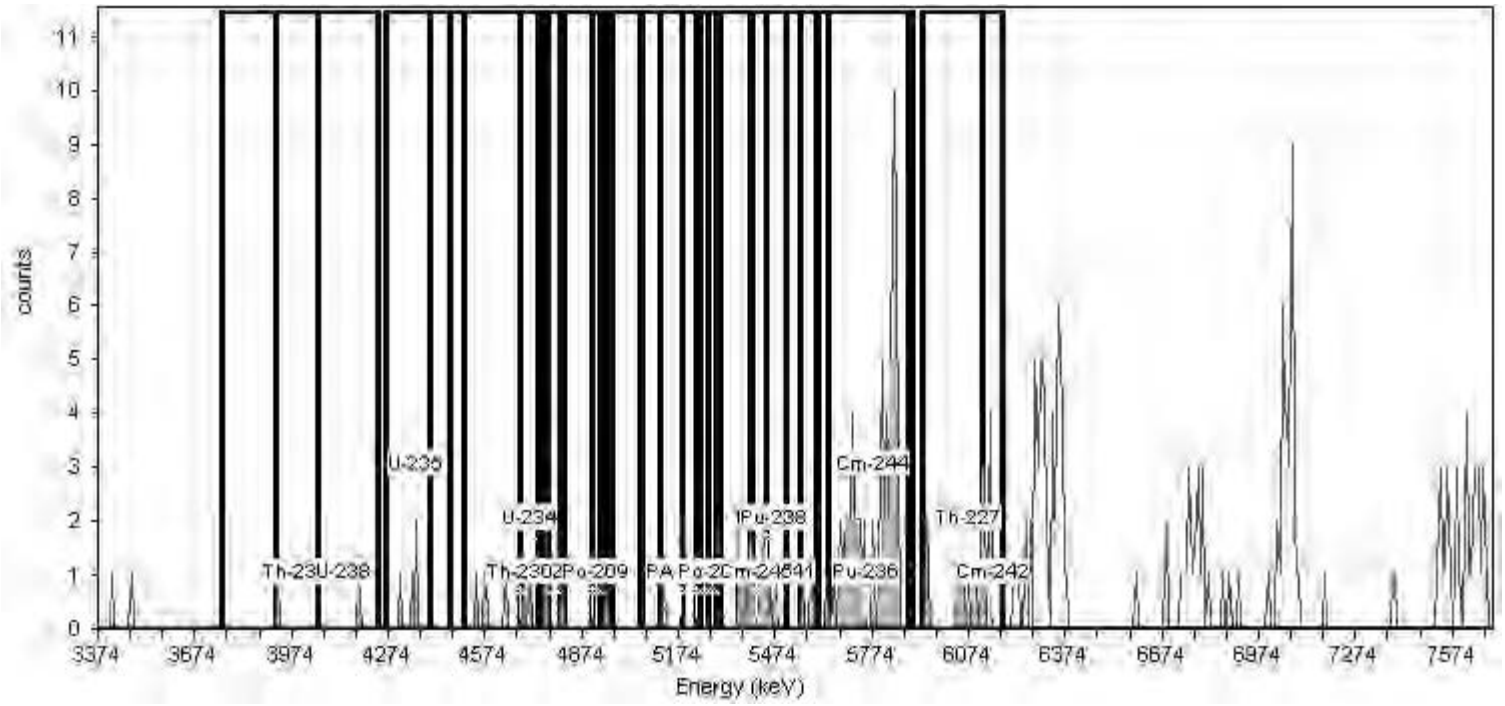
Acquisition

Detector: AV54 , SN: 46-033P4
Acquisition Start Date: 8/14/2018 6:49:40PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV54-05152018
Calibration Date: 5/15/2018 3:37:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.62% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 279.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	67.00	6.979E-002	8.590E-003
Cm-244	5.78	5.64	5.90	66.00	6.875E-002	8.526E-003
Th-227	6.07	5.93	6.18	20.00	2.083E-002	4.774E-003
Cm-242	6.15	6.12	6.18	10.00	1.042E-002	3.455E-003
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:51:01AM 8/15/2018

Sample

Sample Name: ICB;AV55
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

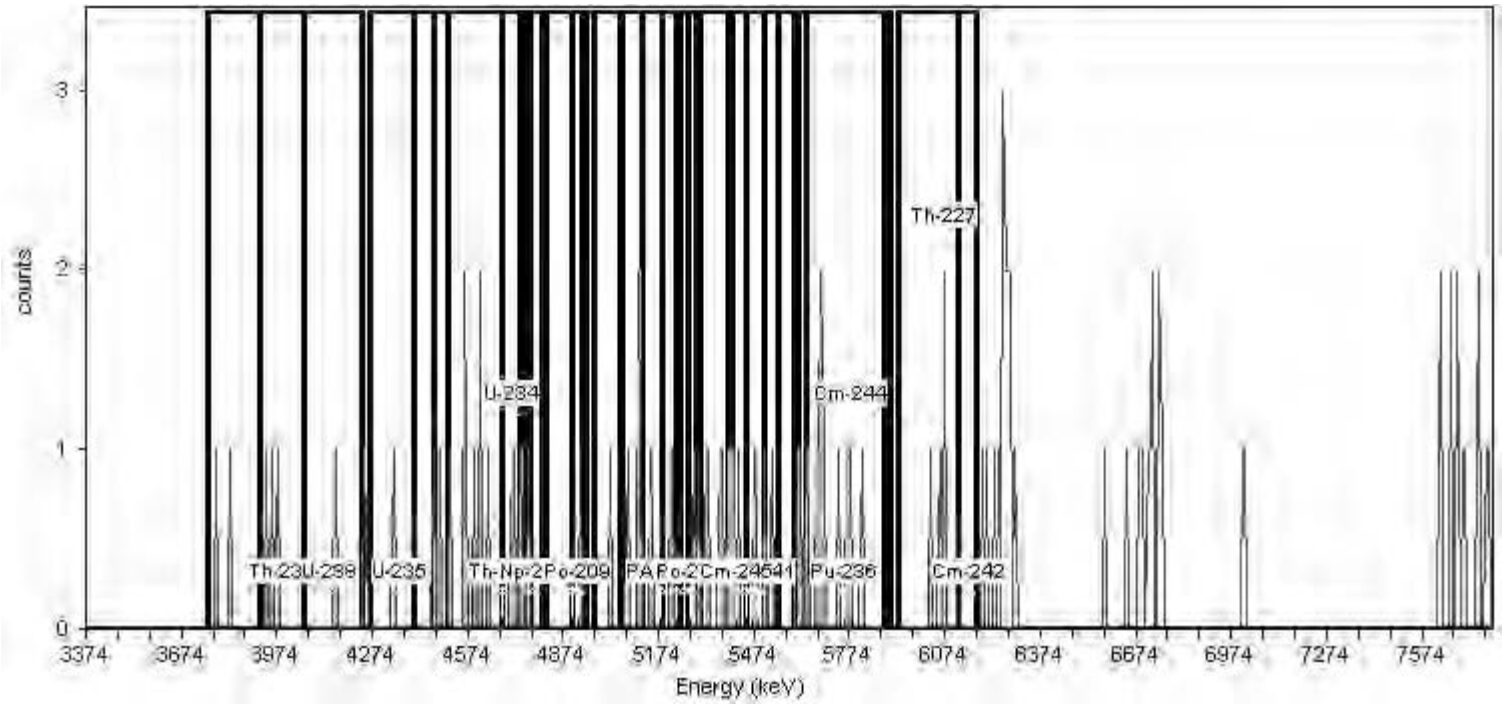
Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 8/14/2018 6:49:41PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV55-05152018
Calibration Date: 5/15/2018 3:38:17PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.96% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 103.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	14.00	1.458E-002	4.034E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	7.00	7.292E-003	2.946E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	12.00	1.250E-002	3.756E-003
Cm-244	5.78	5.64	5.90	10.00	1.042E-002	3.455E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:51:10AM 8/15/2018

Sample

Sample Name: ICB;AV56
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

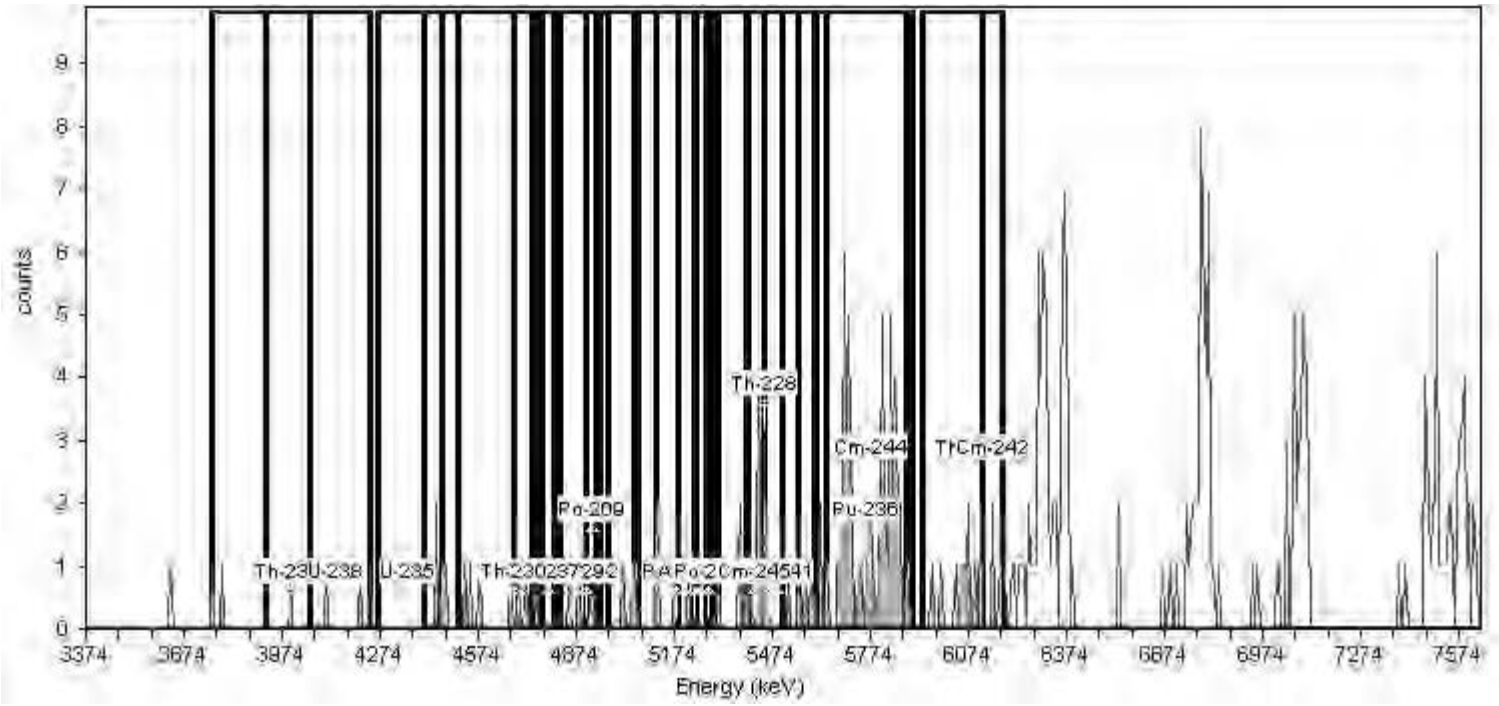
Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 8/14/2018 6:49:42PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV56-05152018
Calibration Date: 5/15/2018 3:38:31PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.25% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 301.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	7.00	7.292E-003	2.946E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	17.00	1.771E-002	4.419E-003
Am-241	5.48	5.30	5.60	20.00	2.083E-002	4.774E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	59.00	6.146E-002	8.069E-003
Cm-244	5.78	5.64	5.90	57.00	5.937E-002	7.933E-003
Th-227	6.07	5.93	6.18	15.00	1.563E-002	4.167E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:51:29AM 8/15/2018

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018b
Description:

Analyst: 60040

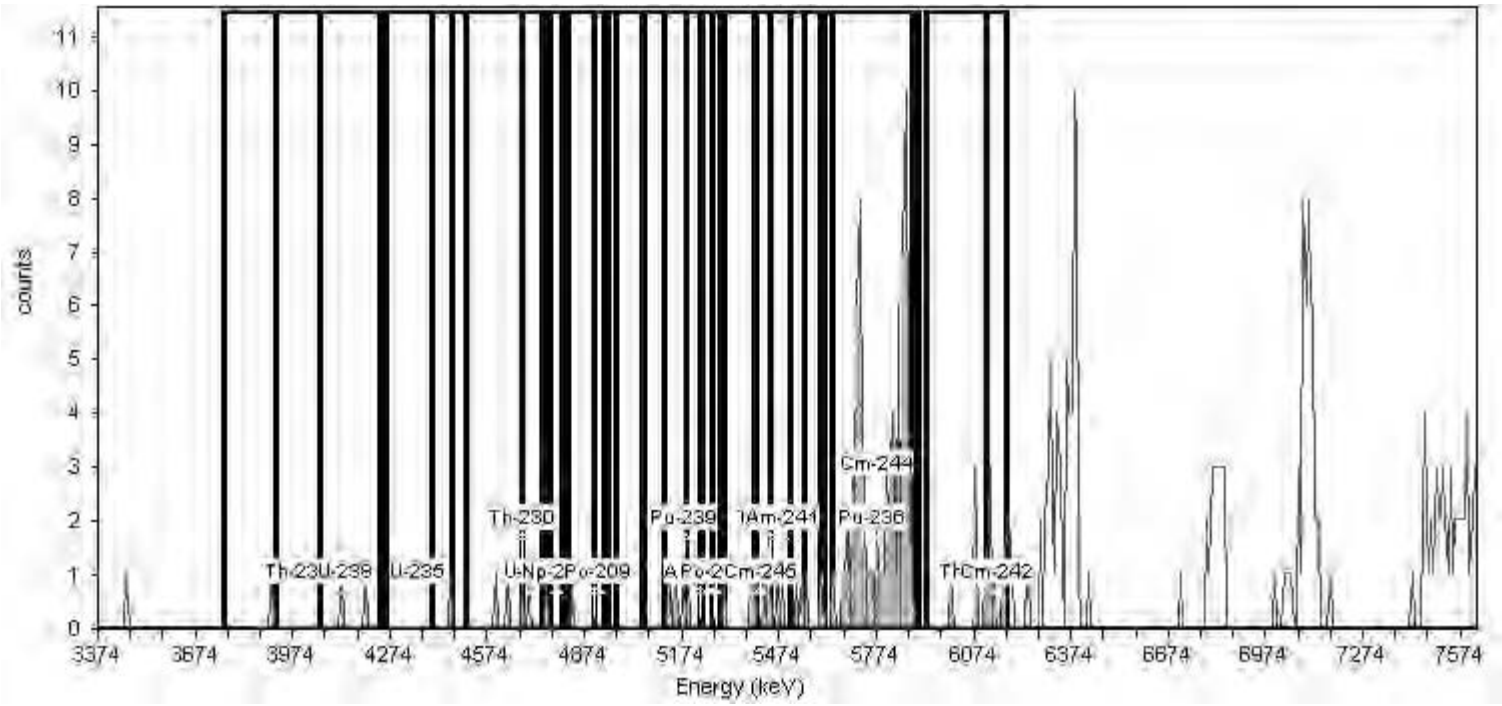
Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 8/14/2018 6:49:45PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV58-05152018
Calibration Date: 5/15/2018 3:38:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.05% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 303.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	80.00	8.333E-002	9.375E-003
Cm-244	5.78	5.64	5.90	80.00	8.333E-002	9.375E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	9.00	9.375E-003	3.294E-003
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:38:51AM 8/14/2018

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

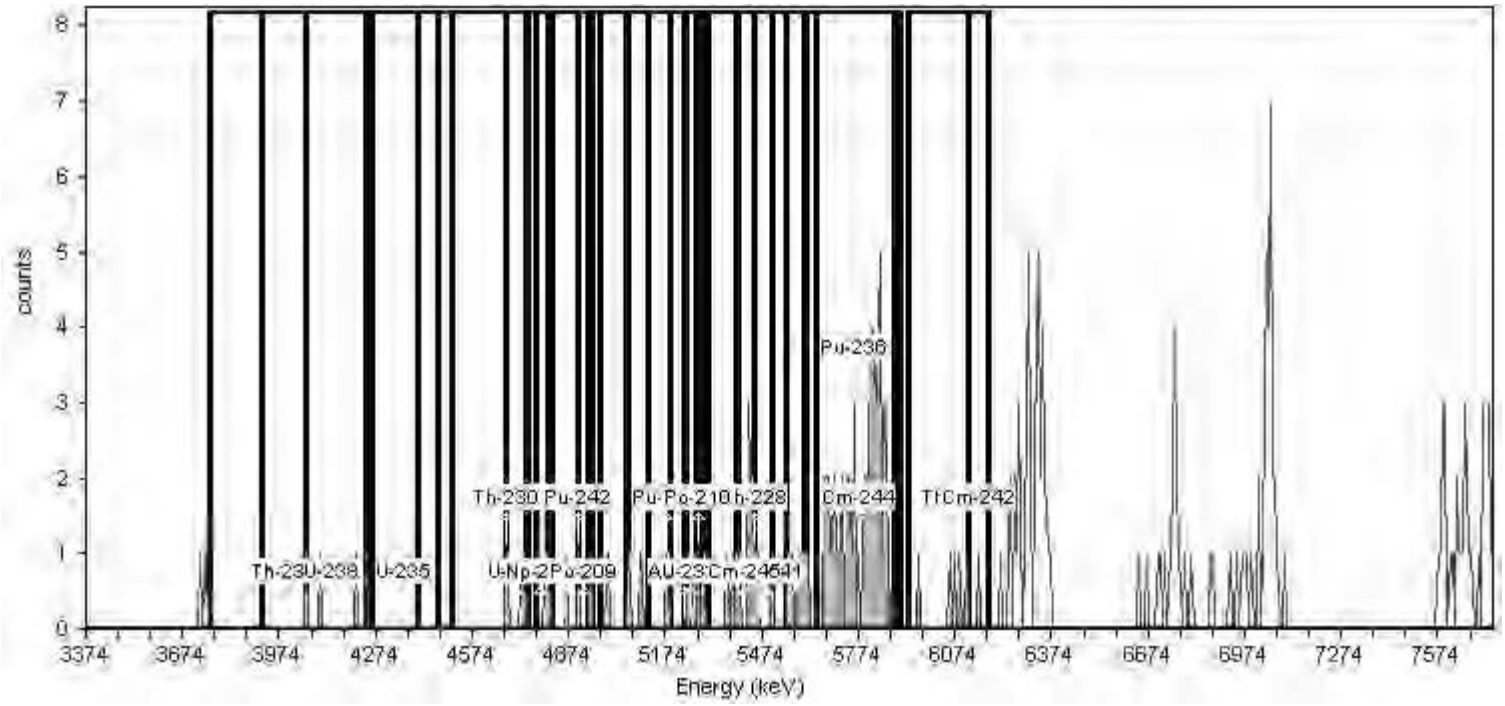
Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 8/13/2018 2:36:05PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-1368447;AV62-05152018
Calibration Date: 5/15/2018 3:39:22PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.40% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 221.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	4.00	4.167E-003	2.329E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	54.00	5.625E-002	7.725E-003
Cm-244	5.78	5.64	5.90	52.00	5.417E-002	7.583E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:30:43AM 8/12/2018

Sample

Sample Name: ICB;AV64
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

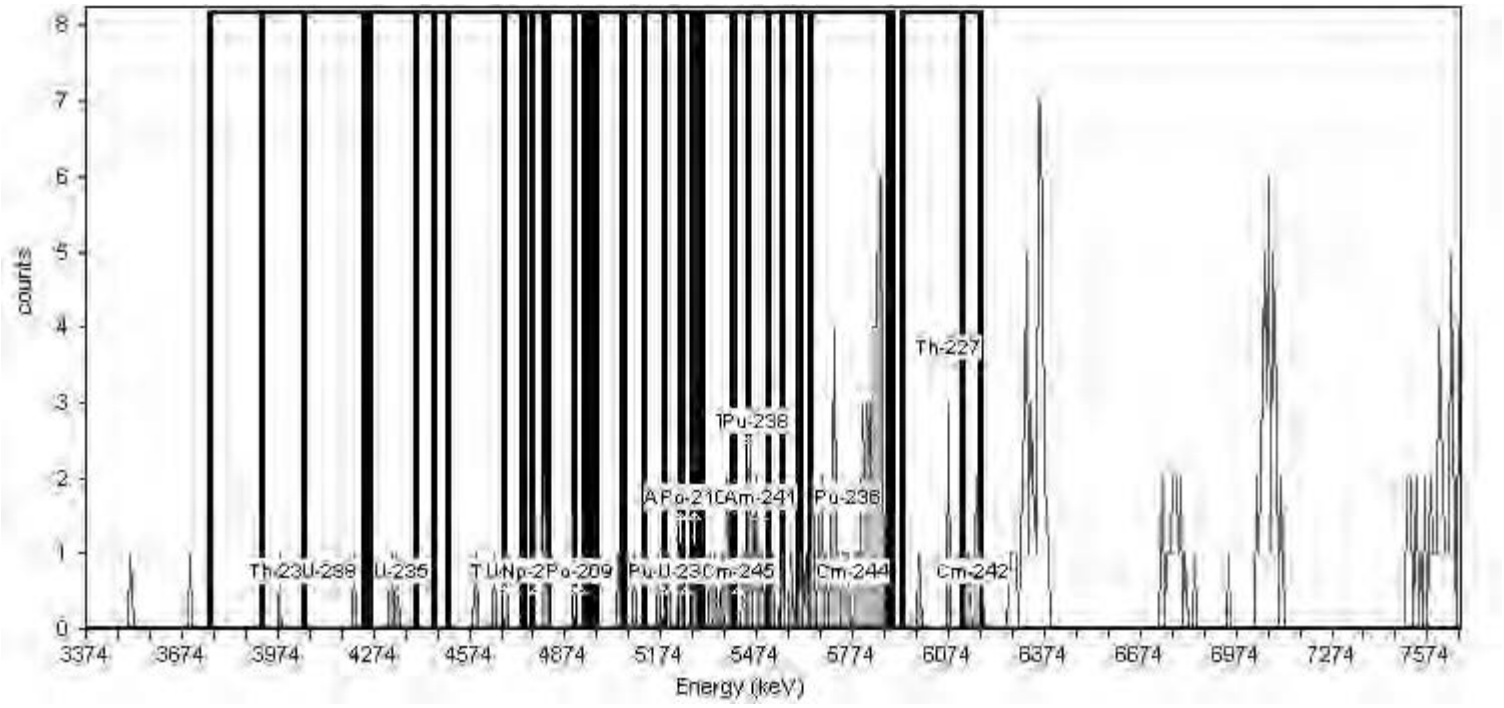
Acquisition

Detector: AV64 , SN: 43-028v3
Acquisition Start Date: 8/11/2018 5:17:19PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-1370622;AV64-05152018
Calibration Date: 5/15/2018 3:39:44PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.38% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 230.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	18.00	1.875E-002	4.541E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	58.00	6.042E-002	8.001E-003
Cm-244	5.78	5.64	5.90	56.00	5.833E-002	7.864E-003
Th-227	6.07	5.93	6.18	11.00	1.146E-002	3.608E-003
Cm-242	6.15	6.12	6.18	7.00	7.292E-003	2.946E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:31:01AM 8/12/2018

Sample

Sample Name: ICB;AV65
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

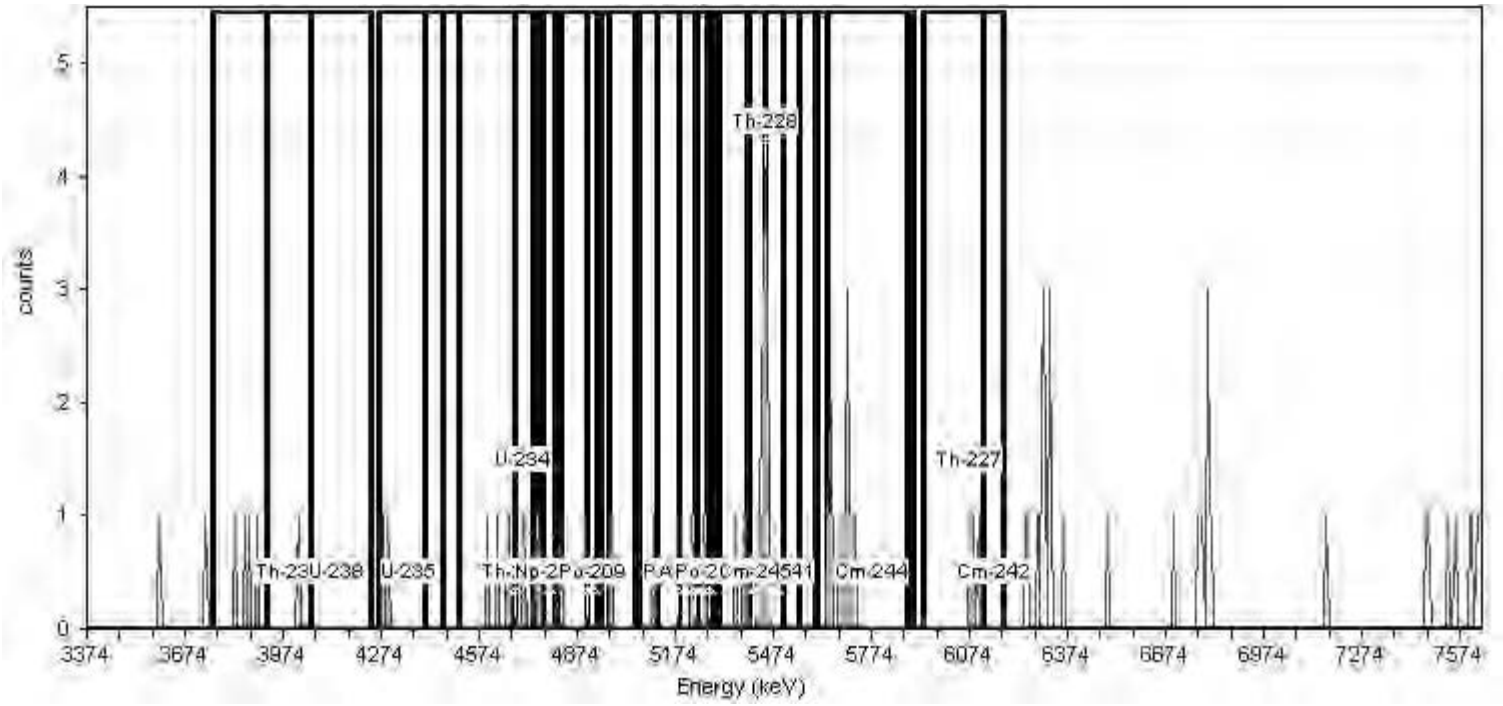
Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 8/11/2018 5:17:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-1370619;AV65-05152018
Calibration Date: 5/15/2018 3:39:56PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.12% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 85.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	18.00	1.875E-002	4.541E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	16.00	1.667E-002	4.295E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	12.00	1.250E-002	3.756E-003
Cm-244	5.78	5.64	5.90	12.00	1.250E-002	3.756E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:31:10AM 8/12/2018

Sample

Sample Name: ICB;AV66
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

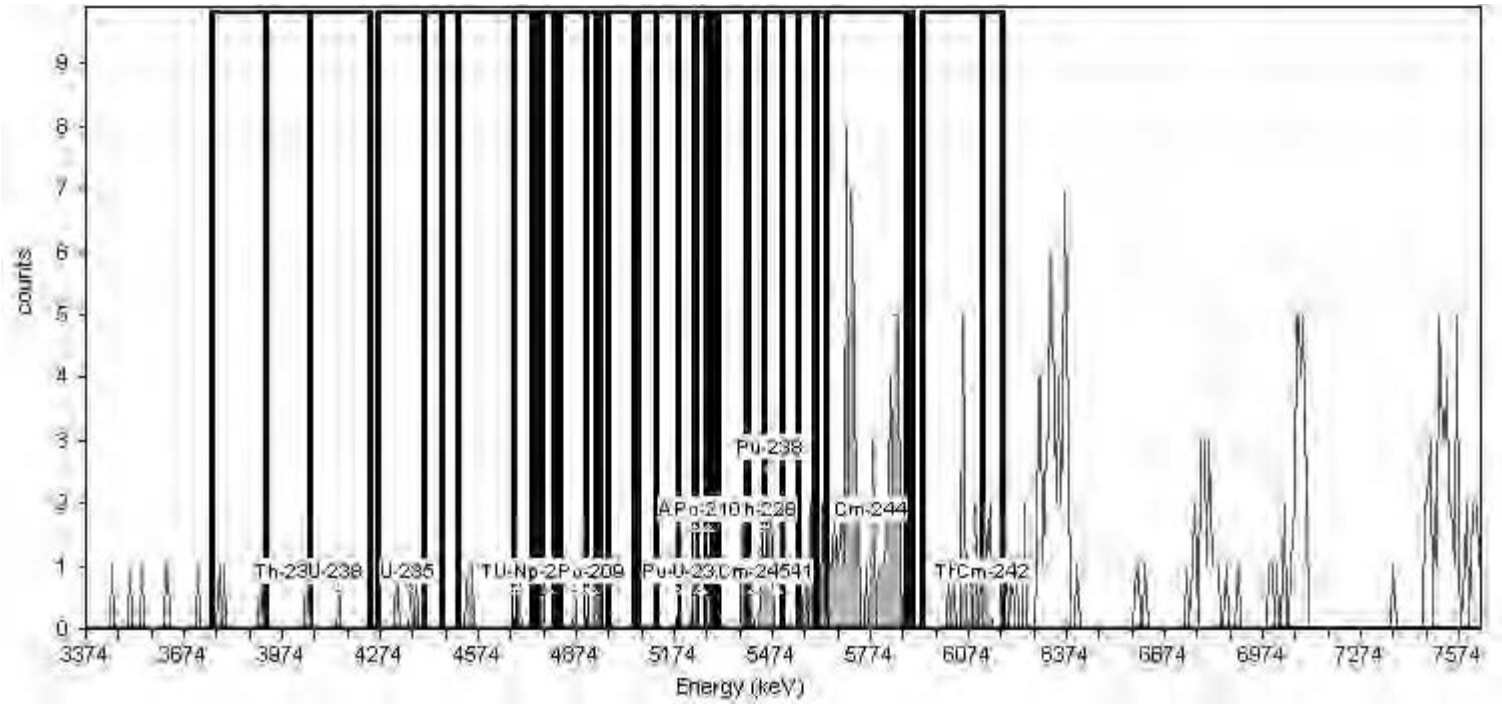
Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 8/11/2018 5:17:21PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-1370620;AV66-05152018
Calibration Date: 5/15/2018 3:40:08PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.12% +/- 0.24% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 271.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	64.00	6.667E-002	8.398E-003
Cm-244	5.78	5.64	5.90	62.00	6.458E-002	8.268E-003
Th-227	6.07	5.93	6.18	17.00	1.771E-002	4.419E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:31:28AM 8/12/2018

Sample

Sample Name: ICB;AV69
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

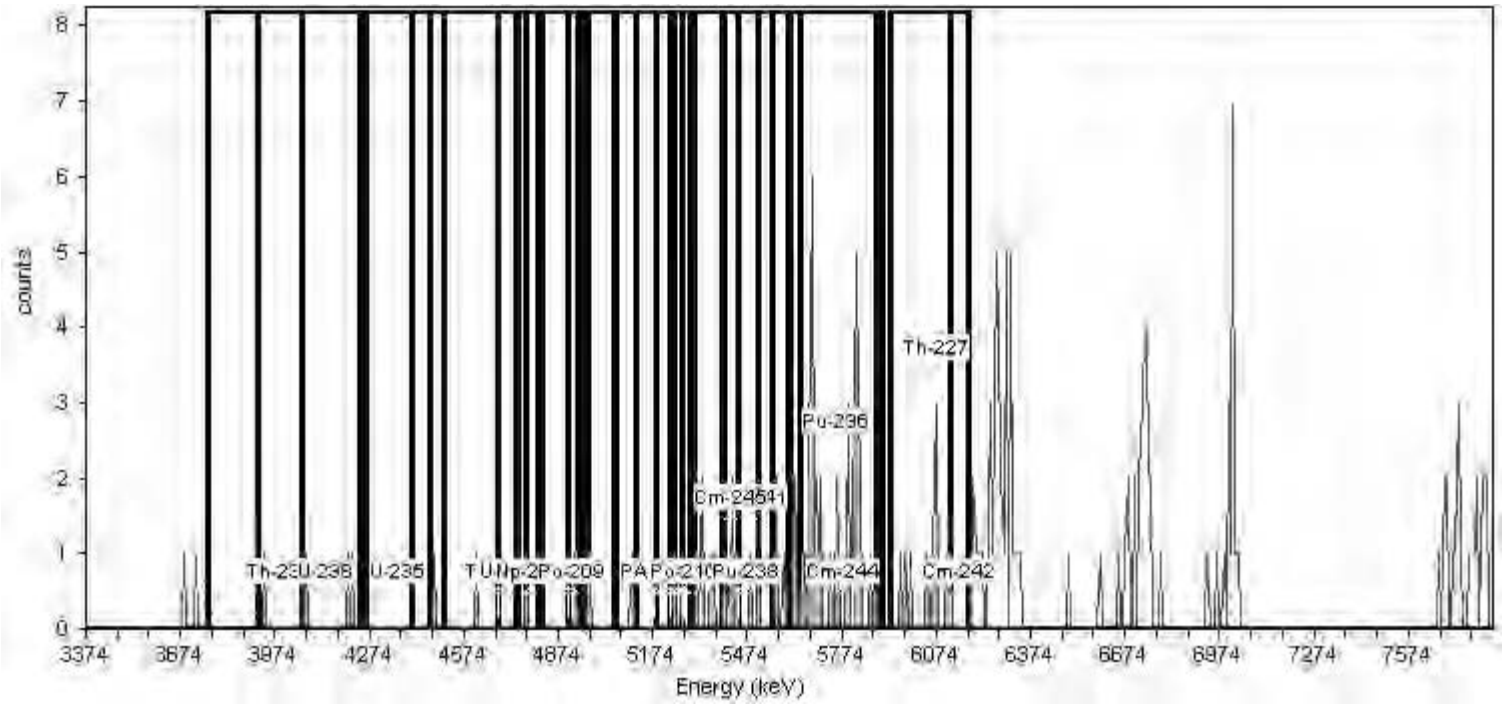
Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 8/11/2018 5:17:23PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8874;AV69-05152018
Calibration Date: 5/15/2018 6:39:25PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.43% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 181.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	40.00	4.167E-002	6.670E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:32:00AM 8/12/2018

Sample

Sample Name: ICB;AV70
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

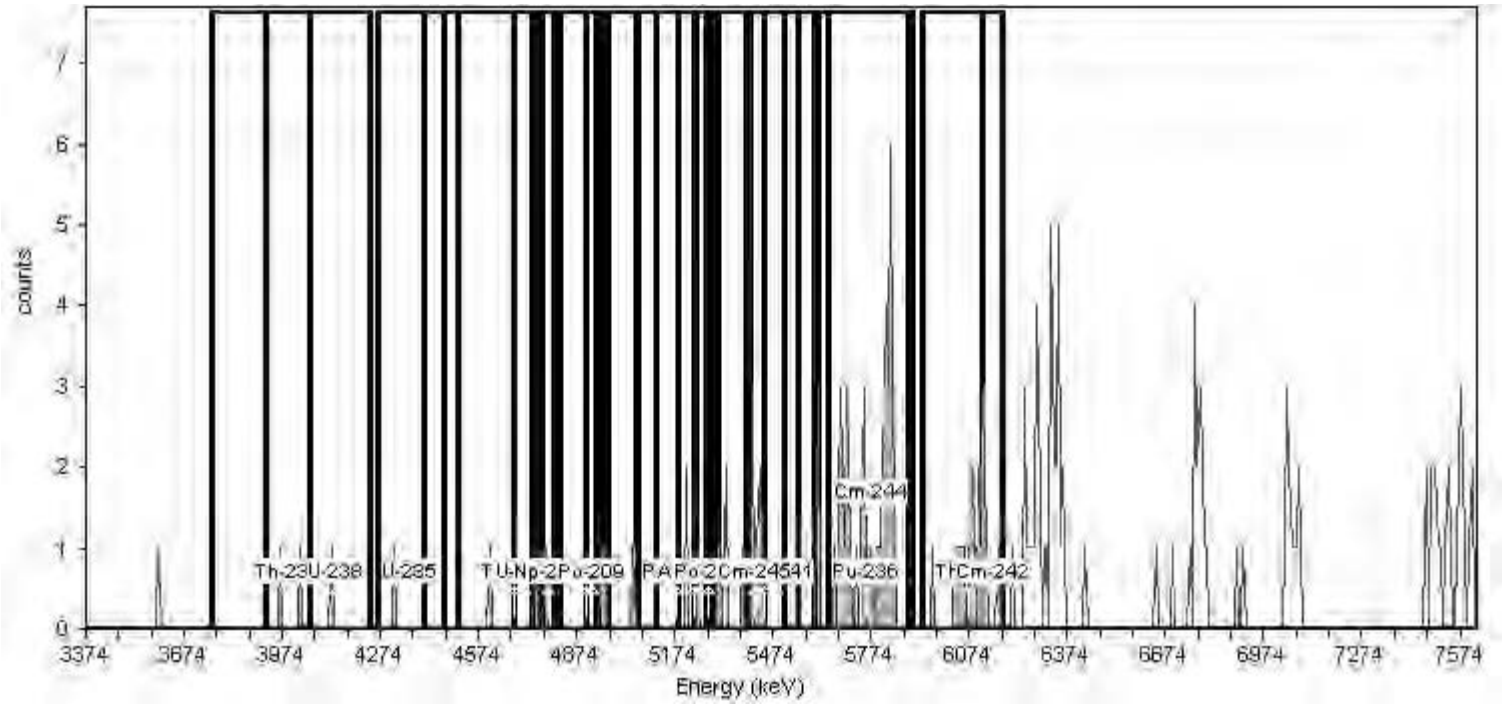
Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 8/11/2018 5:17:26PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV70-05152018
Calibration Date: 5/15/2018 6:36:23PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.40% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 176.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	18.00	1.875E-002	4.541E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:31:37AM 8/12/2018

Sample

Sample Name: ICB;AV71
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

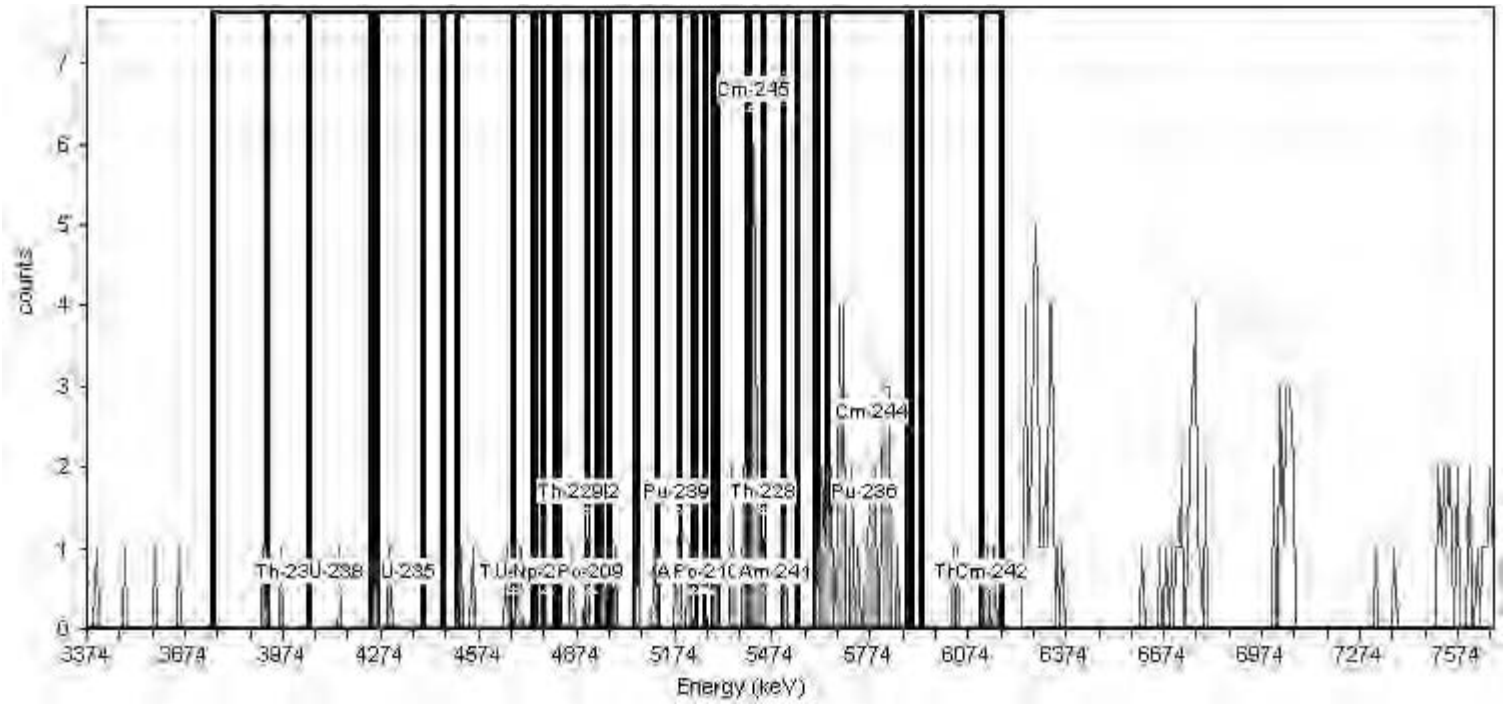
Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 8/11/2018 5:17:28PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV71-05152018
Calibration Date: 5/15/2018 6:36:40PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.00% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 190.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	16.00	1.667E-002	4.295E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	45.00	4.688E-002	7.065E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:00AM 8/14/2018

Sample

Sample Name: ICB;AV72
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

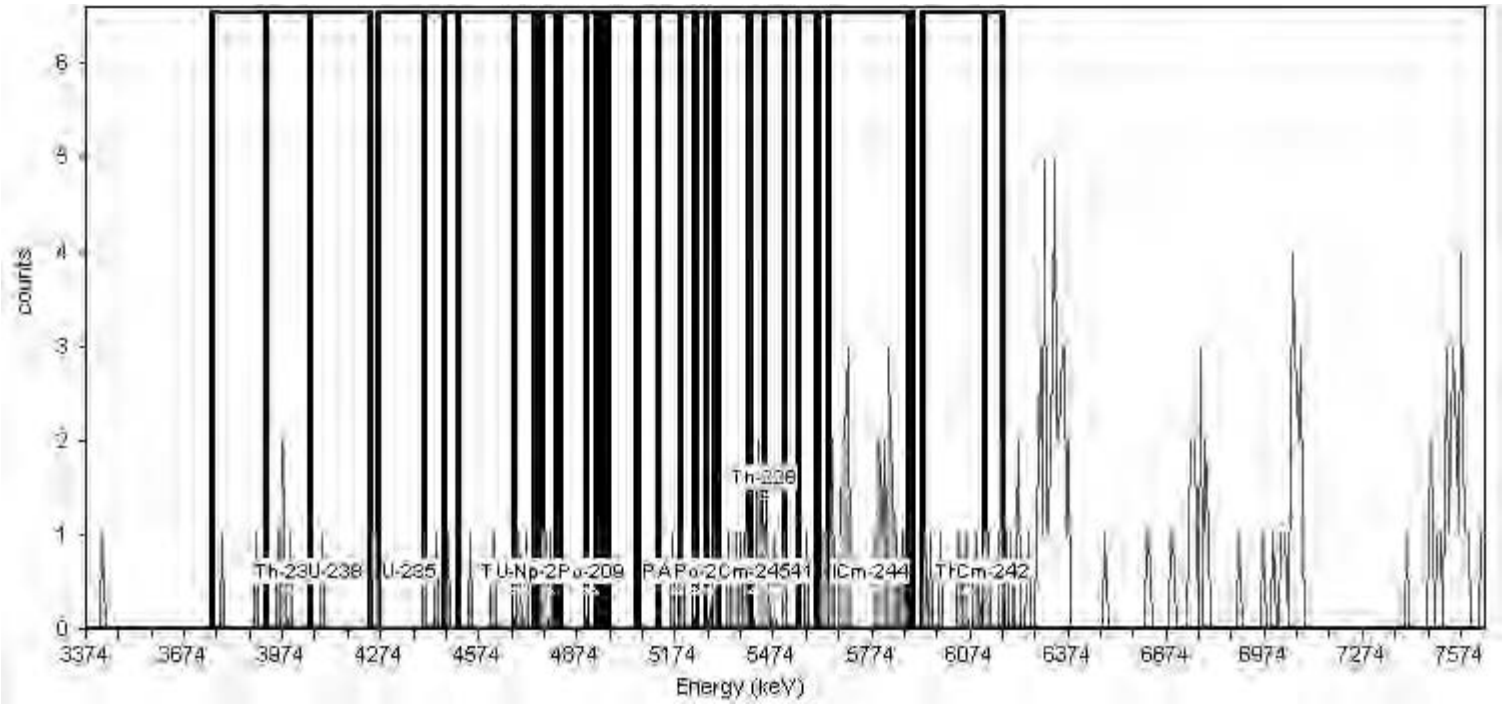
Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 8/13/2018 2:36:08PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV72-05152018
Calibration Date: 5/15/2018 6:36:51PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.58% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 185.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	28.00	2.917E-002	5.610E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:32:09AM 8/12/2018

Sample

Sample Name: ICB;AV73
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

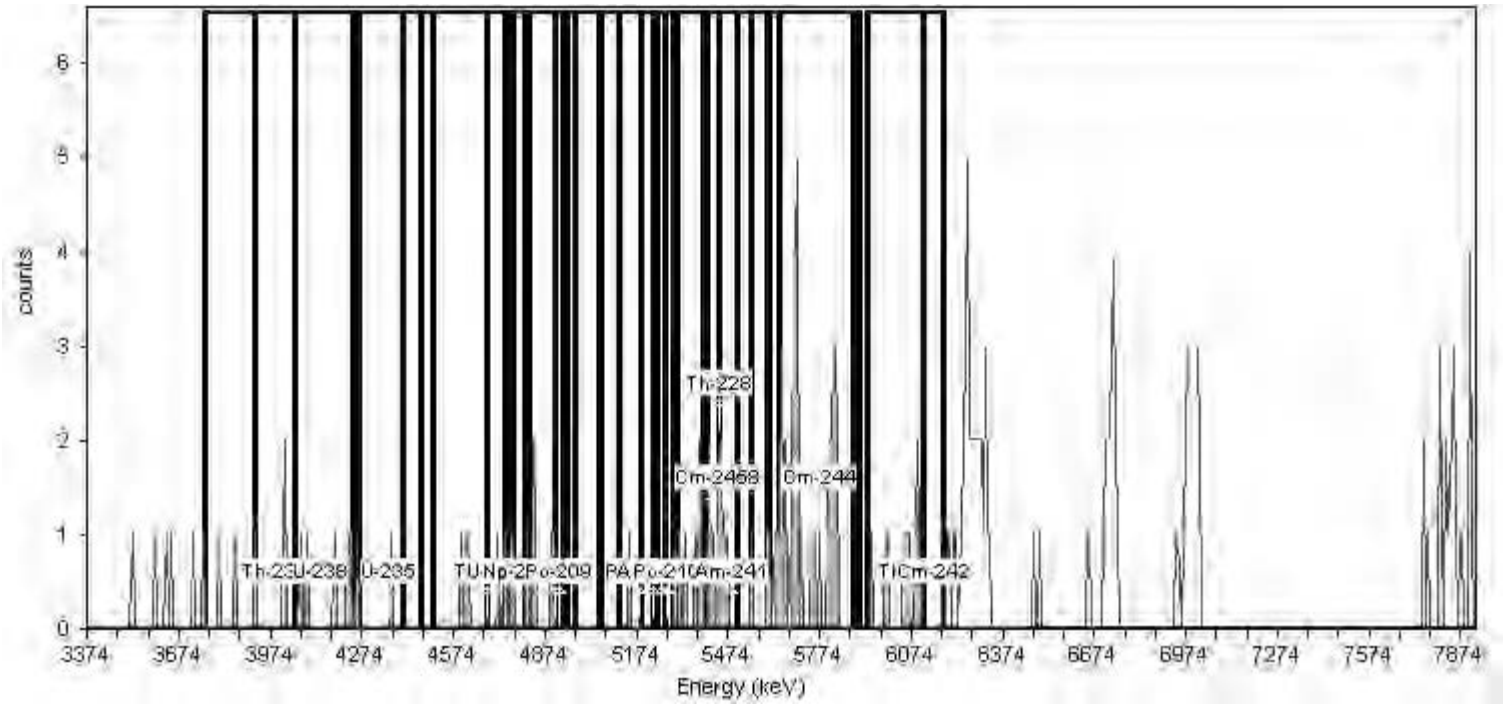
Acquisition

Detector: AV73 , SN: 46-03321
Acquisition Start Date: 8/11/2018 5:17:31PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV73-05152018
Calibration Date: 5/15/2018 6:37:02PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.17% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 197.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	42.00	4.375E-002	6.831E-003
Cm-244	5.78	5.64	5.90	39.00	4.062E-002	6.588E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:32:18AM 8/12/2018

Sample

Sample Name: ICB;AV74
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

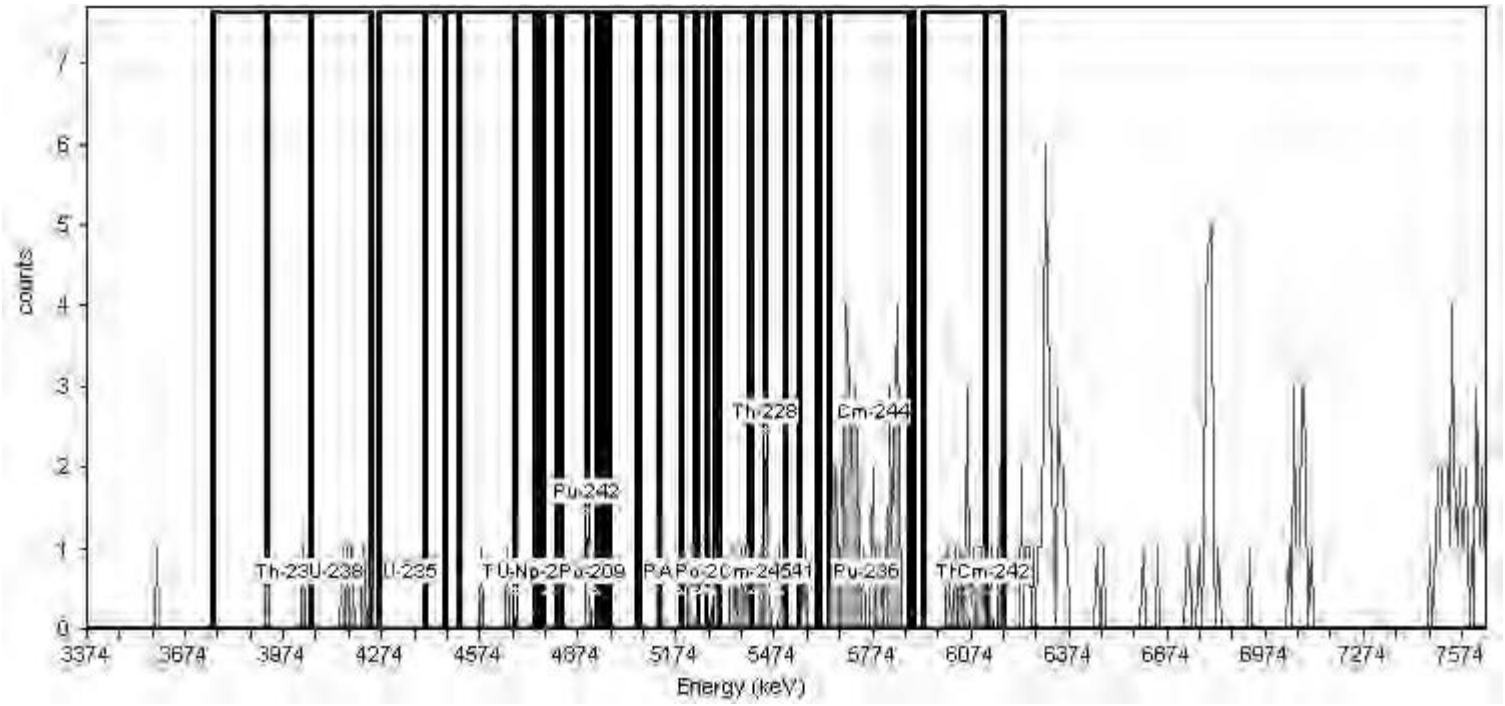
Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 8/11/2018 5:17:33PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV74-05152018
Calibration Date: 5/15/2018 6:37:13PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.68% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 189.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	44.00	4.583E-002	6.988E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:32:27AM 8/12/2018

Sample

Sample Name: ICB;AV75
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

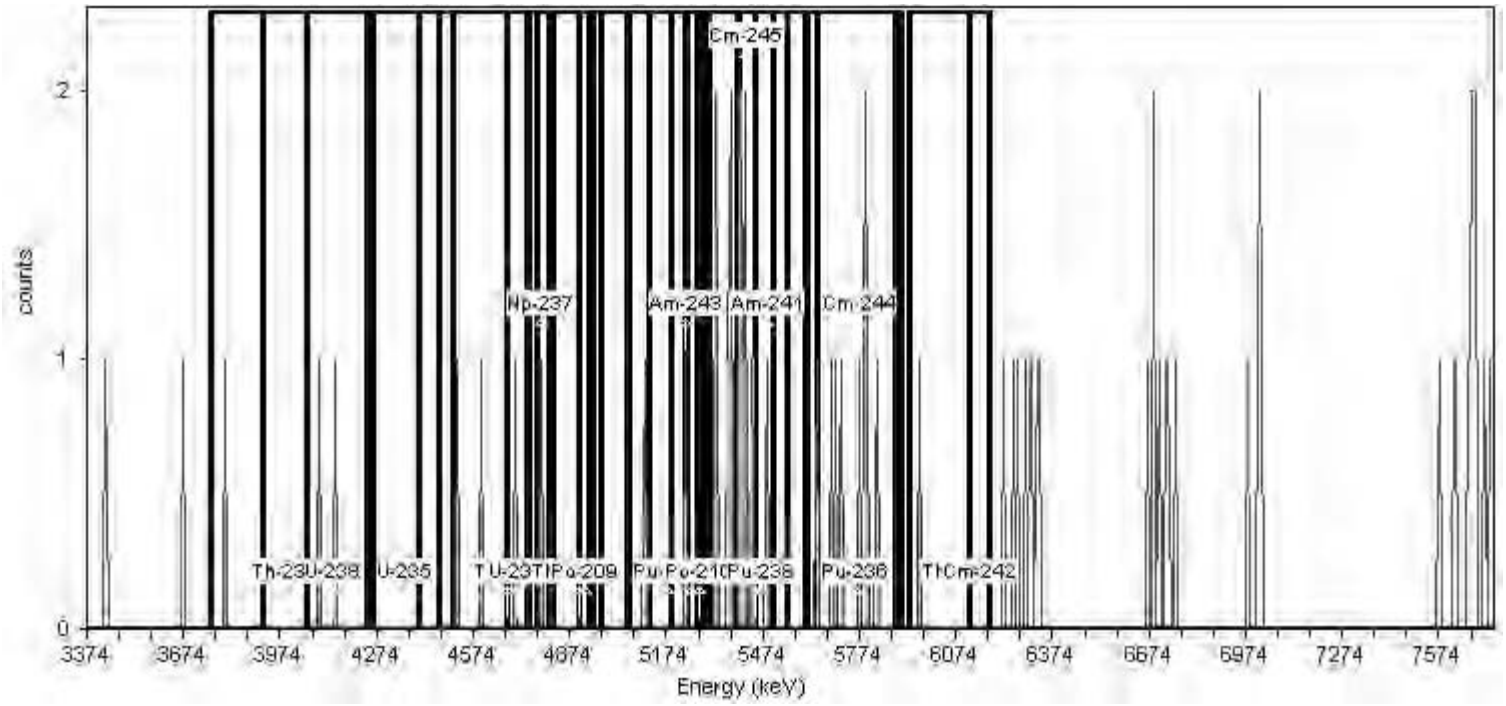
Acquisition

Detector: AV75 , SN: 51-082B4
Acquisition Start Date: 8/11/2018 5:17:35PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9817;AV75-05152018
Calibration Date: 5/15/2018 6:37:33PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 22.76% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 65.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:33:03AM 8/12/2018

Sample

Sample Name: ICB;AV77
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

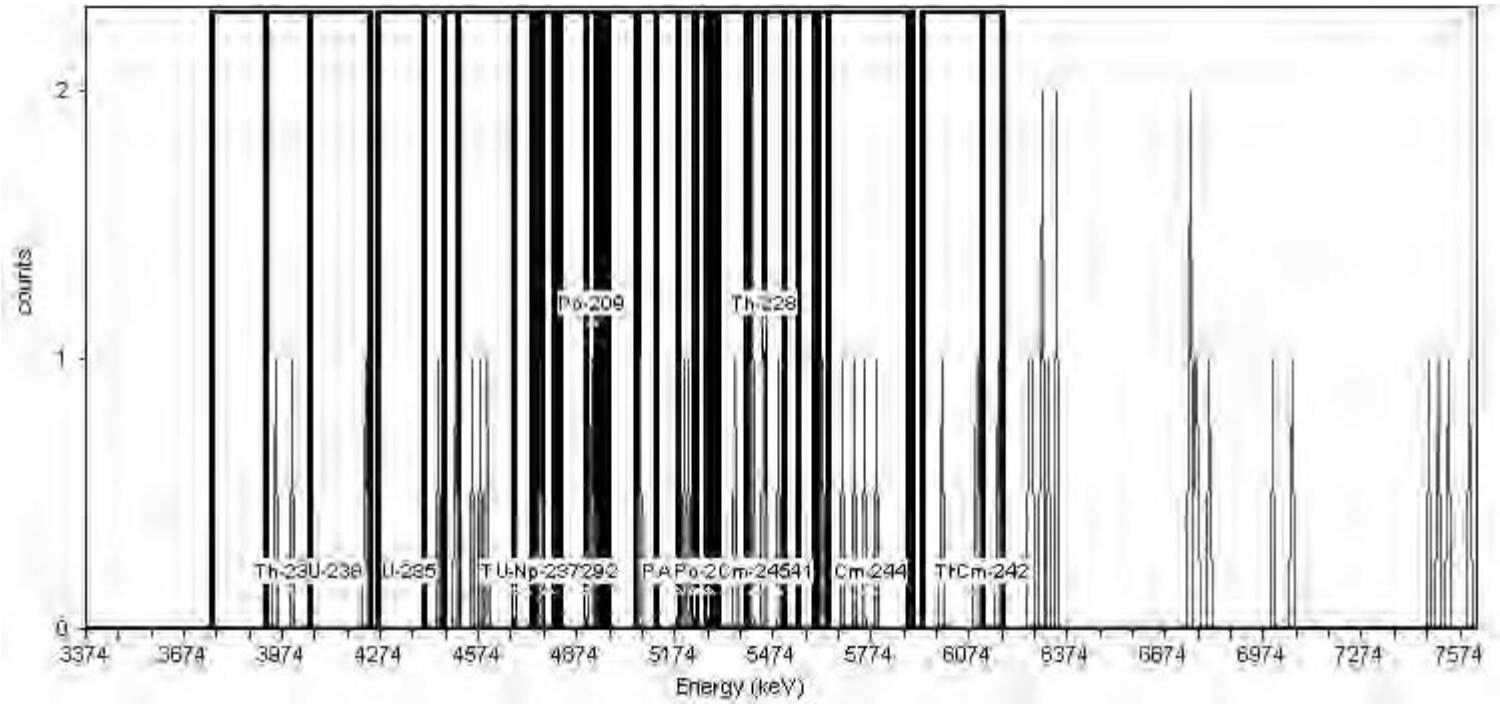
Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 8/11/2018 5:17:37PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 46.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:27AM 8/14/2018

Sample

Sample Name: ICB;AV78
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

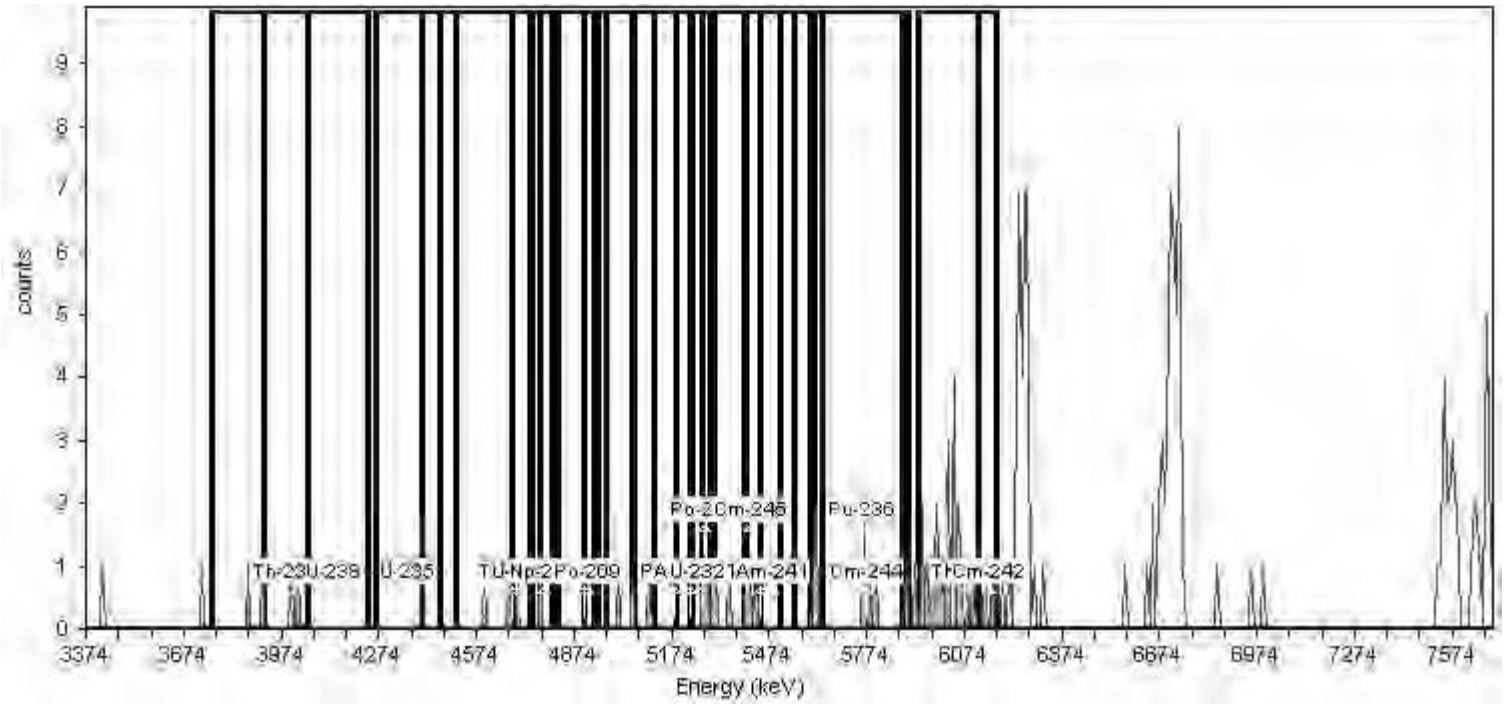
Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 8/13/2018 2:36:13PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-1368447;AV78-05152018
Calibration Date: 5/15/2018 6:37:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.77% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 191.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	26.00	2.708E-002	5.413E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:33:40AM 8/12/2018

Sample

Sample Name: ICB;AV79
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

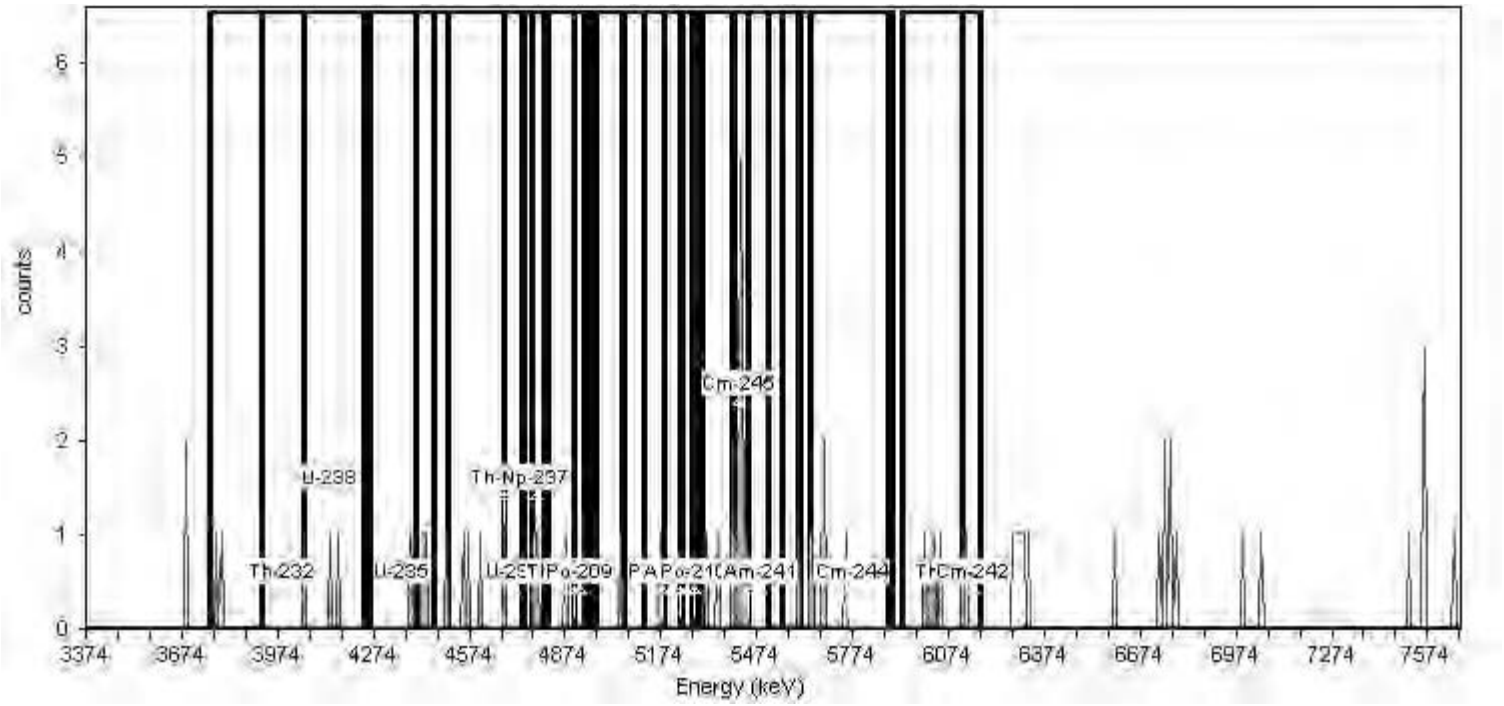
Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 8/11/2018 5:17:42PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 71.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:36AM 8/14/2018

Sample

Sample Name: ICB;AV80
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018a
Description:

Analyst: 60040

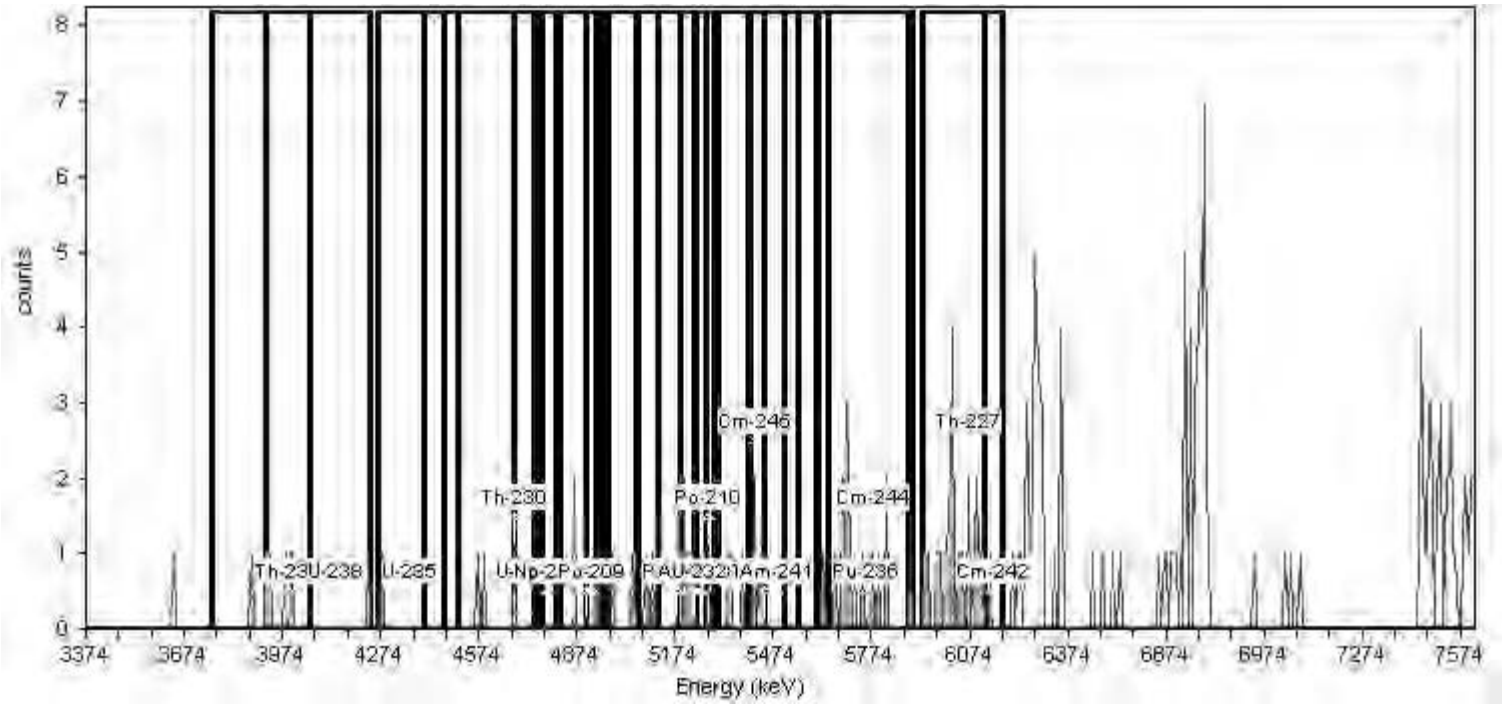
Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 8/13/2018 2:36:15PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-1370622;AV80-05152018
Calibration Date: 5/15/2018 6:38:17PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.23% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 189.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	10.00	1.042E-002	3.455E-003
Am-243	5.23	5.05	5.31	9.00	9.375E-003	3.294E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	22.00	2.292E-002	4.996E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:16AM 8/12/2018

Sample

Sample Name: ICB;AV81
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 8/11/2018 5:17:46PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)

General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 88.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	12.00	1.250E-002	3.756E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	11.00	1.146E-002	3.608E-003
Cm-244	5.78	5.64	5.90	11.00	1.146E-002	3.608E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:25AM 8/12/2018

Sample

Sample Name: ICB;AV82
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

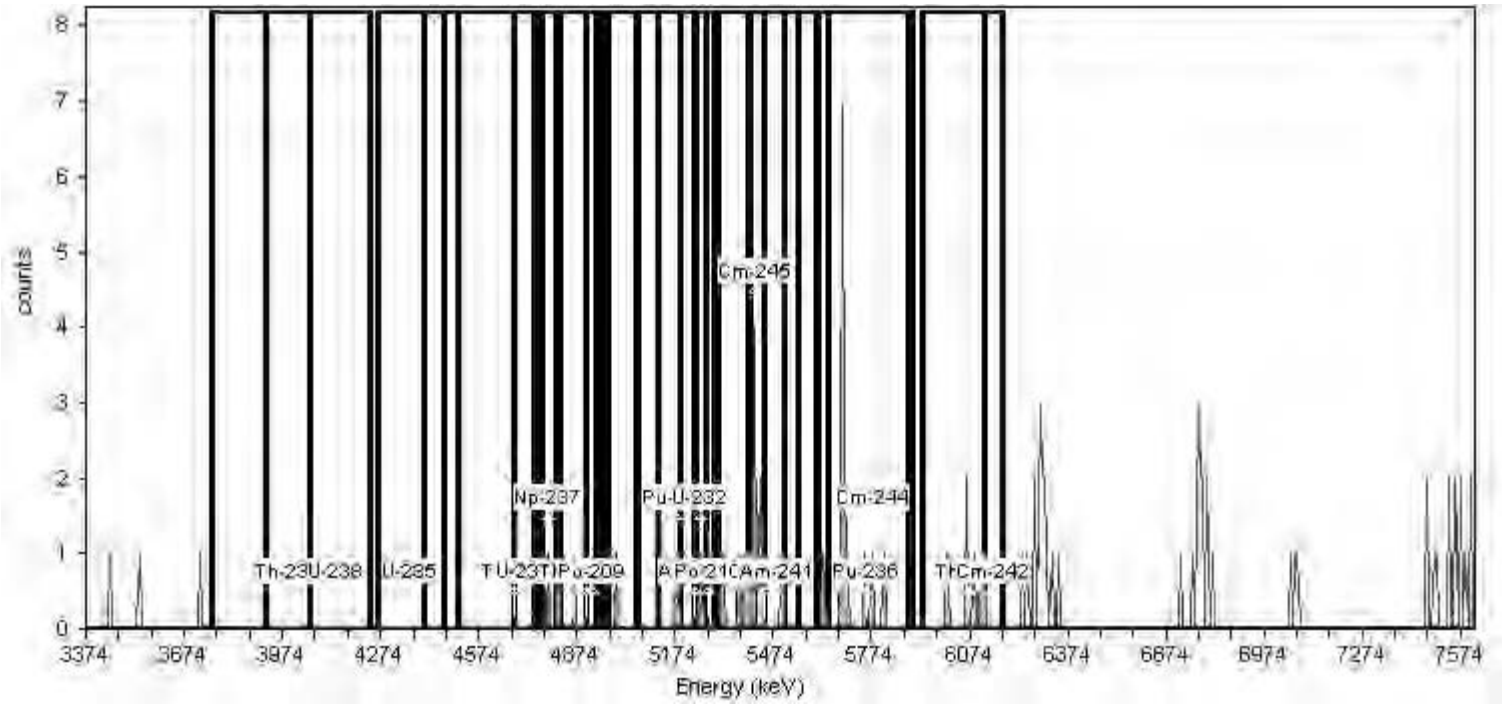
Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 8/11/2018 5:17:48PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 85.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	15.00	1.563E-002	4.167E-003
Cm-244	5.78	5.64	5.90	14.00	1.458E-002	4.034E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:34AM 8/12/2018

Sample

Sample Name: ICB;AV83
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

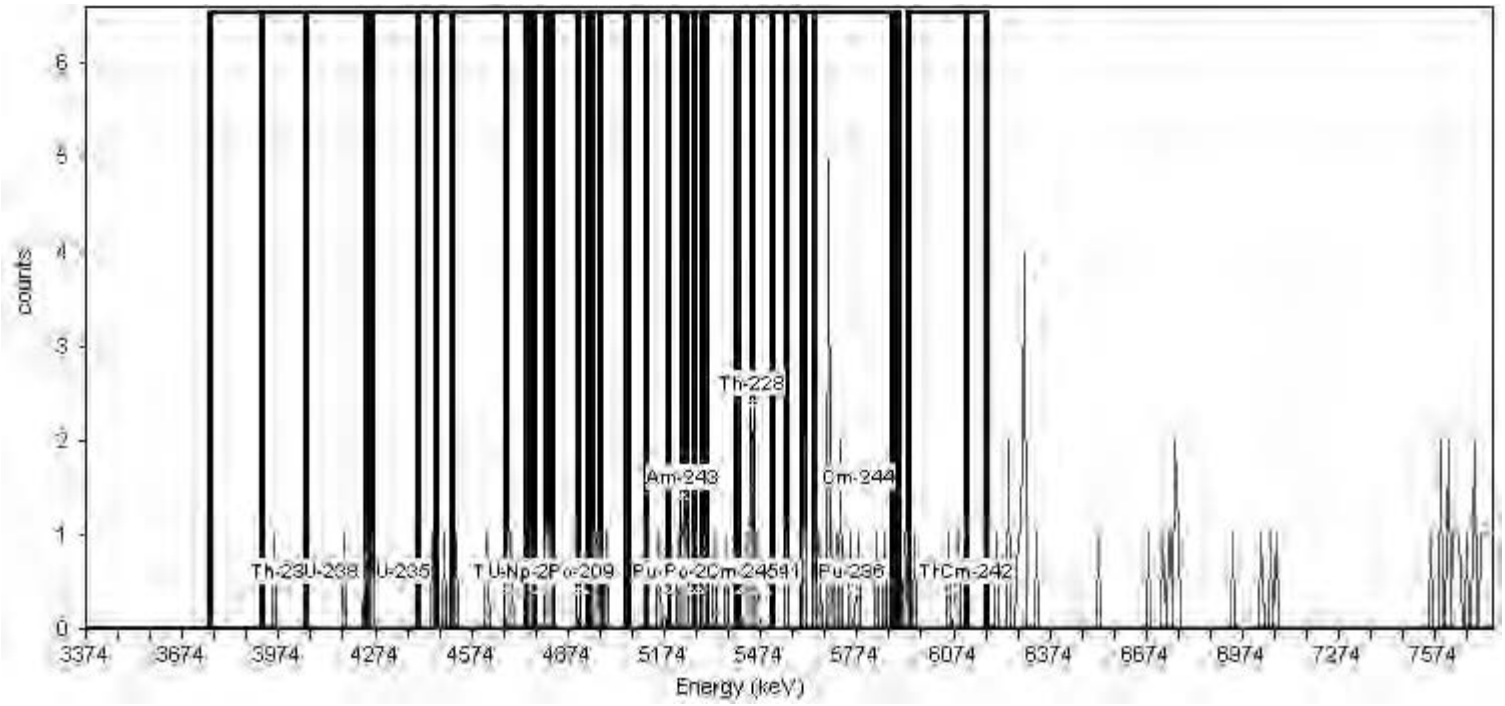
Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 8/11/2018 5:17:49PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	12.00	1.250E-002	3.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:34:52AM 8/12/2018

Sample

Sample Name: ICB;AV85
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

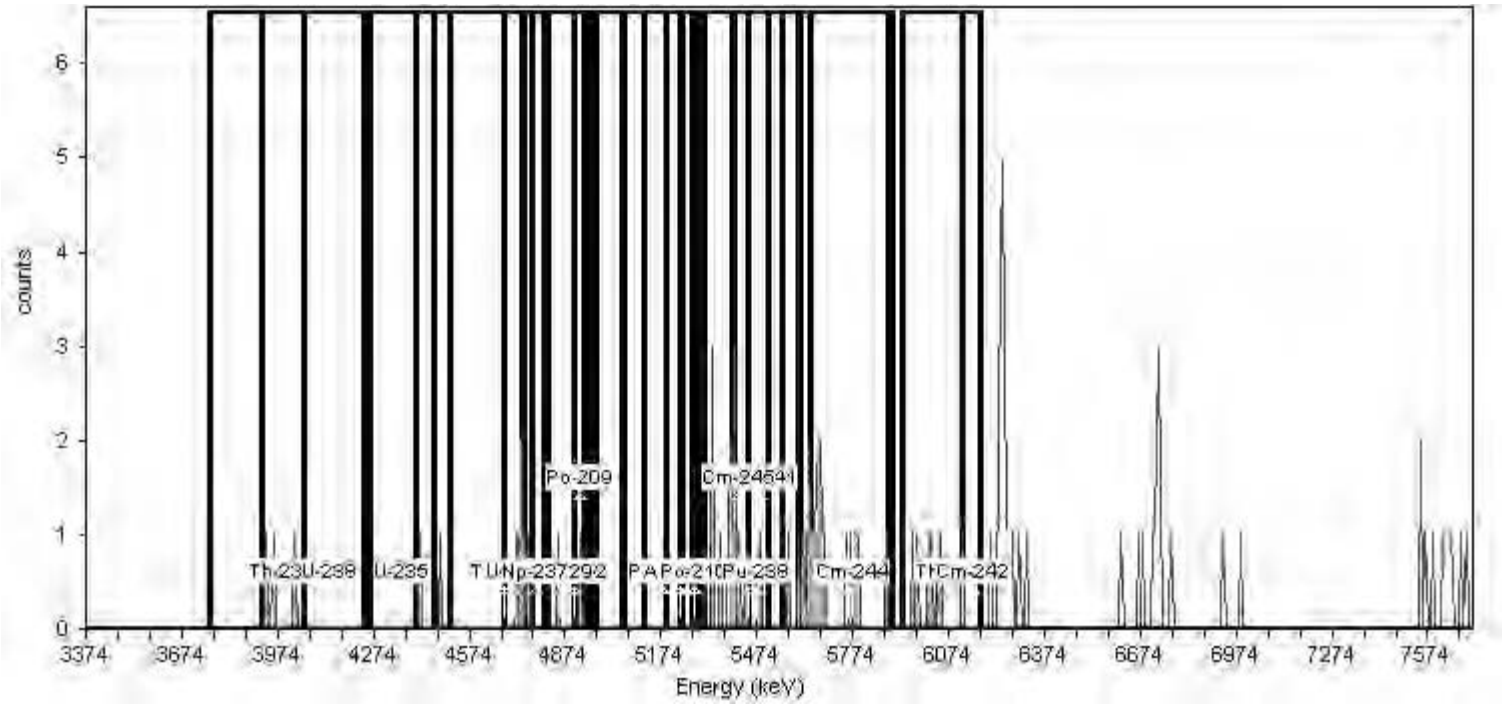
Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 8/11/2018 5:17:53PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 97.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	16.00	1.667E-002	4.295E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	14.00	1.458E-002	4.034E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:35:01AM 8/12/2018

Sample

Sample Name: ICB;AV86
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

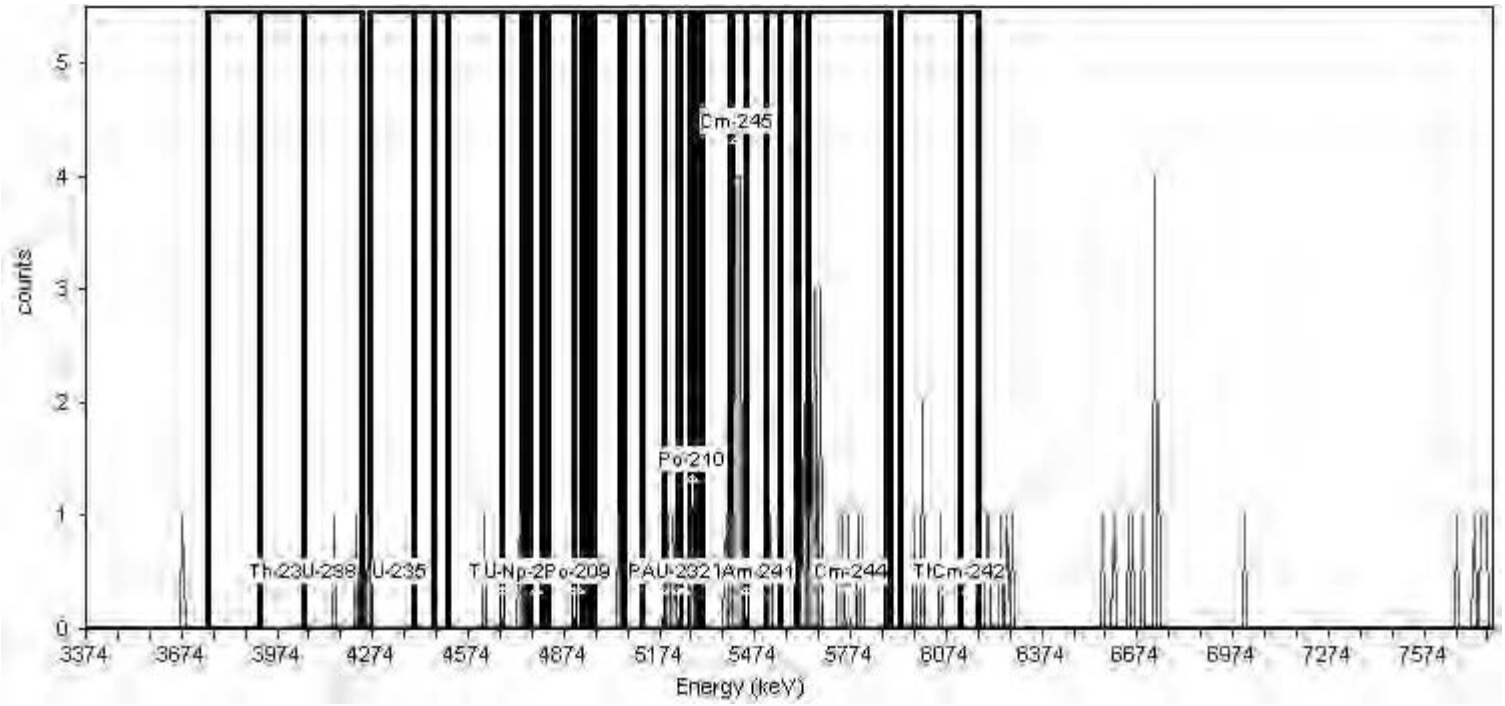
Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 8/11/2018 5:17:53PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	11.00	1.146E-002	3.608E-003
Pu-236	5.76	5.61	5.89	15.00	1.563E-002	4.167E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:35:14AM 8/12/2018

Sample

Sample Name: ICB;AV88
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

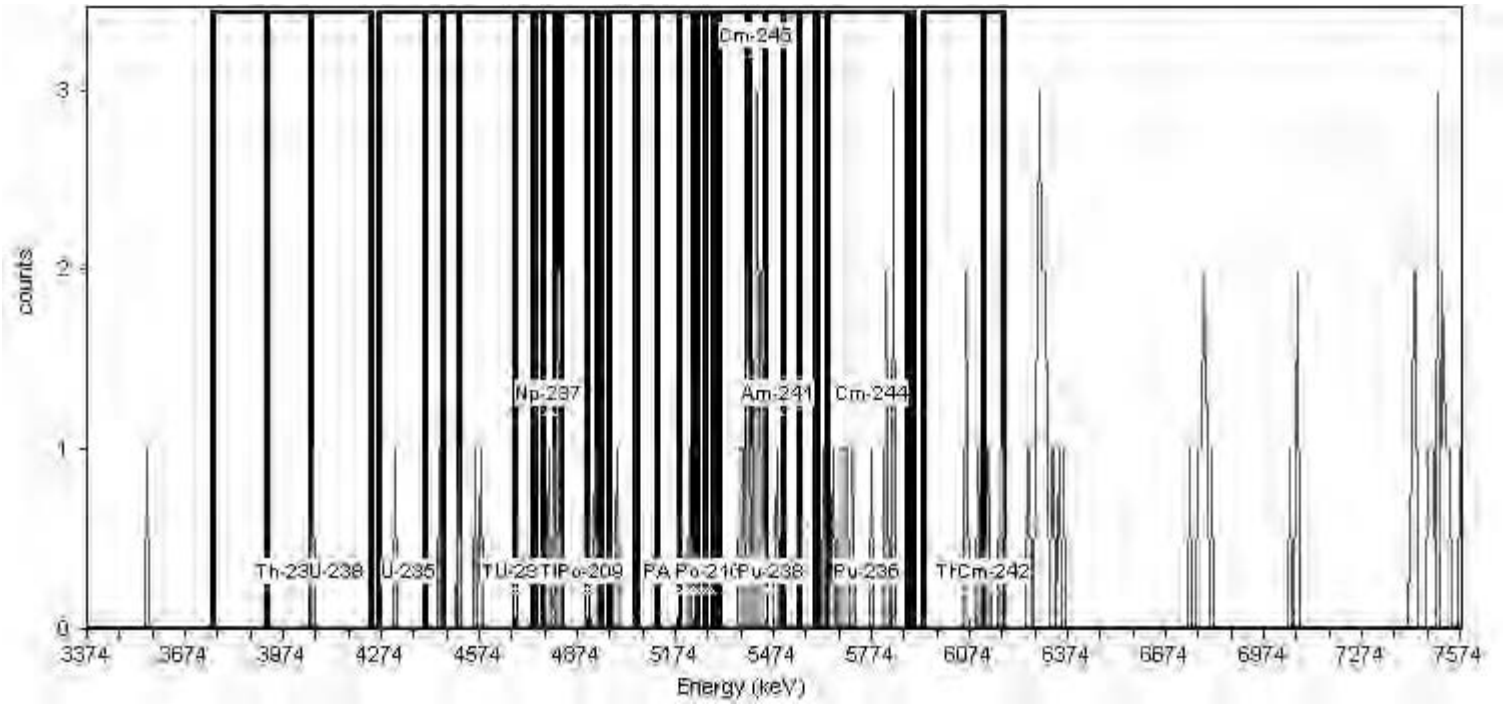
Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 8/11/2018 5:17:55PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	12.00	1.250E-002	3.756E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:35:42AM 8/12/2018

Sample

Sample Name: ICB;AV91
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: August2018
Description:

Analyst: 60040

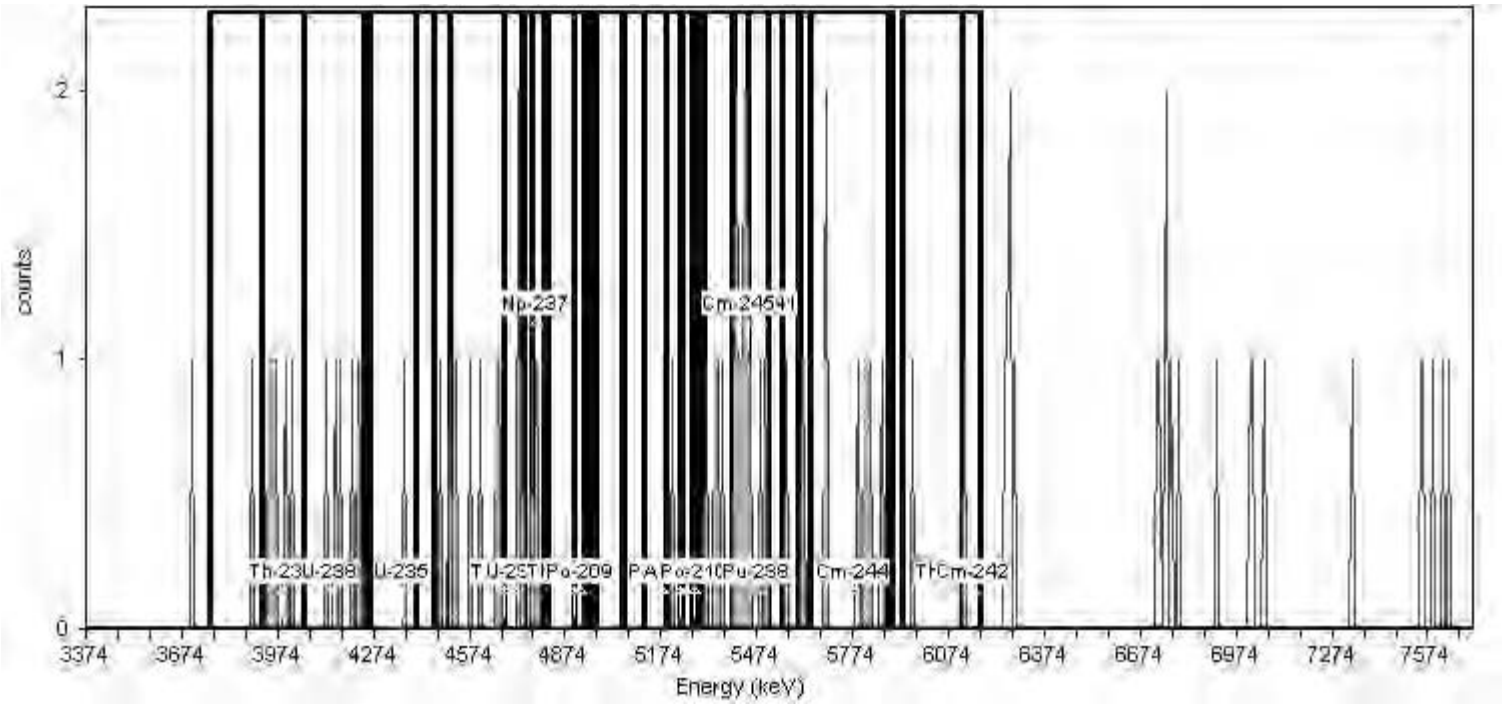
Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 8/11/2018 5:17:59PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV1-05142018
Calibration Date: 5/14/2018 6:23:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 79.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	11.00	1.146E-002	3.608E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	18.00	1.875E-002	4.541E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	17.00	1.771E-002	4.419E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:32PM 8/27/2018

Sample

Sample Name: ICB;AV148
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

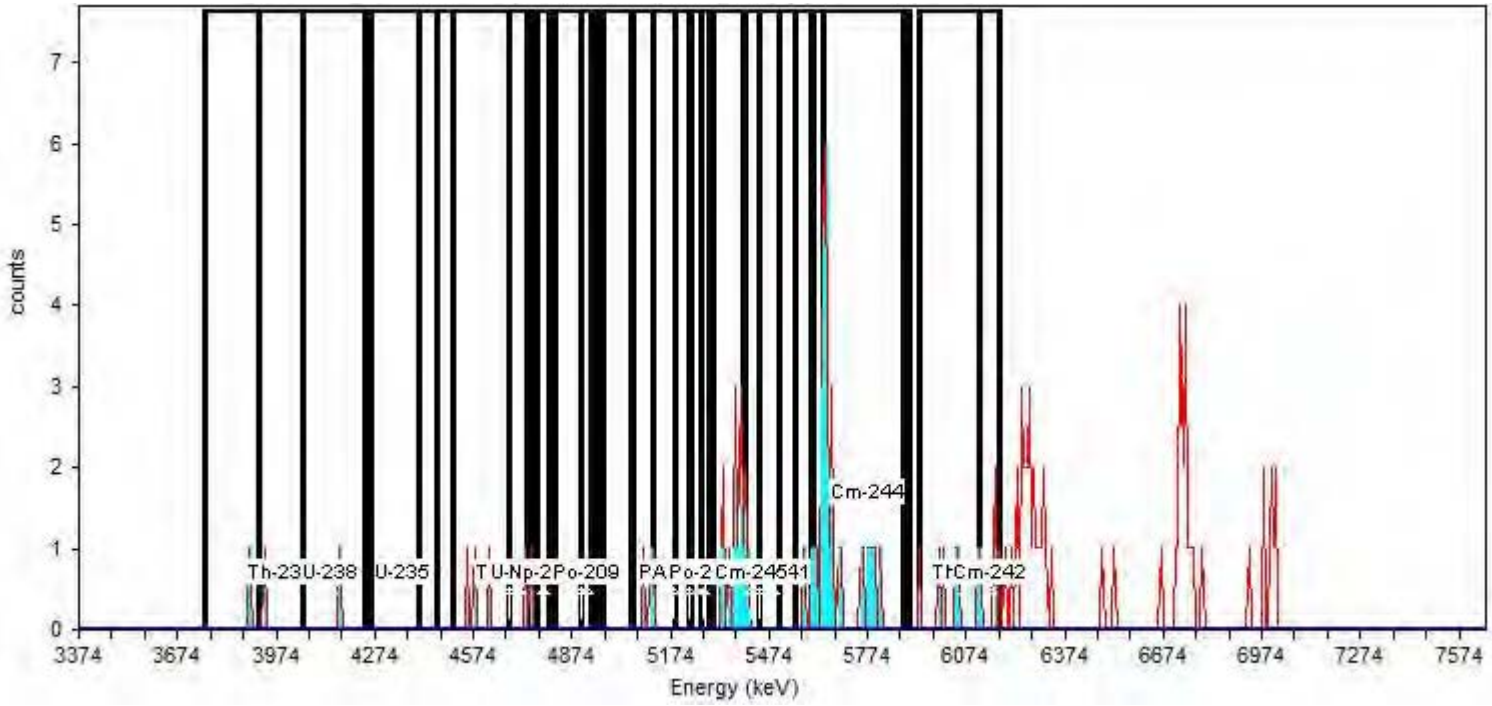
Batch Name: August2018
Description:

Acquisition

Detector: AV148 , SN: 50-05/R2
Acquisition Start Date: 8/20/2018 5:49:58PM
Live Time: 960.00 min.
Real Time: 960.09 min.
Calibration Name: IC-8874;AV148-20171113a
Calibration Date: 11/13/2017 12:24:55PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 120.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	5.00	5.208E-003	2.552E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	18.00	1.875E-002	4.541E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	25.00	2.604E-002	5.311E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:40AM 8/22/2018

Sample

Sample Name: ICB;AV151
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

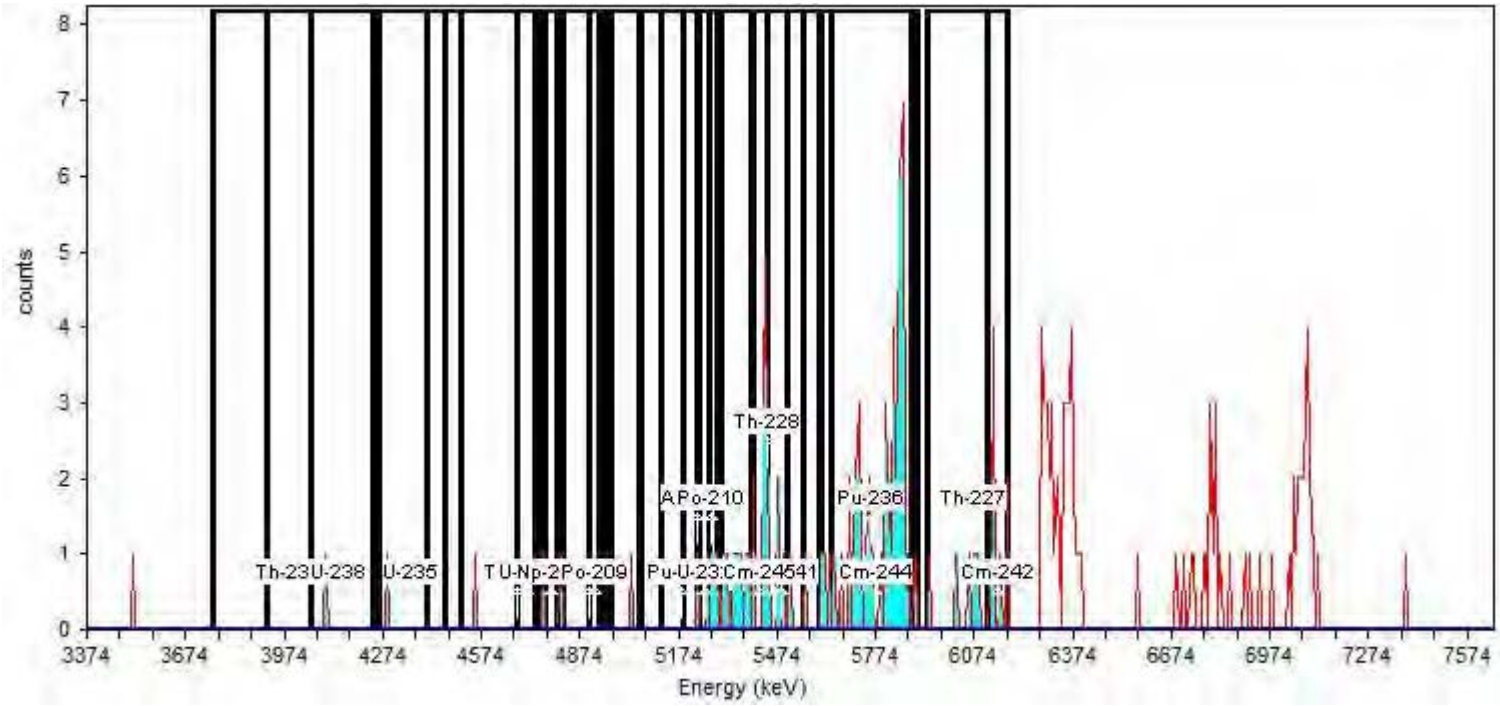
Batch Name: August2018a
Description:

Acquisition

Detector: AV151 , SN: 50-05/R5
Acquisition Start Date: 8/21/2018 1:34:56PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV151-20171113
Calibration Date: 11/13/2017 12:21:30PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 181.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	15.00	1.563E-002	4.167E-003
Th-228	5,447.61	5,186.59	5,507.27	28.00	2.917E-002	5.610E-003
Po-210	5,276.09	5,231.34	5,291.00	5.00	5.208E-003	2.552E-003
Pu-238	5,469.98	5,268.63	5,552.01	27.00	2.812E-002	5.512E-003
Am-241	5,484.90	5,298.46	5,604.22	25.00	2.604E-002	5.311E-003
Cm-245	5,417.78	5,395.41	5,447.61	12.00	1.250E-002	3.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	50.00	5.208E-002	7.439E-003
Cm-244	5,775.74	5,641.51	5,902.52	48.00	5.000E-002	7.292E-003
Th-227	6,074.04	5,932.35	6,178.45	14.00	1.458E-002	4.034E-003
Cm-242	6,148.62	6,118.79	6,178.45	8.00	8.333E-003	3.125E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:45AM 8/22/2018

Sample

Sample Name: ICB;AV152
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

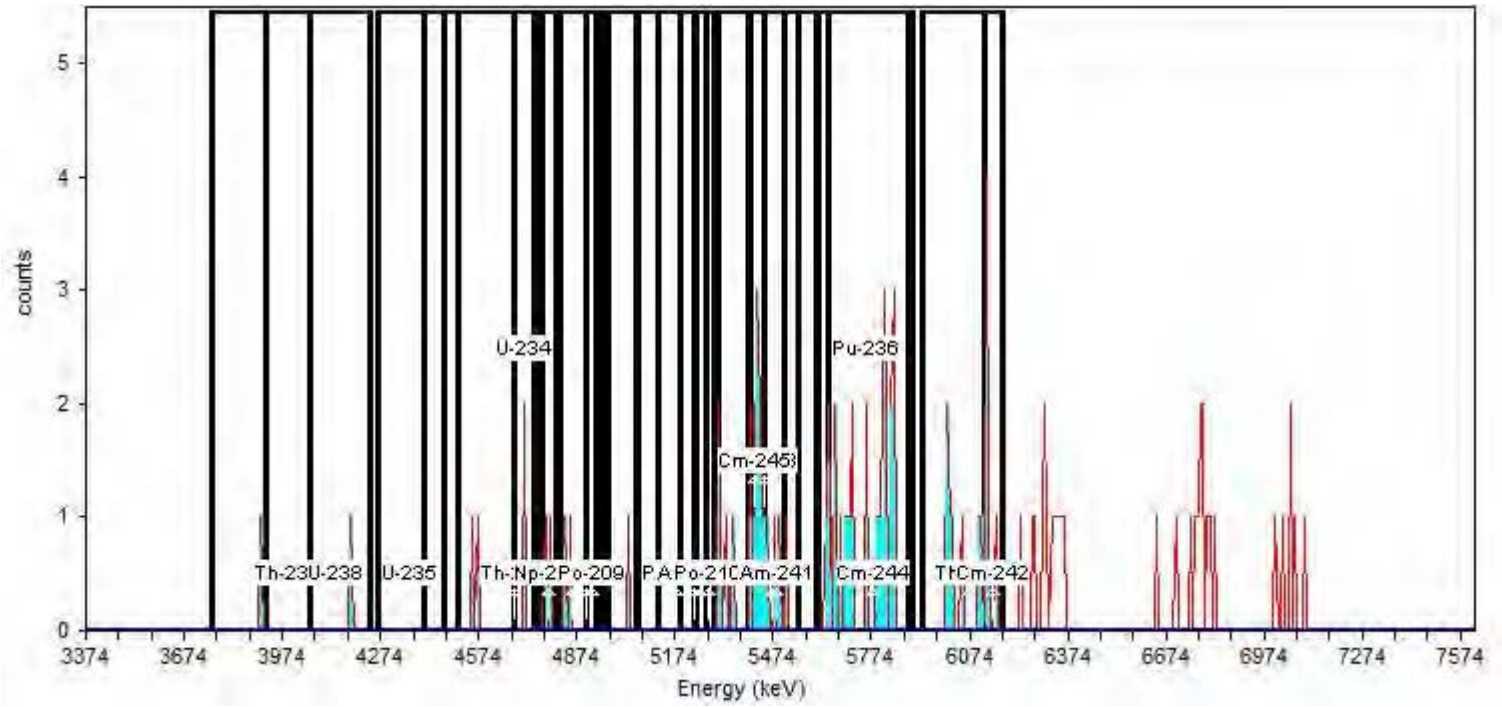
Batch Name: August2018a
Description:

Acquisition

Detector: AV152 , SN: 50-05/R6
Acquisition Start Date: 8/21/2018 1:34:47PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV152-20171113
Calibration Date: 11/13/2017 12:21:36PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 101.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	6.00	6.250E-003	2.756E-003
Pu-242	4,903.21	4,679.48	4,947.95	6.00	6.250E-003	2.756E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	2.00	2.083E-003	1.804E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	27.00	2.812E-002	5.512E-003
Cm-244	5,775.74	5,641.51	5,902.52	26.00	2.708E-002	5.413E-003
Th-227	6,074.04	5,932.35	6,178.45	13.00	1.354E-002	3.898E-003
Cm-242	6,148.62	6,118.79	6,178.45	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:00PM 8/27/2018

Sample

Sample Name: ICB;AV153
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

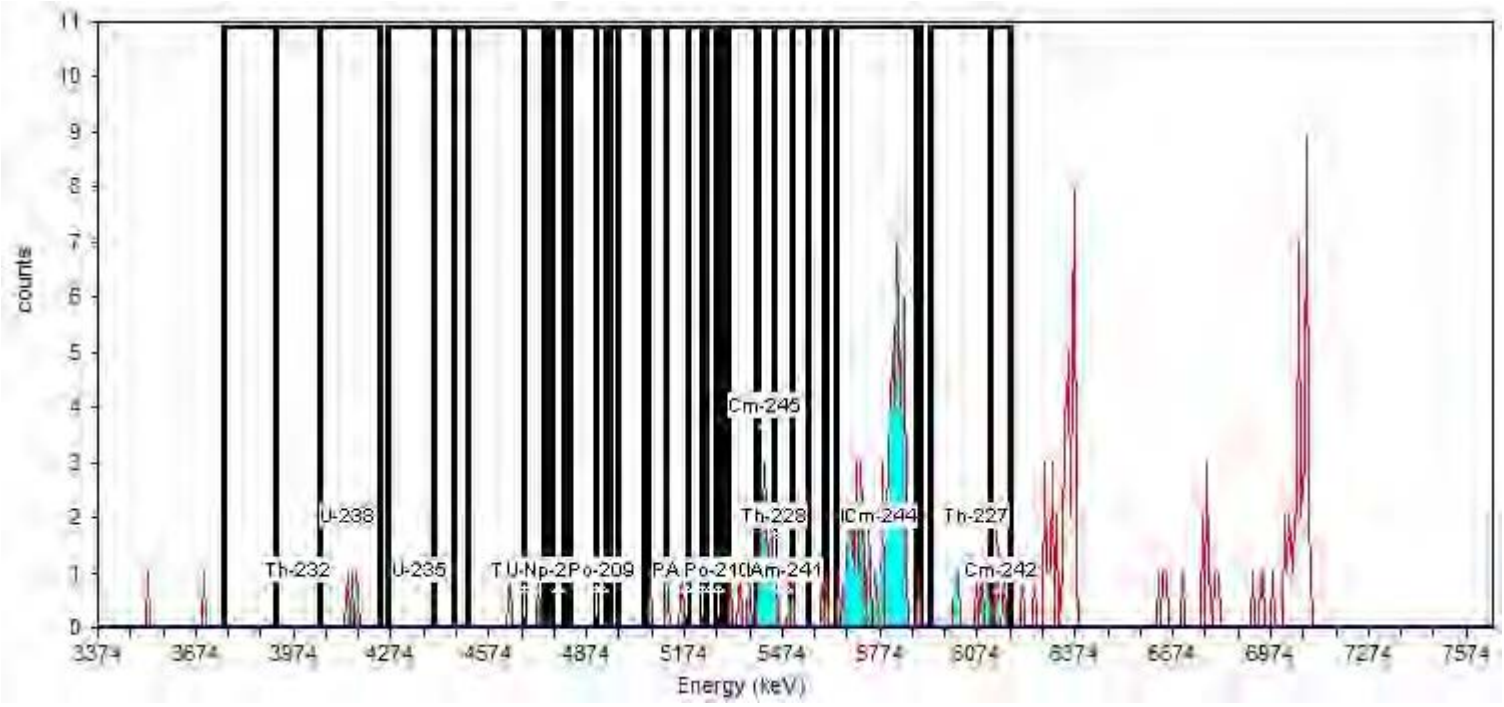
Batch Name: August2018
Description:

Acquisition

Detector: AV153 , SN: 54-011 Y6
Acquisition Start Date: 8/20/2018 5:49:46PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8879;AV153-20171113
Calibration Date: 11/13/2017 12:21:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 193.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	3.00	3.125E-003	2.083E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	18.00	1.875E-002	4.541E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	12.00	1.250E-002	3.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	65.00	6.771E-002	8.463E-003
Cm-244	5,775.74	5,641.51	5,902.52	65.00	6.771E-002	8.463E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:49AM 8/22/2018

Sample

Sample Name: ICB;AV154
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

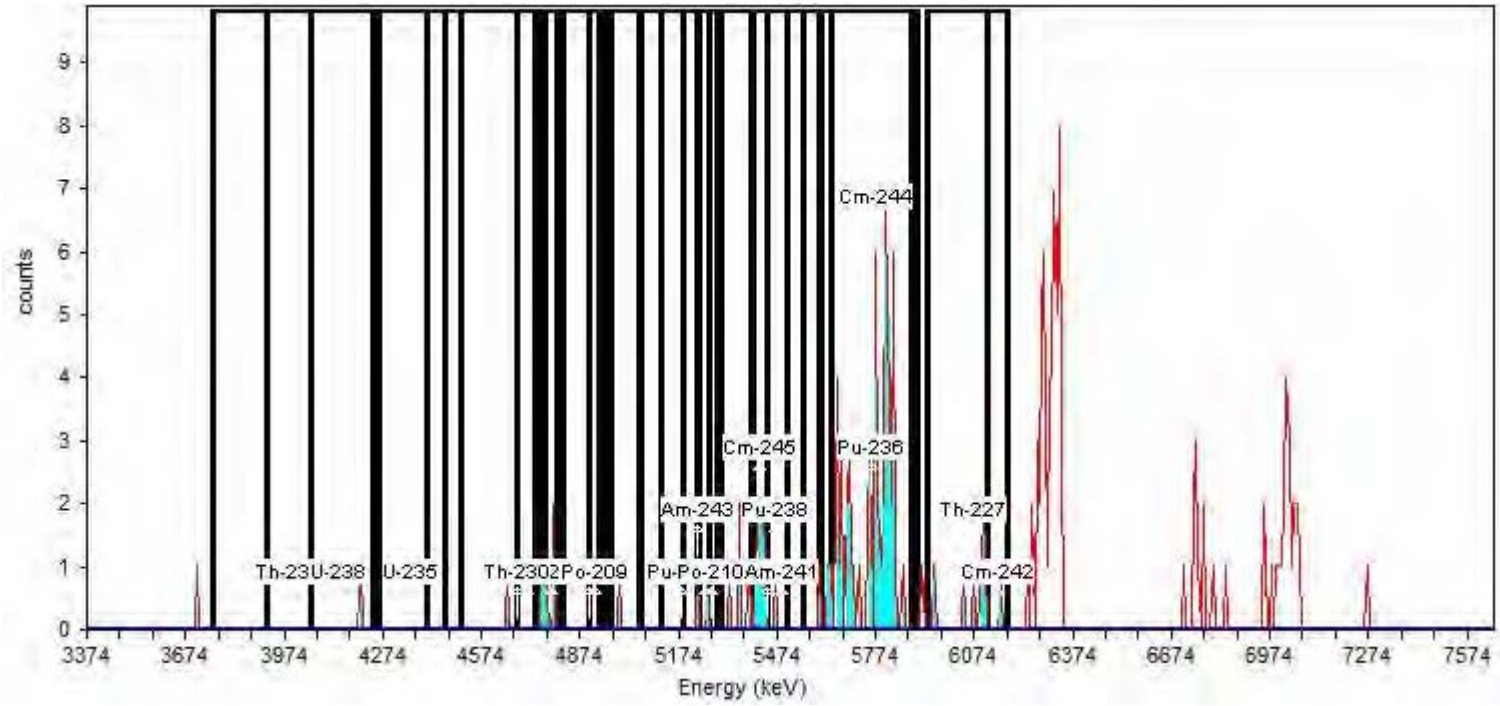
Batch Name: August2018a
Description:

Acquisition

Detector: AV154 , SN: 50-05/JJ7
Acquisition Start Date: 8/21/2018 1:34:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV154-20171113
Calibration Date: 11/13/2017 12:21:47PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 176.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4,709.31	4,507.96	4,821.17	6.00	6.250E-003	2.756E-003
Pu-242	4,903.21	4,679.48	4,947.95	5.00	5.208E-003	2.552E-003
Th-229	4,858.46	4,739.14	5,119.48	6.00	6.250E-003	2.756E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	57.00	5.937E-002	7.933E-003
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
Cm-244	5,775.74	5,641.51	5,902.52	55.00	5.729E-002	7.795E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:44AM 8/22/2018

Sample

Sample Name: ICB;AV156
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

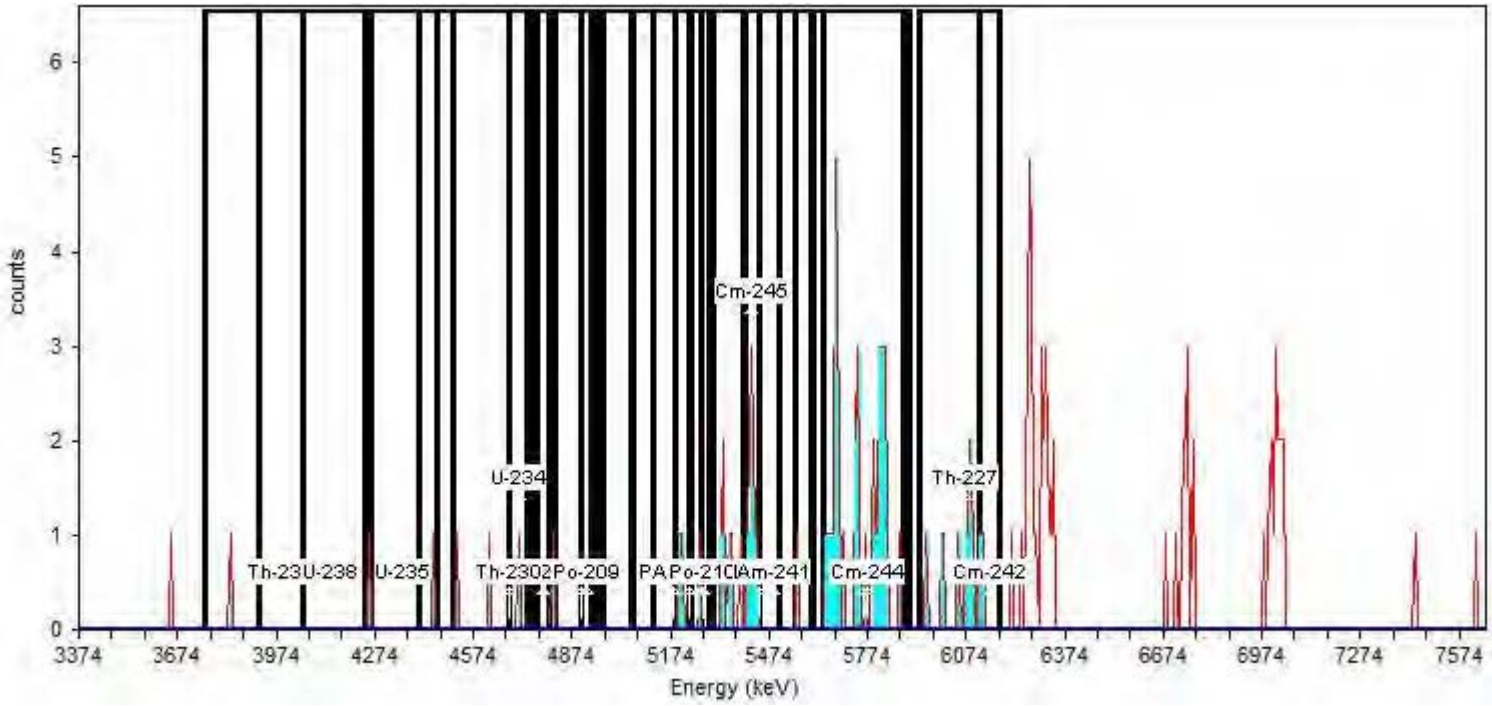
Batch Name: August2018a
Description:

Acquisition

Detector: AV156 , SN: 49-155n4
Acquisition Start Date: 8/21/2018 1:34:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9794;AV156-20171113a
Calibration Date: 11/13/2017 12:25:07PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	33.00	3.437E-002	6.074E-003
Cm-244	5,775.74	5,641.51	5,902.52	33.00	3.437E-002	6.074E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:24PM 8/27/2018

Sample

Sample Name: ICB;AV158
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

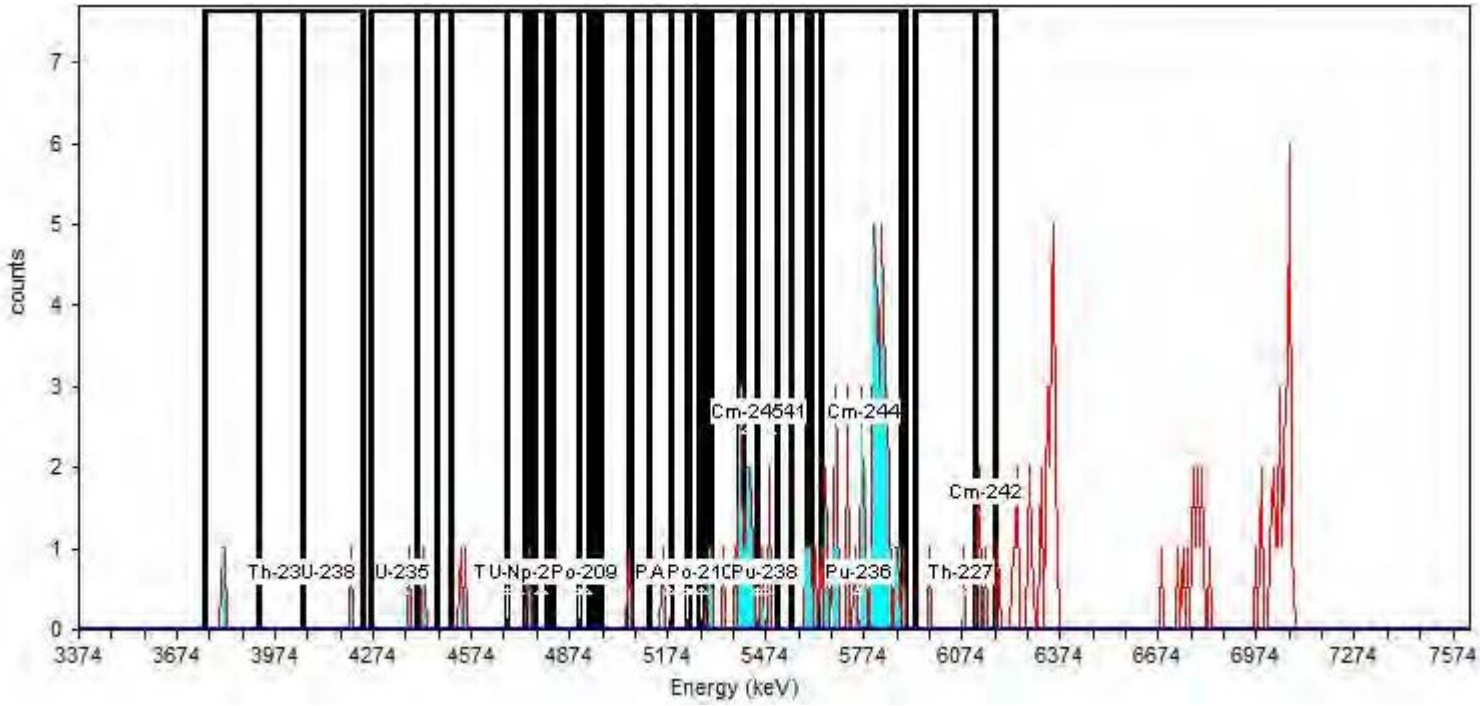
Batch Name: August2018
Description:

Acquisition

Detector: AV158 , SN: 50-05/II4
Acquisition Start Date: 8/20/2018 5:49:47PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV158-20171115
Calibration Date: 11/15/2017 11:00:01AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 151.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	9.00	9.375E-003	3.294E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	50.00	5.208E-002	7.439E-003
Cm-244	5,775.74	5,641.51	5,902.52	49.00	5.104E-002	7.366E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:47AM 8/22/2018

Sample

Sample Name: ICB;AV159
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

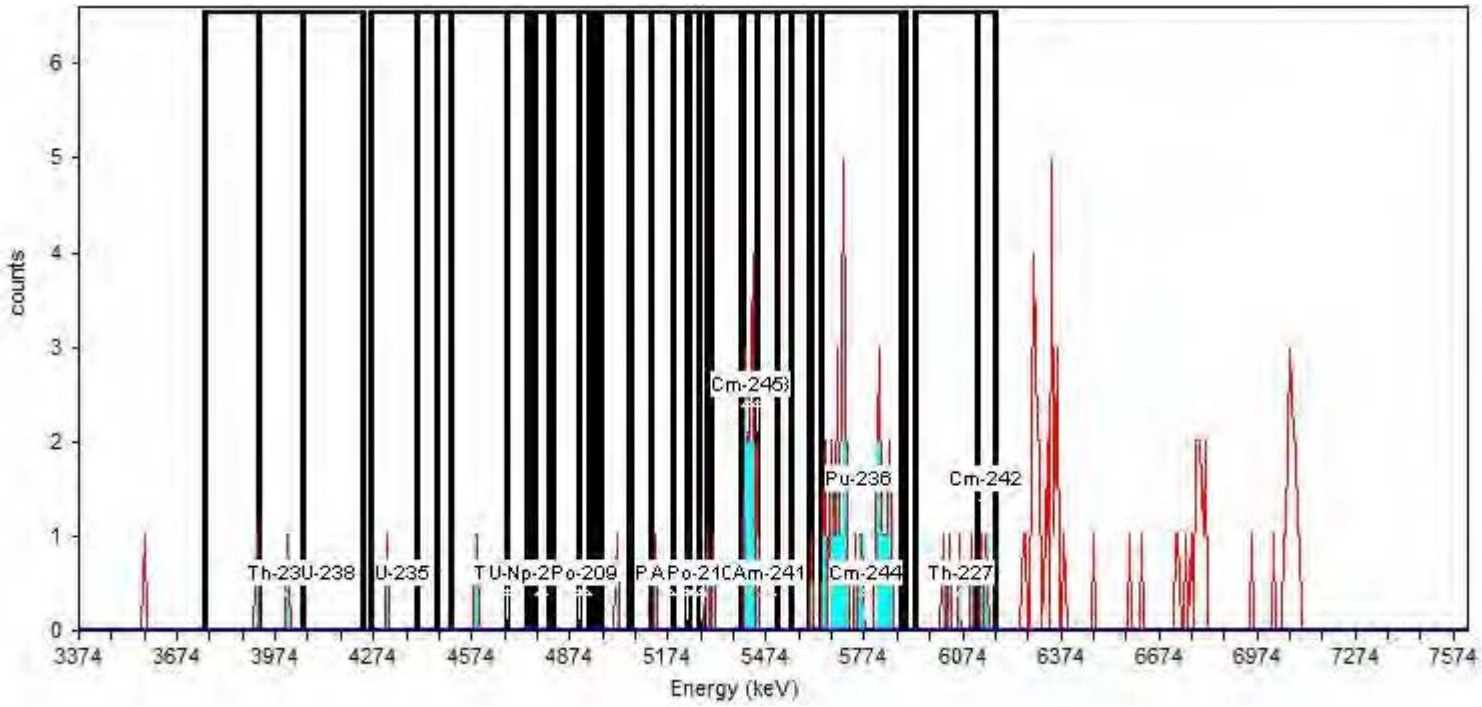
Batch Name: August2018a
Description:

Acquisition

Detector: AV159 , SN: 50-05/II5
Acquisition Start Date: 8/21/2018 1:34:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV159-20171113a
Calibration Date: 11/13/2017 12:26:23PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 121.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	15.00	1.563E-002	4.167E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	13.00	1.354E-002	3.898E-003
Pu-236	5,760.83	5,611.67	5,887.60	35.00	3.646E-002	6.250E-003
Cm-244	5,775.74	5,641.51	5,902.52	34.00	3.542E-002	6.163E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:46AM 8/22/2018

Sample

Sample Name: ICB;AV160
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

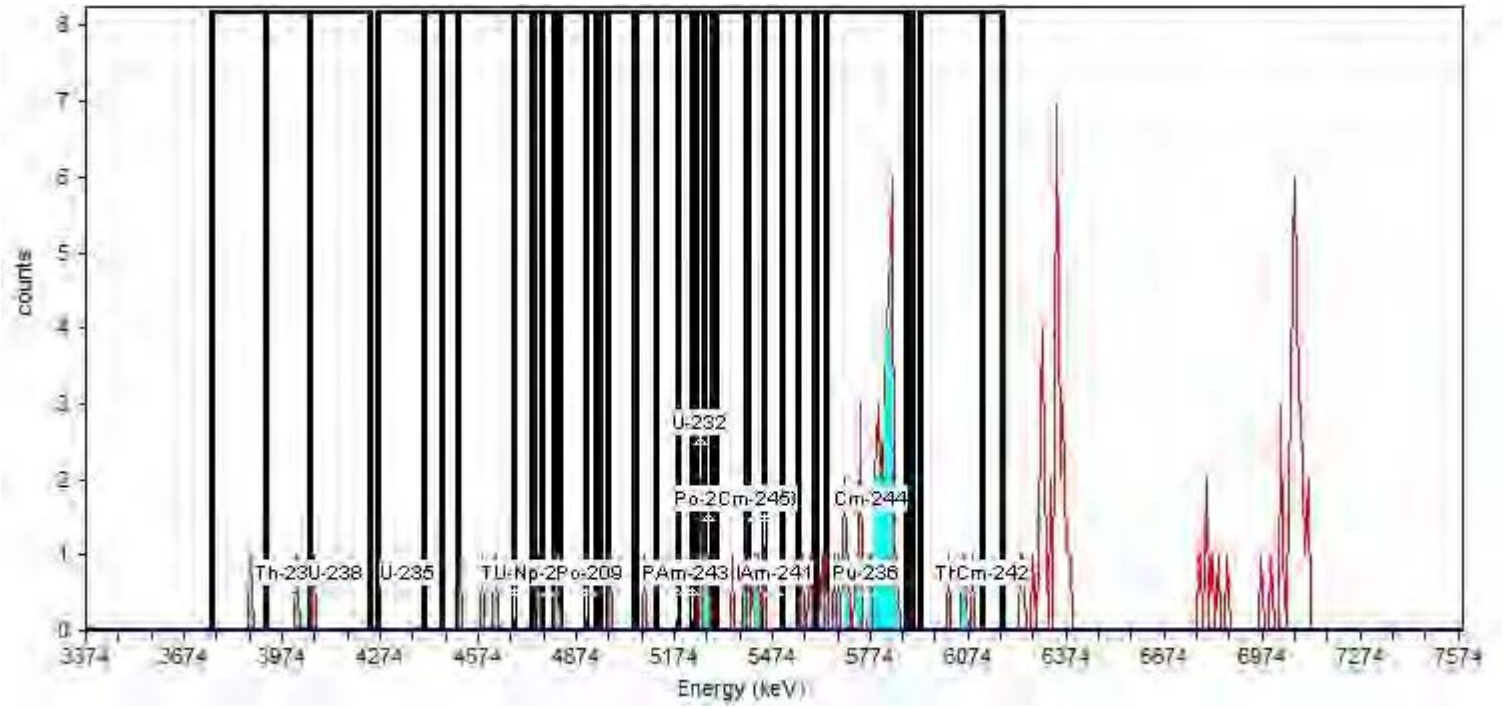
Batch Name: August2018a
Description:

Acquisition

Detector: AV160 , SN: 50-05/II6
Acquisition Start Date: 8/21/2018 1:34:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9885;AV160-20171113
Calibration Date: 11/13/2017 12:24:43PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 147.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	6.00	6.250E-003	2.756E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	4.00	4.167E-003	2.329E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	9.00	9.375E-003	3.294E-003
Cm-245	5,417.78	5,395.41	5,447.61	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	44.00	4.583E-002	6.988E-003
Cm-244	5,775.74	5,641.51	5,902.52	43.00	4.479E-002	6.910E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:52AM 8/22/2018

Sample

Sample Name: ICB;AV161
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

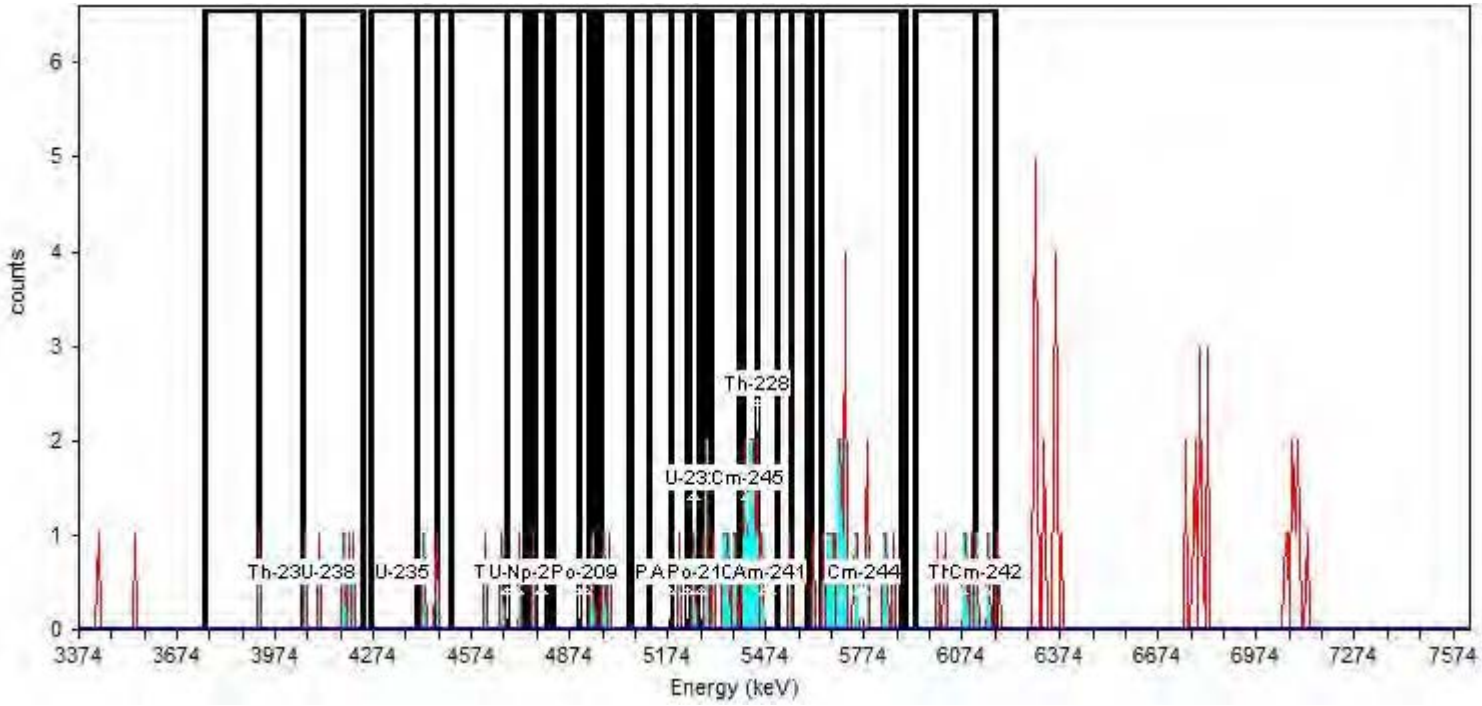
Batch Name: August2018a
Description:

Acquisition

Detector: AV161 , SN: 50-05/II7
Acquisition Start Date: 8/21/2018 1:34:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9886;AV161-20171113
Calibration Date: 11/13/2017 12:24:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 106.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	6.00	6.250E-003	2.756E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	5.00	5.208E-003	2.552E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	11.00	1.146E-002	3.608E-003
Th-228	5,447.61	5,186.59	5,507.27	22.00	2.292E-002	4.996E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	21.00	2.188E-002	4.886E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	21.00	2.188E-002	4.886E-003
Cm-244	5,775.74	5,641.51	5,902.52	20.00	2.083E-002	4.774E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:51AM 8/22/2018

Sample

Sample Name: ICB;AV164
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

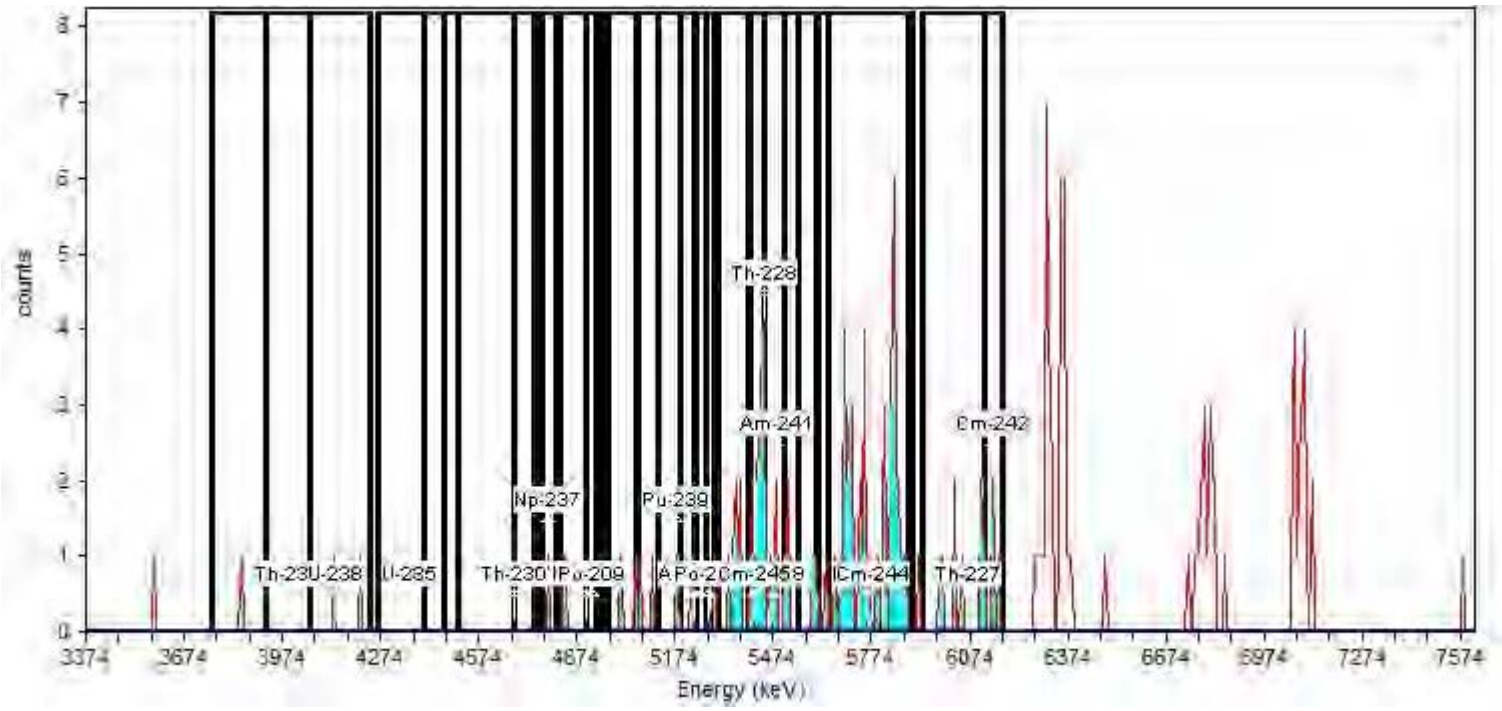
Batch Name: August2018a
Description:

Acquisition

Detector: AV164 , SN: 50-112 A1
Acquisition Start Date: 8/21/2018 1:34:49PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV164-20171113
Calibration Date: 11/13/2017 3:16:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 180.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	6.00	6.250E-003	2.756E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	6.00	6.250E-003	2.756E-003
Am-243	5,231.34	5,052.36	5,305.92	6.00	6.250E-003	2.756E-003
U-232	5,253.71	5,059.82	5,402.86	13.00	1.354E-002	3.898E-003
Th-228	5,447.61	5,186.59	5,507.27	30.00	3.125E-002	5.800E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	32.00	3.333E-002	5.984E-003
Am-241	5,484.90	5,298.46	5,604.22	33.00	3.437E-002	6.074E-003
Cm-245	5,417.78	5,395.41	5,447.61	16.00	1.667E-002	4.295E-003
Pu-236	5,760.83	5,611.67	5,887.60	46.00	4.792E-002	7.141E-003
Cm-244	5,775.74	5,641.51	5,902.52	45.00	4.688E-002	7.065E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:38PM 8/27/2018

Sample

Sample Name: ICB;AV165
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

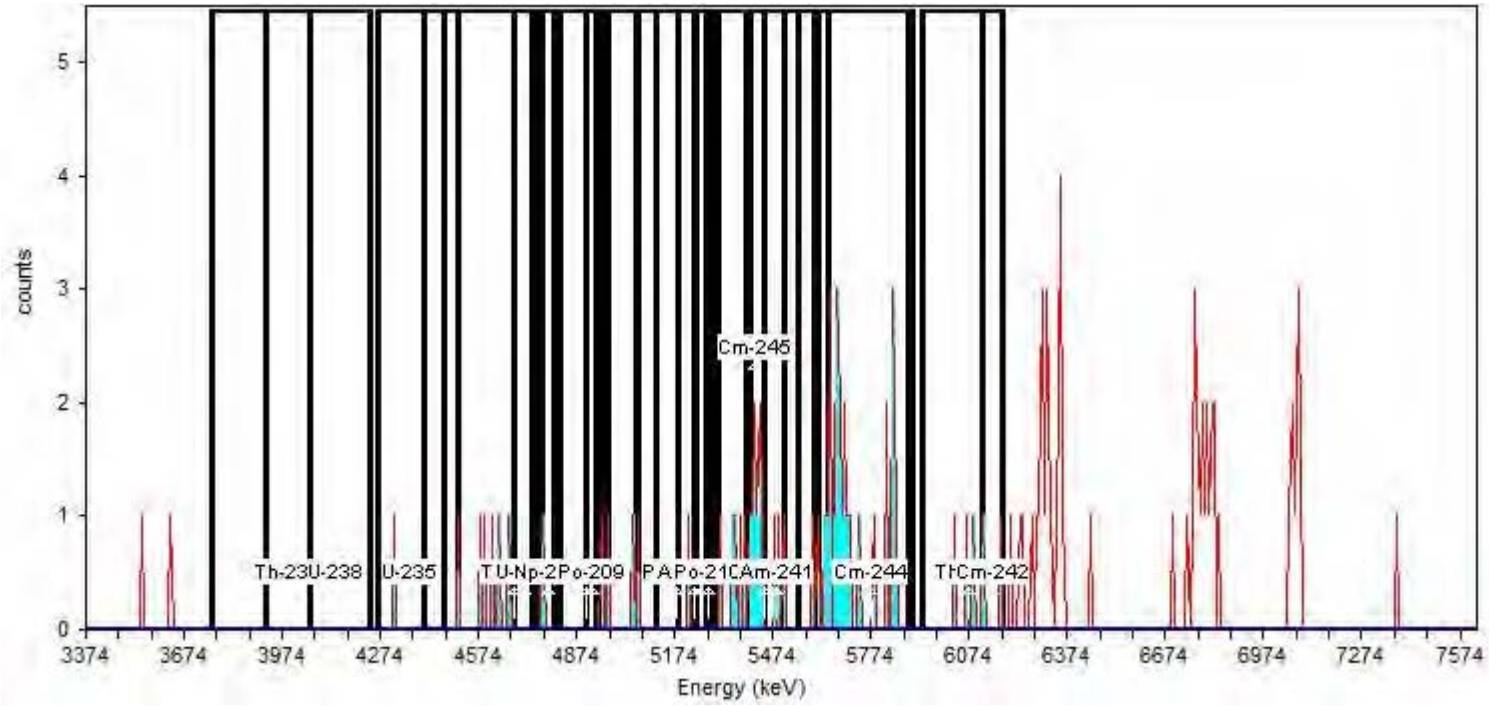
Batch Name: August2018
Description:

Acquisition

Detector: AV165 , SN: 50-112F7
Acquisition Start Date: 8/20/2018 5:49:49PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV165-20171113
Calibration Date: 11/13/2017 3:16:40PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 117.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	6.00	6.250E-003	2.756E-003
U-234	4,709.31	4,507.96	4,821.17	7.00	7.292E-003	2.946E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	25.00	2.604E-002	5.311E-003
Cm-244	5,775.74	5,641.51	5,902.52	23.00	2.396E-002	5.103E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:42PM 8/27/2018

Sample

Sample Name: ICB;AV166
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

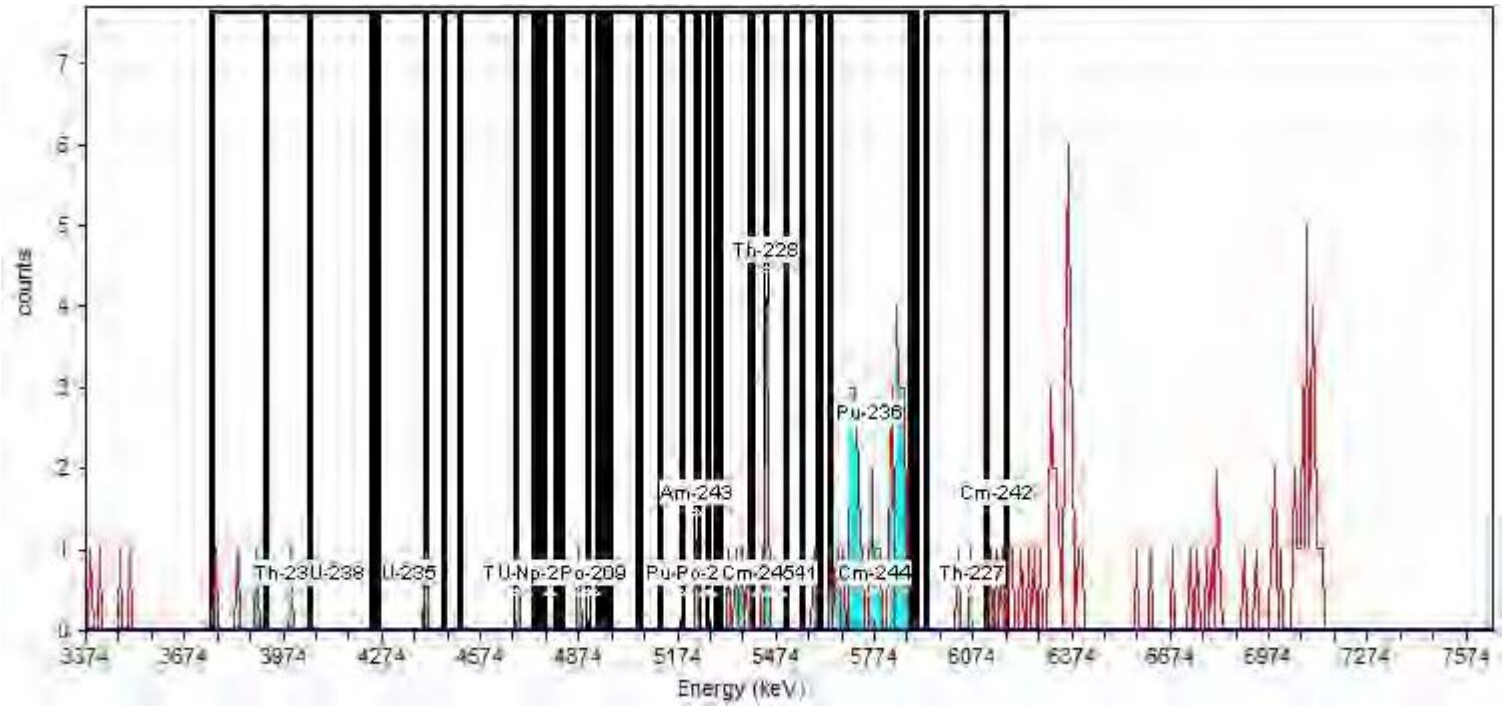
Batch Name: August2018
Description:

Acquisition

Detector: AV166 , SN: 50-112 G1
Acquisition Start Date: 8/20/2018 5:49:49PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV166-20171113
Calibration Date: 11/13/2017 3:16:45PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 146.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	4.00	4.167E-003	2.329E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	11.00	1.146E-002	3.608E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	5.00	5.208E-003	2.552E-003
Pu-236	5,760.83	5,611.67	5,887.60	42.00	4.375E-002	6.831E-003
Cm-244	5,775.74	5,641.51	5,902.52	42.00	4.375E-002	6.831E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:55AM 8/22/2018

Sample

Sample Name: ICB;AV167
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

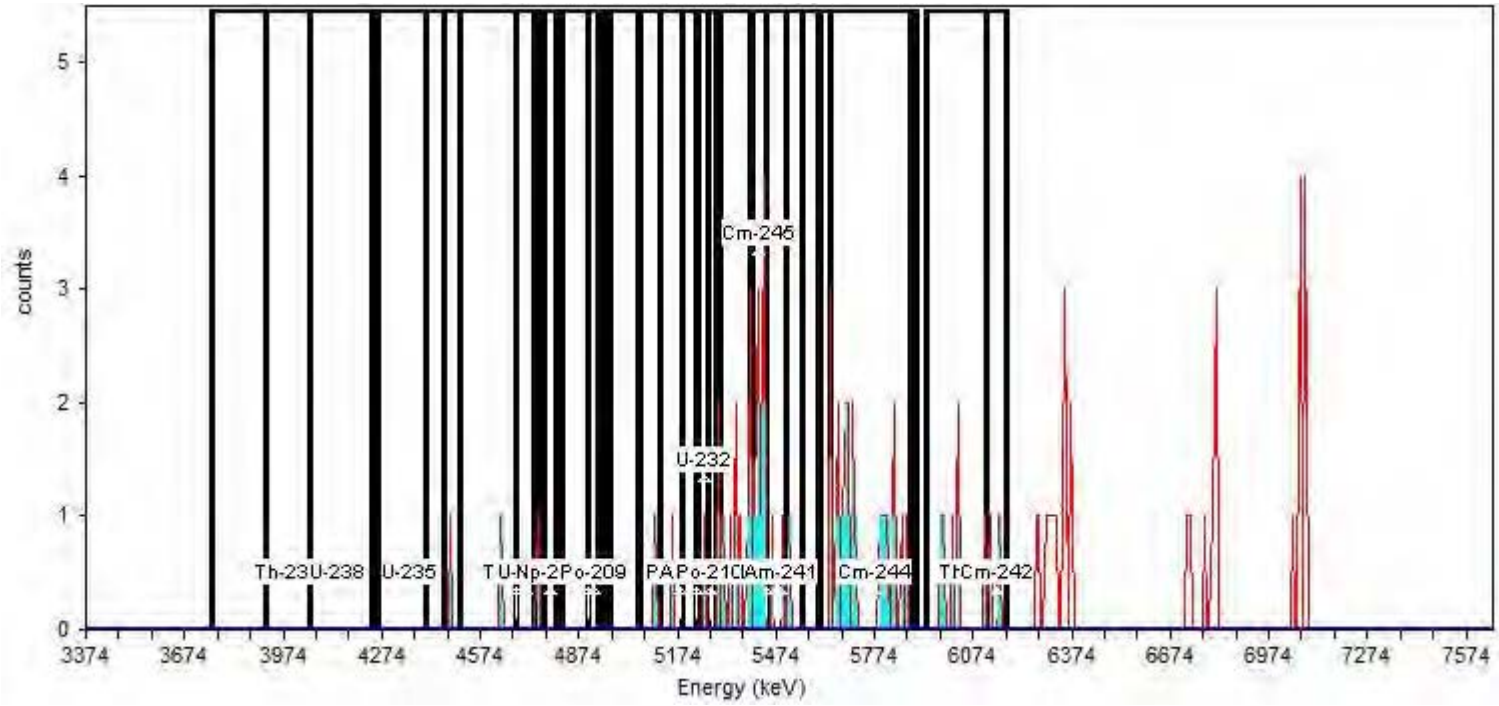
Batch Name: August2018a
Description:

Acquisition

Detector: AV167 , SN: 50-112 G3
Acquisition Start Date: 8/21/2018 1:34:49PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV167-20171113
Calibration Date: 11/13/2017 3:16:50PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	14.00	1.458E-002	4.034E-003
Th-228	5,447.61	5,186.59	5,507.27	25.00	2.604E-002	5.311E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	25.00	2.604E-002	5.311E-003
Am-241	5,484.90	5,298.46	5,604.22	25.00	2.604E-002	5.311E-003
Cm-245	5,417.78	5,395.41	5,447.61	14.00	1.458E-002	4.034E-003
Pu-236	5,760.83	5,611.67	5,887.60	23.00	2.396E-002	5.103E-003
Cm-244	5,775.74	5,641.51	5,902.52	23.00	2.396E-002	5.103E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:00AM 8/22/2018

Sample

Sample Name: ICB;AV171
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

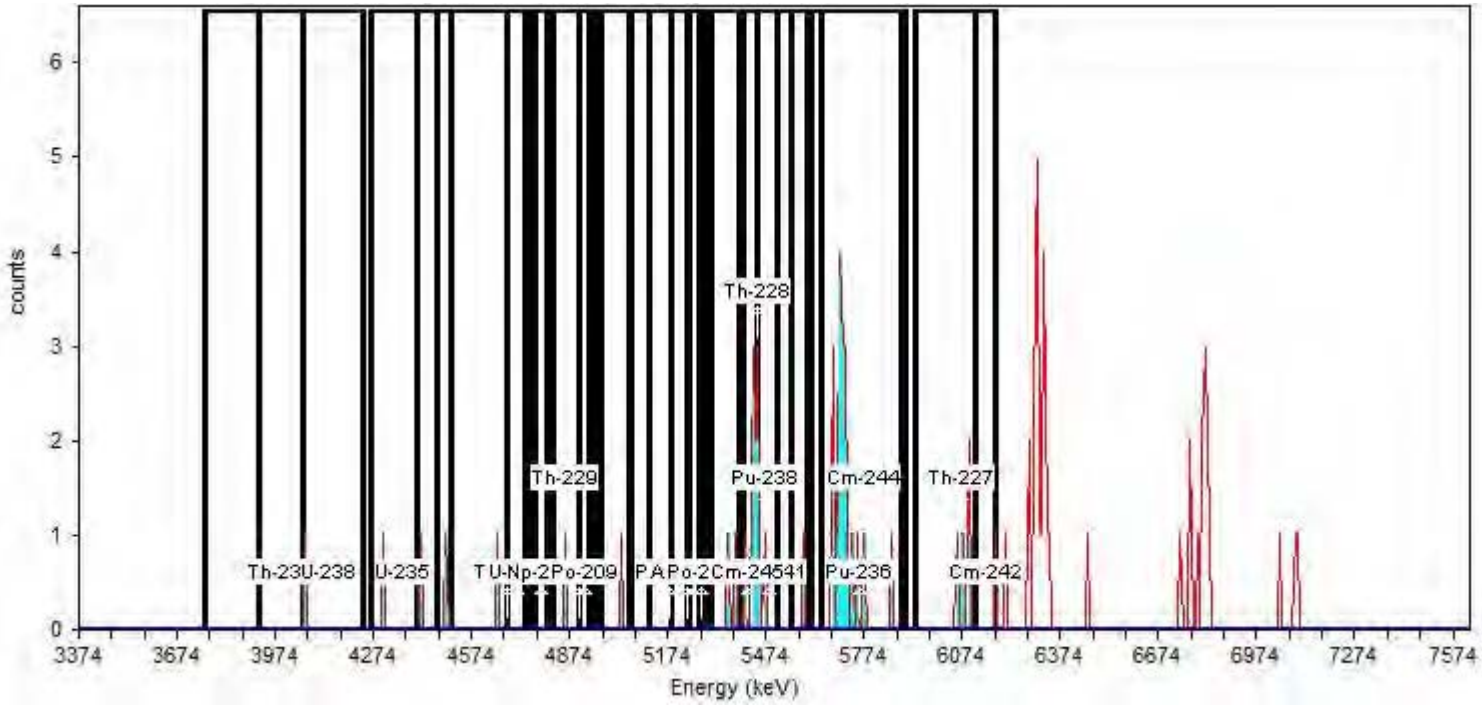
Batch Name: August2018a
Description:

Acquisition

Detector: AV171 , SN: 50-112 Y2
Acquisition Start Date: 8/21/2018 1:34:50PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9794;AV171-20171113
Calibration Date: 11/13/2017 3:17:14PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 83.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	0.00	0.000E+000	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	2.00	2.083E-003	1.804E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	19.00	1.979E-002	4.658E-003
Cm-244	5,775.74	5,641.51	5,902.52	19.00	1.979E-002	4.658E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:59AM 8/22/2018

Sample

Sample Name: ICB;AV172
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

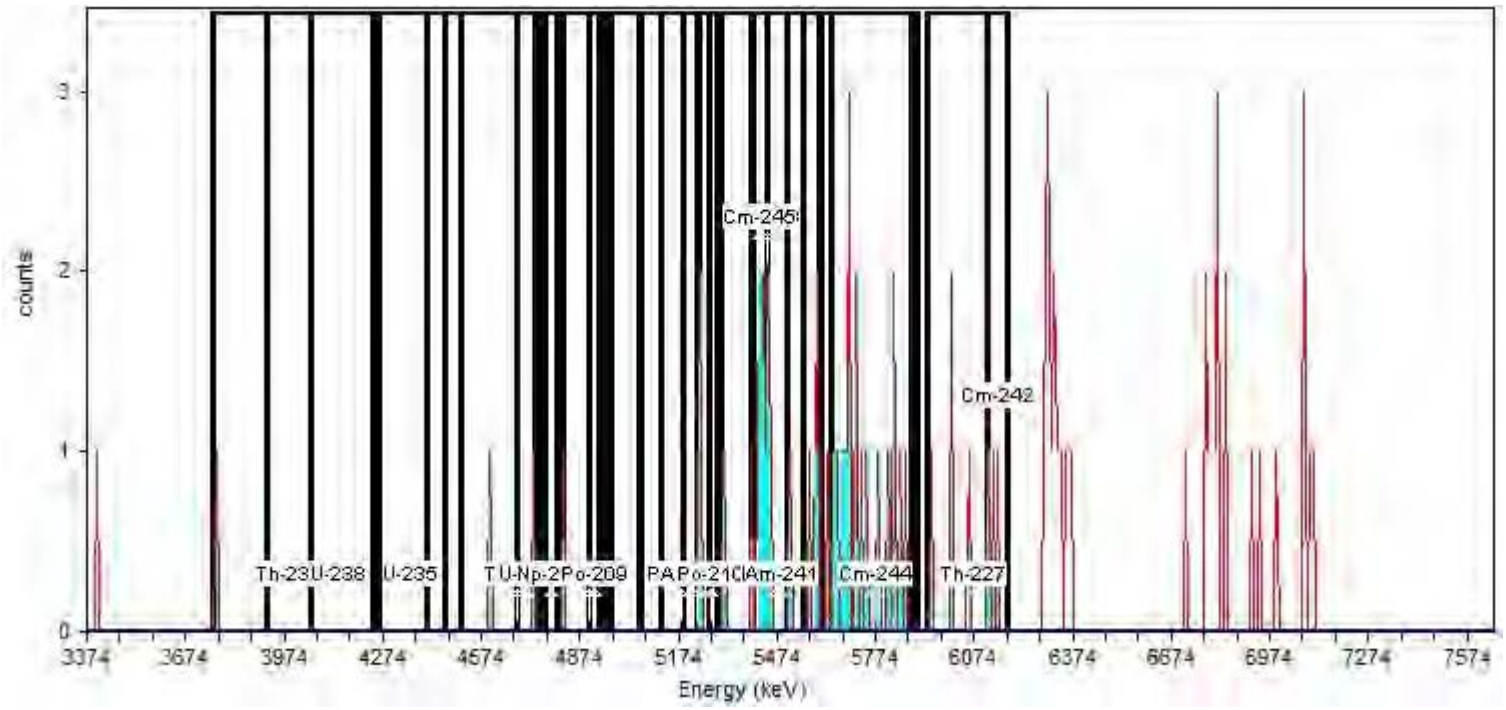
Batch Name: August2018a
Description:

Acquisition

Detector: AV172 , SN: 50-112 Y3
Acquisition Start Date: 8/21/2018 1:34:50PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9795;AV172-20171113
Calibration Date: 11/13/2017 3:17:19PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 87.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	14.00	1.458E-002	4.034E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	20.00	2.083E-002	4.774E-003
Cm-244	5,775.74	5,641.51	5,902.52	19.00	1.979E-002	4.658E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:56AM 8/22/2018

Sample

Sample Name: ICB;AV173
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

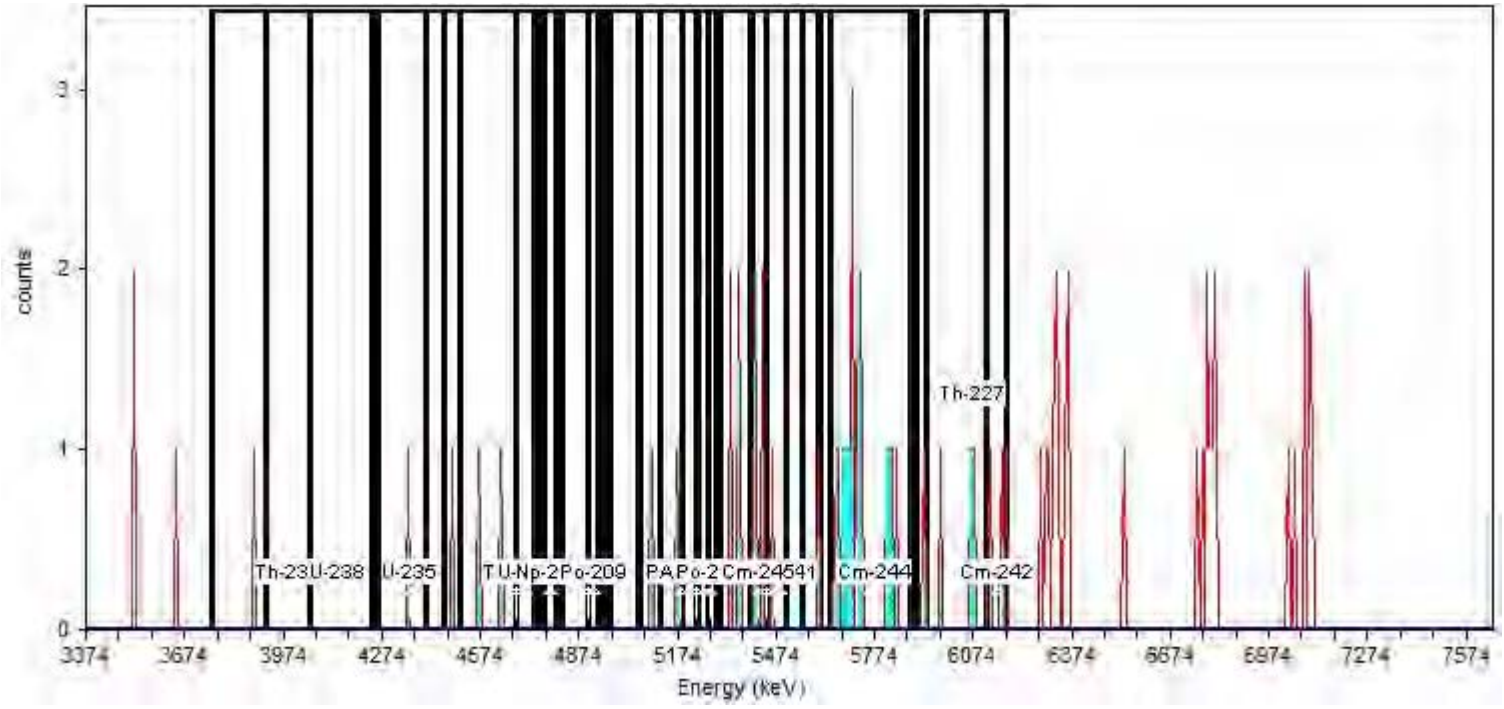
Batch Name: August2018a
Description:

Acquisition

Detector: AV173 , SN: 50-112 Y4
Acquisition Start Date: 8/21/2018 1:34:50PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV173-20171113b
Calibration Date: 11/13/2017 3:17:34PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 75.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	8.00	8.333E-003	3.125E-003
Th-228	5,447.61	5,186.59	5,507.27	10.00	1.042E-002	3.455E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	10.00	1.042E-002	3.455E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	18.00	1.875E-002	4.541E-003
Cm-244	5,775.74	5,641.51	5,902.52	18.00	1.875E-002	4.541E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:57:50PM 8/27/2018

Sample

Sample Name: ICB;AV174
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

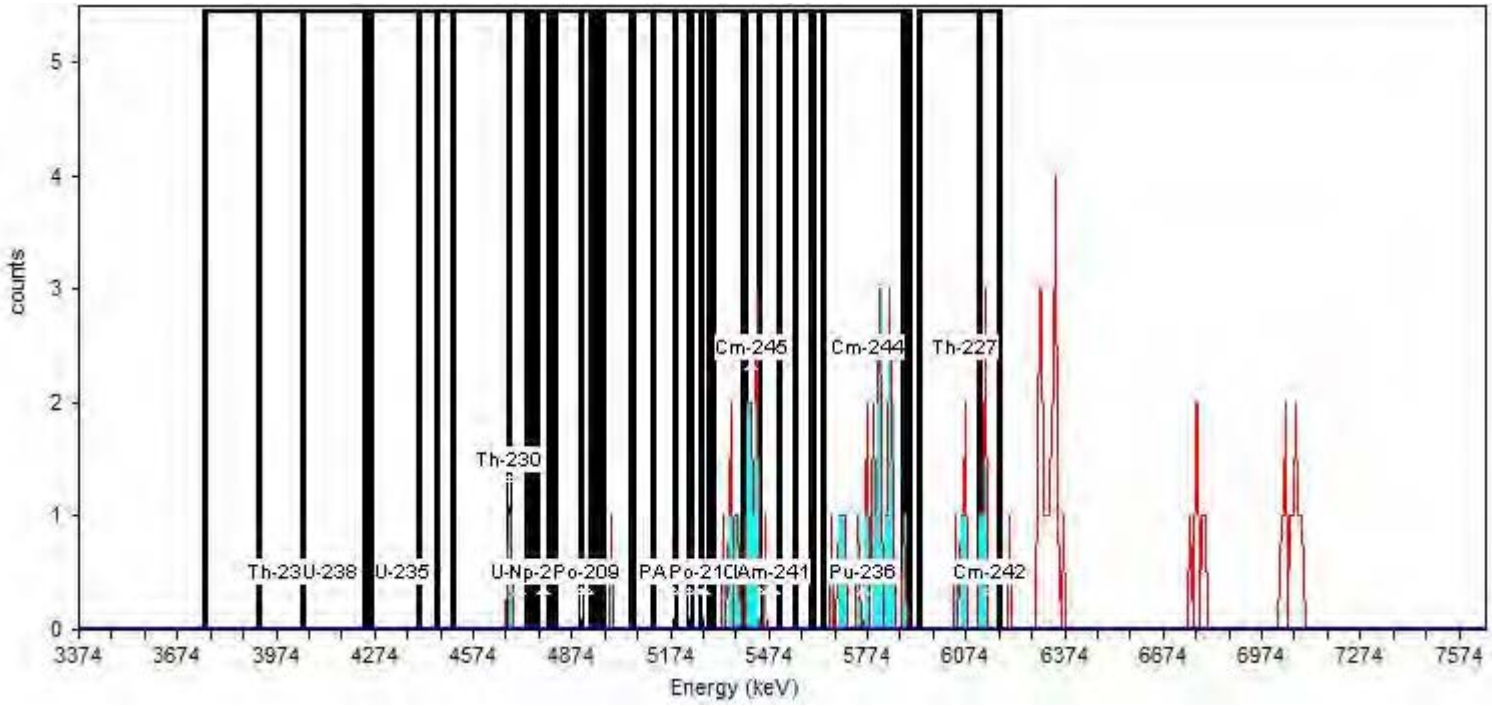
Batch Name: August2018
Description:

Acquisition

Detector: AV174 , SN: 50-112Y5
Acquisition Start Date: 8/20/2018 5:49:51PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV174-20171113b
Calibration Date: 11/13/2017 3:17:39PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	0.00	0.000E+000	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	17.00	1.771E-002	4.419E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	17.00	1.771E-002	4.419E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	25.00	2.604E-002	5.311E-003
Cm-244	5,775.74	5,641.51	5,902.52	25.00	2.604E-002	5.311E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:05AM 8/22/2018

Sample

Sample Name: ICB;AV187
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

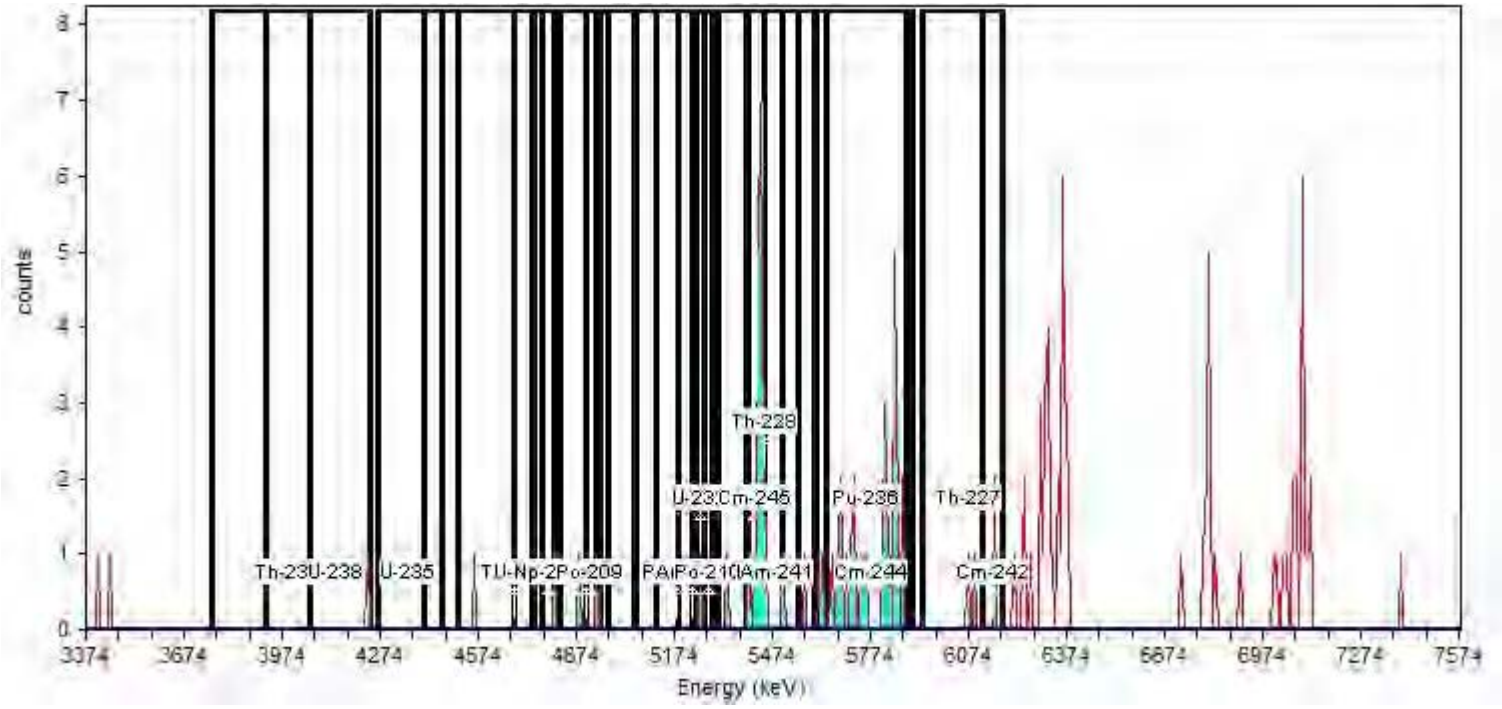
Batch Name: August2018a
Description:

Acquisition

Detector: AV187 , SN: 50-119I2
Acquisition Start Date: 8/21/2018 1:34:51PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV187-20171113
Calibration Date: 11/14/2017 8:46:54AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 129.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	21.00	2.188E-002	4.886E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	20.00	2.083E-002	4.774E-003
Am-241	5,484.90	5,298.46	5,604.22	21.00	2.188E-002	4.886E-003
Cm-245	5,417.78	5,395.41	5,447.61	17.00	1.771E-002	4.419E-003
Pu-236	5,760.83	5,611.67	5,887.60	30.00	3.125E-002	5.800E-003
Cm-244	5,775.74	5,641.51	5,902.52	28.00	2.917E-002	5.610E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:58:44PM 8/27/2018

Sample

Sample Name: ICB;AV188
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

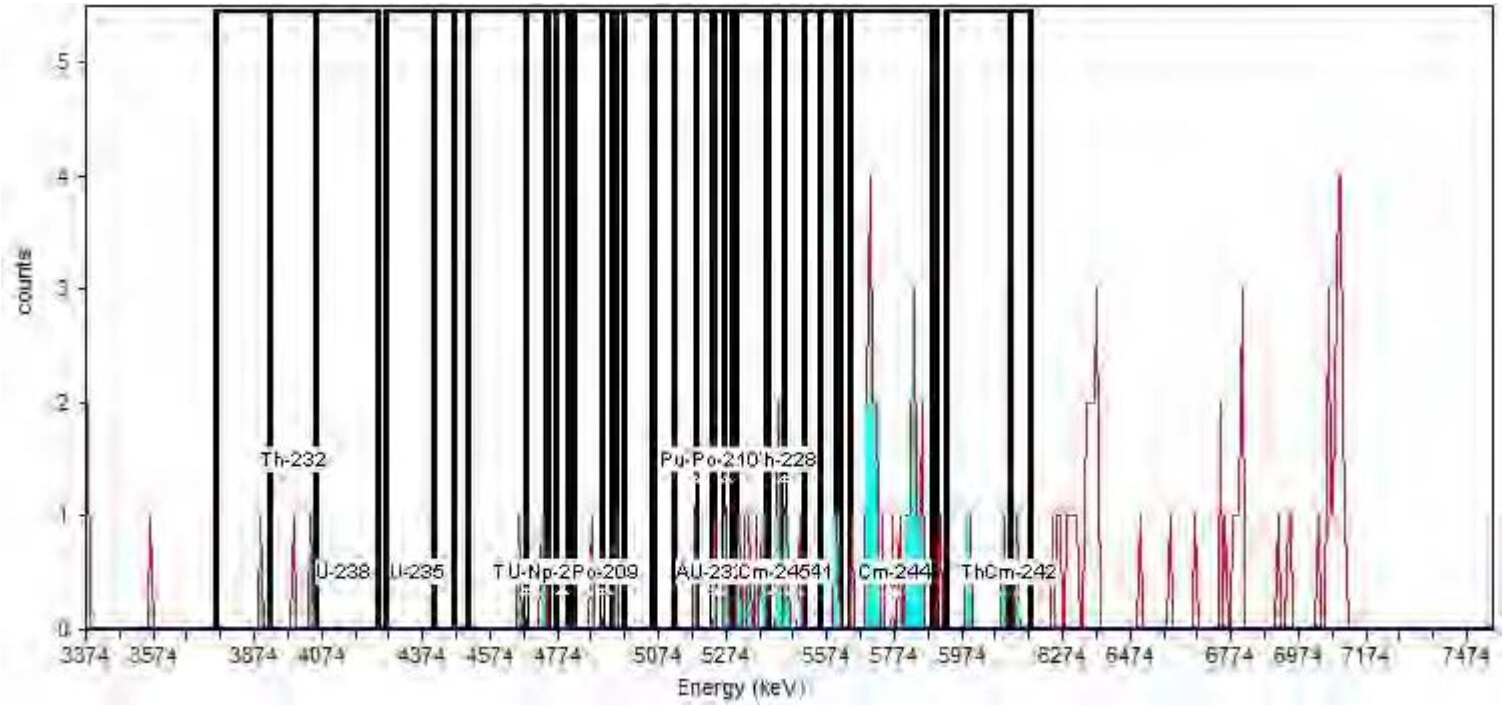
Batch Name: August2018
Description:

Acquisition

Detector: AV188 , SN: 50-110X4
Acquisition Start Date: 8/20/2018 5:49:52PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV188-20171113a
Calibration Date: 11/14/2017 8:47:31AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	3.00	3.125E-003	2.083E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	4.00	4.167E-003	2.329E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	4.00	4.167E-003	2.329E-003
Pu-236	5,760.83	5,611.67	5,887.60	28.00	2.917E-002	5.610E-003
Cm-244	5,775.74	5,641.51	5,902.52	28.00	2.917E-002	5.610E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:58:47PM 8/27/2018

Sample

Sample Name: ICB;AV189
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

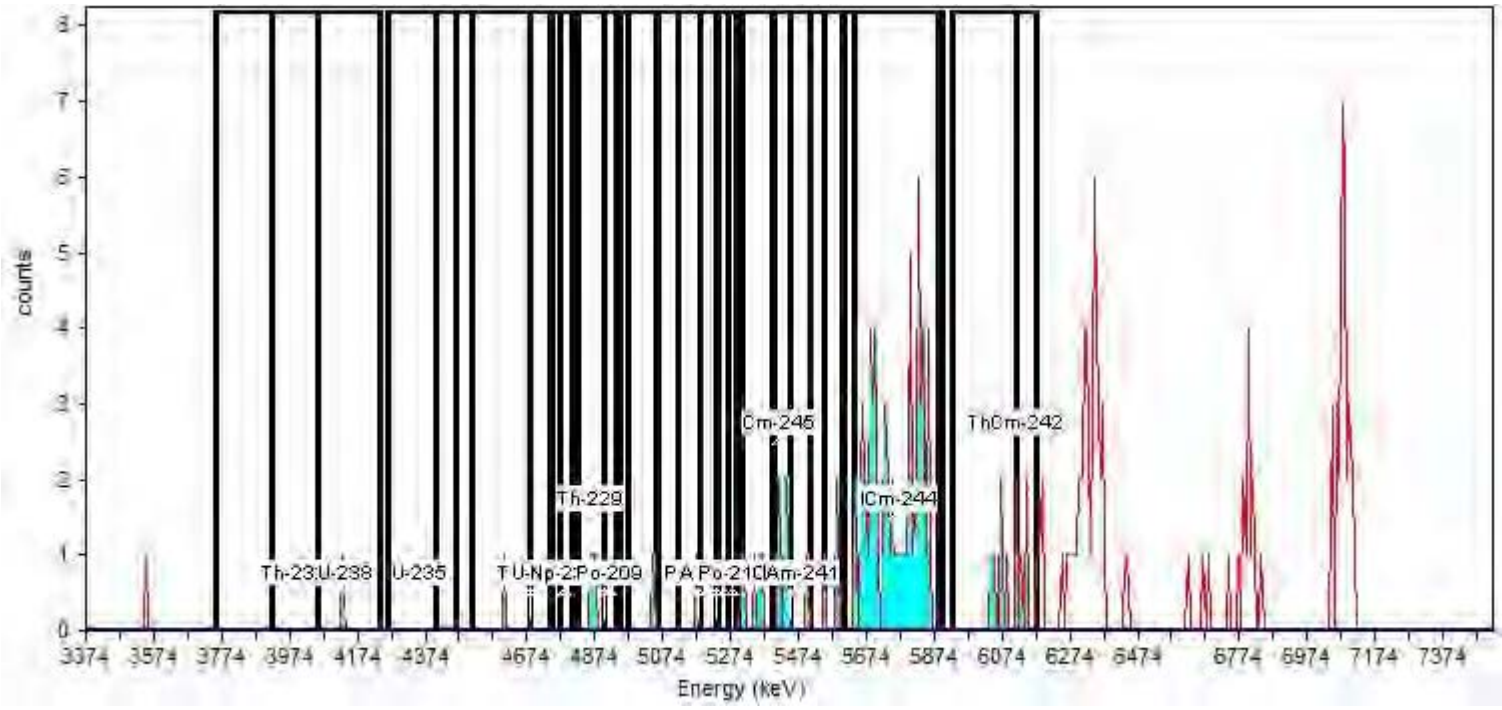
Batch Name: August2018
Description:

Acquisition

Detector: AV189 , SN: 50-112A3
Acquisition Start Date: 8/20/2018 5:49:52PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV189-20171113
Calibration Date: 11/14/2017 8:46:59AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 187.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	3.00	3.125E-003	2.083E-003
Th-229	4,858.46	4,739.14	5,119.48	4.00	4.167E-003	2.329E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	13.00	1.354E-002	3.898E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	65.00	6.771E-002	8.463E-003
Cm-244	5,775.74	5,641.51	5,902.52	65.00	6.771E-002	8.463E-003
Th-227	6,074.04	5,932.35	6,178.45	11.00	1.146E-002	3.608E-003
Cm-242	6,148.62	6,118.79	6,178.45	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:07AM 8/22/2018

Sample

Sample Name: ICB;AV190
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

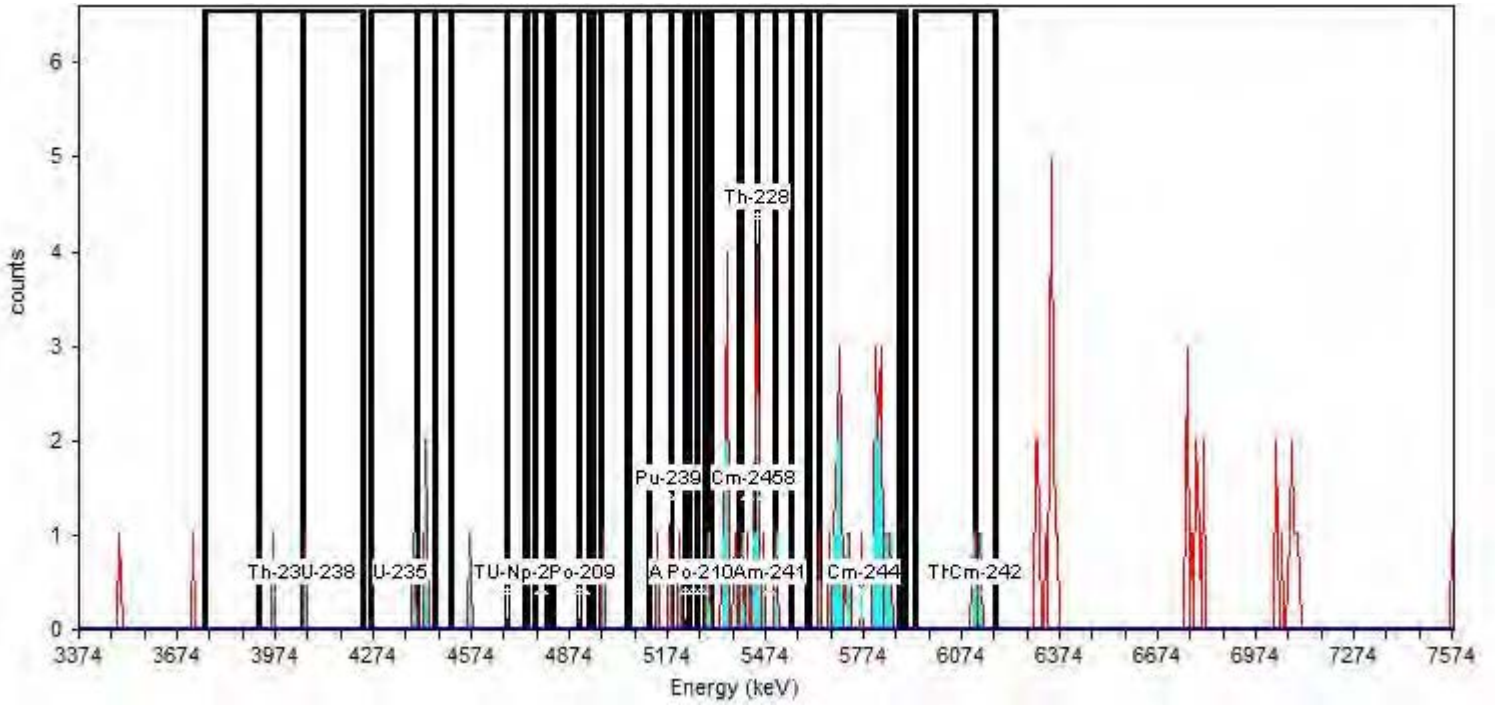
Batch Name: August2018a
Description:

Acquisition

Detector: AV190 , SN: 50-119I7
Acquisition Start Date: 8/21/2018 1:34:51PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9520;AV190-20171113
Calibration Date: 11/14/2017 8:47:05AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 92.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	3.00	3.125E-003	2.083E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	13.00	1.354E-002	3.898E-003
Th-228	5,447.61	5,186.59	5,507.27	20.00	2.083E-002	4.774E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	25.00	2.604E-002	5.311E-003
Cm-244	5,775.74	5,641.51	5,902.52	25.00	2.604E-002	5.311E-003
Th-227	6,074.04	5,932.35	6,178.45	3.00	3.125E-003	2.083E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:58:56PM 8/27/2018

Sample

Sample Name: ICB;AV191
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

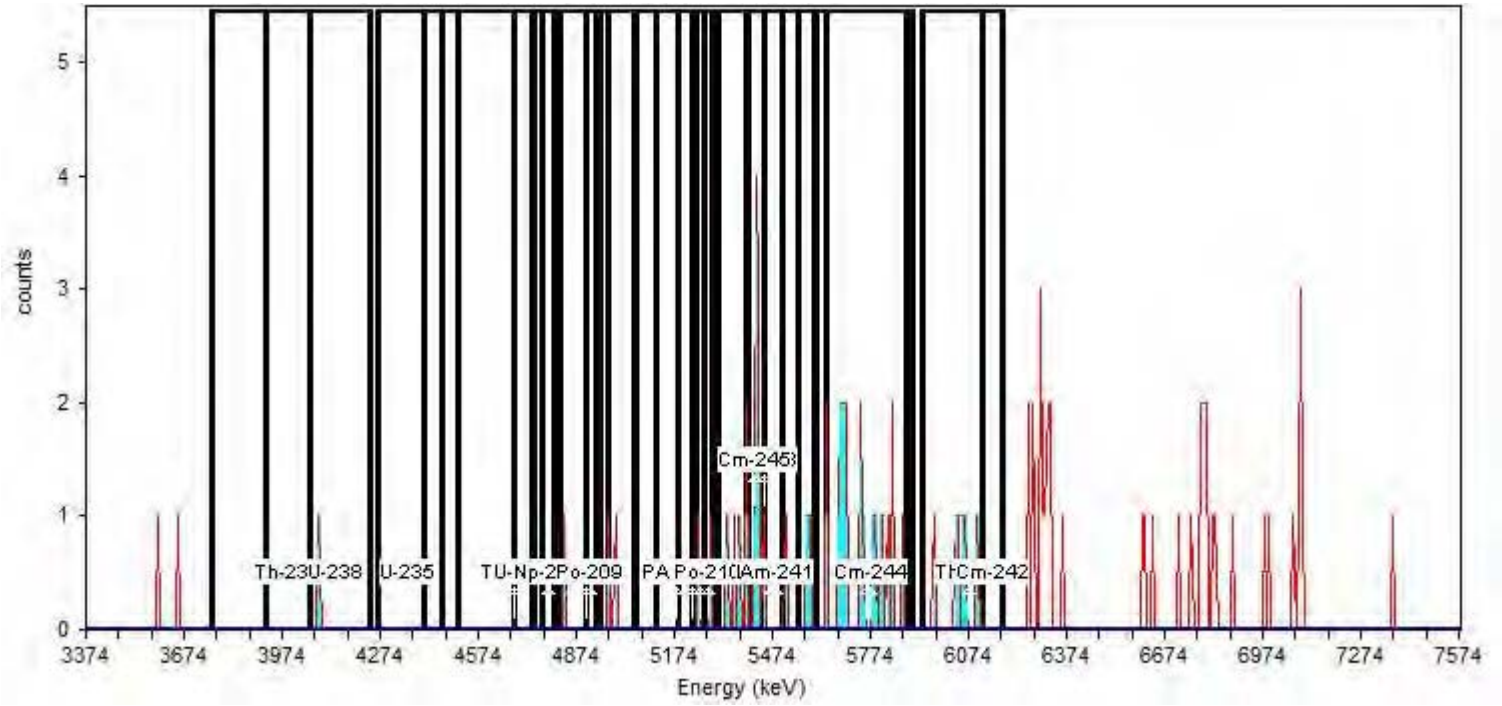
Batch Name: August2018
Description:

Acquisition

Detector: AV191 , SN: 50-112A2
Acquisition Start Date: 8/20/2018 5:49:53PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8879;AV191-20171113
Calibration Date: 11/14/2017 8:47:10AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 88.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	20.00	2.083E-002	4.774E-003
Cm-244	5,775.74	5,641.51	5,902.52	20.00	2.083E-002	4.774E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:36:13AM 8/22/2018

Sample

Sample Name: ICB;AV192
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

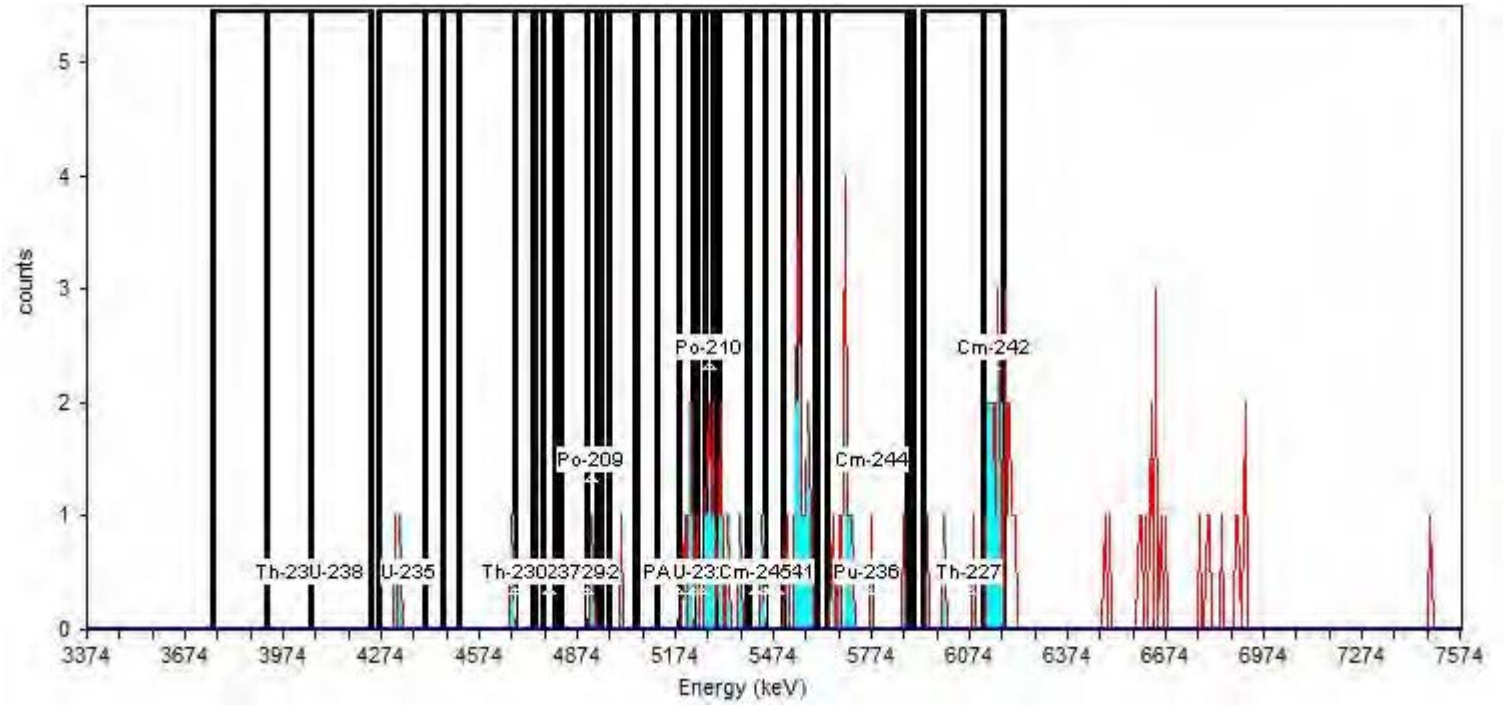
Batch Name: August2018a
Description:

Acquisition

Detector: AV192 , SN: 50-119J7
Acquisition Start Date: 8/21/2018 1:34:51PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9792;AV192-20171113
Calibration Date: 11/14/2017 8:47:16AM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 92.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	7.00	7.292E-003	2.946E-003
Am-243	5,231.34	5,052.36	5,305.92	13.00	1.354E-002	3.898E-003
U-232	5,253.71	5,059.82	5,402.86	17.00	1.771E-002	4.419E-003
Th-228	5,447.61	5,186.59	5,507.27	18.00	1.875E-002	4.541E-003
Po-210	5,276.09	5,231.34	5,291.00	7.00	7.292E-003	2.946E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	19.00	1.979E-002	4.658E-003
Cm-245	5,417.78	5,395.41	5,447.61	1.00	1.042E-003	1.473E-003
Pu-236	5,760.83	5,611.67	5,887.60	11.00	1.146E-002	3.608E-003
Cm-244	5,775.74	5,641.51	5,902.52	11.00	1.146E-002	3.608E-003
Th-227	6,074.04	5,932.35	6,178.45	15.00	1.563E-002	4.167E-003
Cm-242	6,148.62	6,118.79	6,178.45	12.00	1.250E-002	3.756E-003
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:59:54PM 8/27/2018

Sample

Sample Name: ICB;AV206
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

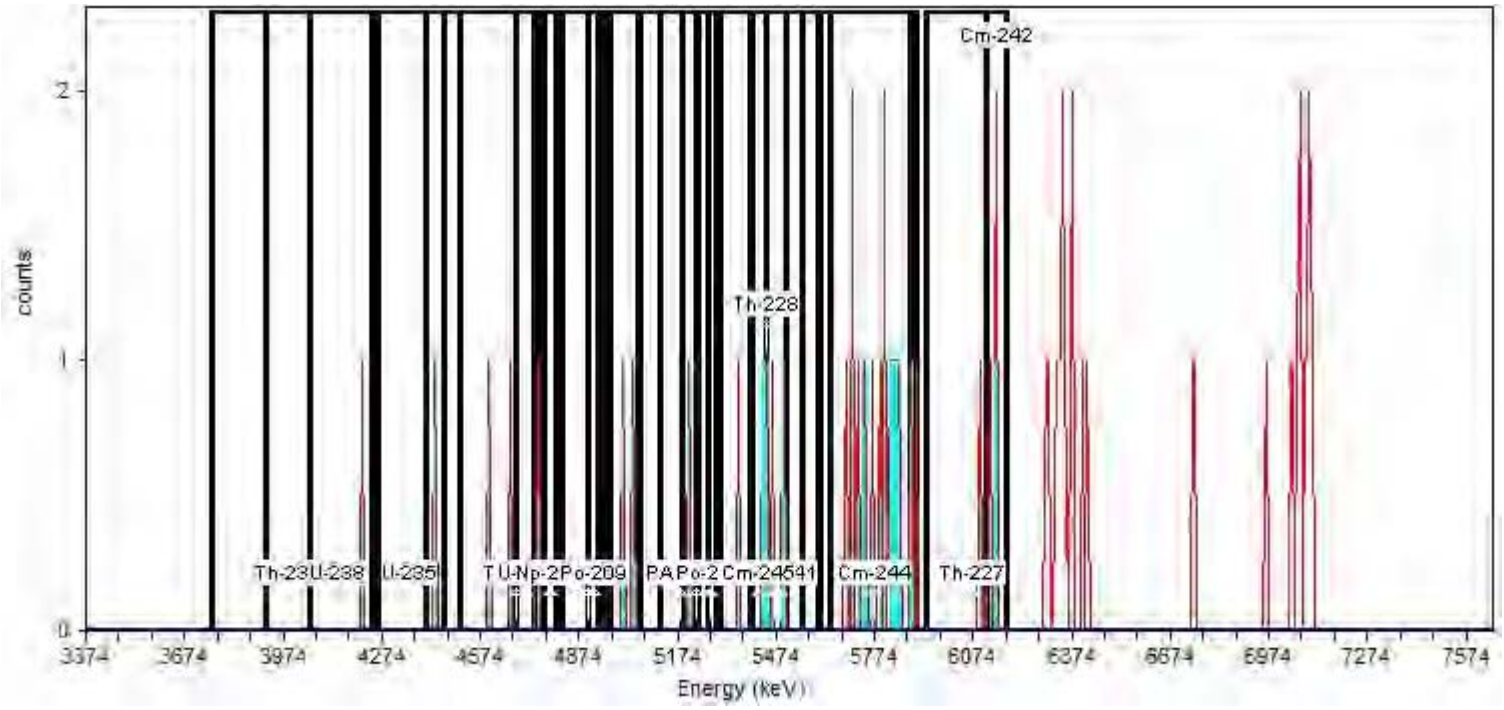
Batch Name: August2018
Description:

Acquisition

Detector: AV206 , SN: 5604420
Acquisition Start Date: 8/20/2018 5:49:56PM
Live Time: 960.00 min.
Real Time: 961.24 min.
Calibration Name: IC-8879;AV206-20171114
Calibration Date: 11/14/2017 12:00:54PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 63.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	3.00	3.125E-003	2.083E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	2.00	2.083E-003	1.804E-003
Th-228	5,447.61	5,186.59	5,507.27	8.00	8.333E-003	3.125E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	7.00	7.292E-003	2.946E-003
Am-241	5,484.90	5,298.46	5,604.22	7.00	7.292E-003	2.946E-003
Cm-245	5,417.78	5,395.41	5,447.61	3.00	3.125E-003	2.083E-003
Pu-236	5,760.83	5,611.67	5,887.60	16.00	1.667E-002	4.295E-003
Cm-244	5,775.74	5,641.51	5,902.52	17.00	1.771E-002	4.419E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:41AM 8/22/2018

Sample

Sample Name: ICB;AV208
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

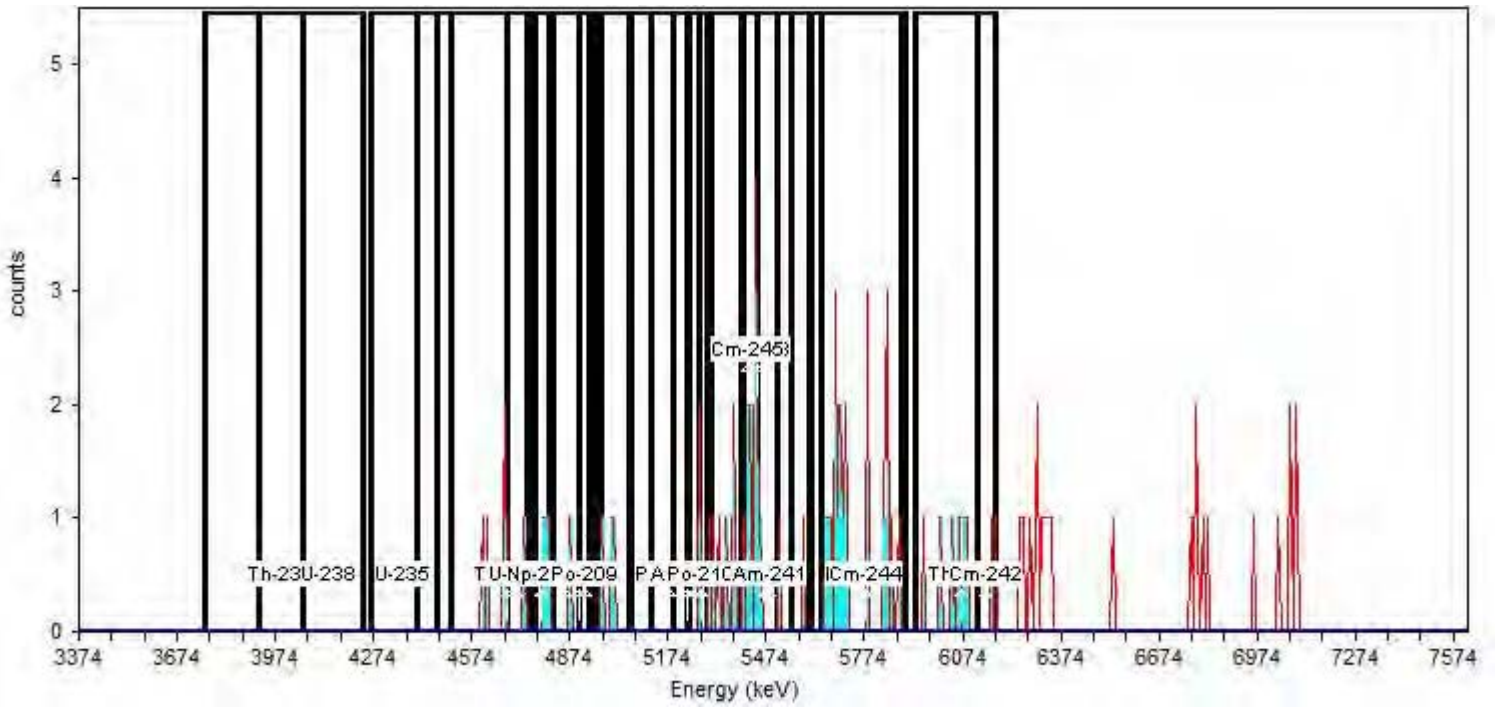
Batch Name: August2018a
Description:

Acquisition

Detector: AV208 , SN: 50-112Z6
Acquisition Start Date: 8/21/2018 1:34:50PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9793;AV208-20171114
Calibration Date: 11/14/2017 12:00:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 91.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	5.00	5.208E-003	2.552E-003
U-234	4,709.31	4,507.96	4,821.17	8.00	8.333E-003	3.125E-003
Pu-242	4,903.21	4,679.48	4,947.95	5.00	5.208E-003	2.552E-003
Th-229	4,858.46	4,739.14	5,119.48	7.00	7.292E-003	2.946E-003
Np-237	4,783.89	4,768.97	4,806.26	3.00	3.125E-003	2.083E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	10.00	1.042E-002	3.455E-003
Th-228	5,447.61	5,186.59	5,507.27	21.00	2.188E-002	4.886E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	22.00	2.292E-002	4.996E-003
Am-241	5,484.90	5,298.46	5,604.22	21.00	2.188E-002	4.886E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	22.00	2.292E-002	4.996E-003
Cm-244	5,775.74	5,641.51	5,902.52	22.00	2.292E-002	4.996E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:43AM 8/22/2018

Sample

Sample Name: ICB;AV211
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

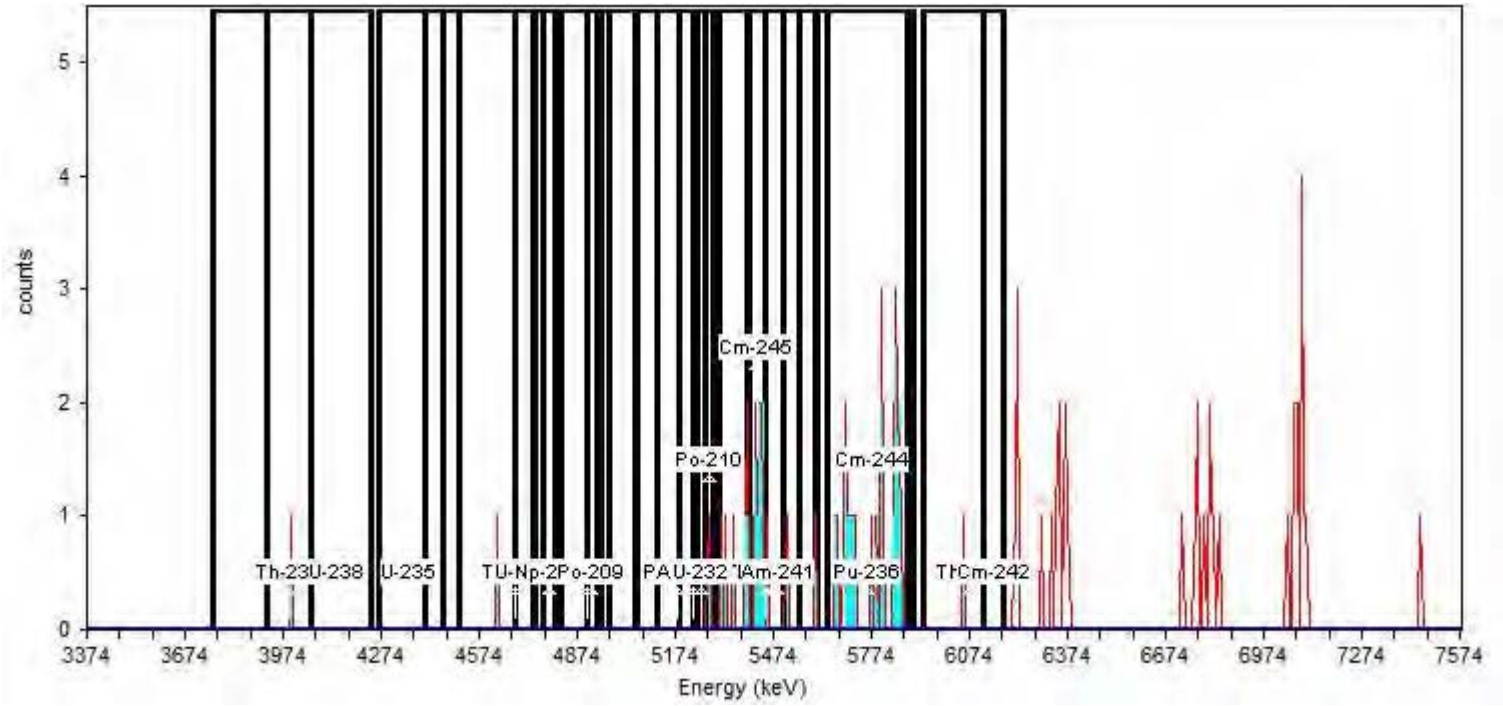
Batch Name: August2018a
Description:

Acquisition

Detector: AV211 , SN: 50-117Z4
Acquisition Start Date: 8/21/2018 1:34:51PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9817;AV211-20171114a
Calibration Date: 11/14/2017 12:01:51PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 76.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	0.00	0.000E+000	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	16.00	1.667E-002	4.295E-003
Cm-245	5,417.78	5,395.41	5,447.61	9.00	9.375E-003	3.294E-003
Pu-236	5,760.83	5,611.67	5,887.60	21.00	2.188E-002	4.886E-003
Cm-244	5,775.74	5,641.51	5,902.52	21.00	2.188E-002	4.886E-003
Th-227	6,074.04	5,932.35	6,178.45	1.00	1.042E-003	1.473E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:50AM 8/22/2018

Sample

Sample Name: ICB;AV212
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

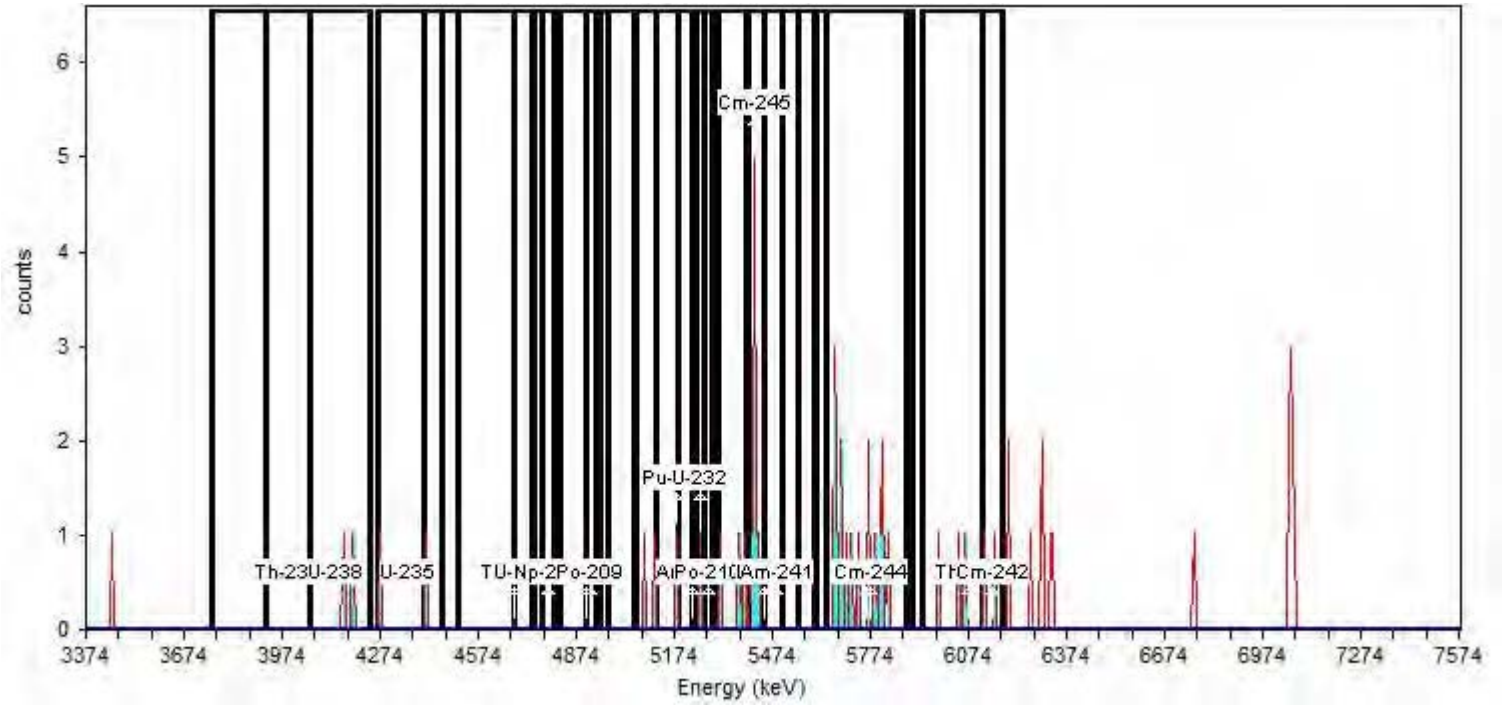
Batch Name: August2018a
Description:

Acquisition

Detector: AV212 , SN: 49-155m5
Acquisition Start Date: 8/21/2018 1:34:51PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9884;AV212-20171114
Calibration Date: 11/14/2017 12:01:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 58.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	2.00	2.083E-003	1.804E-003
U-235	4,358.81	4,261.86	4,463.21	2.00	2.083E-003	1.804E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	4.00	4.167E-003	2.329E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	12.00	1.250E-002	3.756E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	11.00	1.146E-002	3.608E-003
Am-241	5,484.90	5,298.46	5,604.22	11.00	1.146E-002	3.608E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	17.00	1.771E-002	4.419E-003
Cm-244	5,775.74	5,641.51	5,902.52	17.00	1.771E-002	4.419E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:26AM 8/22/2018

Sample

Sample Name: ICB;AV213
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

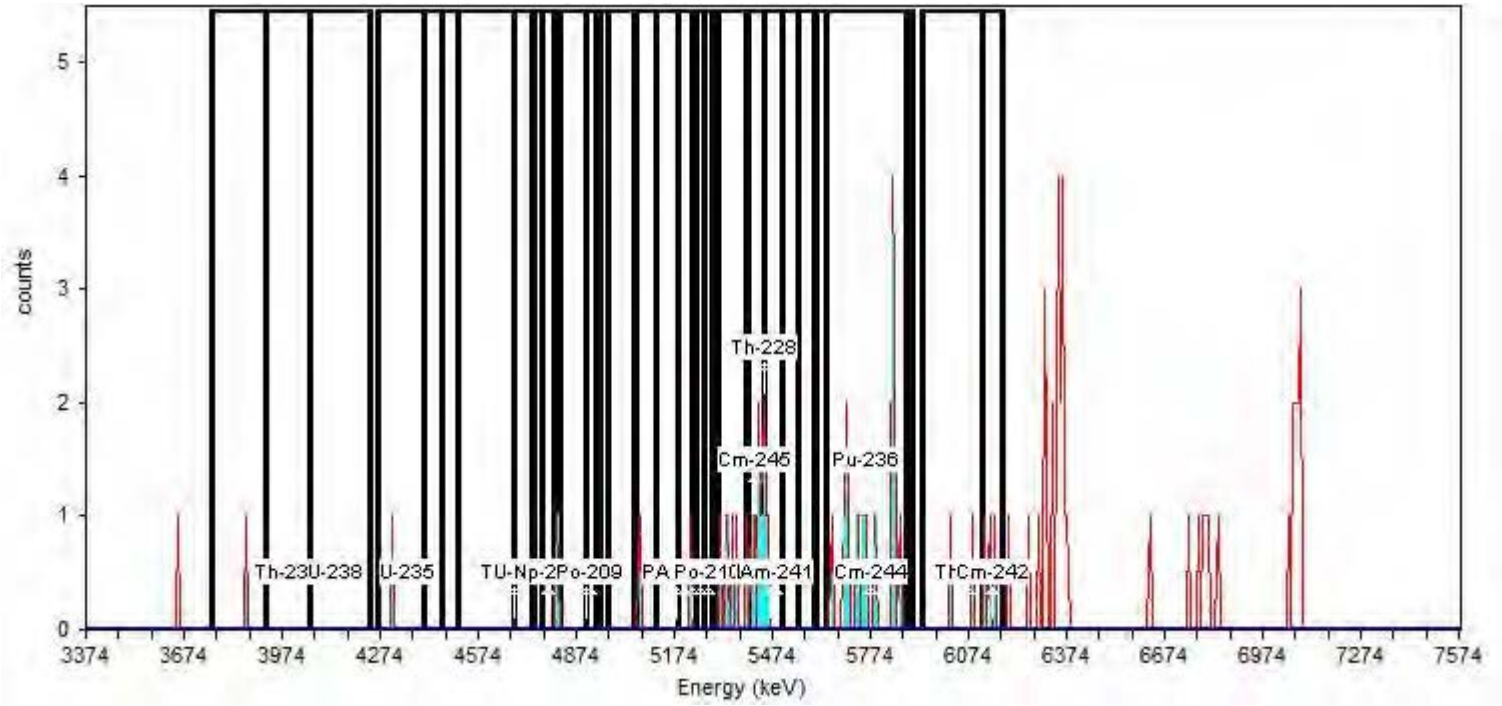
Batch Name: August2018a
Description:

Acquisition

Detector: AV213 , SN: 54-011 Y1
Acquisition Start Date: 8/21/2018 1:34:52PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9885;AV213-20171114
Calibration Date: 11/14/2017 12:01:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 80.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	2.00	2.083E-003	1.804E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	14.00	1.458E-002	4.034E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	18.00	1.875E-002	4.541E-003
Cm-244	5,775.74	5,641.51	5,902.52	18.00	1.875E-002	4.541E-003
Th-227	6,074.04	5,932.35	6,178.45	5.00	5.208E-003	2.552E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:40:50PM 7/22/2018

Sample

Sample Name: ICB;AV215
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

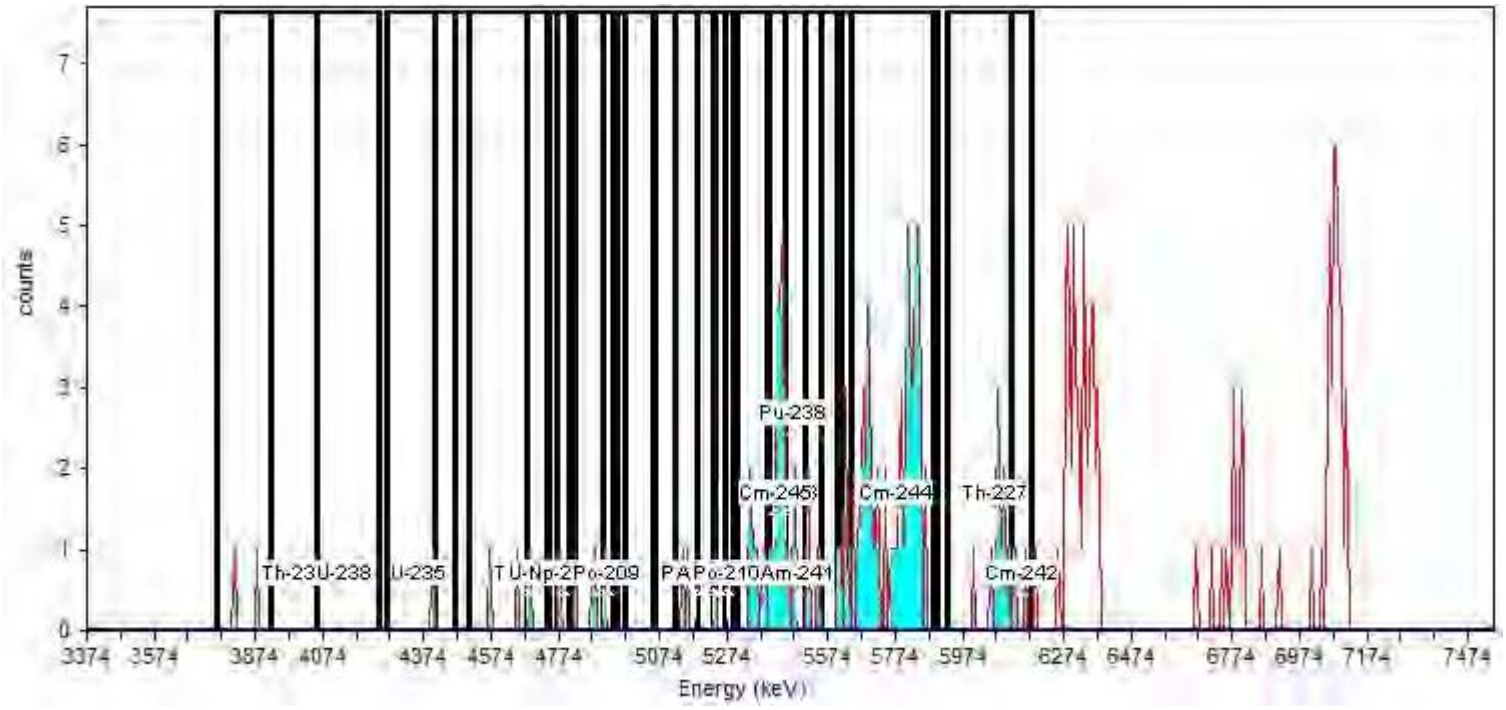
Batch Name: July2018b
Description:

Acquisition

Detector: AV215 , SN: 50-119J4
Acquisition Start Date: 7/21/2018 9:28:22PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV215-20171114
Calibration Date: 11/14/2017 3:23:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 224.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	3.00	3.125E-003	2.083E-003
U-234	4,709.31	4,507.96	4,821.17	5.00	5.208E-003	2.552E-003
Pu-242	4,903.21	4,679.48	4,947.95	6.00	6.250E-003	2.756E-003
Th-229	4,858.46	4,739.14	5,119.48	5.00	5.208E-003	2.552E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	11.00	1.146E-002	3.608E-003
Th-228	5,447.61	5,186.59	5,507.27	30.00	3.125E-002	5.800E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	32.00	3.333E-002	5.984E-003
Am-241	5,484.90	5,298.46	5,604.22	33.00	3.437E-002	6.074E-003
Cm-245	5,417.78	5,395.41	5,447.61	17.00	1.771E-002	4.419E-003
Pu-236	5,760.83	5,611.67	5,887.60	63.00	6.563E-002	8.333E-003
Cm-244	5,775.74	5,641.51	5,902.52	58.00	6.042E-002	8.001E-003
Th-227	6,074.04	5,932.35	6,178.45	14.00	1.458E-002	4.034E-003
Cm-242	6,148.62	6,118.79	6,178.45	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:00:45PM 8/27/2018

Sample

Sample Name: ICB;AV216
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

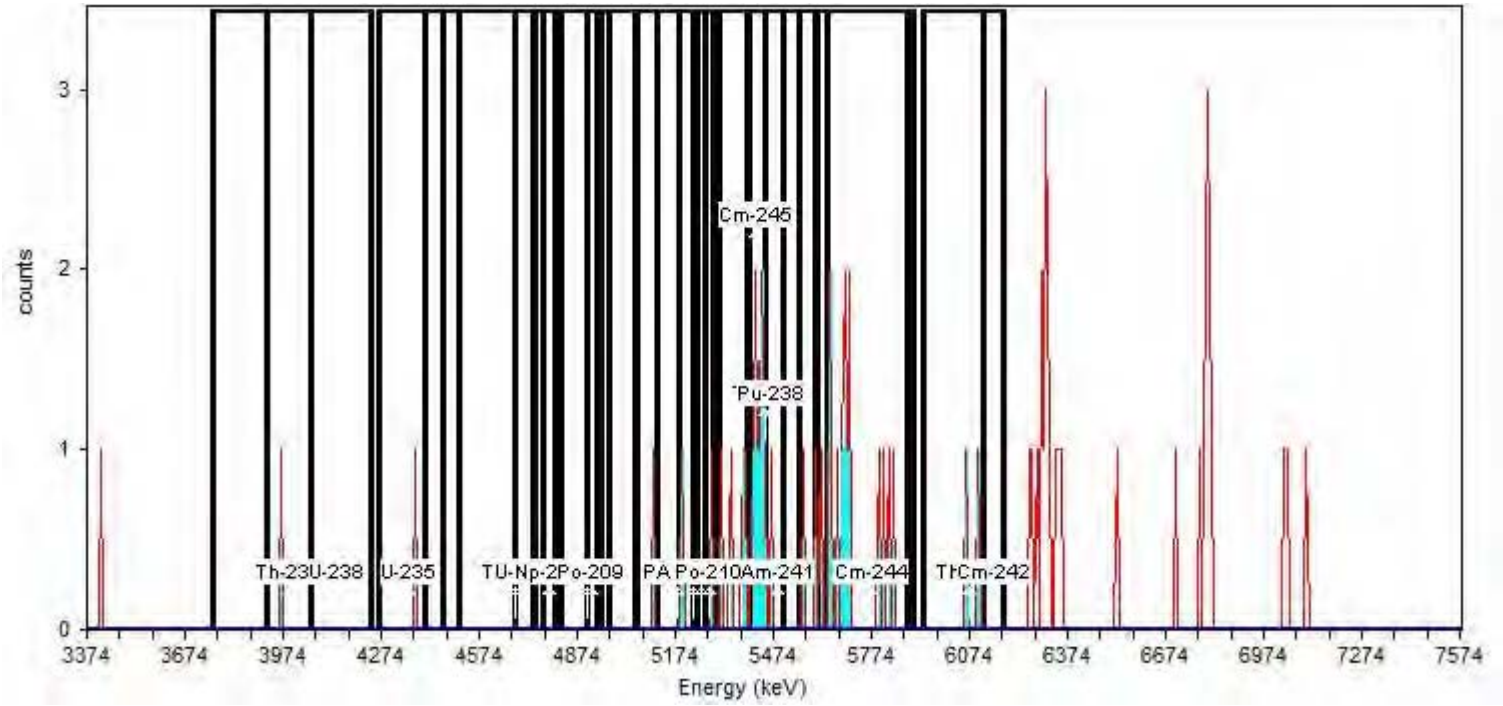
Batch Name: August2018
Description:

Acquisition

Detector: AV216 , SN: 50-117J5
Acquisition Start Date: 8/20/2018 5:49:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV216-20171114
Calibration Date: 11/14/2017 3:23:21PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 63.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	0.00	0.000E+000	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	2.00	2.083E-003	1.804E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	15.00	1.563E-002	4.167E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	14.00	1.458E-002	4.034E-003
Am-241	5,484.90	5,298.46	5,604.22	15.00	1.563E-002	4.167E-003
Cm-245	5,417.78	5,395.41	5,447.61	8.00	8.333E-003	3.125E-003
Pu-236	5,760.83	5,611.67	5,887.60	14.00	1.458E-002	4.034E-003
Cm-244	5,775.74	5,641.51	5,902.52	13.00	1.354E-002	3.898E-003
Th-227	6,074.04	5,932.35	6,178.45	2.00	2.083E-003	1.804E-003
Cm-242	6,148.62	6,118.79	6,178.45	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:00:48PM 8/27/2018

Sample

Sample Name: ICB;AV217
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

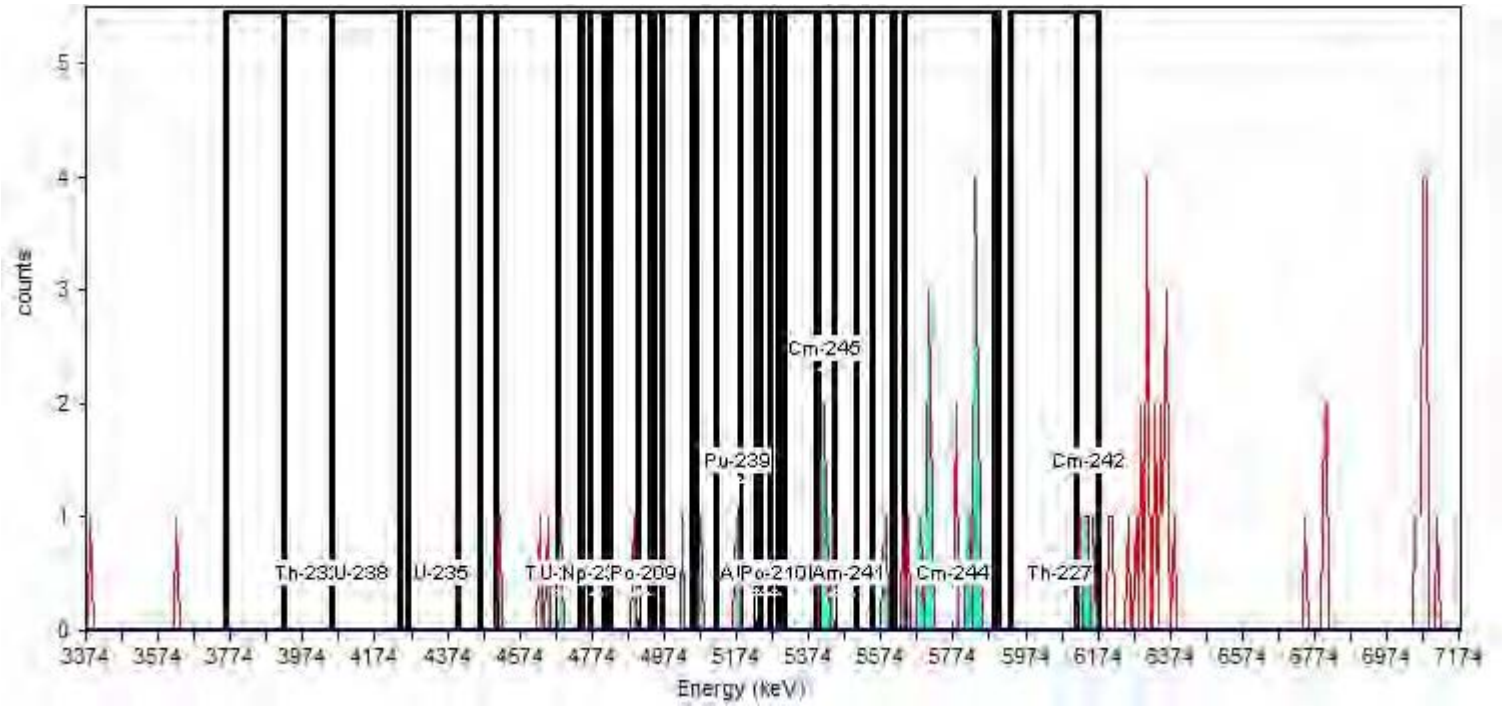
Batch Name: August2018
Description:

Acquisition

Detector: AV217 , SN: 50-117I2
Acquisition Start Date: 8/20/2018 5:49:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8875;AV217-20171114
Calibration Date: 11/14/2017 3:23:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 80.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	4.00	4.167E-003	2.329E-003
Am-243	5,231.34	5,052.36	5,305.92	3.00	3.125E-003	2.083E-003
U-232	5,253.71	5,059.82	5,402.86	3.00	3.125E-003	2.083E-003
Th-228	5,447.61	5,186.59	5,507.27	6.00	6.250E-003	2.756E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	6.00	6.250E-003	2.756E-003
Am-241	5,484.90	5,298.46	5,604.22	8.00	8.333E-003	3.125E-003
Cm-245	5,417.78	5,395.41	5,447.61	6.00	6.250E-003	2.756E-003
Pu-236	5,760.83	5,611.67	5,887.60	20.00	2.083E-002	4.774E-003
Cm-244	5,775.74	5,641.51	5,902.52	19.00	1.979E-002	4.658E-003
Th-227	6,074.04	5,932.35	6,178.45	4.00	4.167E-003	2.329E-003
Cm-242	6,148.62	6,118.79	6,178.45	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:29AM 8/22/2018

Sample

Sample Name: ICB;AV218
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

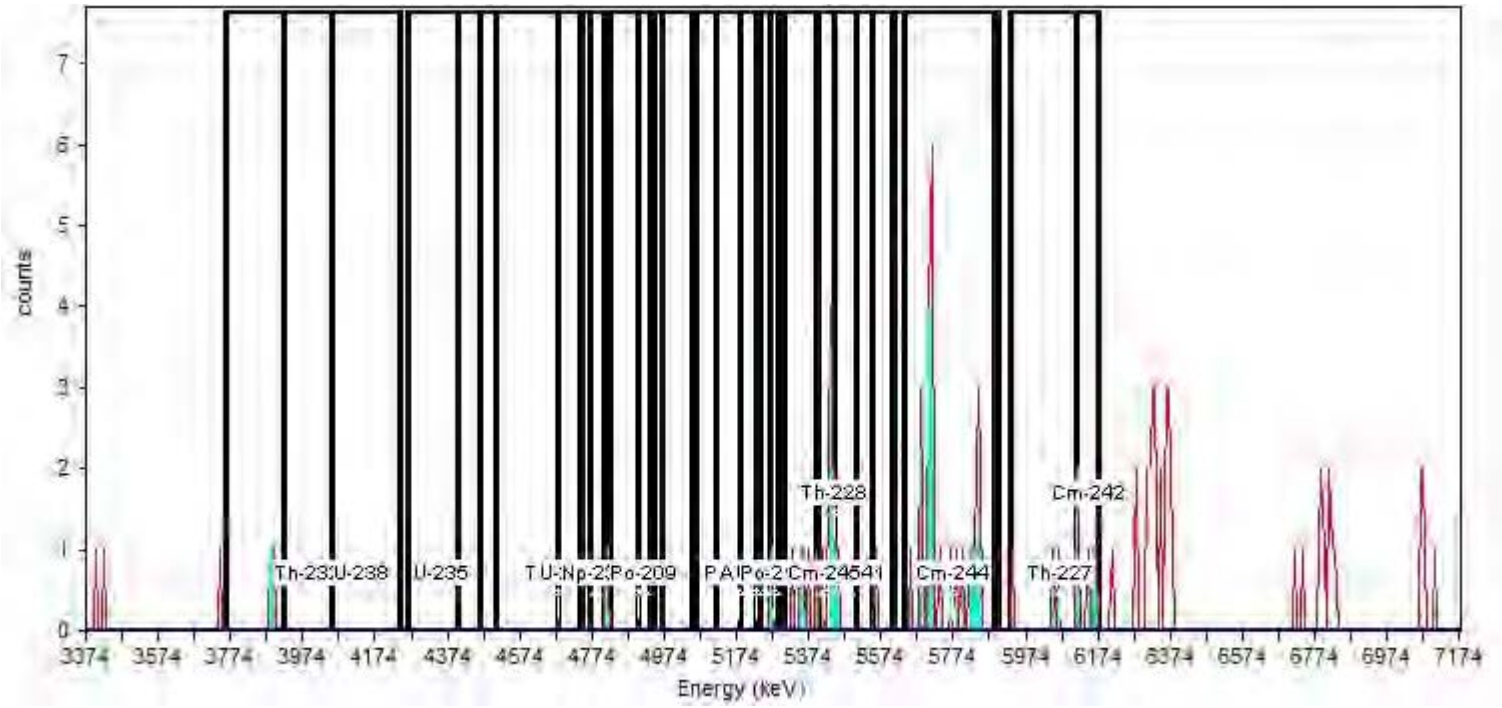
Batch Name: August2018a
Description:

Acquisition

Detector: AV218 , SN: 50-117Z7
Acquisition Start Date: 8/21/2018 1:34:53PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8876;AV218-20171114a
Calibration Date: 11/14/2017 3:23:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 95.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	2.00	2.083E-003	1.804E-003
U-238	4,135.08	3,918.81	4,239.49	0.00	0.000E+000	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	0.00	0.000E+000	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	6.00	6.250E-003	2.756E-003
Th-228	5,447.61	5,186.59	5,507.27	16.00	1.667E-002	4.295E-003
Po-210	5,276.09	5,231.34	5,291.00	1.00	1.042E-003	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	16.00	1.667E-002	4.295E-003
Cm-245	5,417.78	5,395.41	5,447.61	10.00	1.042E-002	3.455E-003
Pu-236	5,760.83	5,611.67	5,887.60	26.00	2.708E-002	5.413E-003
Cm-244	5,775.74	5,641.51	5,902.52	26.00	2.708E-002	5.413E-003
Th-227	6,074.04	5,932.35	6,178.45	8.00	8.333E-003	3.125E-003
Cm-242	6,148.62	6,118.79	6,178.45	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:01:09PM 8/27/2018

Sample

Sample Name: ICB;AV219
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

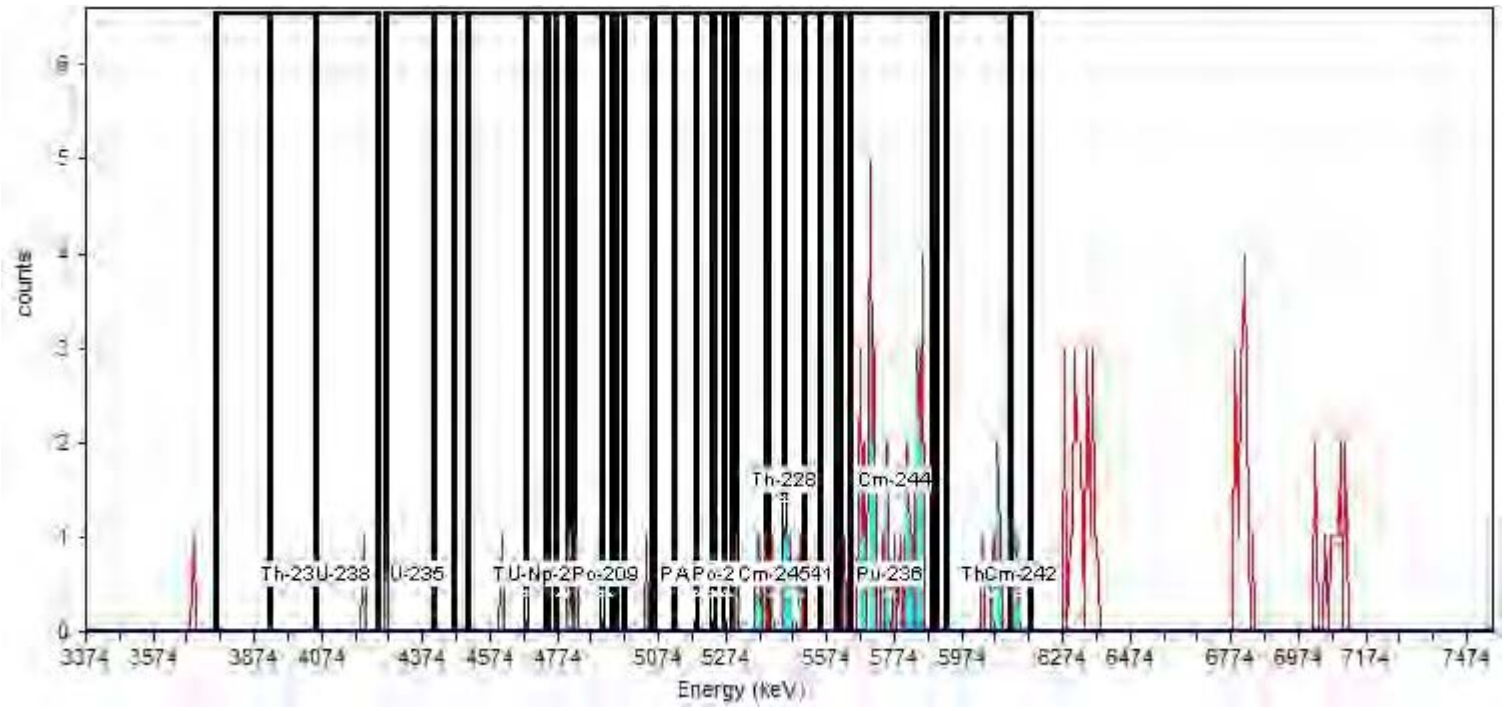
Batch Name: August2018
Description:

Acquisition

Detector: AV219 , SN: 50-112Z5
Acquisition Start Date: 8/20/2018 5:49:48PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8877;AV219-20171114
Calibration Date: 11/14/2017 3:23:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 107.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	1.00	1.042E-003	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	2.00	2.083E-003	1.804E-003
Pu-242	4,903.21	4,679.48	4,947.95	2.00	2.083E-003	1.804E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	1.00	1.042E-003	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	4.00	4.167E-003	2.329E-003
Th-228	5,447.61	5,186.59	5,507.27	9.00	9.375E-003	3.294E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	9.00	9.375E-003	3.294E-003
Am-241	5,484.90	5,298.46	5,604.22	9.00	9.375E-003	3.294E-003
Cm-245	5,417.78	5,395.41	5,447.61	2.00	2.083E-003	1.804E-003
Pu-236	5,760.83	5,611.67	5,887.60	35.00	3.646E-002	6.250E-003
Cm-244	5,775.74	5,641.51	5,902.52	34.00	3.542E-002	6.163E-003
Th-227	6,074.04	5,932.35	6,178.45	7.00	7.292E-003	2.946E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:01:12PM 8/27/2018

Sample

Sample Name: ICB;AV220
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

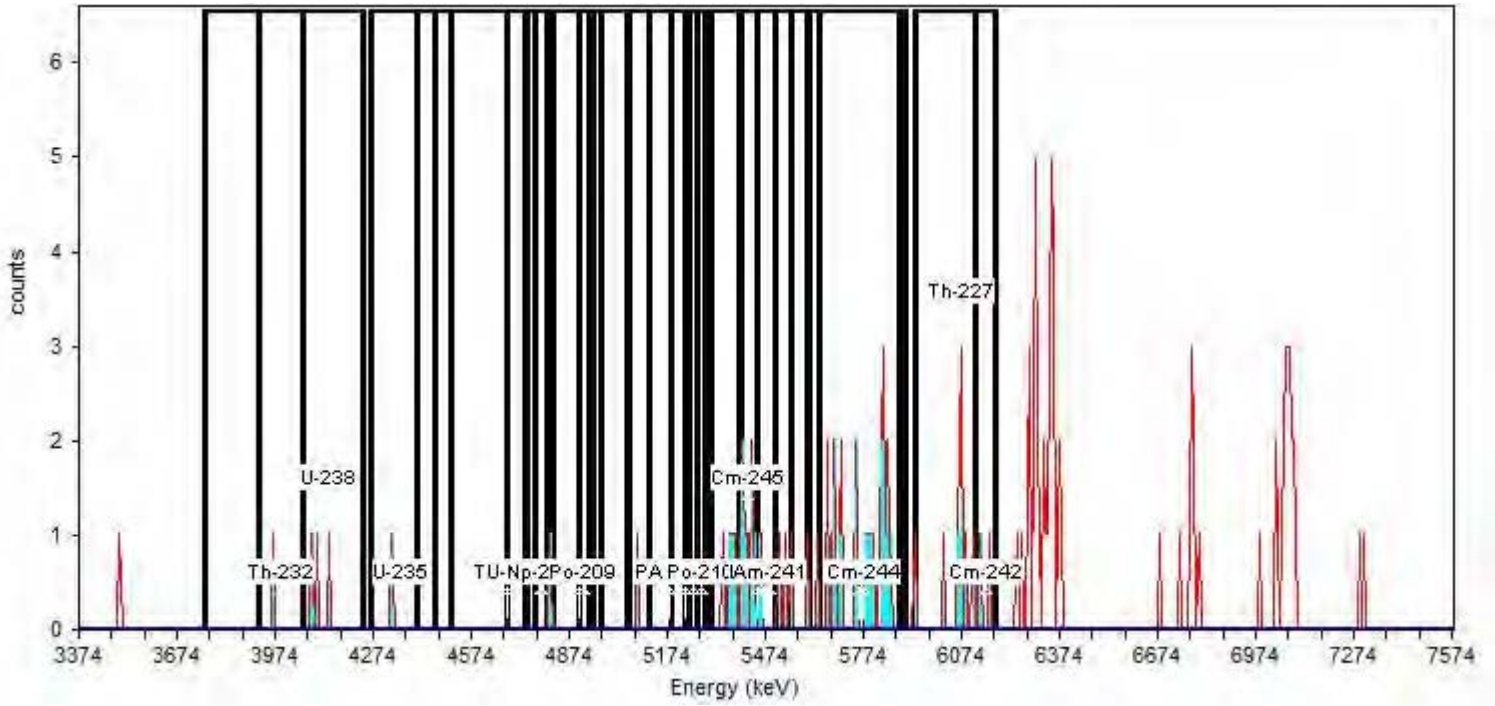
Batch Name: August2018
Description:

Acquisition

Detector: AV220 , SN: 50-119AA3
Acquisition Start Date: 8/20/2018 5:49:49PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV220-20171114a
Calibration Date: 11/14/2017 3:23:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	1.00	1.042E-003	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	4.00	4.167E-003	2.329E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	0.00	0.000E+000	1.473E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	2.00	2.083E-003	1.804E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	1.00	1.042E-003	1.473E-003
Am-243	5,231.34	5,052.36	5,305.92	1.00	1.042E-003	1.473E-003
U-232	5,253.71	5,059.82	5,402.86	7.00	7.292E-003	2.946E-003
Th-228	5,447.61	5,186.59	5,507.27	13.00	1.354E-002	3.898E-003
Po-210	5,276.09	5,231.34	5,291.00	0.00	0.000E+000	1.473E-003
Pu-238	5,469.98	5,268.63	5,552.01	16.00	1.667E-002	4.295E-003
Am-241	5,484.90	5,298.46	5,604.22	17.00	1.771E-002	4.419E-003
Cm-245	5,417.78	5,395.41	5,447.61	7.00	7.292E-003	2.946E-003
Pu-236	5,760.83	5,611.67	5,887.60	23.00	2.396E-002	5.103E-003
Cm-244	5,775.74	5,641.51	5,902.52	22.00	2.292E-002	4.996E-003
Th-227	6,074.04	5,932.35	6,178.45	10.00	1.042E-002	3.455E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:35:32AM 8/22/2018

Sample

Sample Name: ICB;AV222
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

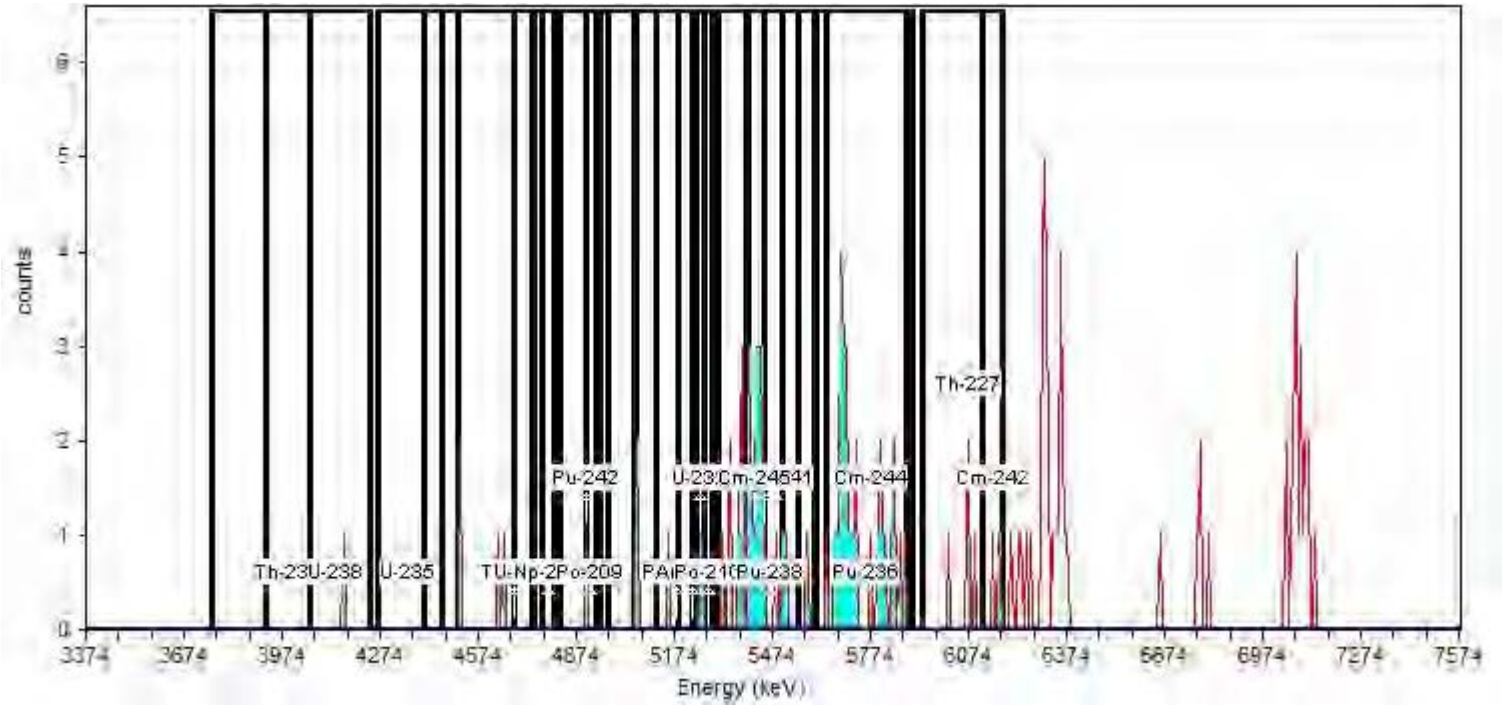
Batch Name: August2018a
Description:

Acquisition

Detector: AV222 , SN: 50-117J2
Acquisition Start Date: 8/21/2018 1:34:53PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9792;AV222-20171114a
Calibration Date: 11/14/2017 3:23:48PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 127.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	0.00	0.000E+000	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	4.00	4.167E-003	2.329E-003
U-234	4,709.31	4,507.96	4,821.17	4.00	4.167E-003	2.329E-003
Pu-242	4,903.21	4,679.48	4,947.95	1.00	1.042E-003	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	3.00	3.125E-003	2.083E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	1.00	1.042E-003	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	15.00	1.563E-002	4.167E-003
Th-228	5,447.61	5,186.59	5,507.27	26.00	2.708E-002	5.413E-003
Po-210	5,276.09	5,231.34	5,291.00	2.00	2.083E-003	1.804E-003
Pu-238	5,469.98	5,268.63	5,552.01	25.00	2.604E-002	5.311E-003
Am-241	5,484.90	5,298.46	5,604.22	26.00	2.708E-002	5.413E-003
Cm-245	5,417.78	5,395.41	5,447.61	15.00	1.563E-002	4.167E-003
Pu-236	5,760.83	5,611.67	5,887.60	31.00	3.229E-002	5.893E-003
Cm-244	5,775.74	5,641.51	5,902.52	31.00	3.229E-002	5.893E-003
Th-227	6,074.04	5,932.35	6,178.45	6.00	6.250E-003	2.756E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:01:58PM 8/27/2018

Sample

Sample Name: ICB;AV225
Comment:

Spectrum #1 Analysis #1
Analyst: 60040

Batch

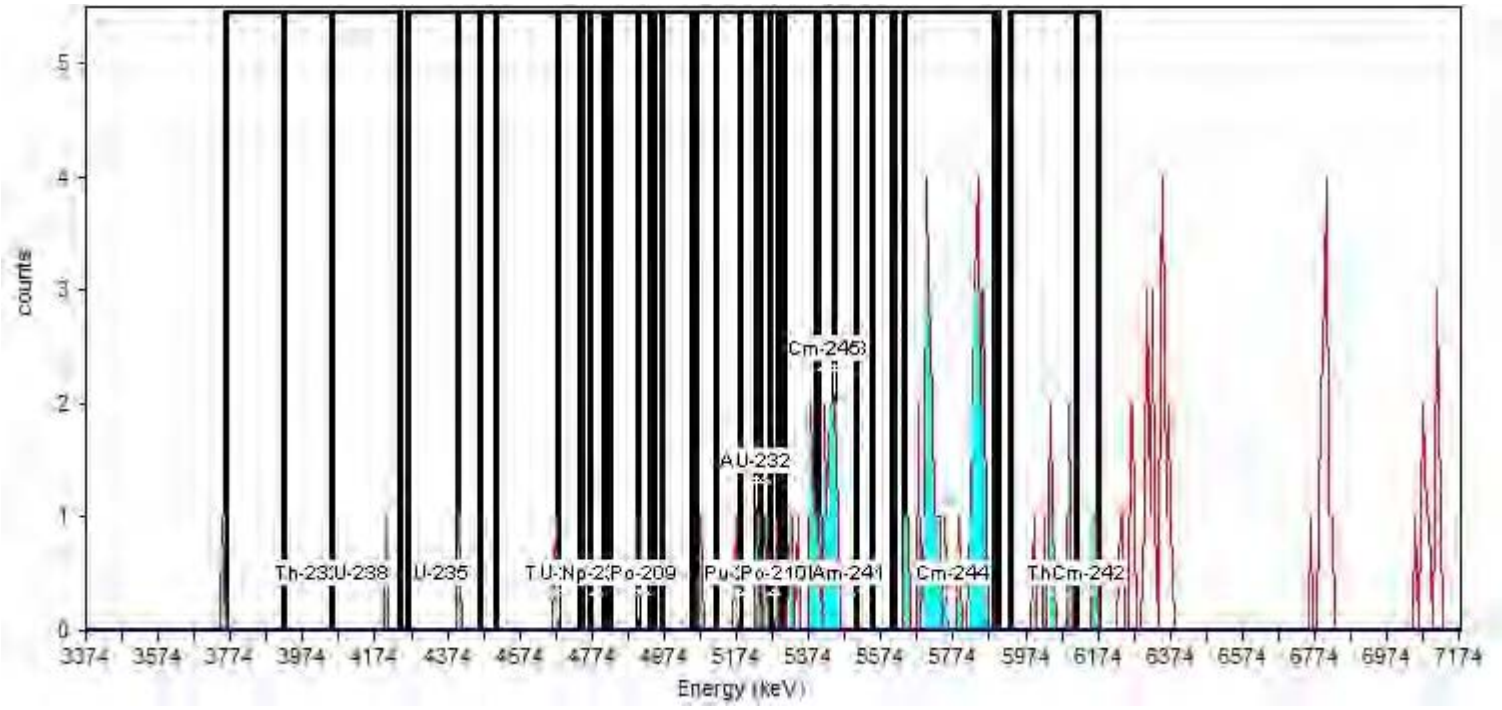
Batch Name: August2018
Description:

Acquisition

Detector: AV225 , SN: 50-117J7
Acquisition Start Date: 8/20/2018 5:49:50PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-9795;AV225-20171114
Calibration Date: 11/14/2017 3:22:43PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 121.00

Nuclide Summary (ROI)

RegionName	Peak Energy (keV)	Start Energy (keV)	End Energy (keV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3,985.93	3,754.75	4,053.05	0.00	0.000E+000	1.473E-003
U-238	4,135.08	3,918.81	4,239.49	1.00	1.042E-003	1.473E-003
U-235	4,358.81	4,261.86	4,463.21	1.00	1.042E-003	1.473E-003
Th-230	4,679.48	4,403.55	4,746.60	2.00	2.083E-003	1.804E-003
U-234	4,709.31	4,507.96	4,821.17	1.00	1.042E-003	1.473E-003
Pu-242	4,903.21	4,679.48	4,947.95	0.00	0.000E+000	1.473E-003
Th-229	4,858.46	4,739.14	5,119.48	1.00	1.042E-003	1.473E-003
Np-237	4,783.89	4,768.97	4,806.26	0.00	0.000E+000	1.473E-003
Po-209	4,918.12	4,903.21	4,933.04	0.00	0.000E+000	1.473E-003
Pu-239	5,179.14	4,970.33	5,238.80	3.00	3.125E-003	2.083E-003
Am-243	5,231.34	5,052.36	5,305.92	5.00	5.208E-003	2.552E-003
U-232	5,253.71	5,059.82	5,402.86	13.00	1.354E-002	3.898E-003
Th-228	5,447.61	5,186.59	5,507.27	21.00	2.188E-002	4.886E-003
Po-210	5,276.09	5,231.34	5,291.00	3.00	3.125E-003	2.083E-003
Pu-238	5,469.98	5,268.63	5,552.01	19.00	1.979E-002	4.658E-003
Am-241	5,484.90	5,298.46	5,604.22	18.00	1.875E-002	4.541E-003
Cm-245	5,417.78	5,395.41	5,447.61	11.00	1.146E-002	3.608E-003
Pu-236	5,760.83	5,611.67	5,887.60	35.00	3.646E-002	6.250E-003
Cm-244	5,775.74	5,641.51	5,902.52	35.00	3.646E-002	6.250E-003
Th-227	6,074.04	5,932.35	6,178.45	9.00	9.375E-003	3.294E-003
Cm-242	6,148.62	6,118.79	6,178.45	2.00	2.083E-003	1.804E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV1

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 15:44	140	IC 160-371830/1		371830			RTM
05/18/18 19:25	60	ICV 160-371933/1		371933			PS
08/11/18 17:19	960	ICB 160-381939/1		381939			PS
08/14/18 14:05	60	CCV 160-382694/1		382694			PS
08/31/18 00:02	1	PULSER 160-386524/1		386524			ALS
08/31/18 02:42	240	MB 160-386101/1-A		386524	386101	A-01-R	ALS

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 15:46	140	IC 160-371847/1		371847			PS
05/18/18 19:25	60	ICV 160-371942/1		371942			PS
08/11/18 17:16	960	ICB 160-381984/1		381984			PS
08/14/18 14:06	60	CCV 160-382709/1		382709			PS
08/31/18 00:02	1	PULSER 160-386568/1		386568			ALS
08/31/18 02:42	240	LCS 160-386101/2-A		386568	386101	A-01-R	ALS

Detector: AV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 15:46	140	IC 160-371848/1		371848			PS
05/18/18 19:26	60	ICV 160-371943/1		371943			PS
08/11/18 17:16	960	ICB 160-381985/1		381985			PS
08/14/18 14:07	60	CCV 160-382710/1		382710			PS
08/31/18 00:02	1	PULSER 160-386569/1		386569			ALS
08/31/18 02:42	240	160-29881-32	CRC-B17-0406	386569	386101	A-01-R	ALS

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 15:47	140	IC 160-371856/1		371856			PS
05/18/18 19:26	60	ICV 160-371945/1		371945			PS
08/11/18 17:16	960	ICB 160-382011/1		382011			PS
08/14/18 14:08	60	CCV 160-382723/1		382723			PS
08/31/18 00:02	1	PULSER 160-386586/1		386586			ALS
08/31/18 02:42	240	160-29881-32 DU	CRC-B17-0406 DU	386586	386101	A-01-R	ALS

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 15:47	140	IC 160-371857/1		371857			PS
05/18/18 19:27	60	ICV 160-371946/1		371946			PS
08/11/18 17:16	960	ICB 160-382022/1		382022			PS
08/14/18 14:08	60	CCV 160-382733/1		382733			PS
08/28/18 00:17	1	PULSER 160-385839/1		385839			ALS
08/28/18 02:47	240	ZZZZZ		385839			
08/28/18 03:07	180	ZZZZZ		385839			
08/28/18 19:45	240	160-29881-20	CRC-BK2-0304	385839	382139	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 18:37	140.003 336588 542	IC 160-371846/1		371846			PS
05/20/18 16:12	60	ICV 160-371957/1		371957			PS
08/11/18 17:16	960	ICB 160-381983/1		381983			PS
08/14/18 16:04	60	CCV 160-382708/1		382708			PS
08/28/18 00:17	1	PULSER 160-385810/1		385810			ALS
08/28/18 02:46	240	MB 160-380676/1-A		385810	380676	A-01-R	ALS
08/28/18 20:20	240	ZZZZZ		385810			

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 18:38	140	IC 160-371850/1		371850			PS
05/20/18 16:13	60	ICV 160-371959/1		371959			PS
08/13/18 14:35	960	ICB 160-382164/1		382164			PS
08/14/18 16:05	60	CCV 160-382711/1		382711			PS
08/28/18 00:26	1	PULSER 160-385813/1		385813			ALS
08/28/18 02:46	240	LCS 160-380676/2-A		385813	380676	A-01-R	ALS
08/28/18 20:21	240	ZZZZZ		385813			

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 18:51	140	IC 160-371851/1		371851			PS
05/20/18 16:13	60	ICV 160-371960/1		371960			PS
08/11/18 17:17	960	ICB 160-381988/1		381988			PS
08/14/18 16:05	60	CCV 160-382712/1		382712			PS
08/28/18 00:26	1	PULSER 160-385814/1		385814			ALS
08/28/18 02:46	240	160-29881-27	CRC-B4-2628	385814	380676	A-01-R	ALS
08/28/18 20:21	240	ZZZZZ		385814			

Detector: AV47

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 18:40	140	IC 160-371853/1		371853			PS
05/20/18 16:15	60	ICV 160-371962/1		371962			PS
08/11/18 17:17	960	ICB 160-381990/1		381990			PS
08/14/18 16:06	60	CCV 160-382714/1		382714			PS
08/28/18 00:26	1	PULSER 160-385816/1		385816			ALS
08/28/18 02:46	240	160-29881-27 DU	CRC-B4-2628 DU	385816	380676	A-01-R	ALS
08/28/18 20:21	240	ZZZZZ		385816			

Detector: AV48

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/14/18 18:40	140	IC 160-371854/1		371854			PS
05/20/18 16:15	60	ICV 160-371963/1		371963			PS
08/11/18 17:17	960	ICB 160-381991/1		381991			PS
08/14/18 16:07	60	CCV 160-382715/1		382715			PS
08/28/18 00:26	1	PULSER 160-385817/1		385817			ALS
08/28/18 02:46	240	160-29881-28	CRC-B14-0608	385817	380676	A-01-R	ALS
08/28/18 20:21	240	ZZZZZ		385817			

Alpha Spectroscopy Run Log

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:37	140	IC 160-371863/1		371863			PS
05/23/18 11:27	60	ICV 160-372000/1		372000			PS
08/14/18 18:49	960	ICB 160-382749/1		382749			PS
08/15/18 14:17	60	CCV 160-382766/1		382766			PS
08/28/18 00:26	1	PULSER 160-385818/1		385818			ALS
08/28/18 02:46	240	160-29881-29	CRC-B14-1012	385818	380676	A-01-R	ALS
08/28/18 19:55	240	MB 160-380642/1-A		385818	380642	A-01-R	ALS

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:38	140	IC 160-371864/1		371864			PS
05/23/18 11:28	60	ICV 160-372001/1		372001			PS
08/14/18 18:49	960	ICB 160-382750/1		382750			PS
08/15/18 12:57	60	CCV 160-382685/1		382685			PS
08/28/18 00:26	1	PULSER 160-385819/1		385819			ALS
08/28/18 02:46	240	160-29881-30	CRC-B14-1618	385819	380676	A-01-R	ALS
08/28/18 19:55	240	LCS 160-380642/2-A		385819	380642	A-01-R	ALS

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:38	140	IC 160-371865/1		371865			PS
05/23/18 11:28	60	ICV 160-372002/1		372002			PS
08/14/18 18:49	960	ICB 160-382751/1		382751			PS
08/15/18 12:58	60	CCV 160-382686/1		382686			PS
08/28/18 00:26	1	PULSER 160-385820/1		385820			ALS
08/28/18 02:46	240	160-29881-31	CRC-B14-2426	385820	380676	A-01-R	ALS
08/28/18 19:55	240	160-29881-1	CRC-B9-0406	385820	380642	A-01-R	ALS

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:39	140.002994791667	IC 160-371867/1		371867			PS
05/23/18 11:29	60	ICV 160-372004/1		372004			PS
08/14/18 18:49	960	ICB 160-382753/1		382753			PS
08/15/18 12:59	60	CCV 160-382687/1		382687			PS
08/28/18 00:26	1	PULSER 160-385821/1		385821			ALS
08/28/18 02:46	240	ZZZZZ		385821			
08/28/18 19:55	240	160-29881-1 DU	CRC-B9-0406 DU	385821	380642	A-01-R	ALS

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:40	140	IC 160-371869/1		371869			PS
05/21/18 10:36	60	ICV 160-371966/1		371966			PS
08/13/18 14:36	960	ICB 160-382169/1		382169			PS
08/14/18 17:25	60	CCV 160-382716/1		382716			PS
08/28/18 00:26	1	PULSER 160-385822/1		385822			ALS
08/28/18 02:46	240	160-29881-33	CRC-B17-0810	385822	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-2	CRC-B6-0204	385822	380642	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:40	140	IC 160-371871/1		371871			PS
05/21/18 10:37	60	ICV 160-371968/1		371968			PS
08/11/18 17:17	960	ICB 160-382006/1		382006			PS
08/14/18 17:25	60	CCV 160-382718/1		382718			PS
08/28/18 00:26	1	PULSER 160-385824/1		385824			ALS
08/28/18 02:46	240	160-29881-34	CRC-B17-1820	385824	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-3	CRC-B1-0406	385824	380642	A-01-R	ALS

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:41	140	IC 160-371872/1		371872			PS
05/21/18 10:37	60	ICV 160-371969/1		371969			PS
08/11/18 17:17	960	ICB 160-382007/1		382007			PS
08/14/18 17:26	60	CCV 160-382719/1		382719			PS
08/28/18 00:26	1	PULSER 160-385825/1		385825			ALS
08/28/18 02:46	240	160-29881-35	CRC-B17-2628	385825	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-4	CRC-B7-0204	385825	380642	A-01-R	ALS

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 12:41	140.005 338541 667	IC 160-371873/1		371873			PS
05/21/18 10:38	60	ICV 160-371970/1		371970			PS
08/11/18 17:17	960	ICB 160-382008/1		382008			PS
08/14/18 17:26	60	CCV 160-382720/1		382720			PS
08/28/18 00:26	1	PULSER 160-385826/1		385826			ALS
08/28/18 02:46	240	160-29881-36	CRC-B5-1214	385826	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-5	CRC-B22-0506	385826	380642	A-01-R	ALS

Detector: AV69

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:45	140	IC 160-371875/1		371875			PS
05/23/18 12:55	60	ICV 160-372006/1		372006			PS
08/11/18 17:17	960	ICB 160-382010/1		382010			PS
08/14/18 17:27	60	CCV 160-382722/1		382722			PS
08/28/18 00:26	1	PULSER 160-385828/1		385828			ALS
08/28/18 02:46	240	160-29881-37	CRC-B5-1618	385828	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-6	CRC-B7-0406	385828	380642	A-01-R	ALS

Detector: AV70

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:45	140	IC 160-371876/1		371876			PS
05/23/18 12:55	60	ICV 160-372007/1		372007			PS
08/11/18 17:17	960	ICB 160-382012/1		382012			PS
08/14/18 17:27	60	CCV 160-382724/1		382724			PS
08/28/18 00:26	1	PULSER 160-385830/1		385830			ALS
08/28/18 02:46	240	160-29881-38	CRC-B5-2224	385830	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-7	CRC-B4-0608	385830	380642	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV71

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:46	140	IC 160-371877/1		371877			PS
05/23/18 12:56	60	ICV 160-372008/1		372008			PS
08/11/18 17:17	960	ICB 160-382013/1		382013			PS
08/14/18 17:28	60	CCV 160-382725/1		382725			PS
08/28/18 00:26	1	PULSER 160-385831/1		385831			ALS
08/28/18 02:46	240	160-29881-39	CRC-B5-2830	385831	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-8	CRC-B14-0204	385831	380642	A-01-R	ALS

Detector: AV72

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:46	140	IC 160-371878/1		371878			PS
05/23/18 12:56	60	ICV 160-372009/1		372009			PS
08/13/18 14:36	960	ICB 160-382170/1		382170			PS
08/14/18 17:28	60	CCV 160-382726/1		382726			PS
08/28/18 00:26	1	PULSER 160-385832/1		385832			ALS
08/28/18 02:46	240	160-29881-40	CRC-B11-1214	385832	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-9	CRC-B17-0204	385832	380642	A-01-R	ALS

Detector: AV73

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:46	140	IC 160-371879/1		371879			PS
05/23/18 12:57	60	ICV 160-372010/1		372010			PS
08/11/18 17:17	960	ICB 160-382015/1		382015			PS
08/14/18 17:29	60	CCV 160-382727/1		382727			PS
08/28/18 00:26	1	PULSER 160-385833/1		385833			ALS
08/28/18 02:46	240	160-29881-41	CRC-B11-2022	385833	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-10	CRC-B5-0204	385833	380642	A-01-R	ALS

Detector: AV74

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:47	140	IC 160-371880/1		371880			PS
05/23/18 13:04	60	ICV 160-372011/1		372011			PS
08/11/18 17:17	960	ICB 160-382016/1		382016			PS
08/14/18 17:29	60	CCV 160-382728/1		382728			PS
08/28/18 00:26	1	PULSER 160-385834/1		385834			ALS
08/28/18 02:46	240	160-29881-42	CRC-B11-2628	385834	380676	A-01-R	ALS
08/28/18 19:56	240	160-29881-11	CRC-B5-0608	385834	380642	A-01-R	ALS

Detector: AV75

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:47	140	IC 160-371881/1		371881			PS
05/23/18 13:01	60	ICV 160-372012/1		372012			PS
08/11/18 17:17	960	ICB 160-382017/1		382017			PS
08/14/18 17:30	60	CCV 160-382729/1		382729			PS
08/28/18 00:39	1	PULSER 160-385835/1		385835			ALS
08/28/18 02:47	240	MB 160-382139/1-A		385835	382139	A-01-R	ALS
08/28/18 19:56	240	160-29881-12	CRC-B11-0204	385835	380642	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV77

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:54	140	IC 160-371883/1		371883			RTM
05/21/18 12:19	60	ICV 160-371971/1		371971			PS
08/11/18 17:17	960	ICB 160-382019/1		382019			PS
08/14/18 17:31	60	CCV 160-382730/1		382730			PS
08/28/18 00:39	1	PULSER 160-385836/1		385836			ALS
08/28/18 02:47	240	LCS 160-382139/2-A		385836	382139	A-01-R	ALS
08/28/18 19:56	240	160-29881-13	CRC-B4-1012	385836	380642	A-01-R	ALS

Detector: AV78

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:49	140	IC 160-371884/1		371884			PS
05/21/18 12:19	60	ICV 160-371972/1		371972			PS
08/13/18 14:36	960	ICB 160-382172/1		382172			PS
08/14/18 18:50	60	CCV 160-382731/1		382731			PS
08/28/18 00:39	1	PULSER 160-385837/1		385837			ALS
08/28/18 02:47	240	160-29881-18	CRC-BK1-0203	385837	382139	A-01-R	ALS
08/28/18 19:56	240	160-29881-14	CRC-B4-1820	385837	380642	A-01-R	ALS

Detector: AV79

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:49	140	IC 160-371885/1		371885			PS
05/21/18 12:19	60	ICV 160-371973/1		371973			PS
08/11/18 17:17	960	ICB 160-382021/1		382021			PS
08/14/18 18:51	60	CCV 160-382732/1		382732			PS
08/28/18 00:39	1	PULSER 160-385838/1		385838			ALS
08/28/18 02:47	240	160-29881-18 DU	CRC-BK1-0203 DU	385838	382139	A-01-R	ALS
08/28/18 19:56	240	160-29881-15	CRC-B12-0002	385838	380642	A-01-R	ALS

Detector: AV80

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:50	140	IC 160-371886/1		371886			PS
05/21/18 12:20	60	ICV 160-371974/1		371974			PS
08/13/18 14:36	960	ICB 160-382173/1		382173			PS
08/14/18 18:51	60	CCV 160-382734/1		382734			PS
08/28/18 00:39	1	PULSER 160-385840/1		385840			ALS
08/28/18 02:47	240	160-29881-19	CRC-BK2-0102	385840	382139	A-01-R	ALS
08/28/18 19:56	240	160-29881-16	CRC-B12-0406	385840	380642	A-01-R	ALS

Detector: AV81

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:50	140	IC 160-371887/1		371887			PS
05/21/18 12:20	60	ICV 160-371975/1		371975			PS
08/11/18 17:17	960	ICB 160-382024/1		382024			PS
08/14/18 18:53	60	CCV 160-382735/1		382735			PS
08/28/18 00:39	1	PULSER 160-385841/1		385841			ALS
08/28/18 02:47	240	ZZZZZ		385841			
08/28/18 19:56	240	160-29881-17	CRC-B12-1214	385841	380642	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV82

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/15/18 15:50	140.006	IC 160-371888/1		371888			PS
	331380						
	208						
05/21/18 12:21	60	ICV 160-371976/1		371976			
05/21/18 14:23	60	ICV 160-371976/2		371976			PS
08/11/18 17:17	960	ICB 160-382025/1		382025			PS
08/14/18 18:53	60	CCV 160-382736/1		382736			PS
08/28/18 00:39	1	PULSER 160-385842/1		385842			ALS
08/28/18 02:47	240	160-29881-21	CRC-BK4-0102	385842	382139	A-01-R	ALS
08/28/18 19:58	180	ZZZZZ		385842			

Detector: AV83

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/16/18 13:31	140	IC 160-371889/1		371889			PS
05/23/18 15:19	60	ICV 160-372014/1		372014			PS
08/11/18 17:17	960	ICB 160-382026/1		382026			PS
08/14/18 18:54	60	CCV 160-382737/1		382737			PS
08/28/18 00:39	1	PULSER 160-385843/1		385843			ALS
08/28/18 02:47	240	160-29881-22	CRC-BK6-0002	385843	382139	A-01-R	ALS
08/28/18 19:58	180	ZZZZZ		385843			

Detector: AV85

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/16/18 13:32	140	IC 160-371891/1		371891			PS
05/23/18 15:20	60	ICV 160-372016/1		372016			PS
08/11/18 17:17	960	ICB 160-382028/1		382028			PS
08/14/18 18:56	60	CCV 160-382739/1		382739			PS
08/28/18 00:39	1	PULSER 160-385845/1		385845			ALS
08/28/18 02:47	240	160-29881-23	CRC-BK6-0406	385845	382139	A-01-R	ALS
08/28/18 19:58	180	ZZZZZ		385845			

Detector: AV86

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/16/18 13:32	140	IC 160-371892/1		371892			PS
05/23/18 15:20	60	ICV 160-372017/1		372017			PS
08/11/18 17:17	960	ICB 160-382029/1		382029			PS
08/14/18 18:55	60	CCV 160-382740/1		382740			PS
08/28/18 00:39	1	PULSER 160-385846/1		385846			ALS
08/28/18 02:47	240	160-29881-24	CRC-BK7-0405	385846	382139	A-01-R	ALS
08/28/18 19:58	180	ZZZZZ		385846			

Detector: AV88

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/16/18 13:33	140	IC 160-371893/1		371893			PS
05/23/18 15:20	60	ICV 160-372018/1		372018			PS
08/11/18 17:17	960	ICB 160-382030/1		382030			PS
08/14/18 18:57	60	CCV 160-382741/1		382741			PS
08/28/18 00:39	1	PULSER 160-385847/1		385847			ALS
08/28/18 02:47	240	160-29881-25	CRC-BK9-0506	385847	382139	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV88 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/28/18 19:58	180	ZZZZZ		385847			

Detector: AV91

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/16/18 13:16	140	IC 160-371896/1		371896			PS
05/23/18 15:21	60	ICV 160-372021/1		372021			PS
08/11/18 17:17	960	ICB 160-382034/1		382034			PS
08/14/18 18:59	60	CCV 160-382744/1		382744			PS
08/28/18 00:39	1	PULSER 160-385850/1		385850			ALS
08/28/18 02:47	240	160-29881-26	CRC-BK8-0102	385850	382139	A-01-R	ALS
08/28/18 19:58	180	ZZZZZ		385850			

Detector: AV148

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 10:03	140	IC 160-337251/1		337251			PS
11/15/17 11:50	60	ICV 160-337583/1		337583			PS
08/20/18 17:49	960	ICB 160-385018/1		385018			PS
08/22/18 11:19	60	CCV 160-384933/1		384933			PS
08/28/18 00:14	1	PULSER 160-385871/1		385871			ALS
08/28/18 03:30	240	MB 160-380693/1-A		385871	380693	A-01-R	ALS
08/28/18 18:03	180	ZZZZZ		385871			

Detector: AV151

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:46	140	IC 160-337254/1		337254			PS
11/15/17 11:45	60	ICV 160-337586/1		337586			PS
08/21/18 13:34	960	ICB 160-384892/1		384892			PS
08/23/18 02:40	60	CCV 160-385000/1		385000			PS
08/28/18 00:14	1	PULSER 160-385873/1		385873			ALS
08/28/18 03:30	240	LCS 160-380693/2-A		385873	380693	A-01-R	ALS
08/28/18 18:11	240	ZZZZZ		385873			

Detector: AV152

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:47	140	IC 160-337255/1		337255			PS
11/15/17 11:51	60	ICV 160-337587/1		337587			PS
08/21/18 13:34	960	ICB 160-384893/1		384893			PS
08/22/18 11:19	60	CCV 160-384936/1		384936			PS
08/28/18 00:14	1	PULSER 160-385874/1		385874			ALS
08/28/18 03:30	240	160-29881-27	CRC-B4-2628	385874	380693	A-01-R	ALS
08/28/18 18:07	960	ZZZZZ		385874			

Detector: AV153

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:48	140	IC 160-337256/1		337256			PS
11/15/17 11:52	60	ICV 160-337588/1		337588			PS
08/20/18 17:49	960	ICB 160-385021/1		385021			PS

Alpha Spectroscopy Run Log

Detector: AV153 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/23/18 02:40	60	CCV 160-385001/1		385001			PS
08/28/18 00:14	1	PULSER 160-385875/1		385875			ALS
08/28/18 03:30	240	160-29881-27 DU	CRC-B4-2628 DU	385875	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385875			

Detector: AV154

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:48	140	IC 160-337257/1		337257			PS
11/15/17 11:52	60	ICV 160-337589/1		337589			PS
08/21/18 13:34	960	ICB 160-384894/1		384894			PS
08/22/18 11:20	60	CCV 160-384938/1		384938			PS
08/28/18 00:14	1	PULSER 160-385876/1		385876			ALS
08/28/18 03:30	240	160-29881-28	CRC-B14-0608	385876	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385876			

Detector: AV156

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 10:04	140	IC 160-337259/1		337259			PS
11/15/17 11:46	60	ICV 160-337591/1		337591			PS
08/21/18 13:34	960	ICB 160-384895/1		384895			PS
08/22/18 11:20	60	CCV 160-384939/1		384939			PS
08/28/18 00:14	1	PULSER 160-385877/1		385877			ALS
08/28/18 03:30	240	160-29881-29	CRC-B14-1012	385877	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385877			

Detector: AV158

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/15/17 08:35	140	IC 160-337338/1		337338			PS
11/15/17 11:47	60	ICV 160-337593/1		337593			PS
08/20/18 17:49	960	ICB 160-385024/1		385024			PS
08/22/18 11:21	60	CCV 160-384941/1		384941			PS
08/28/18 00:14	1	PULSER 160-385879/1		385879			ALS
08/28/18 03:30	240	160-29881-30	CRC-B14-1618	385879	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385879			

Detector: AV159

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 10:06	140	IC 160-337261/1		337261			PS
11/15/17 11:49	60	ICV 160-337594/1		337594			PS
08/21/18 13:34	960	ICB 160-384896/1		384896			PS
08/22/18 11:21	60	CCV 160-384942/1		384942			PS
08/28/18 00:14	1	PULSER 160-385880/1		385880			ALS
08/28/18 03:30	240	160-29881-31	CRC-B14-2426	385880	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385880			

Alpha Spectroscopy Run Log

Detector: AV160

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:52	140	IC 160-337262/1		337262			PS
11/15/17 11:48	60	ICV 160-337595/1		337595			PS
08/21/18 13:34	960	ICB 160-384897/1		384897			PS
08/22/18 11:21	60	CCV 160-384943/1		384943			PS
08/28/18 00:14	1	PULSER 160-385881/1		385881			ALS
08/28/18 03:30	240	160-29881-32	CRC-B17-0406	385881	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385881			

Detector: AV161

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 09:53	140	IC 160-337263/1		337263			PS
11/15/17 11:49	60	ICV 160-337596/1		337596			PS
08/21/18 13:34	960	ICB 160-384898/1		384898			PS
08/22/18 11:22	60	CCV 160-384944/1		384944			PS
08/28/18 00:14	1	PULSER 160-385882/1		385882			ALS
08/28/18 03:30	240	160-29881-33	CRC-B17-0810	385882	380693	A-01-R	ALS
08/28/18 03:30	240	ZZZZZ		385882			
08/28/18 18:11	240	160-29881-42	CRC-B11-2628	385882	380693	A-01-R	ALS

Detector: AV164

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:45	140	IC 160-337267/1		337267			PS
11/15/17 13:10	60	ICV 160-337599/1		337599			PS
08/21/18 13:34	960	ICB 160-384899/1		384899			PS
08/23/18 02:40	60	CCV 160-385002/1		385002			PS
08/28/18 00:14	1	PULSER 160-385885/1		385885			ALS
08/28/18 03:30	240	160-29881-34	CRC-B17-1820	385885	380693	A-01-R	ALS
08/28/18 18:13	480	160-29881-4	CRC-B7-0204	385885	380661	A-01-R	ALS

Detector: AV165

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:45	140	IC 160-337268/1		337268			PS
11/15/17 13:11	60	ICV 160-337600/1		337600			PS
08/20/18 17:49	960	ICB 160-385030/1		385030			PS
08/22/18 12:40	60	CCV 160-384947/1		384947			PS
08/28/18 00:14	1	PULSER 160-385886/1		385886			ALS
08/28/18 03:30	240	160-29881-35	CRC-B17-2628	385886	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385886			

Detector: AV166

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:45	140	IC 160-337269/1		337269			PS
11/15/17 13:11	60	ICV 160-337601/1		337601			PS
08/20/18 17:49	960	ICB 160-385031/1		385031			PS
08/22/18 12:41	60	CCV 160-384948/1		384948			PS
08/28/18 00:14	1	PULSER 160-385887/1		385887			ALS
08/28/18 03:30	240	160-29881-36	CRC-B5-1214	385887	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385887			

Alpha Spectroscopy Run Log

Detector: AV167

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:46	140	IC 160-337270/1		337270			PS
11/15/17 13:09	60	ICV 160-337602/1		337602			PS
08/21/18 13:34	960	ICB 160-384900/1		384900			PS
08/23/18 02:41	60	CCV 160-385003/1		385003			PS
08/28/18 00:14	1	PULSER 160-385888/1		385888			ALS
08/28/18 03:30	240	160-29881-37	CRC-B5-1618	385888	380693	A-01-R	ALS
08/28/18 18:14	240	ZZZZZ		385888			

Detector: AV171

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:47	140	IC 160-337274/1		337274			PS
11/15/17 13:12	60	ICV 160-337606/1		337606			PS
08/21/18 13:34	960	ICB 160-384903/1		384903			PS
08/22/18 12:41	60	CCV 160-384950/1		384950			PS
08/28/18 00:14	1	PULSER 160-385890/1		385890			ALS
08/28/18 03:30	240	160-29881-38	CRC-B5-2224	385890	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385890			

Detector: AV172

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:47	140	IC 160-337275/1		337275			PS
11/15/17 13:12	60	ICV 160-337607/1		337607			PS
08/21/18 13:34	960	ICB 160-384904/1		384904			PS
08/22/18 12:41	60	CCV 160-384951/1		384951			PS
08/28/18 00:14	1	PULSER 160-385891/1		385891			ALS
08/28/18 03:30	240	160-29881-39	CRC-B5-2830	385891	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385891			

Detector: AV173

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:55	140	IC 160-337276/1		337276			PS
11/15/17 13:13	60	ICV 160-337608/1		337608			PS
08/21/18 13:34	960	ICB 160-384905/1		384905			PS
08/22/18 12:41	60	CCV 160-384952/1		384952			PS
08/28/18 00:14	1	PULSER 160-385892/1		385892			ALS
08/28/18 03:30	240	160-29881-40	CRC-B11-1214	385892	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385892			

Detector: AV174

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 12:56	140	IC 160-337351/1		337351			PS
11/15/17 13:08	60	ICV 160-337609/1		337609			PS
08/20/18 17:49	960	ICB 160-385037/1		385037			PS
08/22/18 12:42	60	CCV 160-384953/1		384953			PS
08/28/18 00:14	1	PULSER 160-385893/1		385893			ALS
08/28/18 03:30	240	160-29881-41	CRC-B11-2022	385893	380693	A-01-R	ALS
08/28/18 18:10	960	ZZZZZ		385893			

Alpha Spectroscopy Run Log

Detector: AV187

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:34	140	IC 160-337281/1		337281			PS
11/15/17 14:30	60	ICV 160-337614/1		337614			PS
08/21/18 13:34	960	ICB 160-384910/1		384910			PS
08/22/18 14:19	60	CCV 160-384955/1		384955			PS
08/28/18 00:13	1	PULSER 160-385895/1		385895			ALS
08/28/18 03:26	240	MB 160-380661/1-A		385895	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385895			

Detector: AV188

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:46	140	IC 160-337282/1		337282			PS
11/15/17 14:27	60	ICV 160-337615/1		337615			PS
08/20/18 17:49	960	ICB 160-385041/1		385041			PS
08/22/18 14:20	60	CCV 160-384956/1		384956			PS
08/28/18 00:13	1	PULSER 160-385896/1		385896			ALS
08/28/18 03:26	240	LCS 160-380661/2-A		385896	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385896			

Detector: AV189

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:34	140	IC 160-337283/1		337283			PS
11/15/17 14:27	60	ICV 160-337616/1		337616			PS
08/20/18 17:49	960	ICB 160-385042/1		385042			PS
08/22/18 14:20	60	CCV 160-384957/1		384957			PS
08/28/18 00:13	1	PULSER 160-385897/1		385897			ALS
08/28/18 03:26	240	160-29881-1	CRC-B9-0406	385897	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385897			

Detector: AV190

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:35	140	IC 160-337284/1		337284			PS
11/15/17 14:30	60	ICV 160-337617/1		337617			PS
08/21/18 13:34	960	ICB 160-384911/1		384911			PS
08/22/18 14:20	60	CCV 160-384958/1		384958			PS
08/28/18 00:13	1	PULSER 160-385898/1		385898			ALS
08/28/18 03:26	240	160-29881-1 DU	CRC-B9-0406 DU	385898	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385898			

Detector: AV191

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:35	140	IC 160-337285/1		337285			PS
11/15/17 14:31	60	ICV 160-337618/1		337618			PS
08/20/18 17:49	960	ICB 160-385044/1		385044			PS
08/22/18 14:21	60	CCV 160-384959/1		384959			PS
08/28/18 00:13	1	PULSER 160-385899/1		385899			ALS
08/28/18 03:26	240	160-29881-2	CRC-B6-0204	385899	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385899			

Alpha Spectroscopy Run Log

Detector: AV192

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/13/17 15:35	140	IC 160-337286/1		337286			PS
11/15/17 14:31	60	ICV 160-337619/1		337619			PS
08/21/18 13:34	960	ICB 160-384912/1		384912			PS
08/22/18 14:27	60	CCV 160-384960/1		384960			PS
08/28/18 00:14	1	PULSER 160-385900/1		385900			ALS
08/28/18 03:26	240	160-29881-3	CRC-B1-0406	385900	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385900			

Detector: AV206

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 09:00	140	IC 160-337300/1		337300			PS
11/15/17 15:53	60	ICV 160-337632/1		337632			PS
08/20/18 17:49	960	ICB 160-385053/1		385053			PS
08/22/18 16:35	60	CCV 160-384967/1		384967			PS
08/28/18 00:14	1	PULSER 160-385908/1		385908			ALS
08/28/18 03:26	240	160-29881-5	CRC-B22-0506	385908	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385908			

Detector: AV208

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 08:59	140	IC 160-337302/1		337302			PS
11/15/17 15:50	60	ICV 160-337634/1		337634			PS
08/21/18 13:34	960	ICB 160-384920/1		384920			PS
08/23/18 00:55	60	CCV 160-385006/1		385006			PS
08/28/18 00:14	1	PULSER 160-385910/1		385910			ALS
08/28/18 03:26	240	160-29881-6	CRC-B7-0406	385910	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385910			

Detector: AV211

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 09:06	140	IC 160-337305/1		337305			PS
11/16/17 11:19	60	ICV 160-337642/1		337642			PS
08/21/18 13:34	960	ICB 160-384922/1		384922			PS
08/22/18 16:37	60	CCV 160-384970/1		384970			PS
08/28/18 00:13	1	PULSER 160-385912/1		385912			ALS
08/28/18 03:26	240	160-29881-7	CRC-B4-0608	385912	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385912			

Detector: AV212

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 08:58	140	IC 160-337306/1		337306			PS
11/15/17 15:52	60	ICV 160-337638/1		337638			PS
08/21/18 13:34	960	ICB 160-384923/1		384923			PS
08/22/18 16:38	60	CCV 160-384971/1		384971			PS
08/28/18 00:13	1	PULSER 160-385913/1		385913			ALS
08/28/18 03:26	240	160-29881-8	CRC-B14-0204	385913	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385913			

Alpha Spectroscopy Run Log

Detector: AV213

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 08:58	140	IC 160-337307/1		337307			PS
11/15/17 15:52	60	ICV 160-337639/1		337639			PS
08/21/18 13:34	960	ICB 160-384924/1		384924			PS
08/22/18 16:38	60	CCV 160-384972/1		384972			PS
08/28/18 00:13	1	PULSER 160-385914/1		385914			ALS
08/28/18 03:26	240	160-29881-9	CRC-B17-0204	385914	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385914			

Detector: AV215

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:26	140	IC 160-337309/1		337309			PS
11/16/17 08:34	60	ICV 160-337643/1		337643			PS
07/21/18 21:28	960	ICB 160-378418/1		378418			PS
08/22/18 21:23	60	CCV 160-384973/1		384973			PS
08/28/18 00:13	1	PULSER 160-385915/1		385915			ALS
08/28/18 03:26	240	160-29881-10	CRC-B5-0204	385915	380661	A-01-R	ALS
08/28/18 18:16	960	ZZZZZ		385915			

Detector: AV216

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:25	140	IC 160-337310/1		337310			PS
11/16/17 08:34	60	ICV 160-337644/1		337644			PS
08/20/18 17:49	960	ICB 160-385058/1		385058			PS
08/22/18 21:24	60	CCV 160-384974/1		384974			PS
08/28/18 00:13	1	PULSER 160-385916/1		385916			ALS
08/28/18 03:26	240	160-29881-11	CRC-B5-0608	385916	380661	A-01-R	ALS

Detector: AV217

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:25	140	IC 160-337311/1		337311			PS
11/16/17 08:33	60	ICV 160-337645/1		337645			PS
08/20/18 17:49	960	ICB 160-385059/1		385059			PS
08/22/18 21:24	60	CCV 160-384975/1		384975			PS
08/28/18 00:13	1	PULSER 160-385917/1		385917			ALS
08/28/18 03:26	240	160-29881-12	CRC-B11-0204	385917	380661	A-01-R	ALS

Detector: AV218

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:33	140	IC 160-337312/1		337312			PS
11/16/17 08:34	60	ICV 160-337646/1		337646			PS
08/21/18 13:34	960	ICB 160-384926/1		384926			PS
08/22/18 21:24	60	CCV 160-384976/1		384976			PS
08/28/18 00:13	1	PULSER 160-385918/1		385918			ALS
08/28/18 03:26	240	160-29881-13	CRC-B4-1012	385918	380661	A-01-R	ALS

Alpha Spectroscopy Run Log

Detector: AV219

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:24	140	IC 160-337313/1		337313			PS
11/16/17 08:34	60	ICV 160-337647/1		337647			PS
08/20/18 17:49	960	ICB 160-385061/1		385061			PS
08/22/18 21:24	60	CCV 160-384977/1		384977			PS
08/28/18 00:13	1	PULSER 160-385919/1		385919			ALS
08/28/18 03:26	240	160-29881-14	CRC-B4-1820	385919	380661	A-01-R	ALS

Detector: AV220

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:33	140	IC 160-337314/1		337314			PS
11/16/17 08:33	60	ICV 160-337648/1		337648			PS
08/20/18 17:49	960	ICB 160-385062/1		385062			PS
08/22/18 21:24	60	CCV 160-384978/1		384978			PS
08/28/18 00:13	1	PULSER 160-385920/1		385920			ALS
08/28/18 03:26	240	160-29881-15	CRC-B12-0002	385920	380661	A-01-R	ALS

Detector: AV222

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:34	140	IC 160-337316/1		337316			PS
11/16/17 08:32	60	ICV 160-337650/1		337650			PS
08/21/18 13:34	960	ICB 160-384928/1		384928			PS
08/23/18 00:55	60	CCV 160-385008/1		385008			PS
08/28/18 00:13	1	PULSER 160-385922/1		385922			ALS
08/28/18 03:26	240	160-29881-16	CRC-B12-0406	385922	380661	A-01-R	ALS

Detector: AV225

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
11/14/17 12:22	140	IC 160-337319/1		337319			PS
11/16/17 08:36	60	ICV 160-337653/1		337653			PS
08/20/18 17:49	960	ICB 160-385065/1		385065			PS
08/22/18 21:25	60	CCV 160-384980/1		384980			PS
08/28/18 00:13	1	PULSER 160-385923/1		385923			ALS
08/28/18 03:26	240	160-29881-17	CRC-B12-1214	385923	380661	A-01-R	ALS

GAMMA SPECTROSCOPY

Method 901.1
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method 901.1

Prep Batch: 379951

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: MB 160-379951/1-A Analyzed: 08/23/18 06:25 Ts: 30 Sigma: 2
Client ID: Detector: GV9 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.02519	0.0663	0.0664	U	pCi/g		0.829	384700
Radium-226	-0.1060	0.122	0.122	U	pCi/g	1.00	0.293	384700
Radium-228	-0.01254	0.176	0.176	U	pCi/g		0.219	384700
Thallium-208	0.009027	0.0448	0.0448	U	pCi/g		0.0600	384700
Thorium-232	-0.01254	0.176	0.176	U	pCi/g		0.219	384700
Thorium-234	0.3218	0.742	0.743	U	pCi/g		1.27	384700
Uranium-235	0.05960	0.153	0.153	U	pCi/g		0.494	384700
Uranium-238	0.3218	0.742	0.743	U	pCi/g		1.27	384700
Actinium-228	-0.01254	0.176	0.176	U	pCi/g		0.219	384700
Bismuth-212	-0.02701	0.429	0.429	U	pCi/g		0.808	384700
Bismuth-214	-0.1060	0.122	0.122	U	pCi/g		0.293	384700
Lead-210	-0.07831	0.164	0.164	U	pCi/g		1.69	384700
Lead-212	0.01037	0.0511	0.0511	U	pCi/g		0.0899	384700
Lead-214	-0.04028	0.0768	0.0769	U	pCi/g		0.146	384700
Potassium-40	0.1925	0.426	0.427	U	pCi/g		0.751	384700
Protactinium-231	0.1503	1.42	1.42	U	pCi/g		2.48	384700

Lab ID: LCS 160-379951/2-A Analyzed: 08/23/18 06:26 Ts: 30 Sigma: 2
Client ID: Detector: GV12 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	97.96	1.77	11.5		pCi/g		1.33	384701
Cesium-137	30.72	0.716	3.22		pCi/g		0.228	384701
Cobalt-60	13.61	0.419	1.42		pCi/g		0.174	384701

Lab ID: 160-29881-1 Analyzed: 08/23/18 11:46 Ts: 30 Sigma: 2
Client ID: CRC-B9-0406 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.197	0.481	0.481	U	pCi/g		1.10	384697
Radium-226	0.956	0.188	0.213		pCi/g	1.00	0.0956	384697
Radium-228	0.318	0.254	0.256	U	pCi/g		0.328	384697
Thallium-208	0.141	0.0663	0.0679		pCi/g		0.0550	384697
Thorium-232	0.318	0.254	0.256	U	pCi/g		0.328	384697
Thorium-234	0.718	0.577	0.582	U	pCi/g		1.63	384697
Uranium-235	0.116	0.348	0.348	U	pCi/g		0.592	384697

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-1 Analyzed: 08/23/18 11:46 Ts: 30 Sigma: 2
Client ID: CRC-B9-0406 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	0.718	0.577	0.582	U	pCi/g		1.63	384697
Actinium-228	0.318	0.254	0.256	U	pCi/g		0.328	384697
Bismuth-212	0.302	0.809	0.809	U	pCi/g		1.42	384697
Bismuth-214	0.956	0.188	0.213		pCi/g		0.0956	384697
Lead-210	1.02	1.26	1.27	U	pCi/g		1.84	384697
Lead-212	0.472	0.111	0.126		pCi/g		0.117	384697
Lead-214	0.837	0.142	0.167		pCi/g		0.145	384697
Potassium-40	8.29	1.68	1.88		pCi/g		0.951	384697
Protactinium-231	-1.01	3.39	3.39	U	pCi/g		5.72	384697

Lab ID: 160-29881-1 DU Analyzed: 08/23/18 07:08 Ts: 30 Sigma: 2
Client ID: CRC-B9-0406 Detector: GV9 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.2648	0.415	0.416	U	pCi/g		1.11	384700
Radium-226	0.6697	0.138	0.155		pCi/g	1.00	0.112	384700
Radium-228	0.3837	0.126	0.132		pCi/g		0.0764	384700
Thallium-208	0.06668	0.0643	0.0647	U	pCi/g		0.0735	384700
Thorium-232	0.3837	0.126	0.132		pCi/g		0.0764	384700
Thorium-234	-0.6327	1.35	1.36	U	pCi/g		2.26	384700
Uranium-235	0.07127	0.178	0.178	U	pCi/g		0.831	384700
Uranium-238	-0.6327	1.35	1.36	U	pCi/g		2.26	384700
Actinium-228	0.3837	0.126	0.132		pCi/g		0.0764	384700
Bismuth-212	0.3731	0.626	0.627	U	pCi/g		1.05	384700
Bismuth-214	0.6697	0.138	0.155		pCi/g		0.112	384700
Lead-210	-0.3503	1.13	1.13	U	pCi/g		2.42	384700
Lead-212	0.3481	0.0792	0.0911		pCi/g		0.0907	384700
Lead-214	0.6647	0.114	0.133		pCi/g		0.0907	384700
Potassium-40	9.342	1.28	1.60		pCi/g		0.621	384700
Protactinium-231	0.2174	1.39	1.39	U	pCi/g		4.43	384700

Lab ID: 160-29881-4 Analyzed: 08/23/18 06:28 Ts: 30 Sigma: 2
Client ID: CRC-B7-0204 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.417	0.698	0.700	U	pCi/g		14.8	384704

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-4 Analyzed: 08/23/18 06:28 Ts: 30 Sigma: 2
Client ID: CRC-B7-0204 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	135	2.19	14.2	G	pCi/g	1.00	1.02	384704
Radium-228	0.877	1.94	1.95	U	pCi/g		2.09	384704
Thallium-208	-0.323	0.497	0.499	U	pCi/g		0.630	384704
Thorium-232	0.877	1.94	1.95	U	pCi/g		2.09	384704
Thorium-234	43.0	8.21	9.36		pCi/g		12.9	384704
Uranium-235	5.40	3.02	3.07		pCi/g		3.18	384704
Uranium-238	43.0	8.21	9.36		pCi/g		12.9	384704
Actinium-228	0.877	1.94	1.95	U	pCi/g		2.09	384704
Bismuth-212	-1.99	22.8	22.8	U	pCi/g		9.68	384704
Bismuth-214	135	2.19	14.2		pCi/g		1.02	384704
Lead-210	90.4	8.83	13.8		pCi/g		12.7	384704
Lead-212	0.426	1.38	1.38	U	pCi/g		2.28	384704
Lead-214	147	1.83	15.4		pCi/g		1.30	384704
Potassium-40	11.3	4.98	5.11		pCi/g		5.05	384704
Protactinium-231	-7.27	33.7	33.7	U	pCi/g		55.6	384704

Lab ID: 160-29881-8 Analyzed: 08/23/18 06:28 Ts: 30 Sigma: 2
Client ID: CRC-B14-0204 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.246	0.636	0.637	U	pCi/g		1.36	384702
Radium-226	2.51	0.267	0.374		pCi/g	1.00	0.151	384702
Radium-228	0.921	0.238	0.256		pCi/g		0.440	384702
Thallium-208	-0.00489	0.00555	0.00557	U	pCi/g		0.182	384702
Thorium-232	0.921	0.238	0.256		pCi/g		0.440	384702
Thorium-234	1.70	1.71	1.72	U	pCi/g		2.34	384702
Uranium-235	0.116	0.467	0.467	U	pCi/g		0.872	384702
Uranium-238	1.70	1.71	1.72	U	pCi/g		2.34	384702
Actinium-228	0.921	0.238	0.256		pCi/g		0.440	384702
Bismuth-212	-0.331	1.08	1.08	U	pCi/g		1.86	384702
Bismuth-214	2.51	0.267	0.374		pCi/g		0.151	384702
Lead-210	2.68	1.76	1.79		pCi/g		2.45	384702
Lead-212	0.841	0.131	0.170		pCi/g		0.139	384702
Lead-214	2.67	0.243	0.368		pCi/g		0.181	384702
Potassium-40	11.9	1.59	2.00		pCi/g		0.757	384702
Protactinium-231	-1.05	4.39	4.39	U	pCi/g		7.34	384702

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-9 Analyzed: 08/23/18 06:28 Ts: 30 Sigma: 2
Client ID: CRC-B17-0204 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-1.73	6.55	6.55	U	pCi/g		10.8	384705
Radium-226	24.7	1.06	2.73		pCi/g	1.00	0.472	384705
Radium-228	0.775	0.491	0.498	U	pCi/g		0.953	384705
Thallium-208	0.369	0.169	0.173		pCi/g		0.194	384705
Thorium-232	0.775	0.491	0.498	U	pCi/g		0.953	384705
Thorium-234	18.9	3.81	4.37		pCi/g		5.57	384705
Uranium-235	0.0226	0.0401	0.0402	U	pCi/g		3.71	384705
Uranium-238	18.9	3.81	4.37		pCi/g		5.57	384705
Actinium-228	0.775	0.491	0.498	U	pCi/g		0.953	384705
Bismuth-212	0.00168	2.67	2.67	U	pCi/g		4.57	384705
Bismuth-214	24.7	1.06	2.73		pCi/g		0.472	384705
Lead-210	22.2	5.32	5.99		pCi/g		6.61	384705
Lead-212	0.881	0.269	0.284		pCi/g		0.401	384705
Lead-214	25.8	1.07	2.82		pCi/g		0.630	384705
Potassium-40	11.0	3.02	3.22		pCi/g		2.61	384705
Protactinium-231	0.000	3.01	3.01	U	pCi/g		25.0	384705

Lab ID: 160-29881-12 Analyzed: 08/23/18 06:29 Ts: 30 Sigma: 2
Client ID: CRC-B11-0204 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.581	2.11	2.11	U	pCi/g		3.52	384699
Radium-226	8.82	0.565	1.08		pCi/g	1.00	0.237	384699
Radium-228	1.04	0.412	0.425		pCi/g		0.598	384699
Thallium-208	0.0523	0.164	0.164	U	pCi/g		0.197	384699
Thorium-232	1.04	0.412	0.425		pCi/g		0.598	384699
Thorium-234	-2.84	2.35	2.37	U	pCi/g		6.33	384699
Uranium-235	0.471	1.02	1.02	U	pCi/g		2.00	384699
Uranium-238	-2.84	2.35	2.37	U	pCi/g		6.33	384699
Actinium-228	1.04	0.412	0.425		pCi/g		0.598	384699
Bismuth-212	0.951	1.58	1.58	U	pCi/g		2.64	384699
Bismuth-214	8.82	0.565	1.08		pCi/g		0.237	384699
Lead-210	7.99	3.66	3.78		pCi/g		4.30	384699
Lead-212	0.907	0.172	0.208		pCi/g		0.215	384699
Lead-214	10.1	0.454	1.15		pCi/g		0.330	384699
Potassium-40	13.0	2.06	2.45		pCi/g		1.12	384699

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-12 Analyzed: 08/23/18 06:29 Ts: 30 Sigma: 2
Client ID: CRC-B11-0204 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	0.000	2.51	2.51	U	pCi/g		14.7	384699

Lab ID: 160-29881-13 Analyzed: 08/23/18 06:31 Ts: 30 Sigma: 2
Client ID: CRC-B4-1012 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0618	0.612	0.612	U	pCi/g		1.05	384698
Radium-226	0.304	0.0948	0.0999		pCi/g	1.00	0.0622	384698
Radium-228	0.164	0.130	0.131		pCi/g		0.154	384698
Thallium-208	0.0906	0.0624	0.0631		pCi/g		0.0632	384698
Thorium-232	0.164	0.130	0.131		pCi/g		0.154	384698
Thorium-234	-0.572	0.909	0.911	U	pCi/g		1.44	384698
Uranium-235	-0.0177	0.0340	0.0340	U	pCi/g		0.547	384698
Uranium-238	-0.572	0.909	0.911	U	pCi/g		1.44	384698
Actinium-228	0.164	0.130	0.131		pCi/g		0.154	384698
Bismuth-212	0.162	0.580	0.580	U	pCi/g		1.02	384698
Bismuth-214	0.304	0.0948	0.0999		pCi/g		0.0622	384698
Lead-210	-0.296	1.24	1.24	U	pCi/g		2.16	384698
Lead-212	0.135	0.0569	0.0595		pCi/g		0.0782	384698
Lead-214	0.253	0.0889	0.0927		pCi/g		0.0824	384698
Potassium-40	6.79	1.30	1.47		pCi/g		0.806	384698
Protactinium-231	0.395	1.20	1.20	U	pCi/g		2.85	384698

Lab ID: 160-29881-14 Analyzed: 08/23/18 06:32 Ts: 30 Sigma: 2
Client ID: CRC-B4-1820 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.228	0.723	0.723	U	pCi/g		1.05	384697
Radium-226	0.457	0.175	0.181		pCi/g	1.00	0.164	384697
Radium-228	0.549	0.167	0.176		pCi/g		0.153	384697
Thallium-208	0.0818	0.0969	0.0973	U	pCi/g		0.0927	384697
Thorium-232	0.549	0.167	0.176		pCi/g		0.153	384697
Thorium-234	0.781	1.21	1.21	U	pCi/g		2.01	384697
Uranium-235	-0.0129	0.373	0.373	U	pCi/g		0.703	384697
Uranium-238	0.781	1.21	1.21	U	pCi/g		2.01	384697
Actinium-228	0.549	0.167	0.176		pCi/g		0.153	384697

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-14 Analyzed: 08/23/18 06:32 Ts: 30 Sigma: 2
Client ID: CRC-B4-1820 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Bismuth-212	0.654	1.28	1.28	U	pCi/g		2.17	384697
Bismuth-214	0.457	0.175	0.181		pCi/g		0.164	384697
Lead-210	1.65	1.52	1.53	U	pCi/g		2.04	384697
Lead-212	0.354	0.102	0.112		pCi/g		0.115	384697
Lead-214	0.536	0.146	0.156		pCi/g		0.122	384697
Potassium-40	11.9	2.07	2.40		pCi/g		1.02	384697
Protactinium-231	0.000	0.709	0.709	U	pCi/g		5.80	384697

Lab ID: 160-29881-15 Analyzed: 08/23/18 07:09 Ts: 30 Sigma: 2
Client ID: CRC-B12-0002 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.575	1.56	1.56	U	pCi/g		2.62	384701
Radium-226	2.60	0.335	0.427		pCi/g	1.00	0.176	384701
Radium-228	1.08	0.249	0.273		pCi/g		0.207	384701
Thallium-208	0.251	0.0885	0.0921		pCi/g		0.0839	384701
Thorium-232	1.08	0.249	0.273		pCi/g		0.207	384701
Thorium-234	1.12	0.845	0.854	U	pCi/g		2.47	384701
Uranium-235	0.0346	0.0996	0.0996	U	pCi/g		1.42	384701
Uranium-238	1.12	0.845	0.854	U	pCi/g		2.47	384701
Actinium-228	1.08	0.249	0.273		pCi/g		0.207	384701
Bismuth-212	0.000	0.871	0.871	U	pCi/g		1.85	384701
Bismuth-214	2.60	0.335	0.427		pCi/g		0.176	384701
Lead-210	3.80	2.27	2.32		pCi/g		3.10	384701
Lead-212	0.785	0.150	0.171		pCi/g		0.163	384701
Lead-214	2.66	0.271	0.382		pCi/g		0.254	384701
Potassium-40	12.1	1.83	2.20		pCi/g		0.509	384701
Protactinium-231	-1.36	5.56	5.56	U	pCi/g		9.31	384701

Lab ID: 160-29881-16 Analyzed: 08/23/18 07:09 Ts: 30 Sigma: 2
Client ID: CRC-B12-0406 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.229	0.511	0.512	U	pCi/g		0.772	384703
Radium-226	0.295	0.0990	0.104		pCi/g	1.00	0.0924	384703
Radium-228	0.227	0.102	0.105		pCi/g		0.0844	384703

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-16 Analyzed: 08/23/18 07:09 Ts: 30 Sigma: 2
Client ID: CRC-B12-0406 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thallium-208	0.0409	0.0751	0.0752	U	pCi/g		0.0758	384703
Thorium-232	0.227	0.102	0.105		pCi/g		0.0844	384703
Thorium-234	0.596	0.685	0.688	U	pCi/g		0.959	384703
Uranium-235	-0.113	0.217	0.217	U	pCi/g		0.433	384703
Uranium-238	0.596	0.685	0.688	U	pCi/g		0.959	384703
Actinium-228	0.227	0.102	0.105		pCi/g		0.0844	384703
Bismuth-212	0.220	0.539	0.539	U	pCi/g		0.936	384703
Bismuth-214	0.295	0.0990	0.104		pCi/g		0.0924	384703
Lead-210	-0.200	1.08	1.08	U	pCi/g		1.65	384703
Lead-212	0.103	0.0619	0.0633		pCi/g		0.0930	384703
Lead-214	0.281	0.0753	0.0807		pCi/g		0.0898	384703
Potassium-40	5.93	1.07	1.23		pCi/g		0.537	384703
Protactinium-231	0.000	0.450	0.450	U	pCi/g		2.87	384703

Lab ID: 160-29881-17 Analyzed: 08/23/18 07:10 Ts: 30 Sigma: 2
Client ID: CRC-B12-1214 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.246	0.791	0.791	U	pCi/g		1.34	384704
Radium-226	0.301	0.107	0.111		pCi/g	1.00	0.107	384704
Radium-228	0.177	0.217	0.218	U	pCi/g		0.291	384704
Thallium-208	0.0232	0.0418	0.0418	U	pCi/g		0.109	384704
Thorium-232	0.177	0.217	0.218	U	pCi/g		0.291	384704
Thorium-234	-0.874	1.32	1.32	U	pCi/g		2.92	384704
Uranium-235	-0.0347	0.0534	0.0535	U	pCi/g		0.874	384704
Uranium-238	-0.874	1.32	1.32	U	pCi/g		2.92	384704
Actinium-228	0.177	0.217	0.218	U	pCi/g		0.291	384704
Bismuth-212	-0.0634	0.733	0.733	U	pCi/g		1.33	384704
Bismuth-214	0.301	0.107	0.111		pCi/g		0.107	384704
Lead-210	-0.191	1.65	1.65	U	pCi/g		2.87	384704
Lead-212	0.160	0.0711	0.0741		pCi/g		0.0931	384704
Lead-214	0.258	0.139	0.141		pCi/g		0.152	384704
Potassium-40	12.8	1.91	2.32		pCi/g		0.815	384704
Protactinium-231	0.000	0.725	0.725	U	pCi/g		5.78	384704

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-27 Analyzed: 08/23/18 07:11 Ts: 30 Sigma: 2
Client ID: CRC-B4-2628 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.180	0.790	0.790	U	pCi/g		1.15	384702
Radium-226	0.703	0.177	0.192		pCi/g	1.00	0.146	384702
Radium-228	0.495	0.256	0.261		pCi/g		0.249	384702
Thallium-208	0.124	0.0548	0.0563		pCi/g		0.0593	384702
Thorium-232	0.495	0.256	0.261		pCi/g		0.249	384702
Thorium-234	0.384	0.430	0.431	U	pCi/g		1.63	384702
Uranium-235	-0.240	0.327	0.328	U	pCi/g		0.794	384702
Uranium-238	0.384	0.430	0.431	U	pCi/g		1.63	384702
Actinium-228	0.495	0.256	0.261		pCi/g		0.249	384702
Bismuth-212	-0.667	1.29	1.29	U	pCi/g		2.17	384702
Bismuth-214	0.703	0.177	0.192		pCi/g		0.146	384702
Lead-210	1.11	1.49	1.50	U	pCi/g		2.19	384702
Lead-212	0.360	0.0985	0.109		pCi/g		0.117	384702
Lead-214	0.639	0.141	0.156		pCi/g		0.159	384702
Potassium-40	12.9	1.78	2.22		pCi/g		0.873	384702
Protactinium-231	-0.000000253	2.96	2.96	U	pCi/g		5.06	384702

Lab ID: 160-29881-28 Analyzed: 08/23/18 07:09 Ts: 30 Sigma: 2
Client ID: CRC-B14-0608 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.331	0.737	0.738	U	pCi/g		1.24	384705
Radium-226	0.195	0.101	0.103		pCi/g	1.00	0.121	384705
Radium-228	0.146	0.187	0.188	U	pCi/g		0.302	384705
Thallium-208	0.114	0.0515	0.0528		pCi/g		0.0547	384705
Thorium-232	0.146	0.187	0.188	U	pCi/g		0.302	384705
Thorium-234	-1.39	1.34	1.35	U	pCi/g		2.66	384705
Uranium-235	0.131	0.467	0.467	U	pCi/g		0.787	384705
Uranium-238	-1.39	1.34	1.35	U	pCi/g		2.66	384705
Actinium-228	0.146	0.187	0.188	U	pCi/g		0.302	384705
Bismuth-212	-0.0460	0.606	0.607	U	pCi/g		1.23	384705
Bismuth-214	0.195	0.101	0.103		pCi/g		0.121	384705
Lead-210	-1.45	1.81	1.82	U	pCi/g		3.24	384705
Lead-212	0.204	0.0889	0.0914		pCi/g		0.104	384705
Lead-214	0.233	0.112	0.115		pCi/g		0.156	384705
Potassium-40	10.3	1.72	2.01		pCi/g		1.13	384705

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-28 Analyzed: 08/23/18 07:09 Ts: 30 Sigma: 2
Client ID: CRC-B14-0608 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	0.000	0.503	0.503	U	pCi/g		5.92	384705

Lab ID: 160-29881-29 Analyzed: 08/23/18 07:10 Ts: 30 Sigma: 2
Client ID: CRC-B14-1012 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.425	0.874	0.875	U	pCi/g		1.46	384699
Radium-226	0.0312	0.166	0.166	U	pCi/g	1.00	0.286	384699
Radium-228	0.282	0.193	0.195		pCi/g		0.197	384699
Thallium-208	0.0780	0.0555	0.0560	U	pCi/g		0.0802	384699
Thorium-232	0.282	0.193	0.195		pCi/g		0.197	384699
Thorium-234	-0.375	1.45	1.45	U	pCi/g		2.50	384699
Uranium-235	-0.00664	0.0412	0.0412	U	pCi/g		0.824	384699
Uranium-238	-0.375	1.45	1.45	U	pCi/g		2.50	384699
Actinium-228	0.282	0.193	0.195		pCi/g		0.197	384699
Bismuth-212	0.253	0.553	0.554	U	pCi/g		0.965	384699
Bismuth-214	0.0312	0.166	0.166	U	pCi/g		0.286	384699
Lead-210	-0.380	1.45	1.45	U	pCi/g		2.52	384699
Lead-212	0.202	0.0753	0.0797		pCi/g		0.0962	384699
Lead-214	0.295	0.0979	0.103		pCi/g		0.101	384699
Potassium-40	13.5	1.87	2.33		pCi/g		0.741	384699
Protactinium-231	0.000	0.436	0.436	U	pCi/g		3.99	384699

Lab ID: 160-29881-30 Analyzed: 08/23/18 07:12 Ts: 30 Sigma: 2
Client ID: CRC-B14-1618 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0807	0.296	0.296	U	pCi/g		1.16	384698
Radium-226	0.463	0.106	0.117		pCi/g	1.00	0.0449	384698
Radium-228	0.346	0.194	0.197		pCi/g		0.182	384698
Thallium-208	0.110	0.0728	0.0737		pCi/g		0.0744	384698
Thorium-232	0.346	0.194	0.197		pCi/g		0.182	384698
Thorium-234	0.412	0.473	0.475	U	pCi/g		1.27	384698
Uranium-235	-0.0218	0.220	0.220	U	pCi/g		0.397	384698
Uranium-238	0.412	0.473	0.475	U	pCi/g		1.27	384698
Actinium-228	0.346	0.194	0.197		pCi/g		0.182	384698

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-30 Analyzed: 08/23/18 07:12 Ts: 30 Sigma: 2
Client ID: CRC-B14-1618 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Bismuth-212	-0.458	0.880	0.881	U	pCi/g		1.49	384698
Bismuth-214	0.463	0.106	0.117		pCi/g		0.0449	384698
Lead-210	1.19	1.25	1.26	U	pCi/g		2.02	384698
Lead-212	0.261	0.0794	0.0863		pCi/g		0.102	384698
Lead-214	0.462	0.115	0.125		pCi/g		0.0937	384698
Potassium-40	14.3	1.84	2.35		pCi/g		0.622	384698
Protactinium-231	0.333	1.49	1.49	U	pCi/g		3.94	384698

Lab ID: 160-29881-31 Analyzed: 08/23/18 07:14 Ts: 30 Sigma: 2
Client ID: CRC-B14-2426 Detector: GV5 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.0260	0.696	0.696	U	pCi/g		1.03	384697
Radium-226	0.519	0.138	0.148		pCi/g	1.00	0.0937	384697
Radium-228	0.493	0.194	0.200		pCi/g		0.140	384697
Thallium-208	0.0894	0.0880	0.0885		pCi/g		0.0845	384697
Thorium-232	0.493	0.194	0.200		pCi/g		0.140	384697
Thorium-234	0.776	0.396	0.404	U	pCi/g		1.47	384697
Uranium-235	0.169	0.318	0.318	U	pCi/g		0.571	384697
Uranium-238	0.776	0.396	0.404	U	pCi/g		1.47	384697
Actinium-228	0.493	0.194	0.200		pCi/g		0.140	384697
Bismuth-212	-0.0101	0.749	0.749	U	pCi/g		1.39	384697
Bismuth-214	0.519	0.138	0.148		pCi/g		0.0937	384697
Lead-210	-0.120	1.55	1.55	U	pCi/g		2.36	384697
Lead-212	0.376	0.0951	0.107		pCi/g		0.0971	384697
Lead-214	0.557	0.136	0.147		pCi/g		0.119	384697
Potassium-40	11.3	1.92	2.24		pCi/g		0.932	384697
Protactinium-231	0.000	0.681	0.681	U	pCi/g		4.78	384697

Lab ID: 160-29881-32 Analyzed: 08/23/18 07:43 Ts: 30 Sigma: 2
Client ID: CRC-B17-0406 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.876	1.33	1.34	U	pCi/g		4.53	384700
Radium-226	19.0	0.661	2.08		pCi/g	1.00	0.271	384700
Radium-228	0.908	0.307	0.321		pCi/g		0.347	384700

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-32 Analyzed: 08/23/18 07:43 Ts: 30 Sigma: 2
Client ID: CRC-B17-0406 Detector: GV9 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thallium-208	0.276	0.126	0.129		pCi/g		0.133	384700
Thorium-232	0.908	0.307	0.321		pCi/g		0.347	384700
Thorium-234	7.14	1.43	1.61		pCi/g		4.35	384700
Uranium-235	2.04	0.859	0.884		pCi/g		1.04	384700
Uranium-238	7.14	1.43	1.61		pCi/g		4.35	384700
Actinium-228	0.908	0.307	0.321		pCi/g		0.347	384700
Bismuth-212	-1.25	1.87	1.87	U	pCi/g		3.09	384700
Bismuth-214	19.0	0.661	2.08		pCi/g		0.271	384700
Lead-210	13.7	2.79	3.22		pCi/g		4.00	384700
Lead-212	0.135	0.436	0.436	U	pCi/g		0.723	384700
Lead-214	21.3	0.584	2.29		pCi/g		0.384	384700
Potassium-40	11.0	1.77	2.10		pCi/g		1.21	384700
Protactinium-231	0.000	1.01	1.01	U	pCi/g		16.6	384700

Lab ID: 160-29881-33 Analyzed: 08/23/18 07:44 Ts: 30 Sigma: 2
Client ID: CRC-B17-0810 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.272	1.22	1.22	U	pCi/g		2.06	384701
Radium-226	1.19	0.233	0.263		pCi/g	1.00	0.168	384701
Radium-228	0.915	0.242	0.259		pCi/g		0.219	384701
Thallium-208	0.339	0.100	0.106		pCi/g		0.0851	384701
Thorium-232	0.915	0.242	0.259		pCi/g		0.219	384701
Thorium-234	4.25	1.45	1.53		pCi/g		2.07	384701
Uranium-235	0.000	0.250	0.250	U	pCi/g		1.40	384701
Uranium-238	4.25	1.45	1.53		pCi/g		2.07	384701
Actinium-228	0.915	0.242	0.259		pCi/g		0.219	384701
Bismuth-212	-0.739	1.25	1.25	U	pCi/g		2.09	384701
Bismuth-214	1.19	0.233	0.263		pCi/g		0.168	384701
Lead-210	2.34	2.02	2.04	U	pCi/g		2.73	384701
Lead-212	0.791	0.137	0.160		pCi/g		0.145	384701
Lead-214	1.08	0.179	0.210		pCi/g		0.130	384701
Potassium-40	14.4	1.84	2.35		pCi/g		0.434	384701
Protactinium-231	0.0526	3.94	3.94	U	pCi/g		6.67	384701

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-34 Analyzed: 08/23/18 07:43 Ts: 30 Sigma: 2
Client ID: CRC-B17-1820 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.339	0.505	0.506	U	pCi/g		1.09	384703
Radium-226	0.377	0.141	0.146		pCi/g	1.00	0.141	384703
Radium-228	0.0725	0.212	0.212	U	pCi/g		0.469	384703
Thallium-208	0.143	0.0677	0.0693		pCi/g		0.0737	384703
Thorium-232	0.0725	0.212	0.212	U	pCi/g		0.469	384703
Thorium-234	0.0794	1.46	1.46	U	pCi/g		2.14	384703
Uranium-235	0.111	0.337	0.338	U	pCi/g		0.572	384703
Uranium-238	0.0794	1.46	1.46	U	pCi/g		2.14	384703
Actinium-228	0.0725	0.212	0.212	U	pCi/g		0.469	384703
Bismuth-212	-0.409	0.682	0.683	U	pCi/g		1.75	384703
Bismuth-214	0.377	0.141	0.146		pCi/g		0.141	384703
Lead-210	0.219	1.06	1.06	U	pCi/g		1.72	384703
Lead-212	0.292	0.0856	0.0936		pCi/g		0.0997	384703
Lead-214	0.542	0.132	0.144		pCi/g		0.118	384703
Potassium-40	16.9	2.11	2.73		pCi/g		0.750	384703
Protactinium-231	-0.873	2.90	2.90	U	pCi/g		4.90	384703

Lab ID: 160-29881-35 Analyzed: 08/23/18 07:45 Ts: 30 Sigma: 2
Client ID: CRC-B17-2628 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.216	0.880	0.880	U	pCi/g		1.21	384704
Radium-226	0.684	0.200	0.212		pCi/g	1.00	0.185	384704
Radium-228	0.575	0.203	0.212		pCi/g		0.138	384704
Thallium-208	0.193	0.0620	0.0651		pCi/g		0.0448	384704
Thorium-232	0.575	0.203	0.212		pCi/g		0.138	384704
Thorium-234	-1.14	1.68	1.68	U	pCi/g		3.23	384704
Uranium-235	0.0606	0.176	0.176	U	pCi/g		1.14	384704
Uranium-238	-1.14	1.68	1.68	U	pCi/g		3.23	384704
Actinium-228	0.575	0.203	0.212		pCi/g		0.138	384704
Bismuth-212	-0.0813	0.838	0.838	U	pCi/g		1.93	384704
Bismuth-214	0.684	0.200	0.212		pCi/g		0.185	384704
Lead-210	-0.0871	2.13	2.13	U	pCi/g		3.67	384704
Lead-212	0.479	0.120	0.135		pCi/g		0.139	384704
Lead-214	0.714	0.150	0.168		pCi/g		0.145	384704
Potassium-40	11.8	1.96	2.30		pCi/g		0.917	384704

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Lab ID: 160-29881-35 Analyzed: 08/23/18 07:45 Ts: 30 Sigma: 2
Client ID: CRC-B17-2628 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	-0.585	3.50	3.50	U	pCi/g		5.93	384704

Lab ID: 160-29881-36 Analyzed: 08/23/18 07:47 Ts: 30 Sigma: 2
Client ID: CRC-B5-1214 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.330	0.732	0.733	U	pCi/g		1.04	384702
Radium-226	0.294	0.124	0.128		pCi/g	1.00	0.127	384702
Radium-228	0.234	0.148	0.150		pCi/g		0.163	384702
Thallium-208	0.103	0.0486	0.0498		pCi/g		0.0489	384702
Thorium-232	0.234	0.148	0.150		pCi/g		0.163	384702
Thorium-234	0.990	1.11	1.12	U	pCi/g		1.52	384702
Uranium-235	-0.0215	0.136	0.136	U	pCi/g		0.593	384702
Uranium-238	0.990	1.11	1.12	U	pCi/g		1.52	384702
Actinium-228	0.234	0.148	0.150		pCi/g		0.163	384702
Bismuth-212	-0.264	0.823	0.824	U	pCi/g		1.42	384702
Bismuth-214	0.294	0.124	0.128		pCi/g		0.127	384702
Lead-210	0.659	1.26	1.26	U	pCi/g		1.85	384702
Lead-212	0.190	0.0726	0.0766		pCi/g		0.0948	384702
Lead-214	0.437	0.121	0.130		pCi/g		0.115	384702
Potassium-40	12.3	1.61	2.04		pCi/g		0.758	384702
Protactinium-231	0.0660	0.904	0.904	U	pCi/g		3.97	384702

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-379951/1-A	Actinium-227			0.02519	U	pCi/g							.758956
MB 160-379951/1-A	Radium-226			-0.1060	U	pCi/g							-1.73317222
MB 160-379951/1-A	Radium-228			-0.01254	U	pCi/g							-.14236995
MB 160-379951/1-A	Thallium-208			0.009027	U	pCi/g							.40330565
MB 160-379951/1-A	Thorium-232			-0.01254	U	pCi/g							-.14236995
MB 160-379951/1-A	Thorium-234			0.3218	U	pCi/g							.86666724
MB 160-379951/1-A	Uranium-235			0.05960	U	pCi/g							.77927735
MB 160-379951/1-A	Uranium-238			0.3218	U	pCi/g							.86666724
MB 160-379951/1-A	Actinium-228			-0.01254	U	pCi/g							-.14236995
MB 160-379951/1-A	Bismuth-212			-0.02701	U	pCi/g							-.12598544
MB 160-379951/1-A	Bismuth-214			-0.1060	U	pCi/g							-1.73317222
MB 160-379951/1-A	Lead-210			-0.07831	U	pCi/g							-.95632134
MB 160-379951/1-A	Lead-212			0.01037	U	pCi/g							.40579711
MB 160-379951/1-A	Lead-214			-0.04028	U	pCi/g							-1.0474134
MB 160-379951/1-A	Potassium-40			0.1925	U	pCi/g							.90230972
MB 160-379951/1-A	Protactinium-231			0.1503	U	pCi/g							.21124471

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-379951/2-A	Americium-241		96.8	97.96		pCi/g	101	87 - 116					.1450034363
LCS 160-379951/2-A	Cesium-137		28.2	30.72		pCi/g	109	87 - 120					1.1587571249
LCS 160-379951/2-A	Cobalt-60		12.8	13.61		pCi/g	106	87 - 115					.8045733626

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-1	Actinium-227	0.197		0.2648	U	pCi/g			29	0.08	0.21	1	
160-29881-1	Radium-226	0.956		0.6697		pCi/g			35	0.78	2.18	1	
160-29881-1	Radium-228	0.318		0.3837		pCi/g			19	0.17	0.45	1	
160-29881-1	Thallium-208	0.141		0.06668	U	pCi/g			72	0.56	1.58	1	
160-29881-1	Thorium-232	0.318		0.3837		pCi/g			19	0.17	0.45	1	
160-29881-1	Thorium-234	0.718		-0.6327	U	pCi/g			3166	0.70	1.83	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379951

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-1	Uranium-235	0.116		0.07127	U	pCi/g			48	0.08	0.23	1	
160-29881-1	Uranium-238	0.718		-0.6327	U	pCi/g			3166	0.70	1.83	1	
160-29881-1	Actinium-228	0.318		0.3837		pCi/g			19	0.17	0.45	1	
160-29881-1	Bismuth-212	0.302		0.3731	U	pCi/g			21	0.05	0.14	1	
160-29881-1	Bismuth-214	0.956		0.6697		pCi/g			35	0.78	2.18	1	
160-29881-1	Lead-210	1.02		-0.3503	U	pCi/g			410	0.57	1.61	1	
160-29881-1	Lead-212	0.472		0.3481		pCi/g			30	0.57	1.59	1	
160-29881-1	Lead-214	0.837		0.6647		pCi/g			23	0.57	1.61	1	
160-29881-1	Potassium-40	8.29		9.342		pCi/g			12	0.30	0.85	1	
160-29881-1	Protactinium-231	-1.01		0.2174	U	pCi/g			309	0.26	0.67	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379951 Batch Start Date: 08/02/18 13:36 Batch Analyst: Willett, Elizabeth A

Batch Method: Fill_Geo-21 Batch End Date: 08/02/18 14:14

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-379951/1		Fill_Geo-21, 901.1				291.18 g	8/2/18 14:10	8/23/18	Tuna Can
LCS 160-379951/2		Fill_Geo-21, 901.1				341.9 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-1-B	CRC-B9-0406	Fill_Geo-21, 901.1	T	46.8 g	398.9 g	352.1 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-1-B DU	CRC-B9-0406	Fill_Geo-21, 901.1	T	46.8 g	398.9 g	352.1 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-4-B	CRC-B7-0204	Fill_Geo-21, 901.1	T	46.7 g	368.3 g	321.6 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-8-B	CRC-B14-0204	Fill_Geo-21, 901.1	T	46.8 g	404.5 g	357.7 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-9-B	CRC-B17-0204	Fill_Geo-21, 901.1	T	46.4 g	349.4 g	303 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-12-B	CRC-B11-0204	Fill_Geo-21, 901.1	T	46.4 g	369.6 g	323.2 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-13-A	CRC-B4-1012	Fill_Geo-21, 901.1	T	46.4 g	438.7 g	392.3 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-14-A	CRC-B4-1820	Fill_Geo-21, 901.1	T	46.5 g	374.0 g	327.5 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-15-A	CRC-B12-0002	Fill_Geo-21, 901.1	T	46.5 g	332.8 g	286.3 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-16-A	CRC-B12-0406	Fill_Geo-21, 901.1	T	46.5 g	492.5 g	446 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-B-17-B	CRC-B12-1214	Fill_Geo-21, 901.1	T	46.8 g	398.7 g	351.9 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-27-B	CRC-B4-2628	Fill_Geo-21, 901.1	T	46.5 g	356.7 g	310.2 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-B-28-B	CRC-B14-0608	Fill_Geo-21, 901.1	T	46.4 g	459.3 g	412.9 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-B-29-A	CRC-B14-1012	Fill_Geo-21, 901.1	T	46.7 g	410.7 g	364 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-B-30-B	CRC-B14-1618	Fill_Geo-21, 901.1	T	46.8 g	380.2 g	333.4 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-31-A	CRC-B14-2426	Fill_Geo-21, 901.1	T	46.2 g	405.6 g	359.4 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-32-B	CRC-B17-0406	Fill_Geo-21, 901.1	T	46.6 g	390.1 g	343.5 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-33-B	CRC-B17-0810	Fill_Geo-21, 901.1	T	46.4 g	382.2 g	335.8 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-A-34-A	CRC-B17-1820	Fill_Geo-21, 901.1	T	46.5 g	366.2 g	319.7 g	8/2/18 14:10	8/23/18	Tuna Can

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379951 Batch Start Date: 08/02/18 13:36 Batch Analyst: Willett, Elizabeth A

Batch Method: Fill_Geo-21 Batch End Date: 08/02/18 14:14

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
160-29881-B-35-B	CRC-B17-2628	Fill_Geo-21, 901.1	T	46.4 g	359.2 g	312.8 g	8/2/18 14:10	8/23/18	Tuna Can
160-29881-B-36-A	CRC-B5-1214	Fill_Geo-21, 901.1	T	46.4 g	404.0 g	357.6 g	8/2/18 14:10	8/23/18	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00007	AnalysisComment				
MB 160-379951/1		Fill_Geo-21, 901.1							
LCS 160-379951/2		Fill_Geo-21, 901.1		# g					
160-29881-A-1-B	CRC-B9-0406	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-1-B DU	CRC-B9-0406	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-4-B	CRC-B7-0204	Fill_Geo-21, 901.1	T		hot, 150 cpm				
160-29881-A-8-B	CRC-B14-0204	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-9-B	CRC-B17-0204	Fill_Geo-21, 901.1	T		sand				
160-29881-A-12-B	CRC-B11-0204	Fill_Geo-21, 901.1	T		sand				
160-29881-A-13-A	CRC-B4-1012	Fill_Geo-21, 901.1	T		sand				
160-29881-A-14-A	CRC-B4-1820	Fill_Geo-21, 901.1	T		sand				
160-29881-A-15-A	CRC-B12-0002	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-16-A	CRC-B12-0406	Fill_Geo-21, 901.1	T		mostly rocks				
160-29881-B-17-B	CRC-B12-1214	Fill_Geo-21, 901.1	T		sand				
160-29881-A-27-B	CRC-B4-2628	Fill_Geo-21, 901.1	T		sand				
160-29881-B-28-B	CRC-B14-0608	Fill_Geo-21, 901.1	T		sand				
160-29881-B-29-A	CRC-B14-1012	Fill_Geo-21, 901.1	T		sand				
160-29881-B-30-B	CRC-B14-1618	Fill_Geo-21, 901.1	T		sand				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379951 Batch Start Date: 08/02/18 13:36 Batch Analyst: Willett, Elizabeth A

Batch Method: Fill_Geo-21 Batch End Date: 08/02/18 14:14

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00007	AnalysisComment				
160-29881-A-31-A	CRC-B14-2426	Fill_Geo-21, 901.1	T		sand				
160-29881-A-32-B	CRC-B17-0406	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-33-B	CRC-B17-0810	Fill_Geo-21, 901.1	T		dirt and medium sized rocks				
160-29881-A-34-A	CRC-B17-1820	Fill_Geo-21, 901.1	T		sand				
160-29881-B-35-B	CRC-B17-2628	Fill_Geo-21, 901.1	T		sand				
160-29881-B-36-A	CRC-B5-1214	Fill_Geo-21, 901.1	T		sand				

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 9_Gamma_20183563

Sample Description: 379951_Gamma_MB 160-379951~1-A
Detector: Detector # 9
Batch ID: 379951
Work Order Number: Gamma
Lot Number: MB 160-379951~1-A

Decay to Time: 8/23/2018 06:25 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:25:46 Real Time: 1803 sec
Analysis Time: 8/23/2018 06:56 Dead Time: 0.17 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev14.lib
Bkgd Correction File: 9_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.530E+00	105.4	1.612E+00	1.614E+00	5.561E+00
NA-22	-7.136E-01	55.1	3.933E-01	3.950E-01	1.272E+00
K-40	2.074E+00	110.7	2.296E+00	2.299E+00	8.087E+00
Sc-46	0.000E+00	1.#INF	3.845E-02	3.845E-02	5.552E-01
CR-51	-1.311E+00	133.5	1.750E+00	1.751E+00	6.031E+00
MN-54	1.465E-01	132.7	1.944E-01	1.945E-01	4.809E-01
FE-59	6.501E-02	455.0	2.957E-01	2.958E-01	5.919E-01
Co-56	4.559E-02	36.8	1.677E-02	1.694E-02	8.790E-01
CO-57	5.303E-02	171.1	9.076E-02	9.081E-02	3.202E-01
CO-58	7.201E-02	234.5	1.689E-01	1.689E-01	6.281E-01
CO-60	-8.819E-02	343.8	3.032E-01	3.032E-01	7.304E-01
ZN-65	0.000E+00	1.#INF	1.815E-01	1.815E-01	1.828E+00
NB-94	-2.871E-01	99.8	2.865E-01	2.868E-01	9.770E-01
ZR-95	4.990E-01	35.4	1.764E-01	1.783E-01	4.597E-01
NB-95	3.435E-02	755.0	2.594E-01	2.594E-01	9.402E-01
RU-103	1.245E-01	105.4	1.312E-01	1.313E-01	3.427E-01
RH-106	-8.313E-01	382.8	3.182E+00	3.182E+00	1.229E+01
AG-108M	-2.209E-02	269.7	5.957E-02	5.958E-02	5.552E-01
AG-110M	0.000E+00	1.#INF	1.054E-01	1.054E-01	7.607E-01
SN-113	1.162E-01	196.8	2.285E-01	2.286E-01	8.119E-01
SB-124	1.360E-01	82.9	1.128E-01	1.130E-01	1.200E+00
SB-125	2.463E+00	19.5	4.799E-01	4.961E-01	2.019E+00
I-131	9.898E-02	56.0	5.540E-02	5.564E-02	6.703E-01
Gd-153	-4.454E-01	175.6	7.823E-01	7.828E-01	2.640E+00
Ga-68	2.641E+00	324.3	8.564E+00	8.566E+00	2.134E+01
Tc-99m	0.000E+00	1.#INF	3.085E-02	3.085E-02	6.663E-01
BA-133	-2.104E-02	1236.9	2.602E-01	2.602E-01	9.387E-01
CS-134	-5.656E-03	37.7	2.130E-03	2.150E-03	1.483E+00
CS-137	-4.320E-01	92.9	4.012E-01	4.018E-01	1.354E+00
CE-139	3.286E-03	4729.5	1.554E-01	1.554E-01	5.507E-01
Ba-140	9.978E-01	35.7	3.566E-01	3.603E-01	7.948E-01
La-140	4.232E-02	461.5	1.953E-01	1.953E-01	4.733E-01
CE-141	-2.896E-01	98.5	2.852E-01	2.856E-01	7.430E-01

CE-144	0.000E+00	1.#INF	1.931E-01	1.931E-01	5.107E+00
PM-144	2.498E-01	84.7	2.115E-01	2.119E-01	7.186E-01
EU-152	1.804E+00	26.7	4.822E-01	4.913E-01	3.457E+00
EU-154	1.063E+00	36.0	3.829E-01	3.867E-01	8.336E+00
EU-155	4.561E-01	192.7	8.789E-01	8.792E-01	2.986E+00
HF-181	9.672E-02	107.7	1.042E-01	1.043E-01	8.262E-01
Ta-182	3.985E-01	44.7	1.782E-01	1.793E-01	2.661E+00
Hg-203	1.488E-01	102.2	1.520E-01	1.523E-01	5.222E-01
TL-208	9.725E-02	247.9	2.411E-01	2.411E-01	6.463E-01
pm-146	6.597E-02	979.8	6.464E-01	6.464E-01	1.677E+00
y-88	1.641E-01	62.6	1.028E-01	1.031E-01	3.077E-01
Cd-113m	1.858E+03	113.4	2.106E+03	2.110E+03	7.263E+03
Cd-109	-3.626E+00	185.3	6.721E+00	6.724E+00	2.267E+01
Cf-251	-5.748E-01	138.9	7.984E-01	8.000E-01	2.118E+00
Cf-249	2.036E-01	109.6	2.231E-01	2.234E-01	7.717E-01
Sn-126	1.133E+00	135.8	1.539E+00	1.540E+00	5.283E+00
PB-210	-8.437E-01	104.4	8.808E-01	8.822E-01	1.820E+01
PB-212	1.117E-01	246.3	2.751E-01	2.752E-01	9.685E-01
PB-214	-4.339E-01	95.3	4.137E-01	4.143E-01	1.572E+00
BI-207	1.405E-01	167.7	2.356E-01	2.357E-01	8.245E-01
BI-212	-2.910E-01	793.7	2.310E+00	2.310E+00	8.704E+00
U-235	6.421E-01	128.2	8.233E-01	8.240E-01	5.327E+00
BI-214	-1.142E+00	57.5	6.562E-01	6.589E-01	3.160E+00
BI-210M	-4.803E-02	641.2	3.079E-01	3.080E-01	1.093E+00
AC-228	-1.351E-01	702.4	9.488E-01	9.488E-01	2.357E+00
TH-227	2.714E-01	131.6	3.572E-01	3.575E-01	8.936E+00
TH-229	4.828E-01	50.8	2.454E-01	2.485E-01	8.563E+00
TH-234	3.467E+00	115.3	3.997E+00	4.001E+00	1.363E+01
PA-231	1.620E+00	473.4	7.667E+00	7.667E+00	2.670E+01
PA-233	-1.573E-02	2600.3	4.089E-01	4.089E-01	2.220E+00
PA-234	2.367E-01	377.5	8.934E-01	8.935E-01	3.078E+00
PA-234M	1.722E+01	104.2	1.795E+01	1.797E+01	7.882E+01
AM-241	4.201E-01	115.9	4.871E-01	4.875E-01	1.658E+00
Np-237	-1.057E+00	167.4	1.769E+00	1.770E+00	5.975E+00
Ir-192	1.840E-01	105.2	1.935E-01	1.939E-01	5.471E-01
Cs-136	7.669E-02	169.6	1.301E-01	1.302E-01	6.800E-01
Np-239	4.769E-01	172.9	8.248E-01	8.253E-01	2.798E+00
Nd-147	4.681E-01	265.7	1.244E+00	1.244E+00	3.296E+00
TL-210	0.000E+00	1.#INF	7.160E-02	7.161E-02	5.401E-01
Total	1.900E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_MB 160-379951~1-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20183563.An1

Acquisition information
Start time: 8/23/2018 6:25:46 AM
Live time: 1800
Real time: 1803
Dead time: 0.17 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:25:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-08-11_1245.PBC 8/11/2018 12:45:42 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01 %

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
59.54	10.	115.93	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.29	9.	115.27	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
64.28	8.	135.79	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
105.31	9.	192.68	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
106.13	10.	172.93	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
122.06	4.	171.14	1.07	5.303E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.303E-02	CO57
131.29	4.	377.49	1.08	5.216E-02	131.29	18.000	PBC<MDA	PA234
185.72	2.	411.44	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
205.33	8.	128.22	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	13.	50.83	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
227.00	7.	103.55	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
238.63	3.	246.34	1.18	3.732E-02	238.63	43.300	PBC<MDA	PB212
242.00	7.	120.32	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
256.24	4.	176.78	1.20	3.558E-02	256.24	7.000	PBC<MDA	TH227
263.70	7.	113.39	1.20	3.489E-02	263.70	0.006	PBC<MDA	Cd113m
279.20	7.	102.19	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	7.	101.39	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
302.65	3.	473.35	1.24	3.176E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.546E-01	BA133
316.49	3.	233.84	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
328.76	3.	461.51	1.26	2.999E-02	328.76	20.300	PBC<MDA	La140
345.83	7.	107.70	1.28	2.896E-02	345.83	15.070	PBC<MDA	HF181

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
351.93	-8.	95.33	1.28	2.860E-02	351.93	37.600	PBC<MDA	PB214
383.84	6.	146.02	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	6.	109.61	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
391.69	4.	196.77	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
468.06	8.	105.17	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.60	7.	105.36	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
497.05	5.	105.36	1.41	2.236E-02	497.05	90.900	PBC<MDA	RU103
511.86	66.	16.17	2.67	2.188E-02	511.86	20.000	8.378E+00	RH106
531.00	2.	265.73	1.44	2.130E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	35.74	1.44	2.112E-02	537.26	24.390	9.978E-01	Ba140
569.70	5.	167.73	1.47	2.023E-02	569.32	15.380	8.923E-01	CS134
					569.47	8.200	1.674E+00	PA234
					569.70	97.740	1.405E-01	BI207
583.02	3.	247.90	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
600.50	48.	19.49	1.50	1.946E-02	600.50	17.860	7.631E+00	SB125
636.97	5.	101.95	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
696.54	8.	84.68	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
722.79	6.	82.92	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.007E-01	AG108M
					723.36	20.220	9.020E-01	EU154
722.94	1.	856.13	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.208E-02	AG108M
					723.36	20.220	9.925E-02	EU154
747.16	1.	979.80	1.62	1.651E-02	747.16	34.000	PBC<MDA	pm146
756.73	8.	35.36	1.62	1.635E-02	756.73	54.460	4.990E-01	ZR95
765.79	1.	754.98	1.63	1.621E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.167E+01	PA234M
766.41	6.	104.23	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.624E+01	PA234M
785.42	8.	103.97	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	7.	37.65	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
810.78	2.	234.52	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
818.50	1.	500.00	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
834.85	4.	132.68	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
880.53	6.	87.27	1.72	1.456E-02	880.53	6.000	PBC<MDA	PA234
898.04	4.	62.63	1.74	1.434E-02	898.04	93.700	PBC<MDA	y88
964.11	8.	35.36	1.79	1.357E-02	964.11	14.605	2.242E+00	EU152
996.33	8.	36.01	1.81	1.323E-02	996.33	10.600	3.055E+00	EU154
1048.07	2.	169.63	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1050.36	-1.	601.66	1.85	1.269E-02	1050.36	1.560	PBC<MDA	RH106
1077.40	2.	324.35	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1112.07	14.	26.73	1.89	1.213E-02	1112.07	13.644	4.699E+00	EU152
1120.29	-4.	107.65	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1221.41	5.	44.72	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	8.	36.79	1.98	1.114E-02	1238.28	66.070	6.379E-01	Co56
1291.60	1.	454.95	2.02	1.077E-02	1291.60	43.200	PBC<MDA	FE59
1313.00	5.	44.72	2.03	1.063E-02	1313.00	21.000	PBC<MDA	TL210

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.83	4.	110.71	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	51.	-2.	-0.001	104.40	0.998s
TH-227	200.20	50.14	55.	-1.	-0.001	195.12	1.001s
AM-241	237.77	59.54	61.	10.	0.006	115.93	1.010s
TH-234	252.77	63.29	53.	9.	0.005	115.27	1.014s
Sn-126	256.74	64.28	53.	8.	0.004	135.79	1.015s
BA-133	323.56	80.99	51.	-6.	-0.004	215.34	1.031
Np-237	345.55	86.49	212.	-12.	-0.007	167.44	1.036s
EU-155	345.76	86.54	224.	-12.	-0.007	172.16	1.036s
Sn-126	347.35	86.94	237.	-12.	-0.007	176.71	1.037s
Sn-126	349.87	87.57	249.	-12.	-0.007	181.06	1.037s
Cd-109	351.75	88.04	262.	-12.	-0.007	185.35	1.038s
TH-234	369.94	92.59	214.	-13.	-0.007	167.13	1.042s
AC-228	372.98	93.35	226.	-13.	-0.007	171.72	1.043s
Gd-153	389.58	97.50	239.	-13.	-0.007	175.62	1.047s
Np-239	397.58	99.50	251.	-13.	-0.007	179.76	1.049s
Gd-153	412.37	103.20	264.	-12.	-0.007	192.25	1.052s
Np-239	414.37	103.70	276.	0.	0.000	1000.00	1.053s
EU-155	420.82	105.31	154.	9.	0.005	192.68	1.054s
Np-239	424.09	106.13	156.	10.	0.006	172.93	1.055s
EU-152	486.65	121.78	37.	-2.	-0.001	376.07	1.070s
CO-57	487.80	122.06	25.	4.	0.002	171.14	1.070
EU-154	491.95	123.10	34.	-4.	-0.002	187.91	1.071s
PA-234	524.72	131.29	112.	4.	0.002	377.49	1.079s
HF-181	531.64	133.02	116.	0.	0.000	1000.00	1.081s
CE-144	533.69	133.54	116.	0.	0.000	1000.00	1.081s
HF-181	544.74	136.30	116.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	116.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	116.	0.	0.000	1000.00	1.088s
CE-141	581.29	145.44	40.	-13.	-0.007	98.49	1.092s
Ba-140	650.15	162.66	45.	-3.	-0.002	546.40	1.108s
Cf-251	705.90	176.60	33.	-8.	-0.004	138.91	1.122s
U-235	742.37	185.72	26.	2.	0.001	411.44	1.130s
TH-229	773.52	193.51	32.	-11.	-0.006	105.10	1.137s
U-235	820.80	205.33	24.	8.	0.004	128.22	1.148s
TH-229	842.87	210.85	8.	13.	0.007	50.83	1.153s
Cf-251	907.45	227.00	12.	7.	0.004	103.55	1.168s
PB-212	953.97	238.63	30.	3.	0.002	246.34	1.179s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	967.43	242.00	33.	7.	0.004	120.32	1.182s
EU-152	978.21	244.69	62.	-7.	-0.004	159.03	1.185s
TH-227	1024.40	256.24	12.	4.	0.002	176.78	1.195
Cd-113m	1054.23	263.70	28.	7.	0.004	113.39	1.202s
BI-210M	1062.75	265.83	46.	-2.	-0.001	641.18	1.204s
TL-208	1108.55	277.28	42.	-10.	-0.005	82.76	1.215s
Hg-203	1116.22	279.20	24.	7.	0.004	102.19	1.216s
I-131	1136.61	284.30	12.	7.	0.004	101.39	1.221s
PB-214	1179.77	295.09	129.	-15.	-0.008	53.65	1.231s
TL-210	1183.41	296.00	134.	-4.	-0.002	468.78	1.231s
PA-231	1210.00	302.65	78.	3.	0.001	473.35	1.237s
BA-133	1210.81	302.85	81.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	81.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	81.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	81.	0.	0.000	1000.00	1.243s
Ir-192	1265.35	316.49	26.	3.	0.002	233.84	1.250
CR-51	1279.73	320.08	42.	-7.	-0.004	133.47	1.253s
La-140	1314.43	328.76	93.	3.	0.002	461.51	1.261s
Cf-249	1333.15	333.44	96.	0.	0.000	1000.00	1.265s
AC-228	1352.66	338.32	96.	0.	0.000	1000.00	1.270s
Cs-136	1361.66	340.57	96.	0.	0.000	1000.00	1.272s
HF-181	1382.70	345.83	13.	7.	0.004	107.70	1.276s
PB-214	1407.11	351.93	35.	-8.	-0.005	95.33	1.282
I-131	1457.31	364.48	28.	-9.	-0.005	86.74	1.293s
BA-133	1534.73	383.84	30.	6.	0.003	146.02	1.310s
Cf-249	1551.17	387.95	22.	6.	0.004	109.61	1.314s
SN-113	1566.12	391.69	22.	4.	0.002	196.77	1.317s
SB-125	1710.86	427.88	27.	-9.	-0.005	81.73	1.349s
AG-108M	1735.10	433.94	18.	-3.	-0.001	269.71	1.354s
pm-146	1814.87	453.88	26.	-10.	-0.006	70.05	1.372s
SB-125	1852.82	463.37	48.	-12.	-0.007	60.84	1.380s
Ir-192	1871.59	468.06	34.	8.	0.005	105.17	1.384
BE-7	1909.73	477.60	21.	7.	0.004	105.36	1.392s
HF-181	1927.34	482.00	28.	0.	0.000	1000.00	1.396s
RU-103	1987.56	497.05	4.	5.	0.003	105.36	1.409s
RH-106	2046.81	511.86	7.	66.	0.037	16.17	2.672
Nd-147	2123.35	531.00	9.	2.	0.001	265.73	1.438s
Ba-140	2148.39	537.26	1.	9.	0.005	35.74	1.444s
CS-134	2252.30	563.24	34.	-15.	-0.008	25.17	1.466s
CS-134	2276.64	569.32	23.	-11.	-0.006	66.66	1.471s
PA-234	2277.24	569.47	35.	-2.	-0.001	445.22	1.471s
BI-207	2278.16	569.70	33.	5.	0.003	167.73	1.471s
TL-208	2331.45	583.02	13.	3.	0.002	247.90	1.482s
SB-125	2401.36	600.50	19.	48.	0.027	19.49	1.497s
SB-124	2410.29	602.73	68.	-1.	-0.001	798.77	1.499s
CS-134	2418.21	604.71	105.	-9.	-0.005	163.66	1.500s
BI-214	2436.61	609.31	105.	-18.	-0.010	57.46	1.505s
RU-103	2440.56	610.30	87.	-9.	-0.005	149.04	1.505s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	2456.49	614.28	78.	-9.	-0.005	141.16	1.508s
PM-144	2471.62	618.06	69.	-2.	-0.001	741.49	1.512s
RH-106	2487.04	621.92	70.	-3.	-0.002	382.79	1.515s
SB-125	2542.94	635.89	19.	-7.	-0.004	99.50	1.526s
I-131	2547.28	636.97	12.	5.	0.003	101.95	1.527s
AG-110M	2630.43	657.76	38.	-12.	-0.007	77.68	1.544s
CS-137	2646.03	661.66	56.	-12.	-0.007	92.86	1.548s
PM-144	2785.58	696.54	18.	8.	0.004	84.68	1.576s
NB-94	2809.93	702.63	34.	-9.	-0.005	99.78	1.581s
SB-124	2890.57	722.79	8.	6.	0.003	82.92	1.598s
AG-108M	2891.17	722.94	13.	1.	0.000	856.13	1.598s
EU-154	2892.85	723.36	14.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	14.	0.	0.000	1000.00	1.599s
BI-212	2908.11	727.17	14.	-1.	0.000	793.73	1.601s
pm-146	2988.08	747.16	9.	1.	0.000	979.80	1.617
ZR-95	3026.36	756.73	0.	8.	0.004	35.36	1.625s
AG-110M	3055.23	763.94	18.	-9.	-0.005	74.54	1.631s
NB-95	3062.61	765.79	28.	1.	0.001	754.98	1.632s
PA-234M	3065.10	766.41	15.	6.	0.003	104.23	1.633s
EU-152	3115.14	778.92	25.	-13.	-0.007	90.50	1.643s
BI-212	3141.15	785.42	31.	8.	0.005	103.97	1.648s
CS-134	3182.95	795.87	0.	7.	0.004	37.65	1.656s
TL-210	3197.88	799.60	7.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	16.	-1.	-0.001	546.88	1.661s
CO-58	3242.59	810.78	10.	2.	0.001	234.52	1.668s
La-140	3262.58	815.77	12.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	12.	1.	0.001	500.00	1.674s
MN-54	3338.91	834.85	5.	4.	0.002	132.68	1.687s
Co-56	3386.61	846.77	20.	-9.	-0.005	116.65	1.696s
NB-94	3483.94	871.10	15.	-8.	-0.004	77.06	1.715s
EU-154	3492.47	873.23	27.	-2.	-0.001	243.27	1.717s
PA-234	3521.68	880.53	11.	6.	0.003	87.27	1.722s
AG-110M	3538.30	884.68	6.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	6.	0.	0.000	1000.00	1.729s
y-88	3591.74	898.04	1.	4.	0.002	62.63	1.736s
AC-228	3643.88	911.07	10.	-1.	-0.001	702.38	1.746s
AG-110M	3749.60	937.49	0.	0.	0.000	1000.00	1.766s
PA-234	3783.72	946.02	6.	-2.	-0.001	160.35	1.772s
EU-152	3856.11	964.11	0.	8.	0.004	35.36	1.786s
AC-228	3875.56	968.97	8.	0.	0.000	1000.00	1.790s
EU-154	3985.03	996.33	0.	8.	0.004	36.01	1.810s
PA-234M	4003.71	1001.00	8.	0.	0.000	1000.00	1.814s
EU-154	4018.82	1004.77	8.	0.	0.000	1000.00	1.816s
Co-56	4151.13	1037.84	11.	-2.	-0.001	132.05	1.841s
Cs-136	4192.07	1048.07	7.	2.	0.001	169.63	1.848s
RH-106	4201.23	1050.36	3.	-1.	0.000	601.66	1.850s
BI-207	4254.46	1063.66	22.	-13.	-0.007	25.76	1.860s
Ga-68	4309.44	1077.40	5.	2.	0.001	324.35	1.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4396.88	1099.25	0.	0.	0.000	1000.00	1.886s
EU-152	4448.20	1112.07	0.	14.	0.008	26.73	1.895s
ZN-65	4462.09	1115.55	14.	0.	0.000	1000.00	1.897s
BI-214	4481.06	1120.29	18.	-4.	-0.002	107.65	1.901s
Sc-46	4482.12	1120.55	14.	0.	0.000	1000.00	1.901s
Ta-182	4485.12	1121.30	14.	0.	0.000	1000.00	1.901
Ta-182	4756.25	1189.05	0.	0.	0.000	1000.00	1.949s
Ta-182	4885.75	1221.41	0.	5.	0.003	44.72	1.972s
Co-56	4953.27	1238.28	1.	8.	0.005	36.79	1.984s
NA-22	5098.35	1274.53	23.	-14.	-0.008	55.12	2.008s
EU-154	5098.40	1274.54	37.	-3.	-0.001	323.47	2.008s
FE-59	5166.65	1291.60	6.	1.	0.001	454.95	2.020s
TL-210	5252.32	1313.00	0.	5.	0.003	44.72	2.034s
CO-60	5330.37	1332.50	6.	-2.	-0.001	343.80	2.047s
AG-110M	5537.69	1384.30	0.	0.	0.000	1000.00	2.082s
EU-152	5632.56	1408.00	6.	-4.	-0.002	160.96	2.097s
K-40	5844.03	1460.83	7.	4.	0.002	110.71	2.131s
BI-214	7059.65	1764.49	3.	-3.	-0.002	151.07	2.314s
Co-56	7087.11	1771.35	0.	0.	0.000	1000.00	2.318s
y-88	7346.20	1836.06	0.	0.	0.000	1000.00	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.5298E+00				5.31E+01	
			477.60	1.530E+00	?(	5.561E+00 1.05E+02 1.05E+01	G
NA-22	C	-7.1365E-01				9.50E+02	
			1274.53	-7.136E-01	?(	1.272E+00 5.51E+01 9.99E+01	G
K-40	N	2.0741E+00				4.66E+11	
			1460.83	2.074E+00	?(P	8.087E+00 1.11E+02 1.07E+01	G
CR-51	F	-1.3109E+00				2.77E+01	
			320.08	-1.311E+00	?(	6.031E+00 1.33E+02 9.94E+00	G
MN-54	C	1.4651E-01				3.12E+02	
			834.85	1.465E-01	?(	4.809E-01 1.33E+02 1.00E+02	G
FE-59	F	6.5006E-02				4.45E+01	
			1099.25	0.000E+00	?(	5.919E-01 1.00E+03 5.65E+01	G
			1291.60	1.500E-01	?(P	1.657E+00 4.55E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 4.5594E-02					7.73E+01	
		846.77	-3.460E-01	?(P	8.790E-01	1.17E+02	9.99E+01 G
		1238.28	6.379E-01	?(P	5.564E-01	3.68E+01	6.61E+01 G
		1037.84	-7.147E-01	+ P	5.646E+00	1.32E+02	1.41E+01 G
		1771.35	0.000E+00	-	3.178E+00	1.00E+03	1.55E+01 A
CO-57	C 5.3033E-02					2.72E+02	
		122.06	5.303E-02	?(	3.202E-01	1.71E+02	8.56E+01 G
		136.47	0.000E+00	&	5.343E+00	1.00E+03	1.07E+01 G
CO-58	C 7.2005E-02					7.09E+01	
		810.78	7.201E-02	?(	6.281E-01	2.35E+02	9.95E+01 G
CO-60	F -8.8190E-02					1.93E+03	
		1332.50	-8.819E-02	?(	7.304E-01	3.44E+02	1.00E+02 G
		1173.24	-2.244E-02	% P	6.508E-01	1.00E+03	9.99E+01 G
NB-94	I -2.8709E-01					7.41E+06	
		702.63	-2.871E-01	?(	9.770E-01	9.98E+01	9.79E+01 G
		871.10	-3.030E-01	+	7.863E-01	7.71E+01	9.99E+01 G
ZR-95	I 4.9903E-01					6.40E+01	
		756.73	4.990E-01	?(	4.597E-01	3.54E+01	5.45E+01 G
		724.20	0.000E+00	-	1.499E+00	1.00E+03	4.42E+01 G
NB-95	I 3.4353E-02					6.40E+01	
		765.79	3.435E-02	?(	9.402E-01	7.55E+02	9.98E+01 G
RU-103	I 1.2452E-01					3.93E+01	
		497.05	1.245E-01	?(P	3.427E-01	1.05E+02	9.09E+01 G
		610.30	-4.556E+00	+	2.317E+01	1.49E+02	5.75E+00 GA
RH-106	I -8.3130E-01					3.74E+02	
		621.92	-8.313E-01	?(P	1.229E+01	3.83E+02	9.93E+00 G
		1050.36	-1.531E+00	+ P	2.979E+01	6.02E+02	1.56E+00 G
		511.86	8.378E+00	?	1.909E+00	1.62E+01	2.00E+01 GA
AG-108M	C -2.2086E-02					1.53E+05	
		433.94	-6.643E-02	?(P	5.552E-01	2.70E+02	9.05E+01 G
		722.94	2.208E-02	?(	7.138E-01	8.56E+02	9.08E+01 G
		614.28	-2.936E-01	+	1.415E+00	1.41E+02	8.98E+01 G
SN-113	F 1.1615E-01					1.15E+02	
		391.69	1.162E-01	?(P	8.119E-01	1.97E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	1.3604E-01					6.02E+01	
			602.73	-3.449E-02	?(P	1.200E+00	7.99E+02	9.83E+01 G
			1690.98	-1.126E-02	% P	9.906E-01	5.22E+03	4.78E+01 G
			722.79	1.686E+00	?(	4.781E+00	8.29E+01	1.08E+01 G
SB-125	I	2.4626E+00					1.01E+03	
			427.88	-6.560E-01	?(P	2.019E+00	8.17E+01	2.96E+01 G
			600.50	7.631E+00	?(P	3.703E+00	1.95E+01	1.79E+01 G
			635.89	-1.756E+00	-	6.018E+00	9.95E+01	1.13E+01 G
			463.37	-2.726E+00	- P	7.919E+00	6.08E+01	1.05E+01 G
I-131	I	9.8977E-02					8.02E+00	
			364.48	-2.271E-01	?(P	6.703E-01	8.67E+01	8.17E+01 G
			284.30	1.972E+00	?(P	5.168E+00	1.01E+02	6.14E+00 G
			636.97	2.210E+00	?(	7.845E+00	1.02E+02	7.17E+00 G
Gd-153	F	-4.4544E-01					2.42E+02	
			97.50	-4.454E-01	?(	2.640E+00	1.76E+02	3.00E+01 G
			103.20	-5.808E-01	+	3.768E+00	1.92E+02	2.18E+01 G
Ga-68	C	2.6405E+00					4.71E-02	
			1077.40	2.641E+00	?(	2.134E+01	3.24E+02	3.30E+00 G
BA-133	F	-2.1037E-02					3.85E+03	
			356.00	-2.104E-02	&(	9.387E-01	1.24E+03	6.20E+01 G
			302.85	0.000E+00	&	4.263E+00	1.00E+03	1.83E+01 G
			383.84	1.270E+00	?	6.471E+00	1.46E+02	8.94E+00 GA
			80.99	-2.139E-01	+	1.219E+00	2.15E+02	3.41E+01 GA
CS-134	I	-5.6557E-03					7.54E+02	
			604.71	-2.657E-01	?(	1.483E+00	1.64E+02	9.76E+01 G
			795.87	2.911E-01	?(	3.042E-01	3.77E+01	8.55E+01 G
			569.32	-2.041E+00	+	4.501E+00	6.67E+01	1.54E+01 G
			801.95	-4.303E-01	+	8.737E+00	5.47E+02	8.69E+00 G
			563.24	-4.772E+00	+ P	9.722E+00	2.52E+01	8.35E+00 G
CS-137	I	-4.3201E-01					1.10E+04	
			661.66	-4.320E-01	?(	1.354E+00	9.29E+01	8.52E+01 G
CE-139	F	3.2859E-03					1.38E+02	
			165.85	3.286E-03	%(P	5.507E-01	4.73E+03	7.99E+01 G
Ba-140	I	9.9776E-01					1.28E+01	
			537.26	9.978E-01	?(P	7.948E-01	3.57E+01	2.44E+01 G
			162.66	-6.239E-01	- P	6.488E+00	5.46E+02	6.22E+00 G
			304.85	0.000E+00	-	1.830E+01	1.00E+03	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	4.2317E-02					1.28E+01	
			1596.21	-6.566E-03	%(P	4.733E-01	4.24E+03	9.54E+01 G
			487.02	1.794E-02	&	1.465E+00	2.24E+03	4.55E+01 G
			328.76	2.720E-01	&(P	4.348E+00	4.62E+02	2.03E+01 G
			815.77	0.000E+00	-	2.914E+00	1.00E+03	2.33E+01 G
CE-141	I	-2.8956E-01					3.25E+01	
			145.44	-2.896E-01	?(	7.430E-01	9.85E+01	4.82E+01 G
PM-144	C	2.4981E-01					3.63E+02	
			696.54	2.498E-01	?(	7.186E-01	8.47E+01	9.90E+01 G
			618.06	-4.677E-02	-	1.216E+00	7.41E+02	9.91E+01 G
EU-152	F	1.8041E+00					4.94E+03	
			344.29	7.218E-02	%(	3.457E+00	1.37E+03	2.65E+01 G
			1112.07	4.699E+00	?(	2.474E+00	2.67E+01	1.36E+01 G
			121.78	-8.550E-02	+	1.143E+00	3.76E+02	2.86E+01 G
			778.92	-3.428E+00	+	6.980E+00	9.05E+01	1.29E+01 G
			964.11	2.242E+00	?(	2.066E+00	3.54E+01	1.46E+01 G
			244.69	-1.441E+00	+	7.882E+00	1.59E+02	7.58E+00 G
			1408.00	-9.655E-01	+	3.635E+00	1.61E+02	2.10E+01 GA
EU-154	I	1.0632E+00					3.14E+03	
			873.23	-6.576E-01	?(P	8.336E+00	2.43E+02	1.23E+01 G
			123.10	-1.157E-01	+	7.634E-01	1.88E+02	4.08E+01 G
			1274.54	-3.909E-01	+	4.485E+00	3.23E+02	3.52E+01 G
			723.36	0.000E+00	+	3.271E+00	1.00E+03	2.02E+01 G
			1004.77	0.000E+00	+	3.674E+00	1.00E+03	1.80E+01 G
			996.33	3.055E+00	?(	2.920E+00	3.60E+01	1.06E+01 G
EU-155	I	4.5613E-01					1.81E+03	
			105.31	4.561E-01	?(P	2.986E+00	1.93E+02	2.12E+01 G
			86.54	-4.507E-01	+	2.620E+00	1.72E+02	3.07E+01 G
HF-181	F	9.6715E-02					4.24E+01	
			482.00	0.000E+00	?(	8.262E-01	1.00E+03	8.05E+01 G
			133.02	0.000E+00	?(	1.306E+00	1.00E+03	4.33E+01 G
			345.83	8.912E-01	&(	2.484E+00	1.08E+02	1.51E+01 G
			136.30	0.000E+00	&	9.751E+00	1.00E+03	5.85E+00 G
Ta-182	F	3.9852E-01					1.14E+02	
			1121.30	0.000E+00	?(	2.661E+00	1.00E+03	3.49E+01 G
			1221.41	9.136E-01	?(	1.347E+00	4.47E+01	2.70E+01 G
			1189.05	0.000E+00	-	2.197E+00	1.00E+03	1.62E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Hg-203   F   1.4878E-01                                     4.66E+01
                          279.20 1.488E-01 ?(  5.222E-01 1.02E+02 8.15E+01 G

TL-208   N   9.7249E-02                                     6.98E+02
                          583.02 9.725E-02 ?(P 6.463E-01 2.48E+02 8.45E+01 G
                          277.28-2.575E+00 + P 8.579E+00 8.28E+01 6.31E+00 G
                          860.56 1.434E-02 % P 4.249E+00 1.08E+04 1.24E+01 G

pm-146   C   6.5969E-02                                     2.02E+03
                          747.16 6.597E-02 ?(  1.677E+00 9.80E+02 3.40E+01 G
                          735.72-9.162E-02 % P 1.089E+00 1.75E+03 2.25E+01 G
                          453.88-3.719E-01 + P 9.540E-01 7.00E+01 6.50E+01 G

y-88     F   1.6410E-01                                     1.07E+02
                          898.04 1.641E-01 ?(P 3.077E-01 6.26E+01 9.37E+01 G
                         1836.06 0.000E+00 -   5.109E-01 1.00E+03 9.92E+01 G

Cd-113m      1.8576E+03                                     5.33E+03
                          263.70 1.858E+03 ?(  7.263E+03 1.13E+02 6.00E-03   K

Cd-109   F  -3.6263E+00                                     4.53E+02
                           88.04-3.626E+00 &(  2.267E+01 1.85E+02 3.79E+00 G

Cf-251   T  -5.7476E-01                                     3.28E+05
                          176.60-5.748E-01 ?(  2.118E+00 1.39E+02 1.70E+01 G
                          227.00 1.607E+00 ?   4.309E+00 1.04E+02 6.30E+00 GA

Cf-249   T   2.0358E-01                                     1.28E+05
                          387.95 2.036E-01 ?(  7.717E-01 1.10E+02 6.60E+01 G
                          333.44 0.000E+00 -   5.833E+00 1.00E+03 1.55E+01 G

Sn-126       1.1333E+00                                     3.65E+07
                           87.57-3.672E-01 -   2.244E+00 1.81E+02 3.75E+01 GA
                           64.28 1.133E+00 ?(  5.283E+00 1.36E+02 9.70E+00 G
                           86.94-1.528E+00 +   9.112E+00 1.77E+02 9.04E+00 GA

PB-210   N  -8.4365E-01                                     8.14E+03
                           46.54-8.437E-01 ?(P 1.820E+01 1.04E+02 4.25E+00 G

PB-212   N   1.1168E-01                                     6.98E+02
                          238.63 1.117E-01 &(P 9.685E-01 2.46E+02 4.33E+01 G
                          300.03 5.056E-07 %   3.046E+01 1.74E+09 3.28E+00 GA

PB-214   N  -4.3392E-01                                     5.84E+05
                          351.93-4.339E-01  (P 1.572E+00 9.53E+01 3.76E+01 G
                          295.09-1.358E+00 + P 4.951E+00 5.37E+01 1.93E+01 G
                          242.00 1.439E+00 &   5.970E+00 1.20E+02 7.43E+00 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	1.4048E-01					1.18E+04	
			569.70	1.405E-01	?(	8.245E-01	1.68E+02	9.77E+01 G
			1063.66	-7.852E-01	+ P	1.447E+00	2.58E+01	7.45E+01 G
BI-212	N	-2.9103E-01					6.98E+02	
			727.17	-2.910E-01	?(	8.704E+00	7.94E+02	7.55E+00 G
			785.42	2.212E+01	?	7.874E+01	1.04E+02	1.28E+00 GA
U-235	N	6.4211E-01					2.57E+11	
			143.79	-2.547E-02	%(P	5.327E+00	7.06E+03	1.10E+01 G
			205.33	2.103E+00	?(P	6.892E+00	1.28E+02	5.01E+00 G
			163.38	-1.709E-01	% P	8.243E+00	2.46E+03	5.08E+00 G
			185.72	5.452E-02	&	6.150E-01	4.11E+02	5.40E+01 GA
BI-214	N	-1.1420E+00					5.84E+05	
			609.31	-1.142E+00	(P	3.160E+00	5.75E+01	4.61E+01 G
			1120.29	-1.319E+00	+ P	6.912E+00	1.08E+02	1.51E+01 G
			1764.49	-1.490E+00	+ P	4.910E+00	1.51E+02	1.54E+01 G
BI-210M	T	-4.8028E-02					1.10E+09	
			265.83	-4.803E-02	(	1.093E+00	6.41E+02	5.00E+01 G
			304.90	0.000E+00	+	2.804E+00	1.00E+03	2.80E+01 G
AC-228	N	-1.3509E-01					2.10E+03	
			911.07	-1.351E-01	?(	2.357E+00	7.02E+02	2.90E+01 G
			968.97	0.000E+00	+	3.740E+00	1.00E+03	1.75E+01 G
			338.32	0.000E+00	+	7.610E+00	1.00E+03	1.20E+01 G
			93.35	-2.426E+00	+	1.406E+01	1.72E+02	5.56E+00 XA
TH-227	N	2.7136E-01					7.95E+03	
			50.14	-2.720E-01	?(P	8.936E+00	1.95E+02	8.00E+00 G
			256.24	8.924E-01	?(	4.206E+00	1.77E+02	7.00E+00 G
TH-229	N	4.8283E-01					2.68E+06	
			193.51	-3.240E+00	?(	8.563E+00	1.05E+02	4.40E+00 G
			210.85	5.961E+00	?(	7.287E+00	5.08E+01	2.99E+00 G
TH-234	N	3.4674E+00					1.63E+12	
			63.29	3.467E+00	?(	1.363E+01	1.15E+02	3.81E+00 G
			92.59	-2.421E+00	-	1.366E+01	1.67E+02	5.58E+00 G
PA-231	N	1.6196E+00					1.20E+07	
			302.65	1.620E+00	?(	2.670E+01	4.73E+02	2.88E+00 G
			300.07	-6.741E-07	%	4.061E+01	1.74E+09	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	-1.5726E-02					7.82E+08	
			312.01	-1.573E-02	%(P	2.220E+00	2.60E+03	3.60E+01 G
			300.18	2.675E-07	%	1.612E+01	1.74E+09	6.20E+00 G
PA-234	N	2.3668E-01					1.63E+12	
			131.29	2.367E-01	@(	3.078E+00	3.77E+02	1.80E+01 G
			946.02	-5.273E-01	+ P	4.180E+00	1.60E+02	1.34E+01 G
			569.47	-6.356E-01	+	1.011E+01	4.45E+02	8.20E+00 G
			883.24	1.370E-01	%	8.656E+00	1.69E+03	9.60E+00 G
			880.53	3.809E+00	?	1.140E+01	8.73E+01	6.00E+00 GA
PA-234M	N	1.7218E+01					1.63E+12	
			1001.00	0.000E+00	?(	7.882E+01	1.00E+03	8.37E-01 G
			766.41	6.624E+01	?(	2.398E+02	1.04E+02	2.94E-01 G
AM-241	T	4.2014E-01					1.58E+05	
			59.54	4.201E-01	?(	1.658E+00	1.16E+02	3.59E+01 G
Np-237	F	-1.0565E+00					2.14E+06	
			86.49	-1.057E+00	?(	5.975E+00	1.67E+02	1.31E+01 G
Ir-192	F	1.8404E-01					7.40E+01	
			316.49	6.563E-02	?(	5.471E-01	2.34E+02	8.70E+01 G
			468.06	3.832E-01	?(	1.378E+00	1.05E+02	5.18E+01 G
			308.44	0.000E+00	-	2.492E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.6692E-02					1.30E+01	
			818.50	3.607E-02	?(	6.800E-01	5.00E+02	1.00E+02 G
			1048.07	1.275E-01	?(	8.054E-01	1.70E+02	8.00E+01 G
			340.57	0.000E+00	-	1.958E+00	1.00E+03	4.69E+01 G
Np-239	T	4.7693E-01					2.36E+00	
			103.70	0.000E+00	-	3.496E+00	1.00E+03	2.40E+01 X
			106.13	4.769E-01	&(	2.798E+00	1.73E+02	2.27E+01 G
			99.50	-8.882E-01	&	5.387E+00	1.80E+02	1.50E+01 X
Nd-147		4.6807E-01					1.11E+01	
			531.00	4.681E-01	(	3.296E+00	2.66E+02	1.30E+01 G
			91.10	-6.056E-02	&	3.061E+00	1.48E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	51.	-2.	-0.001	104.40	-8.437E-01	P
TH-227	50.14	55.	-1.	-0.001	195.12	-2.720E-01	P
AM-241	59.54	61.	10.	0.006	115.93	4.201E-01	
TH-234	63.29	53.	9.	0.005	115.27	3.467E+00	
Sn-126	64.28	53.	8.	0.004	135.79	1.133E+00	
BA-133	80.99	51.	-6.	-0.004	215.34	-2.139E-01	
Np-237	86.49	212.	-12.	-0.007	167.44	-1.057E+00	
EU-155	86.54	224.	-12.	-0.007	172.16	-4.507E-01	
Sn-126	86.94	237.	-12.	-0.007	176.71	-1.528E+00	
Sn-126	87.57	249.	-12.	-0.007	181.06	-3.672E-01	
Cd-109	88.04	262.	-12.	-0.007	185.35	-3.626E+00	
TH-234	92.59	214.	-13.	-0.007	167.13	-2.421E+00	
AC-228	93.35	226.	-13.	-0.007	171.72	-2.426E+00	
Gd-153	97.50	239.	-13.	-0.007	175.62	-4.454E-01	
Np-239	99.50	251.	-13.	-0.007	179.76	-8.882E-01	
Gd-153	103.20	264.	-12.	-0.007	192.25	-5.808E-01	
EU-155	105.31	154.	9.	0.005	192.68	4.561E-01	P
Np-239	106.13	156.	10.	0.006	172.93	4.769E-01	
EU-152	121.78	37.	-2.	-0.001	376.07	-8.550E-02	
CO-57	122.06	25.	4.	0.002	171.14	5.303E-02	
EU-154	123.10	34.	-4.	-0.002	187.91	-1.157E-01	
PA-234	131.29	112.	4.	0.002	377.49	2.367E-01	
CE-141	145.44	40.	-13.	-0.007	98.49	-2.896E-01	
Cf-251	176.60	33.	-8.	-0.004	138.91	-5.748E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	185.72	26.	2.	0.001	411.44	5.452E-02	
TH-229	193.51	32.	-11.	-0.006	105.10	-3.240E+00	
U-235	205.33	24.	8.	0.004	128.22	2.103E+00	P
TH-229	210.85	8.	13.	0.007	50.83	5.961E+00	
Cf-251	227.00	12.	7.	0.004	103.55	1.607E+00	
PB-212	238.63	30.	3.	0.002	246.34	1.117E-01	P
PB-214	242.00	33.	7.	0.004	120.32	1.439E+00	
EU-152	244.69	62.	-7.	-0.004	159.03	-1.441E+00	
TH-227	256.24	12.	4.	0.002	176.78	8.924E-01	
Cd-113m	263.70	28.	7.	0.004	113.39	1.858E+03	
BI-210M	265.83	46.	-2.	-0.001	641.18	-4.803E-02	
TL-208	277.28	42.	-10.	-0.005	82.76	-2.575E+00	P
Hg-203	279.20	24.	7.	0.004	102.19	1.488E-01	
I-131	284.30	12.	7.	0.004	101.39	1.972E+00	P
PB-214	295.09	129.	-15.	-0.008	53.65	-1.358E+00	P
TL-210	296.00	134.	-4.	-0.002	468.78	-7.679E-02	
PA-231	302.65	78.	3.	0.001	473.35	1.620E+00	
Ir-192	316.49	26.	3.	0.002	233.84	6.563E-02	
CR-51	320.08	42.	-7.	-0.004	133.47	-1.311E+00	
La-140	328.76	93.	3.	0.002	461.51	2.720E-01	P
HF-181	345.83	13.	7.	0.004	107.70	8.912E-01	
PB-214	351.93	35.	-8.	-0.005	95.33	-4.339E-01	P
I-131	364.48	28.	-9.	-0.005	86.74	-2.271E-01	P
BA-133	383.84	30.	6.	0.003	146.02	1.270E+00	
Cf-249	387.95	22.	6.	0.004	109.61	2.036E-01	
SN-113	391.69	22.	4.	0.002	196.77	1.162E-01	P
AG-108M	433.94	18.	-3.	-0.001	269.71	-6.643E-02	P
pm-146	453.88	26.	-10.	-0.006	70.05	-3.719E-01	P
Ir-192	468.06	34.	8.	0.005	105.17	3.832E-01	
BE-7	477.60	21.	7.	0.004	105.36	1.530E+00	
RU-103	497.05	4.	5.	0.003	105.36	1.245E-01	P
RH-106	511.86	7.	66.	0.037	16.17	8.378E+00	
Nd-147	531.00	9.	2.	0.001	265.73	4.681E-01	
CS-134	563.24	34.	-15.	-0.008	25.17	-4.772E+00	P
CS-134	569.32	23.	-11.	-0.006	66.66	-2.041E+00	
PA-234	569.47	35.	-2.	-0.001	445.22	-6.356E-01	
BI-207	569.70	33.	5.	0.003	167.73	1.405E-01	
TL-208	583.02	13.	3.	0.002	247.90	9.725E-02	P
SB-124	602.73	68.	-1.	-0.001	798.77	-3.449E-02	P
CS-134	604.71	105.	-9.	-0.005	163.66	-2.657E-01	
BI-214	609.31	105.	-18.	-0.010	57.46	-1.142E+00	P
RU-103	610.30	87.	-9.	-0.005	149.04	-4.556E+00	
AG-108M	614.28	78.	-9.	-0.005	141.16	-2.936E-01	
PM-144	618.06	69.	-2.	-0.001	741.49	-4.677E-02	
RH-106	621.92	70.	-3.	-0.002	382.79	-8.313E-01	P
I-131	636.97	12.	5.	0.003	101.95	2.210E+00	
AG-110M	657.76	38.	-12.	-0.007	77.68	-3.877E-01	
CS-137	661.66	56.	-12.	-0.007	92.86	-4.320E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-144	696.54	18.	8.	0.004	84.68	2.498E-01		
NB-94	702.63	34.	-9.	-0.005	99.78	-2.871E-01		
SB-124	722.79	8.	6.	0.003	82.92	1.686E+00		
AG-108M	722.94	13.	1.	0.000	856.13	2.208E-02		
BI-212	727.17	14.	-1.	0.000	793.73	-2.910E-01		
pm-146	747.16	9.	1.	0.000	979.80	6.597E-02		
AG-110M	763.94	18.	-9.	-0.005	74.54	-1.382E+00		
NB-95	765.79	28.	1.	0.001	754.98	3.435E-02		
PA-234M	766.41	15.	6.	0.003	104.23	6.624E+01		
EU-152	778.92	25.	-13.	-0.007	90.50	-3.428E+00		
BI-212	785.42	31.	8.	0.005	103.97	2.212E+01		
CS-134	795.87	0.	7.	0.004	37.65	2.911E-01		
CS-134	801.95	16.	-1.	-0.001	546.88	-4.303E-01		
CO-58	810.78	10.	2.	0.001	234.52	7.201E-02		
Cs-136	818.50	12.	1.	0.001	500.00	3.607E-02		
MN-54	834.85	5.	4.	0.002	132.68	1.465E-01		
Co-56	846.77	20.	-9.	-0.005	116.65	-3.460E-01		P
NB-94	871.10	15.	-8.	-0.004	77.06	-3.030E-01		
EU-154	873.23	27.	-2.	-0.001	243.27	-6.576E-01		P
PA-234	880.53	11.	6.	0.003	87.27	3.809E+00		
y-88	898.04	1.	4.	0.002	62.63	1.641E-01		P
AC-228	911.07	10.	-1.	-0.001	702.38	-1.351E-01		
PA-234	946.02	6.	-2.	-0.001	160.35	-5.273E-01		P
EU-152	964.11	0.	8.	0.004	35.36	2.242E+00		
EU-154	996.33	0.	8.	0.004	36.01	3.055E+00		
Co-56	1037.84	11.	-2.	-0.001	132.05	-7.147E-01		P
Cs-136	1048.07	7.	2.	0.001	169.63	1.275E-01		
RH-106	1050.36	3.	-1.	0.000	601.66	-1.531E+00		P
BI-207	1063.66	22.	-13.	-0.007	25.76	-7.852E-01		P
Ga-68	1077.40	5.	2.	0.001	324.35	2.641E+00		
EU-152	1112.07	0.	14.	0.008	26.73	4.699E+00		
BI-214	1120.29	18.	-4.	-0.002	107.65	-1.319E+00		P
Ta-182	1221.41	0.	5.	0.003	44.72	9.136E-01		
Co-56	1238.28	1.	8.	0.005	36.79	6.379E-01		P
NA-22	1274.53	23.	-14.	-0.008	55.12	-7.136E-01		
EU-154	1274.54	37.	-3.	-0.001	323.47	-3.909E-01		
FE-59	1291.60	6.	1.	0.001	454.95	1.500E-01		P
TL-210	1313.00	0.	5.	0.003	44.72	1.245E+00		
CO-60	1332.50	6.	-2.	-0.001	343.80	-8.819E-02		
EU-152	1408.00	6.	-4.	-0.002	160.96	-9.655E-01		
K-40	1460.83	7.	4.	0.002	110.71	2.074E+00		P
BI-214	1764.49	3.	-3.	-0.002	151.07	-1.490E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.5298E+00	1.5298E+00	1.054E+02%	5.56E+00
NA-22	#A	-7.1365E-01	-7.1365E-01	5.512E+01%	1.27E+00
K-40	#A	2.0741E+00	2.0741E+00	1.107E+02%	8.09E+00
Sc-46	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.55E-01
CR-51	#A	-1.3109E+00	-1.3109E+00	1.335E+02%	6.03E+00
MN-54	#A	1.4651E-01	1.4651E-01	1.327E+02%	4.81E-01
FE-59	#A	6.5006E-02	6.5006E-02	4.550E+02%	5.92E-01
Co-56	#A	4.5593E-02	4.5594E-02	3.679E+01%	8.79E-01
CO-57	#A	5.3033E-02	5.3033E-02	1.711E+02%	3.20E-01
CO-58	#A	7.2005E-02	7.2005E-02	2.345E+02%	6.28E-01
CO-60	#A	-8.8190E-02	-8.8190E-02	3.438E+02%	7.30E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.83E+00
NB-94	#A	-2.8709E-01	-2.8709E-01	9.978E+01%	9.77E-01
ZR-95	#	4.9903E-01	4.9903E-01	3.536E+01%	4.60E-01
NB-95	#A	3.4353E-02	3.4353E-02	7.550E+02%	9.40E-01
RU-103	#A	1.2452E-01	1.2452E-01	1.054E+02%	3.43E-01
RH-106	#A	-8.3130E-01	-8.3130E-01	3.828E+02%	1.23E+01
AG-108M	#A	-2.2086E-02	-2.2086E-02	2.697E+02%	5.55E-01
AG-110M	#A	0.0000E+00	0.0000E+00	5.774E+02%	7.61E-01
SN-113	#A	1.1615E-01	1.1615E-01	1.968E+02%	8.12E-01
SB-124	#A	1.3604E-01	1.3604E-01	8.292E+01%	1.20E+00
SB-125	#C	2.4626E+00	2.4626E+00	1.949E+01%	2.02E+00
I-131	#A	9.8972E-02	9.8977E-02	5.598E+01%	6.70E-01
Gd-153	#A	-4.4544E-01	-4.4544E-01	1.756E+02%	2.64E+00
Ga-68	#A	2.6199E+00	2.6405E+00	3.243E+02%	2.13E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.66E-01
BA-133	#A	-2.1037E-02	-2.1037E-02	1.237E+03%	9.39E-01
CS-134	#A	-5.6557E-03	-5.6557E-03	3.765E+01%	1.48E+00
CS-137	#A	-4.3201E-01	-4.3201E-01	9.286E+01%	1.35E+00
CE-139	#A	3.2859E-03	3.2859E-03	4.730E+03%	5.51E-01
Ba-140	#	9.9773E-01	9.9776E-01	3.574E+01%	7.95E-01
La-140	#A	4.2315E-02	4.2317E-02	4.615E+02%	4.73E-01
CE-141	#A	-2.8955E-01	-2.8956E-01	9.849E+01%	7.43E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.11E+00
PM-144	#A	2.4981E-01	2.4981E-01	8.468E+01%	7.19E-01
EU-152	#A	1.8041E+00	1.8041E+00	2.673E+01%	3.46E+00
EU-154	#A	1.0632E+00	1.0632E+00	3.601E+01%	8.34E+00
EU-155	#A	4.5613E-01	4.5613E-01	1.927E+02%	2.99E+00
HF-181	#A	9.6715E-02	9.6715E-02	1.077E+02%	8.26E-01
Ta-182	#A	3.9852E-01	3.9852E-01	4.472E+01%	2.66E+00
Hg-203	#A	1.4878E-01	1.4878E-01	1.022E+02%	5.22E-01
TL-208	#A	9.7249E-02	9.7249E-02	2.479E+02%	6.46E-01
pm-146	#A	6.5969E-02	6.5969E-02	9.798E+02%	1.68E+00

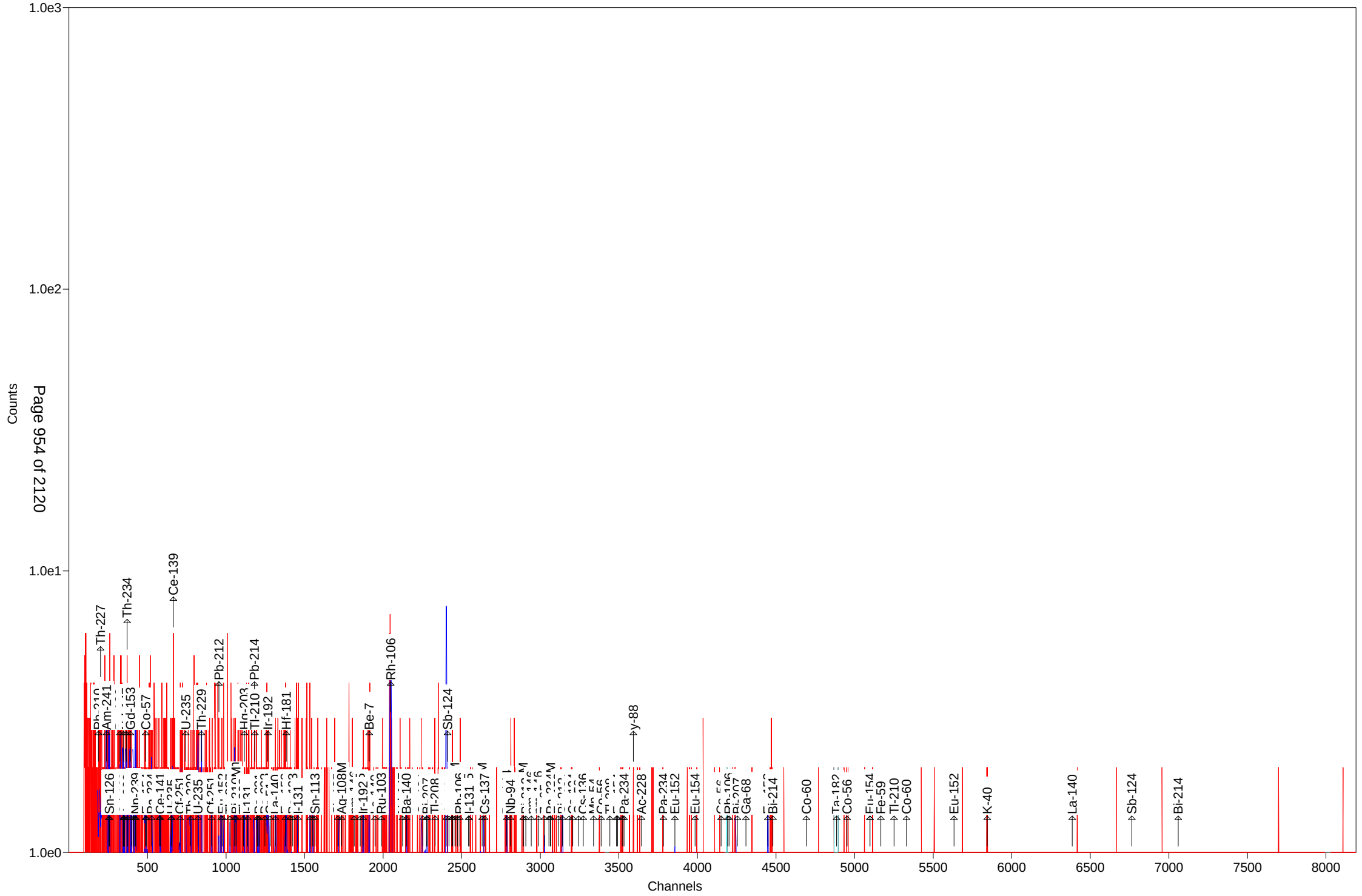
y-88	#A	1.6410E-01	1.6410E-01	6.263E+01%	3.08E-01
Cd-113m	#A	1.8576E+03	1.8576E+03	1.134E+02%	7.26E+03
Cd-109	#A	-3.6263E+00	-3.6263E+00	1.853E+02%	2.27E+01
Cf-251	#A	-5.7476E-01	-5.7476E-01	1.389E+02%	2.12E+00
Cf-249	#A	2.0358E-01	2.0358E-01	1.096E+02%	7.72E-01
Sn-126	#A	1.1333E+00	1.1333E+00	1.358E+02%	5.28E+00
PB-210	#A	-8.4365E-01	-8.4365E-01	1.044E+02%	1.82E+01
PB-212	#A	1.1168E-01	1.1168E-01	2.463E+02%	9.68E-01
PB-214	#A	-4.3392E-01	-4.3392E-01	9.533E+01%	1.57E+00
BI-207	#A	1.4048E-01	1.4048E-01	1.677E+02%	8.24E-01
BI-212	#A	-2.9103E-01	-2.9103E-01	7.937E+02%	8.70E+00
U-235	#A	6.4211E-01	6.4211E-01	1.282E+02%	5.33E+00
BI-214	#A	-1.1420E+00	-1.1420E+00	5.746E+01%	3.16E+00
BI-210M	#A	-4.8028E-02	-4.8028E-02	6.412E+02%	1.09E+00
AC-228	#A	-1.3509E-01	-1.3509E-01	7.024E+02%	2.36E+00
TH-227	#A	2.7136E-01	2.7136E-01	1.316E+02%	8.94E+00
TH-229	#A	4.8283E-01	4.8283E-01	5.083E+01%	8.56E+00
TH-234	#A	3.4674E+00	3.4674E+00	1.153E+02%	1.36E+01
PA-231	#A	1.6196E+00	1.6196E+00	4.734E+02%	2.67E+01
PA-233	#A	-1.5726E-02	-1.5726E-02	2.600E+03%	2.22E+00
PA-234	#A	2.3668E-01	2.3668E-01	3.775E+02%	3.08E+00
PA-234M	#A	1.7218E+01	1.7218E+01	1.042E+02%	7.88E+01
AM-241	#A	4.2014E-01	4.2014E-01	1.159E+02%	1.66E+00
Np-237	#A	-1.0565E+00	-1.0565E+00	1.674E+02%	5.97E+00
Ir-192	#A	1.8404E-01	1.8404E-01	1.052E+02%	5.47E-01
Cs-136	#A	7.6690E-02	7.6692E-02	1.696E+02%	6.80E-01
Np-239	#A	4.7685E-01	4.7693E-01	1.729E+02%	2.80E+00
Nd-147	#A	4.6806E-01	4.6807E-01	2.657E+02%	3.30E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.40E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.3 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 0.0000000E+00 Bq/Sample

379951_Gamma_MB 160-379951~1-A. 9_Gamma_20183563.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181527

Sample Description: 379951_Gamma_LCS 160-379951~2-A
Detector: Detector #12
Batch ID: 379951
Work Order Number: Gamma
Lot Number: LCS 160-379951~2-A

Decay to Time: 8/23/2018 06:26 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:26:24 Real Time: 1806 sec
Analysis Time: 8/23/2018 06:56 Dead Time: 0.34 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.471E+01	102.5	1.507E+01	1.509E+01	5.002E+01
NA-22	-5.854E-01	96.7	5.663E-01	5.671E-01	1.933E+00
K-40	3.660E+00	173.2	6.340E+00	6.343E+00	1.380E+01
Sc-46	1.858E+00	46.6	8.658E-01	8.709E-01	5.704E+00
CR-51	1.175E+01	173.9	2.044E+01	2.045E+01	6.780E+01
MN-54	-3.770E-01	387.0	1.459E+00	1.459E+00	3.330E+00
FE-59	2.520E+00	124.3	3.133E+00	3.135E+00	6.631E+00
Co-56	-5.860E-01	75.2	4.408E-01	4.418E-01	3.853E+00
CO-57	-2.007E-02	4334.6	8.698E-01	8.698E-01	2.913E+00
CO-58	-1.705E+00	80.6	1.373E+00	1.376E+00	4.558E+00
CO-60	1.722E+02	1.5	2.648E+00	8.975E+00	2.200E+00
ZN-65	-4.819E+00	74.1	3.572E+00	3.580E+00	1.183E+01
NB-94	9.116E-01	127.5	1.162E+00	1.163E+00	2.638E+00
ZR-95	-1.172E+00	205.2	2.405E+00	2.406E+00	5.475E+00
NB-95	-1.610E+00	72.3	1.163E+00	1.166E+00	3.853E+00
RU-103	1.352E+00	88.4	1.195E+00	1.197E+00	2.897E+00
RH-106	1.219E+01	128.7	1.569E+01	1.570E+01	5.229E+01
AG-108M	-1.227E+00	129.2	1.585E+00	1.587E+00	3.836E+00
AG-110M	2.169E+00	41.1	8.902E-01	8.970E-01	7.699E+00
SN-113	-8.252E-01	257.3	2.123E+00	2.124E+00	7.091E+00
SB-124	1.298E+00	37.8	4.907E-01	4.952E-01	5.241E+00
SB-125	2.399E+00	58.1	1.394E+00	1.399E+00	1.116E+01
I-131	1.623E+00	69.2	1.123E+00	1.126E+00	3.429E+00
Gd-153	2.897E+00	102.4	2.968E+00	2.973E+00	1.196E+01
Ga-68	-8.366E+01	83.9	7.021E+01	7.037E+01	1.472E+02
Tc-99m	5.335E-01	244.2	1.303E+00	1.303E+00	4.329E+00
BA-133	-5.567E-01	316.0	1.759E+00	1.759E+00	5.892E+00
CS-134	1.614E+00	91.6	1.479E+00	1.481E+00	5.402E+00
CS-137	3.886E+02	1.2	4.528E+00	2.034E+01	2.890E+00
CE-139	8.997E-01	122.6	1.103E+00	1.104E+00	3.662E+00
Ba-140	1.207E+01	37.8	4.562E+00	4.603E+00	1.036E+01
La-140	-1.056E+00	102.7	1.085E+00	1.087E+00	2.248E+00
CE-141	1.562E+00	156.7	2.448E+00	2.449E+00	8.118E+00

CE-144	-6.552E+00	157.8	1.034E+01	1.034E+01	3.430E+01
PM-144	3.796E-01	308.1	1.170E+00	1.170E+00	2.676E+00
EU-152	7.419E+00	68.8	5.103E+00	5.117E+00	1.433E+01
EU-154	4.177E+00	81.7	3.412E+00	3.419E+00	3.873E+01
EU-155	1.876E+00	274.9	5.156E+00	5.157E+00	1.714E+01
HF-181	-9.804E-01	205.5	2.015E+00	2.015E+00	6.720E+00
Ta-182	4.884E+00	84.9	4.146E+00	4.153E+00	1.676E+01
Hg-203	3.171E-01	325.8	1.033E+00	1.033E+00	3.466E+00
TL-208	5.162E+00	24.9	1.286E+00	1.313E+00	2.861E+00
pm-146	2.749E-01	480.4	1.321E+00	1.321E+00	7.677E+00
y-88	-2.891E-01	638.7	1.847E+00	1.847E+00	4.062E+00
Cd-113m	-1.662E+04	80.4	1.336E+04	1.339E+04	4.425E+04
Cd-109	2.145E+01	137.4	2.949E+01	2.951E+01	9.778E+01
Cf-251	-2.870E+00	166.8	4.786E+00	4.788E+00	1.211E+01
Cf-249	0.000E+00	1.#INF	7.919E-01	7.919E-01	6.559E+00
Sn-126	-2.001E+01	238.0	4.762E+01	4.763E+01	1.573E+02
PB-210	1.129E+04	1.1	1.263E+02	7.160E+02	2.218E+02
PB-212	8.821E+00	15.9	1.405E+00	1.479E+00	4.242E+00
PB-214	6.572E+00	29.1	1.914E+00	1.943E+00	5.096E+00
BI-207	-2.655E-02	3238.1	8.597E-01	8.597E-01	2.939E+00
BI-212	-4.005E+00	396.5	1.588E+01	1.588E+01	5.374E+01
U-235	6.579E+00	153.5	1.010E+01	1.011E+01	3.473E+01
BI-214	1.244E+00	64.0	7.967E-01	7.992E-01	1.156E+01
BI-210M	-2.249E-01	782.3	1.759E+00	1.760E+00	5.907E+00
AC-228	4.912E+00	110.1	5.410E+00	5.415E+00	1.385E+01
TH-227	-4.144E+01	179.7	7.447E+01	7.451E+01	2.460E+02
TH-229	8.845E+00	230.1	2.036E+01	2.036E+01	5.157E+01
TH-234	-6.301E+01	135.6	8.545E+01	8.553E+01	4.022E+02
PA-231	-3.910E+01	168.4	6.582E+01	6.585E+01	2.183E+02
PA-233	-3.227E+00	173.2	5.589E+00	5.591E+00	1.854E+01
PA-234	-4.168E+00	115.2	4.801E+00	4.806E+00	1.593E+01
PA-234M	5.851E+01	70.2	4.107E+01	4.118E+01	6.996E+02
AM-241	1.239E+03	0.9	1.120E+01	7.301E+01	1.679E+01
Np-237	1.058E+00	823.8	8.718E+00	8.718E+00	2.902E+01
Ir-192	-3.816E-01	239.2	9.127E-01	9.129E-01	7.805E+00
Cs-136	-1.805E+00	86.3	1.559E+00	1.562E+00	5.175E+00
Np-239	-3.468E+00	139.3	4.831E+00	4.836E+00	1.602E+01
Nd-147	1.984E+00	138.4	2.745E+00	2.747E+00	2.084E+01
TL-210	-1.838E+00	80.2	1.474E+00	1.478E+00	4.890E+00
Total	1.329E+04				

Analyst: kody Saulters

Sample description
379951_Gamma_LCS 160-379951~2-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181527.An1

Acquisition information
Start time: 8/23/2018 6:26:24 AM
Live time: 1800
Real time: 1806
Dead time: 0.34 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:26:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1459

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
32.30	130.	34.40	0.90	7.290E-03				
36.54	314.	17.83	0.92	1.050E-02				
46.47	15589.	1.12	0.84	1.800E-02	46.54	4.250	1.129E+04	PB210
59.43	22560.	0.90	0.90	2.812E-02	59.54	35.900	1.239E+03	AM241
86.49	9.	823.85	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.514E-01	EU155
86.57	13.	215.86	0.89	3.560E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.722E-01	EU155
					86.94	9.040	2.279E+00	Sn126
86.96	9.	413.78	0.89	3.566E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	1.530E+00	Sn126
87.60	14.	261.76	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
88.07	52.	137.44	0.89	3.582E-02	88.04	3.790	PBC<MDA	Cd109
91.10	53.	138.35	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-25.	297.59	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
97.50	50.	143.93	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	50.	145.04	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
103.20	50.	145.80	0.91	3.717E-02	103.20	21.800	PBC<MDA	Gd153
104.97	27.	274.89	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
123.10	48.	92.95	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
140.51	30.	244.22	0.95	3.623E-02	140.51	89.300	PBC<MDA	Tc99m
144.01	48.	153.53	0.95	3.599E-02	143.79	10.960	PBC<MDA	U235
145.64	49.	39.10	0.41	3.584E-02	145.44	48.200	1.575E+00	CE141
161.65	19.	300.37	0.97	3.428E-02	163.38	5.080	PBC<MDA	U235
165.85	44.	122.58	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
169.62	68.	62.83	0.49	3.369E-02				
185.86	106.	35.08	1.69	3.215E-02	185.72	54.000	3.389E+00	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.51	22.	230.12	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
238.47	195.	15.36	1.05	2.745E-02	238.63	43.300	9.116E+00	PB212
241.59	41.	58.62	1.05	2.720E-02	242.00	7.430	PBC<MDA	PB214
257.88	34.	52.34	0.57	2.596E-02				
277.28	43.	88.06	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
279.20	11.	325.81	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
284.30	19.	213.23	1.09	2.416E-02	284.30	6.140	PBC<MDA	I131
295.23	79.	43.73	2.07	2.350E-02	295.09	19.300	PBC<MDA	PB214
					296.00	79.000	2.380E+00	TL210
320.08	46.	173.91	1.13	2.210E-02	320.08	9.940	PBC<MDA	CR51
338.32	41.	110.12	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
339.94	25.	65.02	0.46	2.110E-02	340.57	46.900	1.386E+00	Cs136
344.29	25.	171.35	1.15	2.090E-02	344.29	26.500	PBC<MDA	EU152
351.72	69.	38.47	1.13	2.055E-02	351.93	37.600	PBC<MDA	PB214
463.37	48.	88.23	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	10.	445.58	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	35.	88.39	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	68.	83.03	2.56	1.546E-02	511.86	20.000	PBC<MDA	RH106
537.26	79.	37.79	1.34	1.491E-02	537.26	24.390	1.207E+01	Ba140
563.24	30.	91.62	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
569.32	13.	160.12	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.011E+00	PA234
					569.70	97.740	5.044E-01	BI207
583.02	110.	24.92	1.38	1.403E-02	583.02	84.500	5.162E+00	TL208
600.50	31.	118.42	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	32.	120.89	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	8.	483.12	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
610.30	21.	155.24	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
621.92	29.	128.71	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
636.97	30.	69.23	1.43	1.315E-02	636.97	7.170	PBC<MDA	I131
657.73	33.	382.27	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
661.58	7662.	1.23	1.37	1.279E-02	661.66	85.210	3.906E+02	CS137
696.54	8.	308.13	1.49	1.232E-02	696.54	99.000	PBC<MDA	PM144
702.63	20.	127.49	1.49	1.224E-02	702.63	97.900	PBC<MDA	NB94
735.72	5.	480.36	1.52	1.184E-02	735.72	22.500	PBC<MDA	pm146
763.20	38.	41.05	2.70	1.152E-02	763.94	22.280	8.223E+00	AG110M
766.41	29.	70.20	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	4.695E+02	PA234M
778.92	26.	87.87	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
860.56	5.	599.72	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
873.23	4.	690.23	1.65	1.046E-02	873.23	12.270	PBC<MDA	EU154
884.68	16.	196.52	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
889.28	25.	128.68	1.66	1.033E-02	889.28	99.984	PBC<MDA	Sc46
911.07	17.	197.62	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
959.74	18.	52.92	0.53	9.771E-03				
964.11	37.	74.12	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
1004.77	35.	81.70	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	22.	121.70	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1048.07	19.	96.58	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1099.25	23.	124.33	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1119.65	38.	46.59	3.72	8.721E-03	1120.29	15.100	1.582E+01	BI214
					1120.55	99.987	2.389E+00	Sc46
					1121.30	34.900	6.849E+00	Ta182
1121.30	33.	84.88	1.87	8.716E-03	1121.30	34.900	PBC<MDA	Ta182
1173.20	2591.	2.20	1.80	8.427E-03	1173.24	99.900	1.710E+02	CO60
1189.05	6.	237.78	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	13.	88.11	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1313.00	5.	198.49	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	2385.	2.15	2.06	7.647E-03	1332.50	99.980	1.733E+02	CO60
1460.83	5.	173.21	2.16	7.112E-03	1460.83	10.670	PBC<MDA	K40
1690.98	7.	37.80	2.35	6.302E-03	1690.98	47.790	PBC<MDA	SB124
1764.49	8.	64.04	2.40	6.075E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
128.89	32.30	594.	130.	1.788E+04	34.40	0.904	-	
145.84	36.54	888.	314.	2.989E+04	17.83	0.919	-	s
677.84	169.62	456.	68.	2.013E+03	62.83	0.493	-	s
1030.68	257.88	132.	34.	1.316E+03	52.34	0.566	-	s
1358.82	339.94	107.	25.	1.169E+03	65.02	0.459	-	s
3838.13	959.74	32.	18.	1.791E+03	52.92	0.527	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.52	46.47	4244.	15589.	8.661	1.12	0.842
TH-227	200.18	50.14	27596.	-131.	-0.073	179.71	0.855s
AM-241	237.33	59.43	4224.	22560.	12.533	0.90	0.900
TH-234	252.74	63.29	30855.	-129.	-0.071	135.61	0.868s
Sn-126	256.71	64.28	31371.	-105.	-0.059	237.99	0.869
BA-133	323.50	80.99	1093.	-21.	-0.012	276.66	0.887s
Np-237	345.49	86.49	2672.	9.	0.005	823.85	0.892
EU-155	345.70	86.54	629.	13.	0.007	215.86	0.892D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	347.29	86.94	2620.	9.	0.005	413.78	0.892D
Sn-126	349.81	87.57	2667.	14.	0.008	261.76	0.893D
Cd-109	351.68	88.04	2569.	52.	0.029	137.44	0.894A
Nd-147	363.92	91.10	2622.	53.	0.029	138.35	0.897s
TH-234	369.87	92.59	2706.	-25.	-0.014	297.59	0.898s
AC-228	372.91	93.35	2555.	-53.	-0.030	134.39	0.899s
Gd-153	389.50	97.50	2547.	50.	0.028	143.93	0.903s
Np-239	397.50	99.50	2596.	50.	0.028	145.04	0.905s
Gd-153	412.29	103.20	2646.	50.	0.028	145.80	0.909s
EU-155	420.73	105.31	2673.	27.	0.015	274.89	0.911s
Np-239	424.00	106.13	2682.	-53.	-0.029	139.30	0.912s
EU-152	486.55	121.78	1195.	-50.	-0.028	99.09	0.928s
EU-154	491.84	123.10	980.	48.	0.027	92.95	0.929s
PA-234	524.60	131.29	1616.	-50.	-0.028	115.21	0.938s
HF-181	531.51	133.02	2917.	-48.	-0.027	159.86	0.939s
CE-144	533.57	133.54	2844.	-48.	-0.027	157.80	0.940s
HF-181	544.61	136.30	2820.	-48.	-0.027	156.65	0.943s
CO-57	545.30	136.47	2868.	-23.	-0.013	326.32	0.943s
Tc-99m	561.44	140.51	2699.	30.	0.017	244.22	0.947
U-235	574.53	143.79	2738.	48.	0.027	153.53	0.950
CE-141	581.15	145.44	2875.	49.	0.027	156.65	0.952s
Ba-140	649.99	162.66	1677.	-39.	-0.022	149.99	0.969s
U-235	652.87	163.38	1619.	19.	0.011	300.37	0.970s
CE-139	662.76	165.85	1436.	44.	0.024	122.58	0.973s
Cf-251	705.72	176.60	660.	-29.	-0.016	166.77	0.983s
U-235	742.72	185.86	388.	106.	0.059	35.08	1.694s
TH-229	773.32	193.51	726.	22.	0.012	230.12	1.000s
U-235	820.59	205.33	653.	-47.	-0.026	102.89	1.012s
TH-229	842.65	210.85	733.	-50.	-0.028	102.28	1.018s
Cf-251	907.22	227.00	664.	-10.	-0.005	499.61	1.034s
PB-212	953.73	238.63	356.	189.	0.105	15.93	1.045D
PB-214	967.18	242.00	1446.	26.	0.014	209.72	1.049
EU-152	977.96	244.69	1472.	0.	0.000	1000.00	1.051s
TH-227	1024.13	256.24	598.	-44.	-0.024	80.61	1.063
Cd-113m	1053.96	263.70	656.	-46.	-0.025	80.35	1.070s
BI-210M	1062.48	265.83	806.	-5.	-0.003	782.33	1.072s
TL-208	1108.27	277.28	683.	43.	0.024	88.06	1.084s
Hg-203	1115.93	279.20	683.	11.	0.006	325.81	1.086s
I-131	1136.32	284.30	447.	19.	0.010	213.23	1.091s
PB-214	1180.02	295.23	307.	79.	0.044	43.73	2.067s
TL-210	1183.11	296.00	3076.	-46.	-0.026	169.50	1.102s
PB-212	1199.22	300.03	2997.	-47.	-0.026	166.74	1.106s
PA-231	1199.38	300.07	2978.	-47.	-0.026	166.21	1.106s
PA-233	1199.82	300.18	3025.	-47.	-0.026	167.46	1.107s
PA-231	1209.70	302.65	3071.	-47.	-0.026	168.36	1.109s
BA-133	1210.50	302.85	3118.	-47.	-0.026	169.58	1.109s
Ba-140	1218.49	304.85	3165.	-47.	-0.026	170.58	1.111s
BI-210M	1218.68	304.90	3212.	-47.	-0.026	171.79	1.111

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ir-192	1232.85	308.44	3259.	-47.	-0.026	172.49	1.115s
PA-233	1247.13	312.01	3306.	-47.	-0.026	173.18	1.118s
Ir-192	1265.04	316.49	3353.	-34.	-0.019	239.17	1.123s
CR-51	1279.41	320.08	3242.	46.	0.026	173.91	1.126s
La-140	1314.10	328.76	889.	-44.	-0.025	96.06	1.135s
Cf-249	1332.81	333.44	933.	-15.	-0.008	297.95	1.139s
AC-228	1352.33	338.32	1015.	41.	0.023	110.12	1.144s
Cs-136	1361.32	340.57	1056.	7.	0.004	656.49	1.146s
EU-152	1376.18	344.29	905.	25.	0.014	171.35	1.150s
PB-214	1405.89	351.72	214.	69.	0.038	38.47	1.134
BA-133	1423.02	356.00	795.	-13.	-0.007	315.99	1.162s
I-131	1456.95	364.48	444.	-6.	-0.003	688.80	1.170s
BA-133	1534.35	383.84	972.	-9.	-0.005	509.79	1.189s
Cf-249	1550.79	387.95	980.	0.	0.000	1000.00	1.193s
SN-113	1565.74	391.69	1063.	-18.	-0.010	257.28	1.196s
SB-125	1710.45	427.88	484.	-47.	-0.026	92.63	1.232s
AG-108M	1734.69	433.94	524.	-35.	-0.019	129.16	1.238s
pm-146	1814.45	453.88	532.	-50.	-0.028	90.74	1.257
SB-125	1852.39	463.37	865.	48.	0.027	88.23	1.266s
Ir-192	1871.16	468.06	929.	10.	0.005	445.58	1.271s
BE-7	1909.29	477.60	1057.	-45.	-0.025	102.45	1.280s
HF-181	1926.90	482.00	1103.	-23.	-0.013	205.50	1.284s
La-140	1946.98	487.02	1153.	-16.	-0.009	307.60	1.289s
RU-103	1987.11	497.05	240.	35.	0.019	88.39	1.298s
RH-106	2046.35	511.86	480.	68.	0.038	83.03	2.563s
Ba-140	2147.92	537.26	195.	79.	0.044	37.79	1.337s
CS-134	2251.82	563.24	169.	30.	0.016	91.62	1.362s
CS-134	2276.15	569.32	199.	13.	0.007	160.12	1.367s
PA-234	2276.75	569.47	229.	-9.	-0.005	249.08	1.368
TL-208	2330.96	583.02	157.	110.	0.061	24.92	1.381s
SB-125	2400.87	600.50	679.	31.	0.017	118.42	1.397
SB-124	2409.79	602.73	710.	32.	0.018	120.89	1.399
CS-134	2417.71	604.71	742.	8.	0.004	483.12	1.401s
BI-214	2436.11	609.31	750.	0.	0.000	1000.00	1.405
RU-103	2440.06	610.30	504.	21.	0.011	155.24	1.406s
AG-108M	2455.99	614.28	902.	-32.	-0.018	133.26	1.410
PM-144	2471.12	618.06	869.	-23.	-0.013	179.76	1.414s
RH-106	2486.54	621.92	690.	29.	0.016	128.71	1.417s
SB-125	2542.43	635.89	186.	-13.	-0.007	147.35	1.430
I-131	2546.77	636.97	204.	30.	0.017	69.23	1.432
AG-110M	2629.92	657.76	7980.	33.	0.018	382.27	1.451s
CS-137	2645.51	661.66	134.	7622.	4.234	1.17	1.455D
PM-144	2785.05	696.54	145.	8.	0.005	308.13	1.487s
NB-94	2809.41	702.63	135.	20.	0.011	127.49	1.493s
SB-124	2890.04	722.79	267.	-30.	-0.017	78.68	1.512s
AG-108M	2890.65	722.94	247.	-15.	-0.008	150.71	1.512
EU-154	2892.32	723.36	262.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	262.	0.	0.000	1000.00	1.513s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	2907.58	727.17	329.	-6.	-0.004	396.48	1.516s
pm-146	2941.78	735.72	145.	5.	0.003	480.36	1.524
ZR-95	3025.83	756.73	163.	-13.	-0.007	205.17	1.543s
AG-110M	3051.72	763.20	56.	38.	0.021	41.05	2.700s
NB-95	3062.08	765.79	272.	-33.	-0.018	72.28	1.552
PA-234M	3064.57	766.41	187.	29.	0.016	70.20	1.552s
EU-152	3114.61	778.92	107.	26.	0.014	87.87	1.564s
CS-134	3182.42	795.87	374.	-36.	-0.020	76.89	1.579s
TL-210	3197.35	799.60	410.	-37.	-0.020	80.21	1.583s
CO-58	3242.06	810.78	352.	-34.	-0.019	80.55	1.593s
La-140	3262.05	815.77	328.	-18.	-0.010	141.79	1.598
Cs-136	3272.97	818.50	455.	-36.	-0.020	86.33	1.600s
MN-54	3338.38	834.85	177.	-7.	-0.004	386.98	1.615s
Co-56	3386.08	846.77	235.	-39.	-0.022	88.42	1.626
TL-208	3441.27	860.56	185.	5.	0.003	599.72	1.638s
NB-94	3483.41	871.10	260.	-41.	-0.023	57.33	1.648s
EU-154	3491.95	873.23	347.	4.	0.002	690.23	1.650s
PA-234	3521.16	880.53	479.	-37.	-0.020	85.50	1.657s
PA-234	3532.00	883.24	424.	-37.	-0.021	80.53	1.659s
AG-110M	3537.78	884.68	476.	16.	0.009	196.52	1.660s
Sc-46	3556.17	889.28	491.	25.	0.014	128.68	1.664s
y-88	3591.22	898.04	210.	-5.	-0.003	638.75	1.672s
AC-228	3643.36	911.07	230.	17.	0.009	197.62	1.684
AG-110M	3749.09	937.49	250.	-25.	-0.014	140.48	1.708
PA-234	3783.21	946.02	310.	-47.	-0.026	83.67	1.716s
EU-152	3855.60	964.11	350.	37.	0.020	74.12	1.732s
AC-228	3875.05	968.97	447.	-20.	-0.011	147.77	1.736
EU-154	3984.54	996.33	396.	-38.	-0.021	75.39	1.761s
PA-234M	4003.22	1001.00	435.	-12.	-0.007	242.31	1.765s
EU-154	4018.33	1004.77	386.	35.	0.019	81.70	1.768s
Co-56	4150.66	1037.84	139.	22.	0.012	121.70	1.798
Cs-136	4191.60	1048.07	165.	19.	0.011	96.58	1.807s
RH-106	4200.76	1050.36	218.	-18.	-0.010	115.11	1.809s
BI-207	4253.99	1063.66	192.	-32.	-0.018	100.00	1.820s
Ga-68	4308.98	1077.40	192.	-38.	-0.021	83.93	1.833s
FE-59	4396.44	1099.25	149.	23.	0.013	124.33	1.852
EU-152	4447.76	1112.07	422.	-38.	-0.021	77.53	1.863s
ZN-65	4461.66	1115.55	386.	-38.	-0.021	74.12	1.866s
BI-214	4480.63	1120.29	424.	-38.	-0.021	77.39	1.870s
Sc-46	4478.08	1119.65	60.	38.	0.021	46.59	3.716s
Ta-182	4484.69	1121.30	365.	33.	0.018	84.88	1.871s
CO-60	4692.42	1173.20	87.	2591.	1.440	2.20	1.799
Ta-182	4755.86	1189.05	43.	6.	0.004	237.78	1.930s
Ta-182	4885.39	1221.41	79.	-19.	-0.011	110.41	1.957s
Co-56	4952.92	1238.28	23.	13.	0.007	88.11	1.972s
NA-22	5098.03	1274.53	28.	-8.	-0.005	96.75	2.003
EU-154	5098.09	1274.54	37.	0.	0.000	1000.00	2.003
FE-59	5166.35	1291.60	34.	-13.	-0.007	108.79	2.017

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	5252.04	1313.00	17.	5.	0.003	198.49	2.036s
CO-60	5330.11	1332.50	35.	2385.	1.325	2.15	2.064
AG-110M	5537.48	1384.30	23.	-4.	-0.002	308.96	2.096s
EU-152	5632.39	1408.00	24.	-10.	-0.006	122.47	2.115s
K-40	5843.92	1460.83	12.	5.	0.003	173.21	2.159s
La-140	6386.02	1596.21	24.	-12.	-0.007	102.74	2.269s
SB-124	6765.58	1690.98	0.	7.	0.004	37.80	2.345s
BI-214	7060.00	1764.49	10.	8.	0.005	64.04	2.403
Co-56	7087.48	1771.35	8.	0.	0.000	1000.00	2.408s
y-88	7346.69	1836.06	13.	-4.	-0.002	220.14	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.4713E+01				5.31E+01	
			477.60	-1.471E+01	?(	5.002E+01 1.02E+02 1.05E+01	G
NA-22	C	-5.8535E-01				9.50E+02	
			1274.53	-5.854E-01	&(	1.933E+00 9.67E+01 9.99E+01	G
K-40	N	3.6604E+00				4.66E+11	
			1460.83	3.660E+00	?(	1.380E+01 1.73E+02 1.07E+01	G
Sc-46	F	1.8583E+00				8.38E+01	
			889.28	1.327E+00	?(	5.704E+00 1.29E+02 1.00E+02	G
			1120.55	2.389E+00	(	2.463E+00 4.66E+01 1.00E+02	G
CR-51	F	1.1754E+01				2.77E+01	
			320.08	1.175E+01	?(	6.780E+01 1.74E+02 9.94E+00	G
MN-54	C	-3.7702E-01				3.12E+02	
			834.85	-3.770E-01	?(	3.330E+00 3.87E+02 1.00E+02	G
FE-59	F	2.5197E+00				4.45E+01	
			1099.25	2.520E+00	(	6.631E+00 1.24E+02 5.65E+01	G
			1291.60	-2.134E+00	+	4.906E+00 1.09E+02 4.32E+01	G
Co-56	C	-5.8604E-01				7.73E+01	
			846.77	-2.014E+00	?(	3.853E+00 8.84E+01 9.99E+01	G
			1238.28	1.386E+00	&	2.588E+00 8.81E+01 6.61E+01	G
			1037.84	9.515E+00	&(	2.453E+01 1.22E+02 1.41E+01	G
			1771.35	0.000E+00	+	9.595E+00 1.00E+03 1.55E+01	A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C -2.0066E-02					2.72E+02	
		122.06	-2.007E-02	%(	2.913E+00	4.33E+03	8.56E+01 G
		136.47	-3.313E+00	+	3.594E+01	3.26E+02	1.07E+01 G
CO-58	C -1.7050E+00					7.09E+01	
		810.78	-1.705E+00	?(	4.558E+00	8.06E+01	9.95E+01 G
CO-60	F 1.7216E+02					1.93E+03	
		1332.50	1.733E+02	(	2.200E+00	2.15E+00	1.00E+02 G
		1173.24	1.710E+02	(	3.042E+00	2.20E+00	9.99E+01 G
ZN-65	F -4.8186E+00					2.44E+02	
		1115.55	-4.819E+00	(	1.183E+01	7.41E+01	5.06E+01 G
NB-94	I 9.1159E-01					7.41E+06	
		702.63	9.116E-01	?(	2.638E+00	1.27E+02	9.79E+01 G
		871.10	-2.193E+00	+	4.131E+00	5.73E+01	9.99E+01 G
ZR-95	I -1.1723E+00					6.40E+01	
		756.73	-1.172E+00	&(	5.475E+00	2.05E+02	5.45E+01 G
		724.20	0.000E+00	&	8.209E+00	1.00E+03	4.42E+01 G
NB-95	I -1.6096E+00					6.40E+01	
		765.79	-1.610E+00	(	3.853E+00	7.23E+01	9.98E+01 G
RU-103	I 1.3523E+00					3.93E+01	
		497.05	1.352E+00	&(	2.897E+00	8.84E+01	9.09E+01 G
		610.30	1.472E+01	?	7.646E+01	1.55E+02	5.75E+00 GA
RH-106	I 1.2189E+01					3.74E+02	
		621.92	1.219E+01	?(	5.229E+01	1.29E+02	9.93E+00 G
		1050.36	-7.202E+01	+	2.781E+02	1.15E+02	1.56E+00 G
		511.86	1.222E+01	?	1.884E+01	8.30E+01	2.00E+01 GA
AG-108M	C -1.2274E+00					1.53E+05	
		433.94	-1.227E+00	?(	3.836E+00	1.29E+02	9.05E+01 G
		722.94	-7.634E-01	+	3.873E+00	1.51E+02	9.08E+01 G
		614.28	-1.472E+00	+	6.531E+00	1.33E+02	8.98E+01 G
AG-110M	F 2.1686E+00					2.50E+02	
		884.68	1.168E+00	&(	7.699E+00	1.97E+02	7.27E+01 G
		657.76	1.512E+00	?(	1.915E+01	3.82E+02	9.46E+01 G
		937.49	-4.067E+00	+	1.243E+01	1.40E+02	3.44E+01 G
		1384.30	-1.130E+00	&	7.671E+00	3.09E+02	2.43E+01 G
		763.94	8.223E+00	(	8.132E+00	4.11E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	-8.2525E-01					1.15E+02	
			391.69	-8.252E-01	(	7.091E+00	2.57E+02	6.40E+01 G
SB-124	F	1.2983E+00					6.02E+01	
			602.73	1.302E+00	?(	5.241E+00	1.21E+02	9.83E+01 G
			1690.98	1.291E+00	?(	1.359E+00	3.78E+01	4.78E+01 G
			722.79	-1.294E+01	+	3.380E+01	7.87E+01	1.08E+01 G
SB-125	I	2.3989E+00					1.01E+03	
			427.88	-4.994E+00	?(	1.116E+01	9.26E+01	2.96E+01 G
			600.50	7.132E+00	&(	2.812E+01	1.18E+02	1.79E+01 G
			635.89	-4.975E+00	+	2.474E+01	1.47E+02	1.13E+01 G
			463.37	1.523E+01	&(	4.453E+01	8.82E+01	1.05E+01 G
I-131	I	1.6227E+00					8.02E+00	
			364.48	-2.039E-01	@(	3.429E+00	6.89E+02	8.17E+01 G
			284.30	6.990E+00	&(	3.792E+01	2.13E+02	6.14E+00 G
			636.97	1.784E+01	(	4.087E+01	6.92E+01	7.17E+00 G
Gd-153	F	2.8975E+00					2.42E+02	
			97.50	2.505E+00	&(	1.196E+01	1.44E+02	3.00E+01 G
			103.20	3.437E+00	(	1.662E+01	1.46E+02	2.18E+01 G
Ga-68	C	-8.3655E+01					4.71E-02	
			1077.40	-8.366E+01	&(	1.472E+02	8.39E+01	3.30E+00 G
Tc-99m	I	5.3349E-01					2.51E-01	
			140.51	5.335E-01	&(	4.329E+00	2.44E+02	8.93E+01 G
BA-133	F	-5.5669E-01					3.85E+03	
			356.00	-5.567E-01	?(	5.892E+00	3.16E+02	6.20E+01 G
			302.85	-6.148E+00	+	3.458E+01	1.70E+02	1.83E+01 G
			383.84	-2.801E+00	&	4.782E+01	5.10E+02	8.94E+00 GA
			80.99	-1.004E+00	&	7.379E+00	2.77E+02	3.41E+01 GA
CS-134	I	1.6143E+00					7.54E+02	
			604.71	3.331E-01	(	5.402E+00	4.83E+02	9.76E+01 G
			795.87	-2.115E+00	+	5.390E+00	7.69E+01	8.55E+01 G
			569.32	3.204E+00	&(	1.733E+01	1.60E+02	1.54E+01 G
			801.95	6.312E-01	%	5.853E+01	2.74E+03	8.69E+00 G
			563.24	1.367E+01	&(	2.925E+01	9.16E+01	8.35E+00 G
CS-137	I	3.8856E+02					1.10E+04	
			661.66	3.886E+02	(	2.890E+00	1.17E+00	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	8.9966E-01					1.38E+02	
			165.85	8.997E-01	(	3.662E+00	1.23E+02	7.99E+01 G
Ba-140	I	1.2071E+01					1.28E+01	
			537.26	1.207E+01	&(	1.036E+01	3.78E+01	2.44E+01 G
			162.66	-1.010E+01	-	5.032E+01	1.50E+02	6.22E+00 G
			304.85	-2.644E+01	&	1.496E+02	1.71E+02	4.29E+00 G
La-140	I	-1.0563E+00					1.28E+01	
			1596.21	-1.056E+00	?(	2.248E+00	1.03E+02	9.54E+01 G
			487.02	-1.192E+00	+	1.225E+01	3.08E+02	4.55E+01 G
			328.76	-5.618E+00	&	1.791E+01	9.61E+01	2.03E+01 G
			815.77	-3.975E+00	+	1.891E+01	1.42E+02	2.33E+01 G
CE-141	I	1.5625E+00					3.25E+01	
			145.44	1.562E+00	?(	8.118E+00	1.57E+02	4.82E+01 G
CE-144	I	-6.5519E+00					2.85E+02	
			133.54	-6.552E+00	&(	3.430E+01	1.58E+02	1.11E+01 G
PM-144	C	3.7957E-01					3.63E+02	
			696.54	3.796E-01	&(	2.676E+00	3.08E+02	9.90E+01 G
			618.06	-9.739E-01	+	5.843E+00	1.80E+02	9.91E+01 G
EU-152	F	7.4192E+00					4.94E+03	
			344.29	2.508E+00	?(	1.433E+01	1.71E+02	2.65E+01 G
			1112.07	-1.780E+01	+	4.573E+01	7.75E+01	1.36E+01 G
			121.78	-2.601E+00	+	8.548E+00	9.91E+01	2.86E+01 G
			778.92	9.698E+00	?(	1.927E+01	8.79E+01	1.29E+01 G
			964.11	1.431E+01	*(	3.514E+01	7.41E+01	1.46E+01 G
			244.69	0.000E+00	&	4.936E+01	1.00E+03	7.58E+00 G
			1408.00	-3.611E+00	+	9.223E+00	1.22E+02	2.10E+01 GA
EU-154	I	4.1767E+00					3.14E+03	
			873.23	1.656E+00	?(	3.873E+01	6.90E+02	1.23E+01 G
			123.10	1.765E+00	(	5.440E+00	9.29E+01	4.08E+01 G
			1274.54	0.000E+00	&	6.170E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	1.791E+01	1.00E+03	2.02E+01 G
			1004.77	1.136E+01	?(	3.079E+01	8.17E+01	1.80E+01 G
			996.33	-2.108E+01	+	5.264E+01	7.54E+01	1.06E+01 G
EU-155	I	1.8755E+00					1.81E+03	
			105.31	1.876E+00	?(	1.714E+01	2.75E+02	2.12E+01 G
			86.54	6.722E-01	}	6.079E+00	2.16E+02	3.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F -9.8037E-01					4.24E+01	
		482.00	-9.804E-01	?(	6.720E+00	2.06E+02	8.05E+01 G
		133.02	-1.676E+00	+	8.886E+00	1.60E+02	4.33E+01 G
		345.83	-1.770E-01	%	2.712E+01	4.57E+03	1.51E+01 G
		136.30	-1.252E+01	&	6.504E+01	1.57E+02	5.85E+00 G
Ta-182	F 4.8843E+00					1.14E+02	
		1121.30	5.943E+00	&(	1.676E+01	8.49E+01	3.49E+01 G
		1221.41	-4.866E+00	-	1.113E+01	1.10E+02	2.70E+01 G
		1189.05	2.604E+00	&(	1.363E+01	2.38E+02	1.62E+01 G
Hg-203	F 3.1711E-01					4.66E+01	
		279.20	3.171E-01	?(	3.466E+00	3.26E+02	8.15E+01 G
TL-208	N 5.1617E+00					6.98E+02	
		583.02	5.162E+00	*(P	2.861E+00	2.49E+01	8.45E+01 G
		277.28	1.524E+01	+	4.452E+01	8.81E+01	6.31E+00 G
		860.56	2.115E+00	-	2.796E+01	6.00E+02	1.24E+01 G
pm-146	C 2.7493E-01					2.02E+03	
		747.16	-2.791E-01	%(	7.677E+00	1.19E+03	3.40E+01 G
		735.72	1.112E+00	&(	1.225E+01	4.80E+02	2.25E+01 G
		453.88	-2.545E+00	+	5.566E+00	9.07E+01	6.50E+01 G
y-88	F -2.8914E-01					1.07E+02	
		898.04	-2.891E-01	?(	4.062E+00	6.39E+02	9.37E+01 G
		1836.06	-4.137E-01	+	1.883E+00	2.20E+02	9.92E+01 G
Cd-113m	-1.6625E+04					5.33E+03	
		263.70	-1.662E+04	&(	4.425E+04	8.04E+01	6.00E-03 K
Cd-109	F 2.1454E+01					4.53E+02	
						Derived Ave Activity	
		88.04	2.145E+01	}(	9.778E+01	1.37E+02	3.79E+00 G
Cf-251	T -2.8696E+00					3.28E+05	
		176.60	-2.870E+00	&(	1.211E+01	1.67E+02	1.70E+01 G
		227.00	-3.003E+00	+	3.814E+01	5.00E+02	6.30E+00 GA
Sn-126	-2.0009E+01					3.65E+07	
		87.57	5.910E-01	}	1.008E+01	2.62E+02	3.75E+01 GA
		64.28	-2.001E+01	(	1.573E+02	2.38E+02	9.70E+00 G
		86.94	1.530E+00	}	4.158E+01	4.14E+02	9.04E+00 GA
PB-210	N 1.1289E+04					8.14E+03	
		46.54	1.129E+04	(P	2.218E+02	1.12E+00	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	8.8207E+00					6.98E+02	
			238.63	8.821E+00	(P	4.242E+00	1.59E+01	4.33E+01 G
			300.03	-3.402E+01	&	1.882E+02	1.67E+02	3.28E+00 GA
PB-214	N	6.5717E+00					5.84E+05	
			351.93	4.957E+00	(P	5.096E+00	3.85E+01	3.76E+01 G
			295.09	9.718E+00	(	1.033E+01	4.37E+01	1.93E+01 G
			242.00	7.092E+00	? P	4.953E+01	2.10E+02	7.43E+00 GA
BI-207	C	-2.6548E-02					1.18E+04	
			569.70	-2.655E-02	%(	2.939E+00	3.24E+03	9.77E+01 G
			1063.66	-2.633E+00	+	5.536E+00	1.00E+02	7.45E+01 G
BI-212	N	-4.0052E+00					6.98E+02	
			727.17	-4.005E+00	?(	5.374E+01	3.96E+02	7.55E+00 G
			785.42	-3.843E+00	&	2.223E+02	2.51E+03	1.28E+00 GA
U-235	N	6.5794E+00					2.57E+11	
			143.79	6.820E+00	?(	3.473E+01	1.54E+02	1.10E+01 G
			205.33	-1.718E+01	&	4.456E+01	1.03E+02	5.01E+00 G
			163.38	6.061E+00	&(	6.068E+01	3.00E+02	5.08E+00 G
			185.72	3.389E+00	* P	3.025E+00	3.51E+01	5.40E+01 GA
BI-214	N	1.2441E+00					5.84E+05	
			609.31	0.000E+00	(	1.156E+01	1.00E+03	4.61E+01 G
			1120.29	-1.623E+01	+	4.163E+01	7.74E+01	1.51E+01 G
			1764.49	4.968E+00	?(	1.043E+01	6.40E+01	1.54E+01 G
BI-210M	T	-2.2490E-01					1.10E+09	
			265.83	-2.249E-01	?(	5.907E+00	7.82E+02	5.00E+01 G
			304.90	-4.052E+00	+	2.309E+01	1.72E+02	2.80E+01 G
AC-228	N	4.9123E+00					2.10E+03	
			911.07	3.210E+00	&(	1.385E+01	1.98E+02	2.90E+01 G
			968.97	-6.714E+00	+	3.321E+01	1.48E+02	1.75E+01 G
			338.32	9.024E+00	&(	3.301E+01	1.10E+02	1.20E+01 G
			93.35	-1.465E+01	+	6.529E+01	1.34E+02	5.56E+00 XA
TH-227	N	-4.1438E+01					7.95E+03	
			50.14	-4.144E+01	&(	2.460E+02	1.80E+02	8.00E+00 G
			256.24	-1.329E+01	+	3.549E+01	8.06E+01	7.00E+00 G
TH-229	N	8.8455E+00					2.68E+06	
			193.51	8.845E+00	?(	5.157E+01	2.30E+02	4.40E+00 G
			210.85	-3.119E+01	+	8.038E+01	1.02E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-6.3015E+01					1.63E+12	
			63.29	-6.301E+01	(P	4.022E+02	1.36E+02	3.81E+00 G
			92.59	-6.748E+00	+ P	6.704E+01	2.98E+02	5.58E+00 G
PA-231	N	-3.9098E+01					1.20E+07	
			302.65	-3.910E+01	?(	2.183E+02	1.68E+02	2.88E+00 G
			300.07	-4.537E+01	&	2.501E+02	1.66E+02	2.46E+00 G
PA-233	C	-3.2272E+00					7.82E+08	
			312.01	-3.227E+00	?(	1.854E+01	1.73E+02	3.60E+01 G
			300.18	-1.801E+01	+	1.000E+02	1.67E+02	6.20E+00 G
PA-234	N	-4.1675E+00					1.63E+12	
			131.29	-4.168E+00	?(	1.593E+01	1.15E+02	1.80E+01 G
			946.02	-1.973E+01	&	3.559E+01	8.37E+01	1.34E+01 G
			569.47	-4.113E+00	+	3.472E+01	2.49E+02	8.20E+00 G
			883.24	-2.060E+01	&	5.503E+01	8.05E+01	9.60E+00 G
			880.53	-3.284E+01	&	9.321E+01	8.55E+01	6.00E+00 GA
PA-234M	N	5.8508E+01					1.63E+12	
			1001.00	-8.584E+01	(	6.996E+02	2.42E+02	8.37E-01 G
			766.41	4.695E+02	(	1.091E+03	7.02E+01	2.94E-01 G
AM-241	T	1.2393E+03					1.58E+05	
			59.54	1.239E+03	(	1.679E+01	9.04E-01	3.59E+01 G
Np-237	F	1.0582E+00					2.14E+06	
			86.49	1.058E+00	(	2.902E+01	8.24E+02	1.31E+01 G
Ir-192	F	-3.8159E-01					7.40E+01	
			316.49	-9.830E-01	&(	7.805E+00	2.39E+02	8.70E+01 G
			468.06	6.299E-01	?(	9.401E+00	4.46E+02	5.18E+01 G
			308.44	-3.616E+00	+	2.069E+01	1.72E+02	3.18E+01 G
Cs-136	F	-1.8054E+00					1.30E+01	
			818.50	-1.805E+00	?(	5.175E+00	8.63E+01	1.00E+02 G
			1048.07	1.465E+00	+	4.738E+00	9.66E+01	8.00E+01 G
			340.57	3.941E-01	&	8.664E+00	6.56E+02	4.69E+01 G
Np-239	T	-3.4682E+00					2.36E+00	
			103.70	2.147E-01	&	1.523E+01	2.13E+03	2.40E+01 X
			106.13	-3.468E+00	?(	1.602E+01	1.39E+02	2.27E+01 G
			99.50	5.002E+00	&	2.406E+01	1.45E+02	1.50E+01 X
Nd-147		1.9840E+00					1.11E+01	
			531.00	9.472E-02	%(	2.084E+01	9.28E+03	1.30E+01 G
			91.10	2.852E+00	&(	1.308E+01	1.38E+02	2.83E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-210   N  -1.8381E+00                                        5.84E+05
                          799.60-1.838E+00 ?(  4.890E+00 8.02E+01 9.90E+01 G
                          296.00-1.393E+00 &   7.834E+00 1.70E+02 7.90E+01 G
                         1313.00 1.710E+00 +   7.498E+00 1.98E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	27596.	-131.	-0.073	179.71	-4.144E+01	
TH-234	63.29	30855.	-129.	-0.071	135.61	-6.301E+01	P
BA-133	80.99	1093.	-21.	-0.012	276.66	-1.004E+00	
Np-237	86.49	2672.	9.	0.005	823.85	1.058E+00	
Nd-147	91.10	2622.	53.	0.029	138.35	2.852E+00	
TH-234	92.59	2706.	-25.	-0.014	297.59	-6.748E+00	P
AC-228	93.35	2555.	-53.	-0.030	134.39	-1.465E+01	
Gd-153	97.50	2547.	50.	0.028	143.93	2.505E+00	
Np-239	99.50	2596.	50.	0.028	145.04	5.002E+00	
Gd-153	103.20	2646.	50.	0.028	145.80	3.437E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	106.13	2682.	-53.	-0.029	139.30	-3.468E+00	
EU-152	121.78	1195.	-50.	-0.028	99.09	-2.601E+00	
EU-154	123.10	980.	48.	0.027	92.95	1.765E+00	
PA-234	131.29	1616.	-50.	-0.028	115.21	-4.168E+00	
HF-181	133.02	2917.	-48.	-0.027	159.86	-1.676E+00	
CE-144	133.54	2844.	-48.	-0.027	157.80	-6.552E+00	
HF-181	136.30	2820.	-48.	-0.027	156.65	-1.252E+01	
CO-57	136.47	2868.	-23.	-0.013	326.32	-3.313E+00	
Tc-99m	140.51	2699.	30.	0.017	244.22	5.335E-01	
CE-139	165.85	1436.	44.	0.024	122.58	8.997E-01	
Cf-251	176.60	660.	-29.	-0.016	166.77	-2.870E+00	
TH-229	193.51	726.	22.	0.012	230.12	8.845E+00	
TH-229	210.85	733.	-50.	-0.028	102.28	-3.119E+01	
Cf-251	227.00	664.	-10.	-0.005	499.61	-3.003E+00	
TH-227	256.24	598.	-44.	-0.024	80.61	-1.329E+01	
Cd-113m	263.70	656.	-46.	-0.025	80.35	-1.662E+04	
BI-210M	265.83	806.	-5.	-0.003	782.33	-2.249E-01	
Hg-203	279.20	683.	11.	0.006	325.81	3.171E-01	
I-131	284.30	447.	19.	0.010	213.23	6.990E+00	
TL-210	296.00	3076.	-46.	-0.026	169.50	-1.393E+00	
PA-231	300.07	2978.	-47.	-0.026	166.21	-4.537E+01	
PA-233	300.18	3025.	-47.	-0.026	167.46	-1.801E+01	
PA-231	302.65	3071.	-47.	-0.026	168.36	-3.910E+01	
BA-133	302.85	3118.	-47.	-0.026	169.58	-6.148E+00	
BI-210M	304.90	3212.	-47.	-0.026	171.79	-4.052E+00	
Ir-192	308.44	3259.	-47.	-0.026	172.49	-3.616E+00	
PA-233	312.01	3306.	-47.	-0.026	173.18	-3.227E+00	
Ir-192	316.49	3353.	-34.	-0.019	239.17	-9.830E-01	
CR-51	320.08	3242.	46.	0.026	173.91	1.175E+01	
La-140	328.76	889.	-44.	-0.025	96.06	-5.618E+00	
Cf-249	333.44	933.	-15.	-0.008	297.95	-2.435E+00	
AC-228	338.32	1015.	41.	0.023	110.12	9.024E+00	
Cs-136	340.57	1056.	7.	0.004	656.49	3.941E-01	
EU-152	344.29	905.	25.	0.014	171.35	2.508E+00	
BA-133	356.00	795.	-13.	-0.007	315.99	-5.567E-01	
I-131	364.48	444.	-6.	-0.003	688.80	-2.039E-01	
BA-133	383.84	972.	-9.	-0.005	509.79	-2.801E+00	
SN-113	391.69	1063.	-18.	-0.010	257.28	-8.252E-01	
SB-125	427.88	484.	-47.	-0.026	92.63	-4.994E+00	
AG-108M	433.94	524.	-35.	-0.019	129.16	-1.227E+00	
pm-146	453.88	532.	-50.	-0.028	90.74	-2.545E+00	
SB-125	463.37	865.	48.	0.027	88.23	1.523E+01	
Ir-192	468.06	929.	10.	0.005	445.58	6.299E-01	
BE-7	477.60	1057.	-45.	-0.025	102.45	-1.471E+01	
HF-181	482.00	1103.	-23.	-0.013	205.50	-9.804E-01	
La-140	487.02	1153.	-16.	-0.009	307.60	-1.192E+00	
RU-103	497.05	240.	35.	0.019	88.39	1.352E+00	
RH-106	511.86	480.	68.	0.038	83.03	1.222E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	169.	30.	0.016	91.62	1.367E+01	
CS-134	569.32	199.	13.	0.007	160.12	3.204E+00	
PA-234	569.47	229.	-9.	-0.005	249.08	-4.113E+00	
SB-125	600.50	679.	31.	0.017	118.42	7.132E+00	
SB-124	602.73	710.	32.	0.018	120.89	1.302E+00	
CS-134	604.71	742.	8.	0.004	483.12	3.331E-01	
RU-103	610.30	504.	21.	0.011	155.24	1.472E+01	
AG-108M	614.28	902.	-32.	-0.018	133.26	-1.472E+00	
PM-144	618.06	869.	-23.	-0.013	179.76	-9.739E-01	
RH-106	621.92	690.	29.	0.016	128.71	1.219E+01	
SB-125	635.89	186.	-13.	-0.007	147.35	-4.975E+00	
I-131	636.97	204.	30.	0.017	69.23	1.784E+01	
PM-144	696.54	145.	8.	0.005	308.13	3.796E-01	
NB-94	702.63	135.	20.	0.011	127.49	9.116E-01	
SB-124	722.79	267.	-30.	-0.017	78.68	-1.294E+01	
AG-108M	722.94	247.	-15.	-0.008	150.71	-7.634E-01	
BI-212	727.17	329.	-6.	-0.004	396.48	-4.005E+00	
pm-146	735.72	145.	5.	0.003	480.36	1.112E+00	
ZR-95	756.73	163.	-13.	-0.007	205.17	-1.172E+00	
NB-95	765.79	272.	-33.	-0.018	72.28	-1.610E+00	
PA-234M	766.41	187.	29.	0.016	70.20	4.695E+02	
EU-152	778.92	107.	26.	0.014	87.87	9.698E+00	
CS-134	795.87	374.	-36.	-0.020	76.89	-2.115E+00	
TL-210	799.60	410.	-37.	-0.020	80.21	-1.838E+00	
CO-58	810.78	352.	-34.	-0.019	80.55	-1.705E+00	
La-140	815.77	328.	-18.	-0.010	141.79	-3.975E+00	
Cs-136	818.50	455.	-36.	-0.020	86.33	-1.805E+00	
MN-54	834.85	177.	-7.	-0.004	386.98	-3.770E-01	
Co-56	846.77	235.	-39.	-0.022	88.42	-2.014E+00	
NB-94	871.10	260.	-41.	-0.023	57.33	-2.193E+00	
EU-154	873.23	347.	4.	0.002	690.23	1.656E+00	
PA-234	880.53	479.	-37.	-0.020	85.50	-3.284E+01	
PA-234	883.24	424.	-37.	-0.021	80.53	-2.060E+01	
y-88	898.04	210.	-5.	-0.003	638.75	-2.891E-01	
AC-228	911.07	230.	17.	0.009	197.62	3.210E+00	
PA-234	946.02	310.	-47.	-0.026	83.67	-1.973E+01	
EU-152	964.11	350.	37.	0.020	74.12	1.431E+01	
AC-228	968.97	447.	-20.	-0.011	147.77	-6.714E+00	
EU-154	996.33	396.	-38.	-0.021	75.39	-2.108E+01	
PA-234M	1001.00	435.	-12.	-0.007	242.31	-8.584E+01	
EU-154	1004.77	386.	35.	0.019	81.70	1.136E+01	
Co-56	1037.84	139.	22.	0.012	121.70	9.515E+00	
Cs-136	1048.07	165.	19.	0.011	96.58	1.465E+00	
RH-106	1050.36	218.	-18.	-0.010	115.11	-7.202E+01	
BI-207	1063.66	192.	-32.	-0.018	100.00	-2.633E+00	
Ga-68	1077.40	192.	-38.	-0.021	83.93	-8.366E+01	
FE-59	1099.25	149.	23.	0.013	124.33	2.520E+00	
EU-152	1112.07	422.	-38.	-0.021	77.53	-1.780E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	1115.55	386.	-38.	-0.021	74.12	-4.819E+00	
BI-214	1120.29	424.	-38.	-0.021	77.39	-1.623E+01	
Ta-182	1121.30	365.	33.	0.018	84.88	5.943E+00	
Ta-182	1189.05	43.	6.	0.004	237.78	2.604E+00	
Ta-182	1221.41	79.	-19.	-0.011	110.41	-4.866E+00	
Co-56	1238.28	23.	13.	0.007	88.11	1.386E+00	
NA-22	1274.53	28.	-8.	-0.005	96.75	-5.854E-01	
FE-59	1291.60	34.	-13.	-0.007	108.79	-2.134E+00	
TL-210	1313.00	17.	5.	0.003	198.49	1.710E+00	
EU-152	1408.00	24.	-10.	-0.006	122.47	-3.611E+00	
K-40	1460.83	12.	5.	0.003	173.21	3.660E+00	
La-140	1596.21	24.	-12.	-0.007	102.74	-1.056E+00	
SB-124	1690.98	0.	7.	0.004	37.80	1.291E+00	
BI-214	1764.49	10.	8.	0.005	64.04	4.968E+00	
y-88	1836.06	13.	-4.	-0.002	220.14	-4.137E-01	

P - Peakbackground subtraction

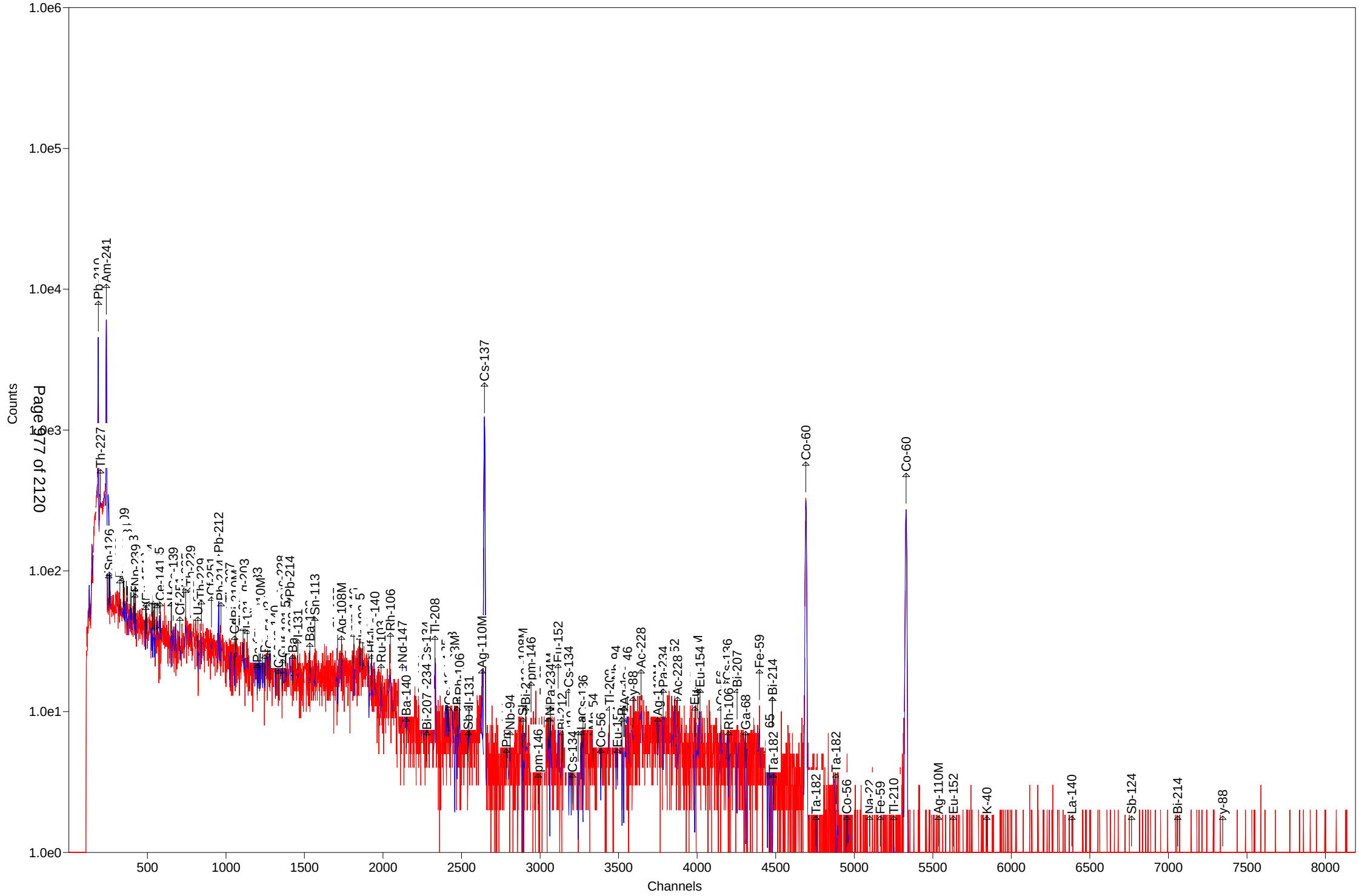
***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.4712E+01	-1.4713E+01	1.025E+02%	5.00E+01
NA-22	#A	-5.8535E-01	-5.8535E-01	9.675E+01%	1.93E+00
K-40	#A	3.6604E+00	3.6604E+00	1.732E+02%	1.38E+01
Sc-46	#A	1.8583E+00	1.8583E+00	4.659E+01%	5.70E+00
CR-51	#A	1.1754E+01	1.1754E+01	1.739E+02%	6.78E+01
MN-54	#A	-3.7702E-01	-3.7702E-01	3.870E+02%	3.33E+00
FE-59	#A	2.5197E+00	2.5197E+00	1.243E+02%	6.63E+00
Co-56	#A	-5.8603E-01	-5.8604E-01	7.522E+01%	3.85E+00
CO-57	#A	-2.0066E-02	-2.0066E-02	4.335E+03%	2.91E+00
CO-58	#A	-1.7050E+00	-1.7050E+00	8.055E+01%	4.56E+00
CO-60		1.7216E+02	1.7216E+02	1.538E+00%	2.20E+00
ZN-65	#A	-4.8186E+00	-4.8186E+00	7.412E+01%	1.18E+01
NB-94	#A	9.1159E-01	9.1159E-01	1.275E+02%	2.64E+00
ZR-95	#A	-1.1723E+00	-1.1723E+00	2.052E+02%	5.47E+00
NB-95	#A	-1.6096E+00	-1.6096E+00	7.228E+01%	3.85E+00
RU-103	#A	1.3523E+00	1.3523E+00	8.839E+01%	2.90E+00
RH-106	#A	1.2189E+01	1.2189E+01	1.287E+02%	5.23E+01
AG-108M	#A	-1.2274E+00	-1.2274E+00	1.292E+02%	3.84E+00
AG-110M	#A	2.1686E+00	2.1686E+00	4.105E+01%	7.70E+00
SN-113	#A	-8.2525E-01	-8.2525E-01	2.573E+02%	7.09E+00
SB-124	#A	1.2983E+00	1.2983E+00	3.780E+01%	5.24E+00
SB-125	#A	2.3989E+00	2.3989E+00	5.811E+01%	1.12E+01
I-131	#A	1.6227E+00	1.6227E+00	6.923E+01%	3.43E+00
Gd-153	#A	2.8974E+00	2.8975E+00	1.024E+02%	1.20E+01
Ga-68	#A	-8.3314E+01	-8.3655E+01	8.393E+01%	1.47E+02

Tc-99m #A	5.3308E-01	5.3349E-01	2.442E+02%		4.33E+00
BA-133 #A	-5.5669E-01	-5.5669E-01	3.160E+02%		5.89E+00
CS-134 #A	1.6143E+00	1.6143E+00	9.162E+01%		5.40E+00
CS-137	3.8856E+02	3.8856E+02	1.165E+00%		2.89E+00
CE-139 #A	8.9966E-01	8.9966E-01	1.226E+02%		3.66E+00
Ba-140 #	1.2071E+01	1.2071E+01	3.779E+01%		1.04E+01
La-140 #A	-1.0562E+00	-1.0563E+00	1.027E+02%		2.25E+00
CE-141 #A	1.5625E+00	1.5625E+00	1.567E+02%		8.12E+00
CE-144 #A	-6.5519E+00	-6.5519E+00	1.578E+02%		3.43E+01
PM-144 #A	3.7957E-01	3.7957E-01	3.081E+02%		2.68E+00
EU-152 #A	7.4192E+00	7.4192E+00	6.878E+01%		1.43E+01
EU-154 #A	4.1767E+00	4.1767E+00	8.170E+01%		3.87E+01
EU-155 A	1.8755E+00	1.8755E+00	2.749E+02%		1.71E+01
HF-181 #A	-9.8037E-01	-9.8037E-01	2.055E+02%		6.72E+00
Ta-182 #A	4.8843E+00	4.8843E+00	8.488E+01%		1.68E+01
Hg-203 #A	3.1711E-01	3.1711E-01	3.258E+02%		3.47E+00
TL-208 #	5.1617E+00	5.1617E+00	2.492E+01%		2.86E+00
pm-146 #A	2.7493E-01	2.7493E-01	4.804E+02%		7.68E+00
y-88 #A	-2.8914E-01	-2.8914E-01	6.387E+02%		4.06E+00
Cd-113m#A	-1.6625E+04	-1.6625E+04	8.035E+01%		4.42E+04
Cd-109 #A	2.1454E+01	2.1454E+01	1.374E+02%		9.78E+01
Cf-251 #A	-2.8696E+00	-2.8696E+00	1.668E+02%		1.21E+01
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.56E+00
Sn-126 A	-2.0009E+01	-2.0009E+01	2.380E+02%		1.57E+02
PB-210	1.1289E+04	1.1289E+04	1.118E+00%		2.22E+02
PB-212	8.8207E+00	8.8207E+00	1.593E+01%		4.24E+00
PB-214	6.5717E+00	6.5717E+00	2.912E+01%		5.10E+00
BI-207 #A	-2.6548E-02	-2.6548E-02	3.238E+03%		2.94E+00
BI-212 #A	-4.0052E+00	-4.0052E+00	3.965E+02%		5.37E+01
U-235 #A	6.5794E+00	6.5794E+00	1.535E+02%		3.47E+01
BI-214 #A	1.2441E+00	1.2441E+00	6.404E+01%		1.16E+01
BI-210M#A	-2.2490E-01	-2.2490E-01	7.823E+02%		5.91E+00
AC-228 #A	4.9123E+00	4.9123E+00	1.101E+02%		1.39E+01
TH-227 #A	-4.1438E+01	-4.1438E+01	1.797E+02%		2.46E+02
TH-229 #A	8.8455E+00	8.8455E+00	2.301E+02%		5.16E+01
TH-234 #A	-6.3015E+01	-6.3015E+01	1.356E+02%		4.02E+02
PA-231 #A	-3.9098E+01	-3.9098E+01	1.684E+02%		2.18E+02
PA-233 #A	-3.2272E+00	-3.2272E+00	1.732E+02%		1.85E+01
PA-234 #A	-4.1675E+00	-4.1675E+00	1.152E+02%		1.59E+01
PA-234M#A	5.8508E+01	5.8508E+01	7.020E+01%		7.00E+02
AM-241	1.2393E+03	1.2393E+03	9.038E-01%		1.68E+01
Np-237 #A	1.0582E+00	1.0582E+00	8.238E+02%		2.90E+01
Ir-192 #A	-3.8159E-01	-3.8159E-01	2.392E+02%		7.80E+00
Cs-136 #A	-1.8054E+00	-1.8054E+00	8.633E+01%		5.18E+00
Np-239 #A	-3.4679E+00	-3.4682E+00	1.393E+02%		1.60E+01
Nd-147 #A	1.9840E+00	1.9840E+00	1.384E+02%		2.08E+01
TL-210 #A	-1.8381E+00	-1.8381E+00	8.021E+01%		4.89E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   25.1 to  1999.1 keV)     1.310E+04  Bq/Sample
Total Decayed Activity (   25.1 to  1999.1 keV) 1.3104499E+04  Bq/Sample
```

379951_Gamma_LCS 160-379951~2-A. 12_Gamma_20181527.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20182912

Sample Description: 379951_Gamma_160-29881-A-1-C
Detector: Detector # 5
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-1-C

Decay to Time: 8/23/2018 11:45 Live Time: 1800 sec
Acquisition Time: 8/23/2018 11:46:14 Real Time: 1810 sec
Analysis Time: 8/23/2018 12:16 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	8.781E-01	368.7	3.238E+00	3.238E+00	1.159E+01
NA-22	6.168E-01	64.9	4.006E-01	4.018E-01	1.308E+00
K-40	1.080E+02	10.1	1.092E+01	1.224E+01	1.239E+01
Sc-46	6.699E-01	122.1	8.178E-01	8.185E-01	2.791E+00
CR-51	3.204E-01	983.9	3.152E+00	3.152E+00	1.116E+01
MN-54	1.134E-01	396.5	4.495E-01	4.496E-01	1.153E+00
FE-59	8.604E-01	130.4	1.122E+00	1.123E+00	2.682E+00
Co-56	9.327E-01	64.6	6.025E-01	6.044E-01	8.799E-01
CO-57	1.764E-01	125.9	2.221E-01	2.223E-01	7.569E-01
CO-58	3.847E-01	115.5	4.442E-01	4.447E-01	1.545E+00
CO-60	-1.377E+00	90.0	1.240E+00	1.242E+00	2.698E+00
ZN-65	1.255E+00	38.6	4.845E-01	4.885E-01	1.264E+00
NB-94	1.305E-01	71.8	9.373E-02	9.397E-02	1.173E+00
ZR-95	6.376E-01	86.9	5.541E-01	5.551E-01	1.894E+00
NB-95	2.551E-01	229.7	5.859E-01	5.860E-01	2.056E+00
RU-103	2.910E-01	100.9	2.936E-01	2.940E-01	7.706E-01
RH-106	-2.600E+00	86.3	2.244E+00	2.248E+00	3.806E+01
AG-108M	-2.736E-01	110.4	3.021E-01	3.024E-01	1.339E+00
AG-110M	5.427E-01	33.3	1.809E-01	1.830E-01	4.227E+00
SN-113	9.434E-02	605.5	5.713E-01	5.713E-01	2.020E+00
SB-124	-2.662E-01	91.9	2.445E-01	2.449E-01	4.135E+00
SB-125	1.618E+00	36.8	5.959E-01	6.016E-01	2.506E+00
I-131	-7.759E-02	282.3	2.191E-01	2.191E-01	1.103E+00
Gd-153	7.687E-01	82.7	6.358E-01	6.375E-01	2.653E+00
Ga-68	9.014E+00	173.7	1.566E+01	1.567E+01	3.945E+01
Tc-99m	2.704E-01	98.6	2.666E-01	2.670E-01	8.973E-01
BA-133	-3.766E-01	251.1	9.457E-01	9.459E-01	3.227E+00
CS-134	-2.534E-01	69.4	1.758E-01	1.762E-01	4.068E+00
CS-137	5.386E-02	1144.3	6.163E-01	6.163E-01	2.195E+00
CE-139	-2.515E-01	139.5	3.509E-01	3.517E-01	1.190E+00
Ba-140	1.236E+00	100.9	1.247E+00	1.249E+00	3.674E+00
La-140	2.112E-01	102.8	2.170E-01	2.173E-01	9.063E-01
CE-141	2.875E-01	203.0	5.836E-01	5.838E-01	1.987E+00

CE-144	-2.046E+00	117.0	2.395E+00	2.397E+00	8.075E+00
PM-144	1.181E-01	374.7	4.424E-01	4.424E-01	1.152E+00
EU-152	1.280E+00	100.0	1.280E+00	1.282E+00	5.867E+00
EU-154	1.392E+00	111.7	1.556E+00	1.557E+00	7.754E+00
EU-155	-1.069E+00	107.9	1.154E+00	1.155E+00	5.477E+00
HF-181	-6.227E-02	744.8	4.638E-01	4.638E-01	1.661E+00
Ta-182	3.345E+00	26.7	8.939E-01	9.094E-01	6.530E+00
Hg-203	2.233E-02	1774.8	3.963E-01	3.963E-01	1.393E+00
TL-208	1.836E+00	23.5	4.317E-01	4.421E-01	7.170E-01
pm-146	1.178E+00	74.1	8.726E-01	8.747E-01	2.262E+00
y-88	1.801E-01	398.2	7.170E-01	7.171E-01	1.763E+00
Cd-113m	1.735E+03	250.0	4.337E+03	4.338E+03	1.518E+04
Cd-109	0.000E+00	1.#INF	1.288E+01	1.288E+01	4.319E+01
Cf-251	1.262E+00	106.1	1.340E+00	1.344E+00	3.668E+00
Cf-249	5.189E-01	64.6	3.354E-01	3.364E-01	1.104E+00
Sn-126	-3.227E+00	116.1	3.748E+00	3.751E+00	1.261E+01
PB-210	1.326E+01	62.1	8.228E+00	8.265E+00	2.402E+01
PB-212	6.150E+00	11.7	7.204E-01	8.230E-01	1.530E+00
PB-214	1.090E+01	8.5	9.255E-01	1.085E+00	1.885E+00
BI-207	5.807E-01	28.9	1.676E-01	1.703E-01	1.164E+00
BI-212	3.934E+00	133.9	5.268E+00	5.272E+00	1.852E+01
U-235	1.510E+00	150.2	2.267E+00	2.269E+00	7.708E+00
BI-214	1.245E+01	9.8	1.224E+00	1.385E+00	1.246E+00
BI-210M	-7.767E-01	97.5	7.571E-01	7.585E-01	2.546E+00
AC-228	4.148E+00	39.9	1.656E+00	1.670E+00	4.277E+00
TH-227	2.573E+00	121.7	3.132E+00	3.135E+00	1.430E+01
TH-229	-2.594E+00	240.1	6.228E+00	6.231E+00	1.730E+01
TH-234	9.354E+00	40.2	3.759E+00	3.791E+00	2.121E+01
PA-231	-1.321E+01	167.0	2.207E+01	2.208E+01	7.446E+01
PA-233	9.696E-02	1770.8	1.717E+00	1.717E+00	5.875E+00
PA-234	1.725E+00	45.3	7.810E-01	7.861E-01	1.947E+00
PA-234M	-1.130E+02	44.5	5.022E+01	5.054E+01	3.793E+02
AM-241	-1.194E+00	60.5	7.233E-01	7.259E-01	2.992E+00
Np-237	-2.126E+00	190.5	4.048E+00	4.050E+00	1.357E+01
Ir-192	3.451E-01	91.5	3.158E-01	3.165E-01	1.173E+00
Cs-136	1.169E-01	72.7	8.498E-02	8.524E-02	1.348E+00
Np-239	-9.737E-01	152.9	1.489E+00	1.490E+00	5.016E+00
Nd-147	4.658E+00	40.9	1.907E+00	1.926E+00	4.311E+00
TL-210	0.000E+00	1.#INF	9.374E-02	9.374E-02	2.181E+00
Total	1.947E+03				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 5_Gamma_20182912.An1

Sample description
379951_Gamma_160-29881-A-1-C

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182912.An1

Acquisition information
Start time: 8/23/2018 11:46:14 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) +
(-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) +
(-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 11:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1572

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.61	18.	62.07	0.36	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	6.	236.58	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.32	29.	49.09	0.58	2.714E-02	63.29	3.810	PBC<MDA	TH234
74.89	68.	20.25	0.81	3.152E-02				
77.11	90.	15.96	0.82	3.218E-02				
84.12	34.	37.46	0.46	3.389E-02				
86.70	22.	56.80	0.82	3.443E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.172E+00	EU155
					86.94	9.040	3.972E+00	Sn126
92.68	28.	57.51	0.99	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.35	3.	973.54	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
97.50	13.	113.85	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
103.20	12.	120.00	0.84	3.612E-02	103.20	21.800	PBC<MDA	Gd153
103.70	11.	148.19	0.84	3.614E-02	103.70	24.000	PBC<MDA	Np239
121.78	12.	107.88	0.86	3.584E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.102E-01	CO57
122.06	10.	125.94	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.764E-01	CO57
131.03	18.	45.28	1.39	3.509E-02	131.29	18.000	PBC<MDA	PA234
140.51	14.	98.57	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	10.	150.18	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
145.44	8.	203.01	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
162.66	2.	777.82	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
176.60	11.	106.11	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
185.72	13.	104.58	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
238.53	120.	12.22	0.78	2.320E-02	238.63	43.300	6.658E+00	PB212
242.08	29.	37.69	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
244.69	11.	197.45	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	9.	121.75	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
263.70	4.	250.00	1.00	2.135E-02	263.70	0.006	PBC<MDA	Cd113m
284.30	2.	451.00	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.43	90.	11.52	1.15	1.943E-02	295.09	19.300	1.298E+01	PB214
					296.00	79.000	3.263E+00	TL210
316.49	9.	113.84	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
320.08	1.	983.87	1.06	1.818E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	102.75	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
338.32	7.	183.29	1.07	1.736E-02	338.32	12.010	PBC<MDA	AC228
351.92	112.	12.04	0.74	1.680E-02	351.93	37.600	9.836E+00	PB214
383.84	14.	26.46	1.12	1.563E-02	383.84	8.940	5.676E+00	BA133
387.95	10.	64.63	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
391.69	2.	605.55	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
463.37	3.	265.05	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	5.	143.32	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
477.60	2.	368.75	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
497.05	6.	100.92	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	39.	41.33	2.48	1.230E-02	511.86	20.000	8.734E+00	RH106
531.00	13.	40.95	1.25	1.193E-02	531.00	13.000	4.658E+00	Nd147
537.26	7.	100.92	1.26	1.181E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	69.37	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.58	4.	172.61	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.108E+00	PA234
					569.70	97.740	1.769E-01	BI207
583.02	28.	23.51	1.30	1.103E-02	583.02	84.500	1.669E+00	TL208
609.48	110.	9.83	1.45	1.063E-02	609.31	46.090	1.245E+01	BI214
635.89	13.	36.84	1.34	1.026E-02	635.89	11.310	6.030E+00	SB125
696.54	2.	374.72	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
722.79	7.	91.86	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.624E-01	AG108M
					723.36	20.220	2.078E+00	EU154
724.20	5.	123.79	1.42	9.202E-03	724.20	44.150	PBC<MDA	ZR95
727.07	5.	133.92	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	6.	112.73	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
747.16	5.	96.09	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
756.73	5.	122.02	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
765.79	4.	229.65	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.665E+01	PA234M
766.41	5.	165.33	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.077E+02	PA234M
810.78	6.	115.49	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
834.85	2.	396.48	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
846.77	5.	97.15	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
860.56	5.	96.99	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	5.	71.81	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
889.28	9.	122.09	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
898.04	2.	398.21	1.56	7.684E-03	898.04	93.700	PBC<MDA	y88
911.07	20.	39.93	1.57	7.591E-03	911.07	29.000	4.963E+00	AC228
937.49	9.	33.33	1.59	7.411E-03	937.49	34.360	1.963E+00	AG110M
964.11	7.	100.00	1.61	7.239E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	113.49	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
1004.77	10.	111.72	1.64	6.992E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	4.	140.81	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	72.66	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	94.89	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	12.	28.87	1.68	6.666E-03	1063.66	74.500	1.343E+00	BI207
1077.40	3.	173.74	1.69	6.594E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	6.	130.42	1.71	6.484E-03	1099.25	56.500	PBC<MDA	FE59
1115.55	7.	38.61	1.72	6.404E-03	1115.55	50.600	PBC<MDA	ZN65
1121.30	8.	90.76	1.72	6.376E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.115E+00	Ta182
1173.24	4.	163.90	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	89.49	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	14.	26.73	1.79	5.934E-03	1221.41	27.000	4.855E+00	Ta182
1238.28	11.	91.04	1.80	5.866E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	6.	64.94	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.752E+00	EU154
1274.54	1.	377.99	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.625E-01	EU154
1313.00	2.	324.35	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	4.	152.39	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	5.	121.64	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.18	106.	10.11	1.86	5.103E-03	1460.83	10.670	1.080E+02	K40
1764.92	10.	37.62	2.11	4.351E-03	1764.49	15.400	8.705E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.20	74.85	61.	68.	2.162E+03	20.25	0.813	- D
308.09	77.07	59.	90.	2.810E+03	15.96	0.815	- D
335.18	84.12	38.	26.	7.700E+02	38.98	0.822	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.61	42.	18.	0.010	62.07	0.364s
TH-227	200.11	50.14	69.	6.	0.003	236.58	0.787s
AM-241	237.72	59.54	99.	-20.	-0.011	60.55	0.797
TH-234	252.74	63.29	62.	22.	0.012	56.14	0.801D
Sn-126	256.71	64.28	155.	-16.	-0.009	116.13	0.802s
BA-133	323.61	80.99	546.	-17.	-0.009	194.78	0.819s
Np-237	345.63	86.49	529.	-17.	-0.010	190.45	0.825
EU-155	345.84	86.54	512.	-17.	-0.010	187.38	0.825s
Sn-126	347.43	86.94	69.	22.	0.012	56.80	0.825D
Sn-126	349.95	87.57	478.	-17.	-0.010	181.04	0.826s
Cd-109	351.83	88.04	454.	0.	0.000	176.34	0.826A
Nd-147	364.08	91.10	437.	-6.	-0.003	511.38	0.829s
TH-234	370.42	92.68	75.	28.	0.015	57.51	0.994
AC-228	373.09	93.35	425.	3.	0.002	973.54	0.832s
Gd-153	389.70	97.50	108.	13.	0.007	113.85	0.836s
Np-239	397.71	99.50	116.	-3.	-0.002	511.45	0.838
Gd-153	412.52	103.20	105.	12.	0.007	120.00	0.842s
Np-239	414.52	103.70	117.	11.	0.006	148.19	0.842s
EU-155	420.98	105.31	245.	-15.	-0.008	107.89	0.844s
Np-239	424.25	106.13	235.	-14.	-0.008	152.93	0.845s
EU-152	486.88	121.78	72.	12.	0.006	107.88	0.861s
CO-57	488.03	122.06	70.	10.	0.005	125.94	0.861s
EU-154	492.18	123.10	92.	-4.	-0.002	329.51	0.862s
PA-234	523.92	131.03	17.	18.	0.010	45.28	1.389s
HF-181	531.91	133.02	195.	-15.	-0.008	53.35	0.872s
CE-144	533.97	133.54	132.	-14.	-0.008	117.03	0.873s
HF-181	545.02	136.30	151.	-7.	-0.004	243.31	0.876s
CO-57	545.72	136.47	168.	-5.	-0.003	346.75	0.876s
Tc-99m	561.88	140.51	93.	14.	0.008	98.57	0.880s
U-235	574.99	143.79	109.	10.	0.006	150.18	0.883s
CE-141	581.61	145.44	140.	8.	0.005	203.01	0.885s
Ba-140	650.54	162.66	120.	2.	0.001	777.82	0.902
U-235	653.42	163.38	122.	0.	0.000	1000.00	0.903
CE-139	663.32	165.85	119.	-11.	-0.006	139.51	0.905s
Cf-251	706.34	176.60	43.	11.	0.006	106.11	0.916s
U-235	742.85	185.72	57.	13.	0.007	104.58	0.925
TH-229	774.03	193.51	57.	-6.	-0.003	240.10	0.933s
U-235	821.35	205.33	53.	-2.	-0.001	560.79	0.945s
TH-229	843.44	210.85	73.	-14.	-0.008	109.55	0.950s
Cf-251	908.08	227.00	50.	-5.	-0.003	255.60	0.966s
PB-212	954.64	238.63	29.	111.	0.062	11.71	0.978D
PB-214	968.10	242.00	43.	29.	0.016	37.69	0.981D
EU-152	978.89	244.69	236.	11.	0.006	197.45	0.984s
TH-227	1025.11	256.24	29.	9.	0.005	121.75	0.995s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1054.97	263.70	48.	4.	0.002	250.00	1.002s
BI-210M	1063.50	265.83	97.	-15.	-0.008	97.47	1.005s
TL-208	1109.33	277.28	54.	-10.	-0.005	111.90	1.016
I-131	1137.41	284.30	34.	2.	0.001	451.00	1.022s
PB-214	1181.97	295.43	7.	88.	0.049	11.97	1.147
TL-210	1184.24	296.00	259.	-12.	-0.007	192.92	1.034s
PB-212	1200.37	300.03	247.	-13.	-0.007	84.15	1.038
PA-231	1200.53	300.07	235.	-11.	-0.006	203.45	1.038s
PA-233	1200.97	300.18	244.	-13.	-0.007	171.92	1.038s
PA-231	1210.86	302.65	231.	-13.	-0.007	167.01	1.040
BA-133	1211.66	302.85	218.	-3.	-0.002	755.00	1.040
Ba-140	1219.66	304.85	215.	0.	0.000	1000.00	1.042
BI-210M	1219.85	304.90	215.	0.	0.000	1000.00	1.042
Ir-192	1234.03	308.44	215.	0.	0.000	1000.00	1.046s
Ir-192	1266.25	316.49	44.	9.	0.005	113.84	1.053s
CR-51	1280.63	320.08	52.	1.	0.001	983.87	1.057s
La-140	1315.35	328.76	18.	8.	0.005	102.75	1.065
AC-228	1353.61	338.32	87.	7.	0.004	183.29	1.074s
Cs-136	1362.62	340.57	94.	0.	0.000	1000.00	1.077s
EU-152	1377.49	344.29	94.	0.	0.000	1000.00	1.080s
PB-214	1408.03	351.92	16.	112.	0.062	12.04	0.735s
BA-133	1424.36	356.00	151.	-7.	-0.004	251.12	1.091s
I-131	1458.32	364.48	26.	-4.	-0.002	339.79	1.099s
BA-133	1535.78	383.84	0.	14.	0.008	26.46	1.117s
Cf-249	1552.22	387.95	14.	10.	0.005	64.63	1.121s
SN-113	1567.19	391.69	50.	2.	0.001	605.55	1.125s
AG-108M	1736.25	433.94	36.	-6.	-0.003	110.41	1.164s
pm-146	1816.05	453.88	36.	-13.	-0.007	54.81	1.182s
SB-125	1854.01	463.37	29.	3.	0.002	265.05	1.191
Ir-192	1872.79	468.06	25.	5.	0.003	143.32	1.195
BE-7	1910.94	477.59	31.	2.	0.001	368.75	1.204s
HF-181	1928.56	482.00	37.	-1.	-0.001	744.78	1.208s
La-140	1948.65	487.02	24.	-3.	-0.002	324.89	1.212s
RU-103	1988.80	497.05	8.	6.	0.003	100.92	1.221s
RH-106	2048.06	511.86	33.	39.	0.021	41.33	2.485
Nd-147	2124.62	531.00	4.	13.	0.007	40.95	1.252s
Ba-140	2149.67	537.26	12.	7.	0.004	100.92	1.258s
CS-134	2253.60	563.24	8.	9.	0.005	69.37	1.280s
PA-234	2278.54	569.47	16.	4.	0.002	172.61	1.286s
BI-207	2279.47	569.70	19.	0.	0.000	1000.00	1.286s
TL-208	2332.76	583.02	4.	28.	0.016	23.51	1.298s
SB-125	2402.69	600.50	278.	-14.	-0.008	174.25	1.313s
SB-124	2411.61	602.73	264.	-14.	-0.008	169.76	1.315s
CS-134	2419.53	604.71	251.	-14.	-0.008	165.19	1.317s
BI-214	2438.62	609.48	3.	110.	0.061	9.83	1.450
RU-103	2441.89	610.30	237.	-14.	-0.008	160.15	1.322s
AG-108M	2457.82	614.28	223.	-14.	-0.008	155.16	1.325s
PM-144	2472.94	618.06	209.	-14.	-0.008	150.06	1.328s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	2488.37	621.92	215.	-15.	-0.008	144.15	1.332s
SB-125	2544.26	635.89	4.	13.	0.007	36.84	1.344s
I-131	2548.61	636.97	29.	-8.	-0.005	56.09	1.345s
AG-110M	2631.76	657.76	32.	-12.	-0.006	74.94	1.362s
PM-144	2786.90	696.54	13.	2.	0.001	374.72	1.395s
NB-94	2811.25	702.63	13.	-2.	-0.001	374.72	1.400s
SB-124	2891.88	722.79	17.	7.	0.004	91.86	1.417s
EU-154	2894.16	723.36	24.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	16.	5.	0.003	123.79	1.418s
BI-212	2909.41	727.17	19.	5.	0.003	133.92	1.421s
pm-146	2943.61	735.72	9.	6.	0.003	112.73	1.428s
pm-146	2989.37	747.16	4.	5.	0.003	96.09	1.437s
ZR-95	3027.65	756.73	9.	5.	0.003	122.02	1.445s
AG-110M	3056.50	763.94	32.	-12.	-0.007	70.71	1.451s
NB-95	3063.89	765.79	41.	4.	0.002	229.65	1.453s
PA-234M	3066.38	766.41	32.	5.	0.003	165.33	1.453s
EU-152	3116.41	778.92	23.	-10.	-0.006	103.93	1.463s
BI-212	3142.41	785.42	14.	-1.	-0.001	800.00	1.468s
CS-134	3184.19	795.87	34.	-8.	-0.004	108.97	1.477s
TL-210	3199.12	799.60	42.	0.	0.000	1000.00	1.480s
CO-58	3243.82	810.78	19.	6.	0.003	115.49	1.489s
Cs-136	3274.72	818.50	14.	-4.	-0.002	204.63	1.495s
MN-54	3340.10	834.85	9.	2.	0.001	396.48	1.508s
Co-56	3387.78	846.77	5.	5.	0.003	97.15	1.518s
TL-208	3442.95	860.56	5.	5.	0.003	96.99	1.529s
NB-94	3485.08	871.10	5.	5.	0.003	71.81	1.537
EU-154	3493.61	873.23	5.	0.	0.000	1000.00	1.539s
PA-234	3522.80	880.53	51.	-12.	-0.007	89.08	1.544s
PA-234	3533.64	883.24	63.	-12.	-0.007	97.62	1.547s
AG-110M	3539.41	884.68	75.	-5.	-0.003	258.52	1.547s
Sc-46	3557.79	889.28	60.	9.	0.005	122.09	1.551s
y-88	3592.83	898.04	19.	2.	0.001	398.21	1.558s
AC-228	3644.94	911.07	9.	20.	0.011	39.93	1.568
AG-110M	3750.60	937.49	0.	9.	0.005	33.33	1.589s
PA-234	3784.70	946.02	28.	-10.	-0.006	116.62	1.595s
EU-152	3857.05	964.11	21.	7.	0.004	100.00	1.609s
AC-228	3876.48	968.97	23.	6.	0.004	113.49	1.612
EU-154	3985.88	996.33	51.	-13.	-0.007	84.27	1.633s
PA-234M	4004.55	1001.00	64.	-12.	-0.007	44.46	1.636s
EU-154	4019.65	1004.77	56.	10.	0.005	111.72	1.639s
Co-56	4151.87	1037.84	5.	4.	0.002	140.81	1.664s
Cs-136	4192.77	1048.07	6.	6.	0.003	72.66	1.671s
RH-106	4201.93	1050.36	12.	6.	0.003	94.89	1.673s
BI-207	4255.11	1063.66	0.	12.	0.007	28.87	1.682s
Ga-68	4310.04	1077.40	5.	3.	0.002	173.74	1.692s
FE-59	4397.41	1099.25	10.	6.	0.003	130.42	1.708s
ZN-65	4462.56	1115.55	0.	7.	0.004	38.61	1.720s
Ta-182	4485.56	1121.30	25.	8.	0.005	90.76	1.724s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4693.21	1173.24	11.	4.	0.002	163.90	1.760s
Ta-182	4756.42	1189.05	5.	6.	0.003	89.49	1.771s
Ta-182	4885.79	1221.41	0.	14.	0.008	26.73	1.793s
Co-56	4953.23	1238.28	16.	11.	0.006	91.04	1.804s
NA-22	5098.13	1274.53	5.	6.	0.004	64.94	1.828s
EU-154	5098.19	1274.54	12.	1.	0.001	377.99	1.828s
FE-59	5166.35	1291.60	16.	0.	0.000	1000.00	1.840s
TL-210	5251.91	1313.00	5.	2.	0.001	324.35	1.854s
CO-60	5329.85	1332.50	27.	-14.	-0.008	90.05	1.866s
AG-110M	5536.88	1384.30	5.	4.	0.002	152.39	1.899s
EU-152	5631.62	1408.00	5.	5.	0.003	121.64	1.914s
K-40	5844.14	1461.18	4.	106.	0.059	10.11	1.860
SB-124	6762.39	1690.98	6.	-3.	-0.002	366.39	2.076s
BI-214	7056.06	1764.49	2.	10.	0.006	37.62	2.114s
Co-56	7083.46	1771.35	13.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	12.	-5.	-0.003	173.21	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	8.7814E-01					5.31E+01
			477.60	8.781E-01	?(	1.159E+01 3.69E+02	1.05E+01 G
NA-22	C	6.1681E-01					9.50E+02
			1274.53	6.168E-01	?(	1.308E+00 6.49E+01	9.99E+01 G
K-40	N	1.0805E+02					4.66E+11
			1460.83	1.080E+02	(P	1.239E+01 1.01E+01	1.07E+01 G
Sc-46	F	6.6986E-01					8.38E+01
			889.28	6.699E-01	?(	2.791E+00 1.22E+02	1.00E+02 G
			1120.55	-2.734E-02	% P	1.381E+00 2.39E+03	1.00E+02 G
CR-51	F	3.2038E-01					2.77E+01
			320.08	3.204E-01	?(P	1.116E+01 9.84E+02	9.94E+00 G
MN-54	C	1.1338E-01					3.12E+02
			834.85	1.134E-01	?(	1.153E+00 3.96E+02	1.00E+02 G
FE-59	F	8.6036E-01					4.45E+01
			1099.25	8.604E-01	?(P	2.682E+00 1.30E+02	5.65E+01 G
			1291.60	0.000E+00	&	4.850E+00 1.00E+03	4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 9.3267E-01					7.73E+01	
		846.77	3.634E-01	?(	8.799E-01	9.72E+01	9.99E+01 G
		1238.28	1.525E+00	(P	3.079E+00	9.10E+01	6.61E+01 G
		1037.84	2.189E+00	?(P	7.713E+00	1.41E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.615E+01	1.00E+03	1.55E+01 A
CO-57	C 1.7636E-01					2.72E+02	
		122.06	1.764E-01	?(	7.569E-01	1.26E+02	8.56E+01 G
		136.47	-8.026E-01	+	9.507E+00	3.47E+02	1.07E+01 G
CO-58	C 3.8467E-01					7.09E+01	
		810.78	3.847E-01	?(P	1.545E+00	1.15E+02	9.95E+01 G
CO-60	F -1.3771E+00					1.93E+03	
		1332.50	-1.377E+00	?(	2.698E+00	9.00E+01	1.00E+02 G
		1173.24	4.060E-01	+ P	1.615E+00	1.64E+02	9.99E+01 G
ZN-65	F 1.2548E+00					2.44E+02	
		1115.55	1.255E+00	?(	1.264E+00	3.86E+01	5.06E+01 G
NB-94	I 1.3052E-01					7.41E+06	
		702.63	-1.203E-01	?(	1.173E+00	3.75E+02	9.79E+01 G
		871.10	3.763E-01	?(	9.015E-01	7.18E+01	9.99E+01 G
ZR-95	I 6.3756E-01					6.40E+01	
		756.73	6.078E-01	?(P	1.894E+00	1.22E+02	5.45E+01 G
		724.20	6.743E-01	?(	2.933E+00	1.24E+02	4.42E+01 G
NB-95	I 2.5512E-01					6.40E+01	
		765.79	2.551E-01	?(	2.056E+00	2.30E+02	9.98E+01 G
RU-103	I 2.9096E-01					3.93E+01	
		497.05	2.910E-01	&(	7.706E-01	1.01E+02	9.09E+01 G
		610.30	-1.254E+01	+	6.772E+01	1.60E+02	5.75E+00 GA
RH-106	I -2.6004E+00					3.74E+02	
		621.92	-7.837E+00	?(	3.806E+01	1.44E+02	9.93E+00 G
		1050.36	3.073E+01	?(	1.008E+02	9.49E+01	1.56E+00 G
		511.86	8.734E+00		6.689E+00	4.13E+01	2.00E+01 GA
AG-108M	C -2.7358E-01					1.53E+05	
		433.94	-2.736E-01	?(P	1.339E+00	1.10E+02	9.05E+01 G
		722.94	2.153E-03	%	1.694E+00	2.14E+04	9.08E+01 G
		614.28	-8.093E-01	&	4.234E+00	1.55E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	5.4274E-01					2.50E+02	
			884.68	-4.724E-01	?(	4.227E+00	2.59E+02	7.27E+01 G
			657.76	-6.829E-01	+	1.711E+00	7.49E+01	9.46E+01 G
			937.49	1.963E+00	?(	1.608E+00	3.33E+01	3.44E+01 G
			1384.30	1.570E+00	?(	5.770E+00	1.52E+02	2.43E+01 G
			763.94	-3.502E+00	+	8.238E+00	7.07E+01	2.23E+01 G
SN-113	F	9.4345E-02					1.15E+02	
			391.69	9.434E-02	?(	2.020E+00	6.06E+02	6.40E+01 G
SB-124	F	-2.6620E-01					6.02E+01	
			602.73	-7.229E-01	?(	4.135E+00	1.70E+02	9.83E+01 G
			1690.98	-7.558E-01	+ P	3.624E+00	3.66E+02	4.78E+01 G
			722.79	3.885E+00	?(	1.222E+01	9.19E+01	1.08E+01 G
SB-125	I	1.6177E+00					1.01E+03	
			427.88	8.946E-02	&(P	2.506E+00	1.01E+03	2.96E+01 G
			600.50	-3.959E+00	&	2.324E+01	1.74E+02	1.79E+01 G
			635.89	6.030E+00	?(P	5.980E+00	3.68E+01	1.13E+01 G
			463.37	1.172E+00	?(P	1.105E+01	2.65E+02	1.05E+01 G
I-131	I	-7.7592E-02					8.02E+00	
			364.48	-1.655E-01	?(P	1.103E+00	3.40E+02	8.17E+01 G
			284.30	1.092E+00	?(P	1.340E+01	4.51E+02	6.14E+00 G
			636.97	-6.395E+00	+ P	2.087E+01	5.61E+01	7.17E+00 G
Gd-153	F	7.6874E-01					2.42E+02	
			97.50	6.901E-01	&(	2.653E+00	1.14E+02	3.00E+01 G
			103.20	8.770E-01	(	3.561E+00	1.20E+02	2.18E+01 G
Ga-68	C	9.0141E+00					4.71E-02	
			1077.40	9.014E+00	?(	3.945E+01	1.74E+02	3.30E+00 G
Tc-99m	I	2.7044E-01					2.51E-01	
			140.51	2.704E-01	&(	8.973E-01	9.86E+01	8.93E+01 G
BA-133	F	-3.7660E-01					3.85E+03	
			356.00	-3.766E-01	?(	3.227E+00	2.51E+02	6.20E+01 G
			302.85	-4.415E-01	+	1.138E+01	7.55E+02	1.83E+01 G
			383.84	5.676E+00	&	2.930E+00	2.65E+01	8.94E+00 GA
			80.99	-8.401E-01	+	5.483E+00	1.95E+02	3.41E+01 GA
CS-134	I	-2.5336E-01					7.54E+02	
			604.71	-7.306E-01	?(	4.068E+00	1.65E+02	9.76E+01 G
			795.87	-6.112E-01	+	2.283E+00	1.09E+02	8.55E+01 G
			569.32	-1.605E-01	%	7.643E+00	1.29E+03	1.54E+01 G
			801.95	-2.522E-01	%	2.526E+01	2.80E+03	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	5.326E+00	?(	9.311E+00	6.94E+01	8.35E+00 G
CS-137	I	5.3859E-02					1.10E+04	
			661.66	5.386E-02	&(P	2.195E+00	1.14E+03	8.52E+01 G
CE-139	F	-2.5152E-01					1.38E+02	
			165.85	-2.515E-01	(	1.190E+00	1.40E+02	7.99E+01 G
Ba-140	I	1.2356E+00					1.28E+01	
			537.26	1.404E+00	?(P	3.674E+00	1.01E+02	2.44E+01 G
			162.66	5.739E-01	&(	1.543E+01	7.78E+02	6.22E+00 G
			304.85	0.000E+00	-	4.860E+01	1.00E+03	4.29E+00 G
La-140	I	2.1121E-01					1.28E+01	
			1596.21	-1.519E-02	%(P	9.063E-01	8.68E+03	9.54E+01 G
			487.02	-2.858E-01	+	2.433E+00	3.25E+02	4.55E+01 G
			328.76	1.275E+00	&(	3.488E+00	1.03E+02	2.03E+01 G
			815.77	-5.737E-02	% P	7.480E+00	3.35E+03	2.33E+01 G
CE-141	I	2.8749E-01					3.25E+01	
			145.44	2.875E-01	?(P	1.987E+00	2.03E+02	4.82E+01 G
CE-144	I	-2.0461E+00					2.85E+02	
			133.54	-2.046E+00	*(	8.075E+00	1.17E+02	1.11E+01 G
PM-144	C	1.1806E-01					3.63E+02	
			696.54	1.181E-01	?(	1.152E+00	3.75E+02	9.90E+01 G
			618.06	-7.393E-01	+	3.741E+00	1.50E+02	9.91E+01 G
EU-152	F	1.2801E+00					4.94E+03	
			344.29	0.000E+00	?(	5.867E+00	1.00E+03	2.65E+01 G
			1112.07	2.114E-01	%	2.102E+01	2.78E+03	1.36E+01 G
			121.78	6.292E-01	?(	2.299E+00	1.08E+02	2.86E+01 G
			778.92	-5.124E+00	+	1.251E+01	1.04E+02	1.29E+01 G
			964.11	3.678E+00	?(	1.265E+01	1.00E+02	1.46E+01 G
			244.69	3.589E+00	?(P	2.395E+01	1.97E+02	7.58E+00 G
			1408.00	2.345E+00		6.769E+00	1.22E+02	2.10E+01 GA
EU-154	I	1.3923E+00					3.14E+03	
			873.23	0.000E+00	?(	7.754E+00	1.00E+03	1.23E+01 G
			123.10	-1.587E-01	+	1.808E+00	3.30E+02	4.08E+01 G
			1274.54	3.625E-01	?(	5.140E+00	3.78E+02	3.52E+01 G
			723.36	0.000E+00	-	7.618E+00	1.00E+03	2.02E+01 G
			1004.77	4.353E+00	?(	1.656E+01	1.12E+02	1.80E+01 G
			996.33	-9.445E+00	+	2.674E+01	8.43E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-1.0692E+00					1.81E+03	
			105.31	-1.069E+00	(P	5.477E+00	1.08E+02	2.12E+01 G
			86.54	-9.068E-01	&	5.695E+00	1.87E+02	3.07E+01 G
HF-181	F	-6.2267E-02					4.24E+01	
			482.00	-6.227E-02	?(	1.661E+00	7.45E+02	8.05E+01 G
			133.02	-5.531E-01	+ P	2.487E+00	5.33E+01	4.33E+01 G
			345.83	-1.854E-01	% P	1.040E+01	1.21E+03	1.51E+01 G
			136.30	-1.983E+00	+	1.646E+01	2.43E+02	5.85E+00 G
Ta-182	F	3.3445E+00					1.14E+02	
			1121.30	2.115E+00	&(	6.530E+00	9.08E+01	3.49E+01 G
			1221.41	4.855E+00	?(	2.556E+00	2.67E+01	2.70E+01 G
			1189.05	3.477E+00	?(	7.419E+00	8.95E+01	1.62E+01 G
Hg-203	F	2.2329E-02					4.66E+01	
			279.20	2.233E-02	%(	1.393E+00	1.77E+03	8.15E+01 G
TL-208	N	1.8363E+00					6.98E+02	
			583.02	1.669E+00	&(	7.170E-01	2.35E+01	8.45E+01 G
			277.28	-4.156E+00	-	1.584E+01	1.12E+02	6.31E+00 G
			860.56	2.976E+00	&(P	7.186E+00	9.70E+01	1.24E+01 G
pm-146	C	1.1781E+00					2.02E+03	
			747.16	9.107E-01	?(	2.262E+00	9.61E+01	3.40E+01 G
			735.72	1.582E+00	?(P	4.576E+00	1.13E+02	2.25E+01 G
			453.88	-8.060E-01	- P	1.940E+00	5.48E+01	6.50E+01 G
y-88	F	1.8005E-01					1.07E+02	
			898.04	1.801E-01	?(	1.763E+00	3.98E+02	9.37E+01 G
			1836.06	-6.655E-01	+	2.509E+00	1.73E+02	9.92E+01 G
Cd-113m		1.7347E+03					5.33E+03	
			263.70	1.735E+03	?(	1.518E+04	2.50E+02	6.00E-03 K
Cf-251	T	1.2625E+00					3.28E+05	
			176.60	1.262E+00	*(	3.668E+00	1.06E+02	1.70E+01 G
			227.00	-1.824E+00	+	1.301E+01	2.56E+02	6.30E+00 GA
Cf-249	T	5.1889E-01					1.28E+05	
			387.95	5.189E-01	&(	1.104E+00	6.46E+01	6.60E+01 G
			333.44	-6.795E-02	%	5.697E+00	3.04E+03	1.55E+01 G
Sn-126		-3.2272E+00					3.65E+07	
			87.57	-7.394E-01	}	4.488E+00	1.81E+02	3.75E+01 GA
			64.28	-3.227E+00	?(	1.261E+01	1.16E+02	9.70E+00 G
			86.94	3.972E+00		7.380E+00	5.68E+01	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.3256E+01					8.14E+03	
			46.54	1.326E+01	(P	2.402E+01	6.21E+01	4.25E+00 G
PB-212	N	6.1504E+00					6.98E+02	
			238.63	6.150E+00	(P	1.530E+00	1.17E+01	4.33E+01 G
			300.03	-1.109E+01	- P	6.710E+01	8.42E+01	3.28E+00 GA
PB-214	N	1.0902E+01					5.84E+05	
			351.93	9.836E+00	(P	1.885E+00	1.20E+01	3.76E+01 G
			295.09	1.298E+01	(P	2.266E+00	1.20E+01	1.93E+01 G
			242.00	9.300E+00		1.091E+01	3.77E+01	7.43E+00 GA
BI-207	C	5.8068E-01					1.18E+04	
			569.70	0.000E+00	?(	1.164E+00	1.00E+03	9.77E+01 G
			1063.66	1.343E+00	?(	8.245E-01	2.89E+01	7.45E+01 G
BI-212	N	3.9335E+00					6.98E+02	
			727.17	3.934E+00	?(	1.852E+01	1.34E+02	7.55E+00 G
			785.42	-5.048E+00	+	1.017E+02	8.00E+02	1.28E+00 GA
U-235	N	1.5098E+00					2.57E+11	
			143.79	1.510E+00	(P	7.708E+00	1.50E+02	1.10E+01 G
			205.33	-9.852E-01	+	1.551E+01	5.61E+02	5.01E+00 G
			163.38	0.000E+00	-	1.910E+01	1.00E+03	5.08E+00 G
			185.72	4.786E-01		1.362E+00	1.05E+02	5.40E+01 GA
BI-214	N	1.2452E+01					5.84E+05	
			609.31	1.245E+01	(P	1.246E+00	9.83E+00	4.61E+01 G
			1120.29	-1.810E-01	% P	9.146E+00	2.38E+03	1.51E+01 G
			1764.49	8.705E+00	- P	8.355E+00	3.76E+01	1.54E+01 G
BI-210M	T	-7.7674E-01					1.10E+09	
			265.83	-7.767E-01	?(	2.546E+00	9.75E+01	5.00E+01 G
			304.90	0.000E+00	+	7.447E+00	1.00E+03	2.80E+01 G
AC-228	N	4.1485E+00					2.10E+03	
			911.07	4.963E+00	(	4.277E+00	3.99E+01	2.90E+01 G
			968.97	2.796E+00	?(	1.099E+01	1.13E+02	1.75E+01 G
			338.32	1.954E+00	&	1.228E+01	1.83E+02	1.20E+01 G
			93.35	8.475E-01	-	2.791E+01	9.74E+02	5.56E+00 XA
TH-227	N	2.5728E+00					7.95E+03	
			50.14	2.071E+00	&(	1.430E+01	2.37E+02	8.00E+00 G
			256.24	3.146E+00	?(	1.015E+01	1.22E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	-2.5939E+00					2.68E+06	
			193.51	-2.594E+00	?(	1.730E+01	2.40E+02	4.40E+00 G
			210.85	-1.036E+01	+	3.082E+01	1.10E+02	2.99E+00 G
TH-234	N	9.3544E+00					1.63E+12	
			63.29	1.166E+01	(P	2.121E+01	5.61E+01	3.81E+00 G
			92.59	7.784E+00	(P	1.218E+01	5.75E+01	5.58E+00 G
PA-231	N	-1.3213E+01					1.20E+07	
			302.65	-1.321E+01	?(	7.446E+01	1.67E+02	2.88E+00 G
			300.07	-1.268E+01	&	8.726E+01	2.03E+02	2.46E+00 G
PA-233	C	9.6958E-02					7.82E+08	
			312.01	9.696E-02	%(	5.875E+00	1.77E+03	3.60E+01 G
			300.18	-6.082E+00	&	3.527E+01	1.72E+02	6.20E+00 G
PA-234	N	1.7248E+00					1.63E+12	
			131.29	1.550E+00	(P	1.947E+00	4.53E+01	1.80E+01 G
			946.02	-5.637E+00	&	1.543E+01	1.17E+02	1.34E+01 G
			569.47	2.108E+00	?(	1.303E+01	1.73E+02	8.20E+00 G
			883.24	-8.928E+00	-	2.945E+01	9.76E+01	9.60E+00 G
			880.53	-1.423E+01	-	4.272E+01	8.91E+01	6.00E+00 GA
PA-234M	N	-1.1296E+02					1.63E+12	
			1001.00	-1.130E+02	&(P	3.793E+02	4.45E+01	8.37E-01 G
			766.41	1.077E+02	+	6.230E+02	1.65E+02	2.94E-01 G
AM-241	T	-1.1945E+00					1.58E+05	
			59.54	-1.194E+00	?(P	2.992E+00	6.05E+01	3.59E+01 G
Np-237	F	-2.1257E+00					2.14E+06	
			86.49	-2.126E+00	(	1.357E+01	1.90E+02	1.31E+01 G
Ir-192	F	3.4512E-01					7.40E+01	
			316.49	3.014E-01	?(	1.173E+00	1.14E+02	8.70E+01 G
			468.06	4.186E-01	&(	2.101E+00	1.43E+02	5.18E+01 G
			308.44	0.000E+00	-	6.630E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.1695E-01					1.30E+01	
			818.50	-2.676E-01	?(	1.348E+00	2.05E+02	1.00E+02 G
			1048.07	5.976E-01	?(	1.453E+00	7.27E+01	8.00E+01 G
			340.57	0.000E+00	-	3.286E+00	1.00E+03	4.69E+01 G
Np-239	T	-9.7366E-01					2.36E+00	
			103.70	6.774E-01	?	3.409E+00	1.48E+02	2.40E+01 X
			106.13	-9.737E-01	?(	5.016E+00	1.53E+02	2.27E+01 G
			99.50	-3.091E-01	+	5.456E+00	5.11E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147       4.6581E+00                                        1.11E+01
                           531.00 4.658E+00 ?(  4.311E+00 4.09E+01 1.30E+01 G
                            91.10-3.245E-01 -   5.602E+00 5.11E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	69.	6.	0.003	236.58	2.071E+00	
AM-241	59.54	99.	-20.	-0.011	60.55	-1.194E+00	P
BA-133	80.99	546.	-17.	-0.009	194.78	-8.401E-01	
Np-237	86.49	529.	-17.	-0.010	190.45	-2.126E+00	
EU-155	86.54	512.	-17.	-0.010	187.38	-9.068E-01	
AC-228	93.35	425.	3.	0.002	973.54	8.475E-01	
Gd-153	97.50	108.	13.	0.007	113.85	6.901E-01	
Np-239	99.50	116.	-3.	-0.002	511.45	-3.091E-01	
Gd-153	103.20	105.	12.	0.007	120.00	8.770E-01	
Np-239	103.70	117.	11.	0.006	148.19	6.774E-01	
EU-155	105.31	245.	-15.	-0.008	107.89	-1.069E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Np-239	106.13	235.	-14.	-0.008	152.93	-9.737E-01		
EU-152	121.78	72.	12.	0.006	107.88	6.292E-01		
CO-57	122.06	70.	10.	0.005	125.94	1.764E-01		
EU-154	123.10	92.	-4.	-0.002	329.51	-1.587E-01		
HF-181	133.02	195.	-15.	-0.008	53.35	-5.531E-01		P
CE-144	133.54	132.	-14.	-0.008	117.03	-2.046E+00		
HF-181	136.30	151.	-7.	-0.004	243.31	-1.983E+00		
CO-57	136.47	168.	-5.	-0.003	346.75	-8.026E-01		
Tc-99m	140.51	93.	14.	0.008	98.57	2.704E-01		
U-235	143.79	109.	10.	0.006	150.18	1.510E+00		P
CE-141	145.44	140.	8.	0.005	203.01	2.875E-01		P
Ba-140	162.66	120.	2.	0.001	777.82	5.739E-01		
CE-139	165.85	119.	-11.	-0.006	139.51	-2.515E-01		
Cf-251	176.60	43.	11.	0.006	106.11	1.262E+00		
U-235	185.72	57.	13.	0.007	104.58	4.786E-01		
TH-229	193.51	57.	-6.	-0.003	240.10	-2.594E+00		
U-235	205.33	53.	-2.	-0.001	560.79	-9.852E-01		
TH-229	210.85	73.	-14.	-0.008	109.55	-1.036E+01		
Cf-251	227.00	50.	-5.	-0.003	255.60	-1.824E+00		
EU-152	244.69	236.	11.	0.006	197.45	3.589E+00		P
TH-227	256.24	29.	9.	0.005	121.75	3.146E+00		
Cd-113m	263.70	48.	4.	0.002	250.00	1.735E+03		
BI-210M	265.83	97.	-15.	-0.008	97.47	-7.767E-01		
I-131	284.30	34.	2.	0.001	451.00	1.092E+00		P
TL-210	296.00	259.	-12.	-0.007	192.92	-4.323E-01		
PA-231	300.07	235.	-11.	-0.006	203.45	-1.268E+01		
PA-233	300.18	244.	-13.	-0.007	171.92	-6.082E+00		
PA-231	302.65	231.	-13.	-0.007	167.01	-1.321E+01		
BA-133	302.85	218.	-3.	-0.002	755.00	-4.415E-01		
Ir-192	316.49	44.	9.	0.005	113.84	3.014E-01		
CR-51	320.08	52.	1.	0.001	983.87	3.204E-01		P
La-140	328.76	18.	8.	0.005	102.75	1.275E+00		
AC-228	338.32	87.	7.	0.004	183.29	1.954E+00		
BA-133	356.00	151.	-7.	-0.004	251.12	-3.766E-01		
I-131	364.48	26.	-4.	-0.002	339.79	-1.655E-01		P
BA-133	383.84	0.	14.	0.008	26.46	5.676E+00		
Cf-249	387.95	14.	10.	0.005	64.63	5.189E-01		
SN-113	391.69	50.	2.	0.001	605.55	9.434E-02		
AG-108M	433.94	36.	-6.	-0.003	110.41	-2.736E-01		P
pm-146	453.88	36.	-13.	-0.007	54.81	-8.060E-01		P
SB-125	463.37	29.	3.	0.002	265.05	1.172E+00		P
Ir-192	468.06	25.	5.	0.003	143.32	4.186E-01		
BE-7	477.59	31.	2.	0.001	368.75	8.781E-01		
HF-181	482.00	37.	-1.	-0.001	744.78	-6.227E-02		
La-140	487.02	24.	-3.	-0.002	324.89	-2.858E-01		
RU-103	497.05	8.	6.	0.003	100.92	2.910E-01		
RH-106	511.86	33.	39.	0.021	41.33	8.734E+00		
Ba-140	537.26	12.	7.	0.004	100.92	1.404E+00		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	8.	9.	0.005	69.37	5.326E+00	
SB-125	600.50	278.	-14.	-0.008	174.25	-3.959E+00	
SB-124	602.73	264.	-14.	-0.008	169.76	-7.229E-01	
CS-134	604.71	251.	-14.	-0.008	165.19	-7.306E-01	
RU-103	610.30	237.	-14.	-0.008	160.15	-1.254E+01	
AG-108M	614.28	223.	-14.	-0.008	155.16	-8.093E-01	
PM-144	618.06	209.	-14.	-0.008	150.06	-7.393E-01	
RH-106	621.92	215.	-15.	-0.008	144.15	-7.837E+00	
SB-125	635.89	4.	13.	0.007	36.84	6.030E+00	P
I-131	636.97	29.	-8.	-0.005	56.09	-6.395E+00	P
AG-110M	657.76	32.	-12.	-0.006	74.94	-6.829E-01	
PM-144	696.54	13.	2.	0.001	374.72	1.181E-01	
NB-94	702.63	13.	-2.	-0.001	374.72	-1.203E-01	
SB-124	722.79	17.	7.	0.004	91.86	3.885E+00	
ZR-95	724.20	16.	5.	0.003	123.79	6.743E-01	
pm-146	735.72	9.	6.	0.003	112.73	1.582E+00	P
pm-146	747.16	4.	5.	0.003	96.09	9.107E-01	
ZR-95	756.73	9.	5.	0.003	122.02	6.078E-01	P
AG-110M	763.94	32.	-12.	-0.007	70.71	-3.502E+00	
NB-95	765.79	41.	4.	0.002	229.65	2.551E-01	
PA-234M	766.41	32.	5.	0.003	165.33	1.077E+02	
EU-152	778.92	23.	-10.	-0.006	103.93	-5.124E+00	
CS-134	795.87	34.	-8.	-0.004	108.97	-6.112E-01	
CO-58	810.78	19.	6.	0.003	115.49	3.847E-01	P
Cs-136	818.50	14.	-4.	-0.002	204.63	-2.676E-01	
MN-54	834.85	9.	2.	0.001	396.48	1.134E-01	
NB-94	871.10	5.	5.	0.003	71.81	3.763E-01	
AG-110M	884.68	75.	-5.	-0.003	258.52	-4.724E-01	
Sc-46	889.28	60.	9.	0.005	122.09	6.699E-01	
y-88	898.04	19.	2.	0.001	398.21	1.801E-01	
AC-228	911.07	9.	20.	0.011	39.93	4.963E+00	
AG-110M	937.49	0.	9.	0.005	33.33	1.963E+00	
EU-152	964.11	21.	7.	0.004	100.00	3.678E+00	
AC-228	968.97	23.	6.	0.004	113.49	2.796E+00	
EU-154	996.33	51.	-13.	-0.007	84.27	-9.445E+00	
PA-234M	1001.00	64.	-12.	-0.007	44.46	-1.130E+02	P
EU-154	1004.77	56.	10.	0.005	111.72	4.353E+00	
Cs-136	1048.07	6.	6.	0.003	72.66	5.976E-01	
RH-106	1050.36	12.	6.	0.003	94.89	3.073E+01	
BI-207	1063.66	0.	12.	0.007	28.87	1.343E+00	
Ga-68	1077.40	5.	3.	0.002	173.74	9.014E+00	
FE-59	1099.25	10.	6.	0.003	130.42	8.604E-01	P
ZN-65	1115.55	0.	7.	0.004	38.61	1.255E+00	
Ta-182	1121.30	25.	8.	0.005	90.76	2.115E+00	
CO-60	1173.24	11.	4.	0.002	163.90	4.060E-01	P
Ta-182	1189.05	5.	6.	0.003	89.49	3.477E+00	
Ta-182	1221.41	0.	14.	0.008	26.73	4.855E+00	
NA-22	1274.53	5.	6.	0.004	64.94	6.168E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	1274.54	12.	1.	0.001	377.99	3.625E-01		
TL-210	1313.00	5.	2.	0.001	324.35	7.897E-01		
CO-60	1332.50	27.	-14.	-0.008	90.05	-1.377E+00		
AG-110M	1384.30	5.	4.	0.002	152.39	1.570E+00		
EU-152	1408.00	5.	5.	0.003	121.64	2.345E+00		
SB-124	1690.98	6.	-3.	-0.002	366.39	-7.558E-01	P	
y-88	1836.06	12.	-5.	-0.003	173.21	-6.655E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

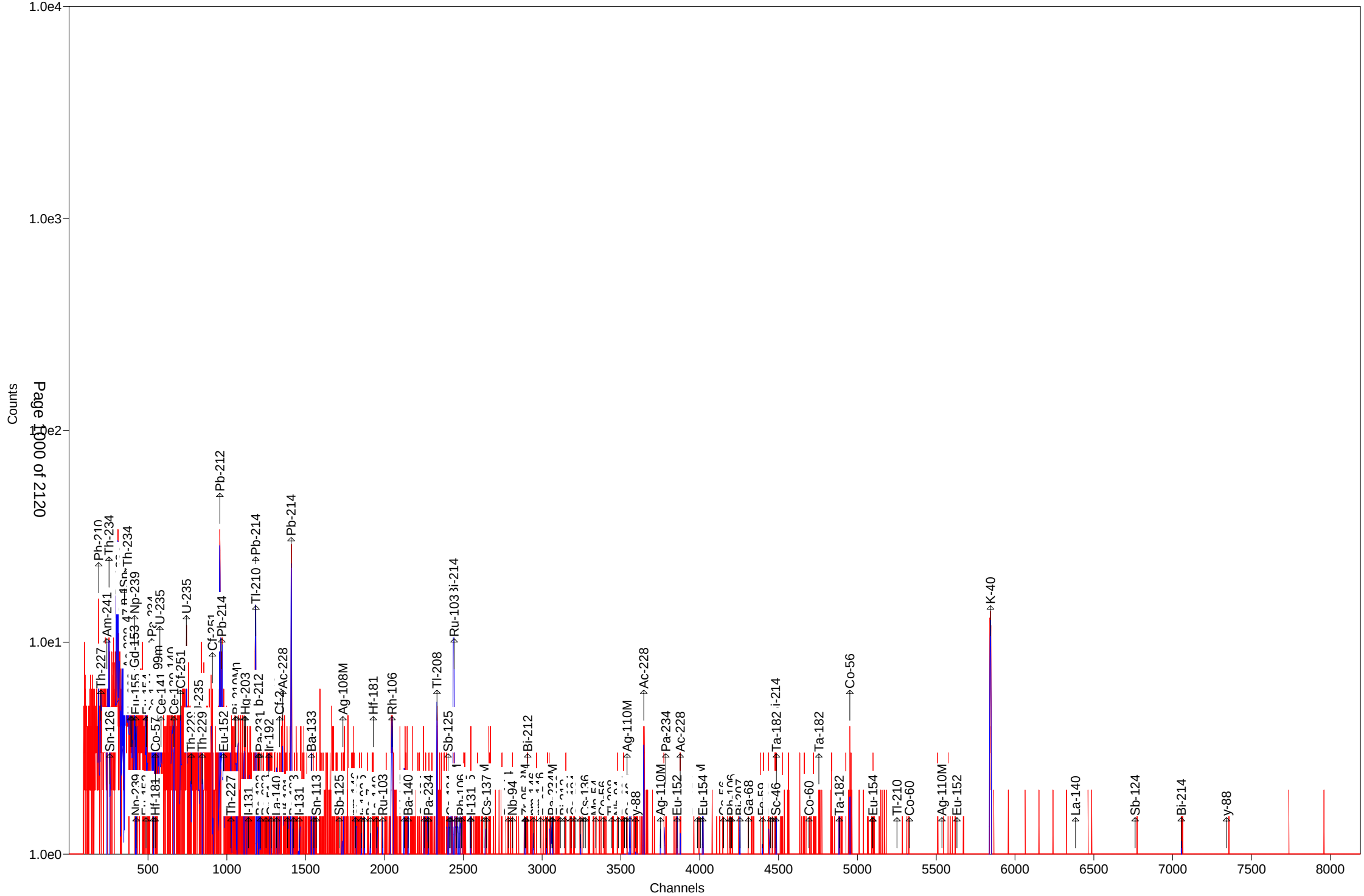
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	8.7813E-01	8.7814E-01	3.687E+02%	1.16E+01
NA-22	#A	6.1681E-01	6.1681E-01	6.494E+01%	1.31E+00
K-40		1.0805E+02	1.0805E+02	1.011E+01%	1.24E+01
Sc-46	#A	6.6985E-01	6.6986E-01	1.221E+02%	2.79E+00
CR-51	#A	3.2038E-01	3.2038E-01	9.839E+02%	1.12E+01
MN-54	#A	1.1338E-01	1.1338E-01	3.965E+02%	1.15E+00
FE-59	#A	8.6034E-01	8.6036E-01	1.304E+02%	2.68E+00
Co-56	#	9.3267E-01	9.3267E-01	6.460E+01%	8.80E-01
CO-57	#A	1.7636E-01	1.7636E-01	1.259E+02%	7.57E-01
CO-58	#A	3.8467E-01	3.8467E-01	1.155E+02%	1.54E+00
CO-60	#A	-1.3771E+00	-1.3771E+00	9.005E+01%	2.70E+00
ZN-65	#A	1.2548E+00	1.2548E+00	3.861E+01%	1.26E+00
NB-94	#A	1.3052E-01	1.3052E-01	7.181E+01%	1.17E+00
ZR-95	#A	6.3755E-01	6.3756E-01	8.691E+01%	1.89E+00
NB-95	#A	2.5512E-01	2.5512E-01	2.297E+02%	2.06E+00
RU-103	#A	2.9096E-01	2.9096E-01	1.009E+02%	7.71E-01
RH-106	#A	-2.6004E+00	-2.6004E+00	8.629E+01%	3.81E+01
AG-108M	#A	-2.7358E-01	-2.7358E-01	1.104E+02%	1.34E+00
AG-110M	#A	5.4274E-01	5.4274E-01	3.333E+01%	4.23E+00
SN-113	#A	9.4344E-02	9.4345E-02	6.055E+02%	2.02E+00
SB-124	#A	-2.6620E-01	-2.6620E-01	9.186E+01%	4.14E+00
SB-125	#A	1.6177E+00	1.6177E+00	3.684E+01%	2.51E+00
I-131	#A	-7.7587E-02	-7.7592E-02	2.823E+02%	1.10E+00
Gd-153	#A	7.6874E-01	7.6874E-01	8.271E+01%	2.65E+00
Ga-68	#A	8.9011E+00	9.0141E+00	1.737E+02%	3.95E+01
Tc-99m	#A	2.6980E-01	2.7044E-01	9.857E+01%	8.97E-01
BA-133	#A	-3.7660E-01	-3.7660E-01	2.511E+02%	3.23E+00
CS-134	#A	-2.5336E-01	-2.5336E-01	6.937E+01%	4.07E+00
CS-137	#A	5.3859E-02	5.3859E-02	1.144E+03%	2.19E+00
CE-139	#A	-2.5152E-01	-2.5152E-01	1.395E+02%	1.19E+00
Ba-140	#A	1.2356E+00	1.2356E+00	1.009E+02%	3.67E+00
La-140	#A	2.1120E-01	2.1121E-01	1.028E+02%	9.06E-01
CE-141	#A	2.8748E-01	2.8749E-01	2.030E+02%	1.99E+00

CE-144 #A	-2.0461E+00	-2.0461E+00	1.170E+02%		8.07E+00
PM-144 #A	1.1806E-01	1.1806E-01	3.747E+02%		1.15E+00
EU-152 #A	1.2801E+00	1.2801E+00	1.000E+02%		5.87E+00
EU-154 #A	1.3923E+00	1.3923E+00	1.117E+02%		7.75E+00
EU-155 #A	-1.0692E+00	-1.0692E+00	1.079E+02%		5.48E+00
HF-181 #A	-6.2266E-02	-6.2267E-02	7.448E+02%		1.66E+00
Ta-182 #A	3.3445E+00	3.3445E+00	2.673E+01%		6.53E+00
Hg-203 #A	2.2328E-02	2.2329E-02	1.775E+03%		1.39E+00
TL-208 #	1.8363E+00	1.8363E+00	2.351E+01%		7.17E-01
pm-146 #A	1.1781E+00	1.1781E+00	7.406E+01%		2.26E+00
y-88 #A	1.8005E-01	1.8005E-01	3.982E+02%		1.76E+00
Cd-113m#A	1.7347E+03	1.7347E+03	2.500E+02%		1.52E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.32E+01
Cf-251 #A	1.2625E+00	1.2625E+00	1.061E+02%		3.67E+00
Cf-249 #A	5.1889E-01	5.1889E-01	6.463E+01%		1.10E+00
Sn-126 A	-3.2272E+00	-3.2272E+00	1.161E+02%		1.26E+01
PB-210 A	1.3256E+01	1.3256E+01	6.207E+01%		2.40E+01
PB-212	6.1504E+00	6.1504E+00	1.171E+01%		1.53E+00
PB-214	1.0902E+01	1.0902E+01	8.489E+00%		1.89E+00
BI-207 #A	5.8068E-01	5.8068E-01	2.887E+01%		1.16E+00
BI-212 #A	3.9335E+00	3.9335E+00	1.339E+02%		1.85E+01
U-235 #A	1.5098E+00	1.5098E+00	1.502E+02%		7.71E+00
BI-214	1.2452E+01	1.2452E+01	9.832E+00%		1.25E+00
BI-210M#A	-7.7674E-01	-7.7674E-01	9.747E+01%		2.55E+00
AC-228 #A	4.1485E+00	4.1485E+00	3.993E+01%		4.28E+00
TH-227 #A	2.5728E+00	2.5728E+00	1.217E+02%		1.43E+01
TH-229 #A	-2.5939E+00	-2.5939E+00	2.401E+02%		1.73E+01
TH-234 A	9.3544E+00	9.3544E+00	4.019E+01%		2.12E+01
PA-231 #A	-1.3213E+01	-1.3213E+01	1.670E+02%		7.45E+01
PA-233 #A	9.6958E-02	9.6958E-02	1.771E+03%		5.88E+00
PA-234 A	1.7248E+00	1.7248E+00	4.528E+01%		1.95E+00
PA-234M#A	-1.1296E+02	-1.1296E+02	4.446E+01%		3.79E+02
AM-241 #A	-1.1945E+00	-1.1945E+00	6.055E+01%		2.99E+00
Np-237 #A	-2.1257E+00	-2.1257E+00	1.905E+02%		1.36E+01
Ir-192 #A	3.4512E-01	3.4512E-01	9.151E+01%		1.17E+00
Cs-136 #A	1.1694E-01	1.1695E-01	7.266E+01%		1.35E+00
Np-239 #A	-9.7341E-01	-9.7366E-01	1.529E+02%		5.02E+00
Nd-147 #	4.6579E+00	4.6581E+00	4.095E+01%		4.31E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		2.18E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

```
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  2000.8 keV)     1.619E+02  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 1.6188687E+02  Bq/Sample
```

379951_Gamma_160-29881-A-1-C. 5_Gamma_20182912.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20183564

Sample Description: 379951_Gamma_160-29881-A-1-D DU
Detector: Detector # 9
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-1-D DU

Decay to Time: 8/23/2018 07:08 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:08:35 Real Time: 1803 sec
Analysis Time: 8/23/2018 07:38 Dead Time: 0.17 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev14.lib
Bkgd Correction File: 9_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	7.649E-02	3670.2	2.807E+00	2.807E+00	9.862E+00
NA-22	-8.740E-01	53.9	4.712E-01	4.732E-01	1.526E+00
K-40	1.217E+02	6.8	8.317E+00	1.039E+01	8.087E+00
Sc-46	7.403E-02	390.7	2.893E-01	2.893E-01	1.553E+00
CR-51	-2.361E+00	105.3	2.486E+00	2.489E+00	8.396E+00
MN-54	7.326E-02	431.6	3.161E-01	3.162E-01	7.603E-01
FE-59	0.000E+00	1.#INF	1.606E-01	1.606E-01	1.715E+00
Co-56	3.952E-01	52.5	2.074E-01	2.084E-01	1.051E+00
CO-57	0.000E+00	1.#INF	5.996E-02	5.996E-02	7.804E-01
CO-58	2.880E-01	117.3	3.377E-01	3.381E-01	1.159E+00
CO-60	7.153E-01	25.4	1.814E-01	1.849E-01	3.900E-01
ZN-65	-1.339E+00	86.3	1.155E+00	1.157E+00	3.875E+00
NB-94	5.804E-01	21.8	1.266E-01	1.302E-01	1.512E+00
ZR-95	-6.862E-01	113.5	7.791E-01	7.799E-01	1.761E+00
NB-95	-4.351E-01	85.8	3.732E-01	3.738E-01	1.255E+00
RU-103	-8.507E-02	358.1	3.046E-01	3.046E-01	7.251E-01
RH-106	-8.313E-01	517.4	4.301E+00	4.302E+00	2.192E+01
AG-108M	9.957E-02	305.6	3.043E-01	3.043E-01	7.539E-01
AG-110M	-5.884E-01	97.9	5.760E-01	5.768E-01	1.950E+00
SN-113	-3.446E-01	147.0	5.065E-01	5.068E-01	1.984E+00
SB-124	5.667E-01	41.9	2.374E-01	2.392E-01	2.072E+00
SB-125	4.403E-01	100.5	4.426E-01	4.431E-01	2.534E+00
I-131	4.078E-01	93.3	3.806E-01	3.812E-01	8.553E-01
Gd-153	-7.498E-01	149.3	1.119E+00	1.120E+00	3.744E+00
Ga-68	-3.163E+00	460.1	1.455E+01	1.455E+01	3.376E+01
Tc-99m	0.000E+00	1.#INF	1.344E-01	1.344E-01	1.354E+00
BA-133	1.893E-01	349.6	6.619E-01	6.620E-01	2.252E+00
CS-134	5.188E-01	53.6	2.780E-01	2.793E-01	2.127E+00
CS-137	-2.101E-01	171.6	3.605E-01	3.607E-01	1.251E+00
CE-139	2.366E-01	105.7	2.500E-01	2.510E-01	8.399E-01
Ba-140	3.352E-01	102.6	3.438E-01	3.443E-01	3.094E+00
La-140	3.180E-01	148.5	4.723E-01	4.726E-01	9.133E-01
CE-141	-1.917E-01	245.6	4.708E-01	4.709E-01	1.223E+00

CE-144	-8.525E-02	3601.1	3.070E+00	3.070E+00	1.037E+01
PM-144	-5.586E-01	80.4	4.489E-01	4.498E-01	1.499E+00
EU-152	8.300E-01	166.9	1.386E+00	1.386E+00	4.689E+00
EU-154	-3.234E+00	106.6	3.447E+00	3.451E+00	9.958E+00
EU-155	-2.158E-02	6985.2	1.507E+00	1.507E+00	5.100E+00
HF-181	-2.314E-01	153.8	3.559E-01	3.561E-01	1.222E+00
Ta-182	1.747E+00	85.6	1.496E+00	1.498E+00	5.025E+00
Hg-203	2.814E-01	109.7	3.087E-01	3.092E-01	1.041E+00
TL-208	8.686E-01	48.2	4.188E-01	4.213E-01	9.573E-01
pm-146	-1.363E+00	85.8	1.170E+00	1.172E+00	2.708E+00
y-88	-8.397E-02	554.5	4.656E-01	4.656E-01	1.185E+00
Cd-113m	-8.846E+02	413.5	3.658E+03	3.658E+03	1.267E+04
Cd-109	0.000E+00	1.#INF	1.069E+01	1.069E+01	3.574E+01
Cf-251	-1.413E+00	99.0	1.399E+00	1.404E+00	3.587E+00
Cf-249	-4.279E-01	115.6	4.948E-01	4.953E-01	1.670E+00
Sn-126	2.998E+00	112.7	3.380E+00	3.384E+00	1.131E+01
PB-210	-4.564E+00	160.7	7.334E+00	7.339E+00	3.156E+01
PB-212	4.534E+00	11.4	5.159E-01	5.935E-01	1.181E+00
PB-214	8.659E+00	8.6	7.411E-01	8.670E-01	1.182E+00
BI-207	1.826E-01	156.0	2.849E-01	2.851E-01	9.848E-01
BI-212	4.861E+00	83.8	4.075E+00	4.083E+00	1.373E+01
U-235	9.285E-01	124.7	1.158E+00	1.159E+00	1.082E+01
BI-214	8.725E+00	10.3	8.987E-01	1.007E+00	1.464E+00
BI-210M	4.832E-01	85.1	4.110E-01	4.120E-01	1.377E+00
AC-228	4.998E+00	16.4	8.217E-01	8.604E-01	9.956E-01
TH-227	3.450E+00	78.3	2.700E+00	2.707E+00	1.443E+01
TH-229	5.642E+00	78.6	4.435E+00	4.458E+00	1.212E+01
TH-234	-8.243E+00	107.0	8.819E+00	8.830E+00	2.949E+01
PA-231	2.832E+00	320.2	9.067E+00	9.069E+00	5.768E+01
PA-233	-1.573E-02	4210.2	6.621E-01	6.621E-01	4.714E+00
PA-234	-1.275E+00	142.7	1.819E+00	1.821E+00	6.087E+00
PA-234M	6.201E+01	64.9	4.026E+01	4.038E+01	1.103E+02
AM-241	-2.115E-01	491.1	1.039E+00	1.039E+00	3.523E+00
Np-237	0.000E+00	1.#INF	2.996E+00	2.996E+00	1.010E+01
Ir-192	3.073E-01	94.1	2.891E-01	2.896E-01	1.061E+00
Cs-136	6.020E-01	30.4	1.832E-01	1.864E-01	9.872E-01
Np-239	9.388E-01	143.3	1.345E+00	1.346E+00	4.503E+00
Nd-147	-6.687E-01	341.7	2.285E+00	2.285E+00	5.692E+00
TL-210	1.435E-01	183.1	2.628E-01	2.630E-01	1.055E+00
Total	2.430E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-1-D DU

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20183564.An1

Acquisition information
Start time: 8/23/2018 7:08:35 AM
Live time: 1800
Real time: 1803
Dead time: 0.17 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:08:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-08-11_1245.PBC 8/11/2018 12:45:42 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1403

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
49.45	16.	109.27	1.00	2.900E-02	50.14	8.000	PBC<MDA	TH227
64.28	21.	112.73	1.02	3.987E-02	64.28	9.700	PBC<MDA	Sn126
75.14	81.	21.34	1.03	4.590E-02				
77.08	140.	13.37	1.03	4.676E-02				
87.62	45.	34.02	1.04	5.038E-02	87.57	37.500	PBC<MDA	Sn126
93.09	63.	31.40	2.43	5.171E-02	92.59	5.584	1.222E+01	TH234
					93.35	5.561	1.224E+01	AC228
106.13	20.	143.26	1.05	5.323E-02	106.13	22.700	PBC<MDA	Np239
123.10	19.	85.86	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
162.66	18.	102.58	1.11	4.690E-02	162.66	6.220	PBC<MDA	Ba140
163.38	13.	124.69	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
165.85	16.	105.68	1.11	4.736E-02	165.85	79.900	PBC<MDA	CE139
185.72	21.	93.82	1.13	4.403E-02	185.72	54.000	PBC<MDA	U235
193.51	16.	102.10	1.14	4.287E-02	193.51	4.400	PBC<MDA	TH229
210.85	15.	119.57	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
238.38	138.	12.23	1.06	3.735E-02	238.63	43.300	4.612E+00	PB212
241.89	57.	20.95	1.18	3.697E-02	242.00	7.430	1.161E+01	PB214
257.26	13.	112.09	1.20	3.558E-02	256.24	7.000	PBC<MDA	TH227
265.83	15.	85.06	1.20	3.470E-02	265.83	50.000	PBC<MDA	BI210M
279.20	14.	109.72	1.22	3.356E-02	279.20	81.460	PBC<MDA	Hg203
284.30	12.	117.99	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.02	118.	15.31	0.99	3.232E-02	295.09	19.300	1.053E+01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					296.00	79.000	2.578E+00	TL210
300.07	9.	320.16	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.148E+00	PA231
					300.18	6.200	2.440E+00	PA233
300.09	15.	184.34	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.051E+01	PA231
					300.18	6.200	4.173E+00	PA233
316.49	14.	105.41	1.25	3.080E-02	316.49	87.040	PBC<MDA	Ir192
328.76	5.	430.10	1.26	2.999E-02	328.76	20.300	PBC<MDA	La140
338.35	58.	24.38	1.68	2.940E-02	338.32	12.010	9.099E+00	AC228
344.29	12.	166.92	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.96	173.	8.86	0.93	2.860E-02	351.93	37.600	8.950E+00	PB214
356.00	6.	349.60	1.29	2.837E-02	356.00	62.050	PBC<MDA	BA133
433.94	4.	305.62	1.35	2.466E-02	433.94	90.480	PBC<MDA	AG108M
453.88	6.	165.87	1.37	2.388E-02	453.88	65.000	PBC<MDA	pm146
463.37	11.	104.20	1.38	2.352E-02	463.37	10.470	PBC<MDA	SB125
468.06	7.	155.84	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
487.02	8.	148.53	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
511.86	81.	16.41	2.67	2.188E-02	511.86	20.000	1.028E+01	RH106
563.24	19.	53.58	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.70	6.	156.01	1.47	2.023E-02	569.32	15.380	1.160E+00	CS134
					569.47	8.200	2.176E+00	PA234
					569.70	97.740	1.826E-01	BI207
583.10	26.	48.22	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
600.50	9.	245.46	1.50	1.946E-02	600.50	17.860	PBC<MDA	SB125
602.73	8.	267.21	1.50	1.940E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	236.26	1.50	1.936E-02	604.71	97.620	PBC<MDA	CS134
609.27	139.	10.30	1.42	1.925E-02	609.31	46.090	8.725E+00	BI214
					610.30	5.750	7.002E+01	RU103
621.92	-3.	517.42	1.51	1.896E-02	621.92	9.930	PBC<MDA	RH106
636.97	9.	93.33	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
702.63	11.	123.43	1.58	1.730E-02	702.63	97.900	PBC<MDA	NB94
722.79	9.	97.45	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.131E-01	AG108M
					723.36	20.220	1.407E+00	EU154
727.17	11.	83.84	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.41	13.	82.13	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.481E+02	PA234M
785.42	3.	350.45	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.87	6.	129.10	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
810.78	8.	117.26	1.67	1.551E-02	810.78	99.460	PBC<MDA	CO58
818.50	8.	97.36	1.67	1.540E-02	818.50	100.000	PBC<MDA	Cs136
834.85	2.	431.57	1.69	1.517E-02	834.85	99.980	PBC<MDA	MN54
871.10	21.	21.82	1.71	1.468E-02	871.10	99.890	7.955E-01	NB94
911.52	37.	16.44	2.66	1.418E-02	911.07	29.000	4.998E+00	AC228
968.80	43.	15.25	0.69	1.352E-02	968.97	17.460	1.012E+01	AC228
996.33	6.	83.50	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
1001.00	6.	100.56	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1048.07	18.	30.43	1.85	1.271E-02	1048.07	80.000	9.833E-01	Cs136
1120.00	10.	130.12	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	3.	390.73	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.481E-01	Sc46
					1121.30	34.900	4.244E-01	Ta182
1121.01	13.	85.61	1.90	1.205E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.747E+00	Ta182
1173.24	16.	42.45	1.94	1.163E-02	1173.24	99.900	7.428E-01	CO60
1220.97	3.	327.45	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.28	17.	52.47	1.98	1.114E-02	1238.28	66.070	PBC<MDA	Co56
1313.00	7.	87.39	2.03	1.063E-02	1313.00	21.000	PBC<MDA	TL210
1332.50	13.	27.74	2.05	1.050E-02	1332.50	99.980	6.879E-01	CO60
1384.30	1.	427.57	2.08	1.018E-02	1384.30	24.290	PBC<MDA	AG110M
1460.94	228.	6.83	1.61	9.749E-03	1460.83	10.670	1.217E+02	K40
1596.21	4.	160.58	2.22	9.069E-03	1596.21	95.400	PBC<MDA	La140
1690.98	6.	41.89	2.27	8.649E-03	1690.98	47.790	PBC<MDA	SB124
1764.98	28.	21.48	2.31	8.350E-03	1764.49	15.400	1.190E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
300.17	75.17	110.	81.	1.771E+03	21.34	1.025	- sD
307.93	77.11	105.	140.	2.992E+03	13.37	1.027	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	163.	-9.	-0.005	160.68	0.998s
TH-227	200.20	50.14	152.	16.	0.009	109.27	1.001s
AM-241	237.77	59.54	299.	-5.	-0.003	491.12	1.010s
TH-234	252.77	63.29	270.	-22.	-0.012	106.99	1.014s
Sn-126	256.74	64.28	266.	21.	0.012	112.73	1.015
BA-133	323.56	80.99	574.	-24.	-0.014	140.85	1.031s
Np-237	345.55	86.49	626.	0.	0.000	1000.00	1.036A
EU-155	345.76	86.54	762.	-22.	-0.012	179.43	1.036s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	349.87	87.57	646.	45.	0.025	34.02	1.037D
Cd-109	351.75	88.04	668.	0.	0.000	167.95	1.038A
TH-234	369.94	92.59	466.	-20.	-0.011	153.07	1.042s
AC-228	371.95	93.09	77.	63.	0.035	31.40	2.429s
Gd-153	389.58	97.50	491.	-21.	-0.012	149.27	1.047s
Np-239	397.58	99.50	470.	-21.	-0.012	145.81	1.049s
Gd-153	412.37	103.20	448.	-20.	-0.011	148.71	1.052s
Np-239	424.09	106.13	418.	20.	0.011	143.26	1.055s
EU-152	486.65	121.78	165.	-6.	-0.004	289.86	1.070s
CO-57	487.80	122.06	172.	0.	0.000	1000.00	1.070s
EU-154	491.95	123.10	123.	19.	0.011	85.86	1.071s
PA-234	524.72	131.29	462.	-22.	-0.012	142.74	1.079
HF-181	531.64	133.02	484.	-22.	-0.012	145.74	1.081
HF-181	544.74	136.30	506.	0.	0.000	1000.00	1.084s
CO-57	545.43	136.47	506.	0.	0.000	1000.00	1.084s
Tc-99m	561.57	140.51	506.	0.	0.000	1000.00	1.088s
CE-141	581.29	145.44	117.	-8.	-0.005	245.63	1.092s
Ba-140	650.15	162.66	156.	18.	0.010	102.58	1.108s
U-235	653.03	163.38	120.	13.	0.007	124.69	1.109s
CE-139	662.92	165.85	137.	16.	0.009	105.68	1.111s
Cf-251	705.90	176.60	103.	-20.	-0.011	98.99	1.122s
U-235	742.37	185.72	103.	21.	0.012	93.82	1.130
TH-229	773.52	193.51	68.	16.	0.009	102.10	1.137s
U-235	820.80	205.33	80.	-2.	-0.001	781.58	1.148s
TH-229	842.87	210.85	80.	15.	0.008	119.57	1.153s
Cf-251	907.45	227.00	88.	-7.	-0.004	265.09	1.168
PB-212	953.97	238.63	46.	132.	0.073	11.38	1.179D
PB-214	967.43	242.00	44.	57.	0.032	20.95	1.182D
EU-152	978.21	244.69	368.	-19.	-0.010	145.64	1.185s
TH-227	1024.40	256.24	52.	13.	0.007	112.09	1.195
Cd-113m	1054.23	263.70	93.	-3.	-0.002	413.52	1.202s
BI-210M	1062.75	265.83	75.	15.	0.008	85.06	1.204s
TL-208	1108.55	277.28	141.	-22.	-0.012	69.52	1.215
Hg-203	1116.22	279.20	109.	14.	0.008	109.72	1.216s
I-131	1136.61	284.30	48.	12.	0.007	117.99	1.221
PB-214	1179.77	295.09	42.	91.	0.050	14.65	1.231D
TL-210	1183.41	296.00	361.	15.	0.008	183.13	1.231s
PB-212	1199.52	300.03	368.	15.	0.008	184.34	1.235
PA-231	1199.68	300.07	383.	9.	0.005	320.16	1.235
PA-233	1200.12	300.18	392.	0.	0.000	1000.00	1.235
PA-231	1210.00	302.65	392.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	392.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	392.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	392.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	392.	0.	0.000	1000.00	1.243s
Ir-192	1265.35	316.49	108.	14.	0.008	105.41	1.250s
CR-51	1279.73	320.08	86.	-13.	-0.007	105.28	1.253s
La-140	1314.43	328.76	197.	5.	0.003	430.10	1.261s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1333.15	333.44	202.	0.	0.000	1000.00	1.265s
AC-228	1352.80	338.35	24.	58.	0.032	24.38	1.677s
Cs-136	1361.66	340.57	202.	0.	0.000	1000.00	1.272s
EU-152	1376.53	344.29	178.	12.	0.006	166.92	1.275s
HF-181	1382.70	345.83	214.	-11.	-0.006	182.09	1.276s
PB-214	1407.23	351.96	19.	173.	0.096	8.86	0.929s
BA-133	1423.37	356.00	217.	6.	0.003	349.60	1.285s
I-131	1457.31	364.48	48.	-4.	-0.002	356.47	1.293s
BA-133	1534.73	383.84	128.	-16.	-0.009	100.44	1.310s
Cf-249	1551.17	387.95	116.	-14.	-0.008	115.63	1.314s
SN-113	1566.12	391.69	155.	-11.	-0.006	147.00	1.317s
SB-125	1710.86	427.88	44.	-11.	-0.006	140.75	1.349s
AG-108M	1735.10	433.94	35.	4.	0.002	305.62	1.354s
pm-146	1814.87	453.88	22.	6.	0.003	165.87	1.372s
SB-125	1852.82	463.37	56.	11.	0.006	104.20	1.380s
Ir-192	1871.59	468.06	56.	7.	0.004	155.84	1.384s
HF-181	1927.34	482.00	66.	-8.	-0.004	153.78	1.396
La-140	1947.43	487.02	61.	8.	0.004	148.53	1.400s
RU-103	1987.56	497.05	26.	-3.	-0.002	358.06	1.409s
RH-106	2046.81	511.86	14.	81.	0.045	16.41	2.672s
Nd-147	2123.35	531.00	30.	-3.	-0.002	341.69	1.438
Ba-140	2148.39	537.26	31.	-4.	-0.002	275.05	1.444s
CS-134	2252.30	563.24	20.	19.	0.011	53.58	1.466s
CS-134	2276.64	569.32	37.	-14.	-0.008	65.82	1.471s
PA-234	2277.24	569.47	52.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	48.	6.	0.004	156.01	1.471s
TL-208	2331.45	583.02	32.	26.	0.015	48.22	1.482s
SB-125	2401.36	600.50	225.	9.	0.005	245.46	1.497s
SB-124	2410.29	602.73	216.	8.	0.004	267.21	1.499s
CS-134	2418.21	604.71	223.	9.	0.005	236.26	1.500s
BI-214	2436.46	609.27	20.	139.	0.077	10.30	1.422
AG-108M	2456.49	614.28	233.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	233.	0.	0.000	1000.00	1.512s
RH-106	2487.04	621.92	236.	-3.	-0.002	517.42	1.515s
I-131	2547.28	636.97	14.	9.	0.005	93.33	1.527s
AG-110M	2630.43	657.76	29.	-3.	-0.002	247.65	1.544s
CS-137	2646.03	661.66	47.	-6.	-0.003	171.57	1.548s
PM-144	2785.58	696.54	88.	-17.	-0.010	80.36	1.576s
NB-94	2809.93	702.63	87.	11.	0.006	123.43	1.581s
SB-124	2890.57	722.79	31.	9.	0.005	97.45	1.598s
AG-108M	2891.17	722.94	40.	0.	0.000	1000.00	1.598s
EU-154	2892.85	723.36	40.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	61.	-17.	-0.009	70.70	1.599
BI-212	2908.11	727.17	38.	11.	0.006	83.84	1.601s
pm-146	2988.08	747.16	28.	-14.	-0.008	85.83	1.617s
ZR-95	3026.36	756.73	30.	-11.	-0.006	113.55	1.625s
AG-110M	3055.23	763.94	36.	-2.	-0.001	430.12	1.631s
NB-95	3062.61	765.79	53.	-13.	-0.007	85.76	1.632s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	3065.10	766.41	48.	13.	0.007	82.13	1.633s
EU-152	3115.14	778.92	20.	-5.	-0.003	201.66	1.643s
BI-212	3141.15	785.42	42.	3.	0.001	350.45	1.648s
CS-134	3182.95	795.87	27.	6.	0.003	129.10	1.656s
TL-210	3197.88	799.60	33.	0.	0.000	1000.00	1.659s
CS-134	3207.29	801.95	42.	-9.	-0.005	107.15	1.661s
CO-58	3242.59	810.78	40.	8.	0.004	117.26	1.668s
La-140	3262.58	815.77	48.	0.	0.000	1000.00	1.672s
Cs-136	3273.50	818.50	28.	8.	0.005	97.36	1.674s
MN-54	3338.91	834.85	15.	2.	0.001	431.57	1.687s
Co-56	3386.61	846.77	30.	-5.	-0.003	173.71	1.696s
NB-94	3483.94	871.10	0.	21.	0.012	21.82	1.715s
EU-154	3492.47	873.23	40.	-10.	-0.006	106.59	1.717s
PA-234	3521.68	880.53	44.	0.	0.000	1000.00	1.722s
PA-234	3532.53	883.24	44.	0.	0.000	1000.00	1.724s
AG-110M	3538.30	884.68	54.	-11.	-0.006	97.89	1.725s
Sc-46	3556.69	889.28	65.	0.	0.000	1000.00	1.729s
y-88	3591.74	898.04	31.	-2.	-0.001	554.50	1.736s
AC-228	3645.68	911.52	0.	37.	0.021	16.44	2.662s
AG-110M	3749.60	937.49	25.	-6.	-0.003	187.70	1.766s
PA-234	3783.72	946.02	41.	-18.	-0.010	63.87	1.772s
EU-152	3856.11	964.11	66.	-2.	-0.001	773.16	1.786s
AC-228	3874.86	968.80	0.	43.	0.024	15.25	0.687s
EU-154	3985.03	996.33	11.	6.	0.003	83.50	1.810s
PA-234M	4003.71	1001.00	17.	6.	0.004	100.56	1.814s
EU-154	4018.82	1004.77	57.	-13.	-0.007	88.79	1.816s
Cs-136	4192.07	1048.07	6.	18.	0.010	30.43	1.848s
RH-106	4201.23	1050.36	25.	-1.	-0.001	831.38	1.850s
Ga-68	4309.44	1077.40	16.	-2.	-0.001	460.07	1.870s
FE-59	4396.88	1099.25	16.	0.	0.000	1000.00	1.886s
EU-152	4448.20	1112.07	88.	-15.	-0.008	93.93	1.895s
ZN-65	4462.09	1115.55	74.	-15.	-0.008	86.29	1.897
BI-214	4481.06	1120.29	87.	10.	0.006	130.12	1.901
Sc-46	4482.12	1120.55	77.	3.	0.002	390.73	1.901
Ta-182	4485.12	1121.30	57.	13.	0.007	85.61	1.901s
CO-60	4692.96	1173.24	5.	16.	0.009	42.45	1.938s
Ta-182	4756.25	1189.05	45.	-19.	-0.011	85.44	1.949s
Ta-182	4885.75	1221.41	17.	3.	0.002	327.45	1.972s
Co-56	4953.27	1238.28	12.	17.	0.010	52.47	1.984s
NA-22	5098.35	1274.53	34.	-17.	-0.010	53.91	2.008s
EU-154	5098.40	1274.54	51.	-2.	-0.001	540.51	2.008s
FE-59	5166.65	1291.60	34.	-17.	-0.009	52.70	2.020s
TL-210	5252.32	1313.00	6.	7.	0.004	87.39	2.034s
CO-60	5330.37	1332.50	0.	13.	0.007	27.74	2.047s
AG-110M	5537.69	1384.30	6.	1.	0.001	427.57	2.082s
EU-152	5632.56	1408.00	11.	-2.	-0.001	344.64	2.097s
K-40	5844.46	1460.94	7.	228.	0.127	6.83	1.606s
La-140	6385.95	1596.21	6.	4.	0.002	160.58	2.215s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6765.35	1690.98	0.	6.	0.003	41.89	2.272s
BI-214	7059.65	1764.49	3.	28.	0.015	21.48	2.314s
Co-56	7087.11	1771.35	31.	0.	0.000	1000.00	2.318s
y-88	7346.20	1836.06	13.	-7.	-0.004	138.11	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	7.6489E-02					5.31E+01	
			477.60	7.649E-02	&(	9.862E+00	3.67E+03 1.05E+01	G
NA-22	C	-8.7404E-01					9.50E+02	
			1274.53	-8.740E-01	?(	1.526E+00	5.39E+01 9.99E+01	G
K-40	N	1.2171E+02					4.66E+11	
			1460.83	1.217E+02	(P	8.087E+00	6.83E+00 1.07E+01	G
Sc-46	F	7.4029E-02					8.38E+01	
			889.28	0.000E+00	&(	1.553E+00	1.00E+03 1.00E+02	G
			1120.55	1.481E-01	?(	2.012E+00	3.91E+02 1.00E+02	G
CR-51	F	-2.3615E+00					2.77E+01	
			320.08	-2.361E+00	&(	8.396E+00	1.05E+02 9.94E+00	G
MN-54	C	7.3256E-02					3.12E+02	
			834.85	7.326E-02	?(	7.603E-01	4.32E+02 1.00E+02	G
Co-56	C	3.9521E-01					7.73E+01	
			846.77	-1.978E-01	?(P	1.051E+00	1.74E+02 9.99E+01	G
			1238.28	1.292E+00	?(P	1.417E+00	5.25E+01 6.61E+01	G
			1037.84	-2.032E-01	% P	6.670E+00	1.72E+03 1.41E+01	G
			1771.35	0.000E+00	-	1.236E+01	1.00E+03 1.55E+01	A
CO-58	C	2.8802E-01					7.09E+01	
			810.78	2.880E-01	&(	1.159E+00	1.17E+02 9.95E+01	G
CO-60	F	7.1533E-01					1.93E+03	
			1332.50	6.879E-01	?(	3.900E-01	2.77E+01 1.00E+02	G
			1173.24	7.428E-01	?(P	6.508E-01	4.24E+01 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-1.3387E+00					2.44E+02	
			1115.55	-1.339E+00	?(	3.875E+00	8.63E+01	5.06E+01 G
NB-94	I	5.8035E-01					7.41E+06	
			702.63	3.608E-01	?(	1.512E+00	1.23E+02	9.79E+01 G
			871.10	7.955E-01	?(	2.792E-01	2.18E+01	9.99E+01 G
ZR-95	I	-6.8617E-01					6.40E+01	
			756.73	-6.862E-01	?(	1.761E+00	1.14E+02	5.45E+01 G
			724.20	-1.241E+00	+	2.914E+00	7.07E+01	4.42E+01 G
NB-95	I	-4.3513E-01					6.40E+01	
			765.79	-4.351E-01	?(	1.255E+00	8.58E+01	9.98E+01 G
RU-103	I	-8.5073E-02					3.93E+01	
			497.05	-8.507E-02	?(P	7.251E-01	3.58E+02	9.09E+01 G
			610.30	3.039E-01	%	3.707E+01	3.57E+03	5.75E+00 GA
RH-106	I	-8.3130E-01					3.74E+02	
			621.92	-8.313E-01	?(P	2.192E+01	5.17E+02	9.93E+00 G
			1050.36	-3.870E+00	+ P	7.348E+01	8.31E+02	1.56E+00 G
			511.86	1.028E+01	?	2.557E+00	1.64E+01	2.00E+01 GA
AG-108M	C	9.9569E-02					1.53E+05	
			433.94	9.957E-02	?(P	7.539E-01	3.06E+02	9.05E+01 G
			722.94	0.000E+00	-	1.163E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	-	2.387E+00	1.00E+03	8.98E+01 G
AG-110M	F	-5.8835E-01					2.50E+02	
			884.68	-5.884E-01	?(	1.950E+00	9.79E+01	7.27E+01 G
			657.76	-1.023E-01	+	9.002E-01	2.48E+02	9.46E+01 G
			937.49	-6.994E-01	+	3.032E+00	1.88E+02	3.44E+01 G
			1384.30	2.995E-01	+	3.100E+00	4.28E+02	2.43E+01 G
			763.94	-3.072E-01	+	4.710E+00	4.30E+02	2.23E+01 G
SN-113	F	-3.4457E-01					1.15E+02	
			391.69	-3.446E-01	(P	1.984E+00	1.47E+02	6.40E+01 G
SB-124	F	5.6669E-01					6.02E+01	
			602.73	2.285E-01	?(P	2.072E+00	2.67E+02	9.83E+01 G
			1690.98	7.952E-01	?(P	9.906E-01	4.19E+01	4.78E+01 G
			722.79	2.630E+00	?(	8.739E+00	9.75E+01	1.08E+01 G
SB-125	I	4.4033E-01					1.01E+03	
			427.88	-8.318E-01	?(P	2.534E+00	1.41E+02	2.96E+01 G
			600.50	1.396E+00	?(P	1.161E+01	2.45E+02	1.79E+01 G
			635.89	-8.782E-02	%	6.644E+00	2.06E+03	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	2.406E+00	?(P	8.501E+00	1.04E+02	1.05E+01 G
I-131	I	4.0782E-01					8.02E+00	
			364.48	-1.052E-01	?(P	8.553E-01	3.56E+02	8.17E+01 G
			284.30	3.241E+00	&(P	9.563E+00	1.18E+02	6.14E+00 G
			636.97	3.827E+00	?(	8.469E+00	9.33E+01	7.17E+00 G
Gd-153	F	-7.4979E-01					2.42E+02	
			97.50	-7.498E-01	?(	3.744E+00	1.49E+02	3.00E+01 G
			103.20	-9.786E-01	+	4.872E+00	1.49E+02	2.18E+01 G
Ga-68	C	-3.1627E+00					4.71E-02	
			1077.40	-3.163E+00	&(	3.376E+01	4.60E+02	3.30E+00 G
BA-133	F	1.8933E-01					3.85E+03	
			356.00	1.893E-01	?(	2.252E+00	3.50E+02	6.20E+01 G
			302.85	0.000E+00	-	9.067E+00	1.00E+03	1.83E+01 G
			383.84	-3.793E+00	+	1.279E+01	1.00E+02	8.94E+00 GA
			80.99	-8.208E-01	+	3.861E+00	1.41E+02	3.41E+01 GA
CS-134	I	5.1882E-01					7.54E+02	
			604.71	2.657E-01	?(	2.127E+00	2.36E+02	9.76E+01 G
			795.87	2.477E-01	?(	1.111E+00	1.29E+02	8.55E+01 G
			569.32	-2.558E+00	+	5.565E+00	6.58E+01	1.54E+01 G
			801.95	-3.678E+00	&	1.345E+01	1.07E+02	8.69E+00 G
			563.24	6.256E+00	?(P	7.649E+00	5.36E+01	8.35E+00 G
CS-137	I	-2.1014E-01					1.10E+04	
			661.66	-2.101E-01	?(	1.251E+00	1.72E+02	8.52E+01 G
CE-139	F	2.3656E-01					1.38E+02	
			165.85	2.366E-01	?(P	8.399E-01	1.06E+02	7.99E+01 G
Ba-140	I	3.3519E-01					1.28E+01	
			537.26	-4.402E-01	?(P	3.094E+00	2.75E+02	2.44E+01 G
			162.66	3.376E+00	&(P	1.161E+01	1.03E+02	6.22E+00 G
			304.85	0.000E+00	-	3.892E+01	1.00E+03	4.29E+00 G
La-140	I	3.1799E-01					1.28E+01	
			1596.21	2.503E-01	?(P	9.133E-01	1.61E+02	9.54E+01 G
			487.02	4.126E-01	?(	2.104E+00	1.49E+02	4.55E+01 G
			328.76	4.241E-01	?(P	6.220E+00	4.30E+02	2.03E+01 G
			815.77	0.000E+00	-	5.408E+00	1.00E+03	2.33E+01 G
CE-141	I	-1.9166E-01					3.25E+01	
			145.44	-1.917E-01	?(	1.223E+00	2.46E+02	4.82E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-144	I	-8.5249E-02					2.85E+02	
			133.54	-8.525E-02	%(	1.037E+01	3.60E+03	1.11E+01 G
PM-144	C	-5.5860E-01					3.63E+02	
			696.54	-5.586E-01	?(	1.499E+00	8.04E+01	9.90E+01 G
			618.06	0.000E+00	+	2.174E+00	1.00E+03	9.91E+01 G
EU-152	F	8.3004E-01					4.94E+03	
			344.29	8.300E-01	?(	4.689E+00	1.67E+02	2.65E+01 G
			1112.07	-4.946E+00	+	1.562E+01	9.39E+01	1.36E+01 G
			121.78	-2.321E-01	&	2.295E+00	2.90E+02	2.86E+01 G
			778.92	-1.342E+00	+	6.320E+00	2.02E+02	1.29E+01 G
			964.11	-4.204E-01	+	1.141E+01	7.73E+02	1.46E+01 G
			244.69	-3.768E+00	&	1.840E+01	1.46E+02	7.58E+00 G
			1408.00	-6.144E-01	+	4.845E+00	3.45E+02	2.10E+01 GA
EU-154	I	-3.2340E+00					3.14E+03	
			873.23	-3.234E+00	?(P	9.958E+00	1.07E+02	1.23E+01 G
			123.10	4.882E-01	+	1.401E+00	8.59E+01	4.08E+01 G
			1274.54	-2.738E-01	+	5.226E+00	5.41E+02	3.52E+01 G
			723.36	0.000E+00	+	5.225E+00	1.00E+03	2.02E+01 G
			1004.77	-2.966E+00	+	8.867E+00	8.88E+01	1.80E+01 G
			996.33	2.494E+00	+	7.104E+00	8.35E+01	1.06E+01 G
EU-155	I	-2.1575E-02					1.81E+03	
			105.31	-2.158E-02	&(P	5.100E+00	6.99E+03	2.12E+01 G
			86.54	-7.914E-01	&	4.744E+00	1.79E+02	3.07E+01 G
HF-181	F	-2.3144E-01					4.24E+01	
			482.00	-2.314E-01	?(	1.222E+00	1.54E+02	8.05E+01 G
			133.02	-5.328E-01	&	2.598E+00	1.46E+02	4.33E+01 G
			345.83	-1.464E+00	+	9.014E+00	1.82E+02	1.51E+01 G
			136.30	0.000E+00	+	1.982E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.7469E+00					1.14E+02	
			1121.30	1.747E+00	?(	5.025E+00	8.56E+01	3.49E+01 G
			1221.41	5.482E-01	-	4.006E+00	3.27E+02	2.70E+01 G
			1189.05	-5.717E+00	&	1.016E+01	8.54E+01	1.62E+01 G
Hg-203	F	2.8140E-01					4.66E+01	
			279.20	2.814E-01	&(	1.041E+00	1.10E+02	8.15E+01 G
TL-208	N	8.6863E-01					6.98E+02	
			583.02	8.686E-01	?(P	9.573E-01	4.82E+01	8.45E+01 G
			277.28	-5.668E+00	- P	1.516E+01	6.95E+01	6.31E+00 G
			860.56	3.162E-01	% P	7.983E+00	1.06E+03	1.24E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

pm-146   C  -1.3630E+00                                     2.02E+03
                         747.16-1.363E+00 ?(  2.708E+00 8.58E+01 3.40E+01 G
                         735.72-4.235E-02 % P 3.425E+00 3.22E+03 2.25E+01 G
                         453.88 2.128E-01 + P 8.804E-01 1.66E+02 6.50E+01 G

y-88     F  -8.3972E-02                                     1.07E+02
                         898.04-8.397E-02 ?(P 1.185E+00 5.55E+02 9.37E+01 G
                        1836.06-4.621E-01 +   1.337E+00 1.38E+02 9.92E+01 G

Cd-113m     -8.8456E+02                                     5.33E+03
                         263.70-8.846E+02 ?(  1.267E+04 4.14E+02 6.00E-03   K

Cf-251   T  -1.4129E+00                                     3.28E+05
                         176.60-1.413E+00 ?(  3.587E+00 9.90E+01 1.70E+01 G
                         227.00-1.600E+00 &   1.061E+01 2.65E+02 6.30E+00 GA

Cf-249   T  -4.2790E-01                                     1.28E+05
                         387.95-4.279E-01 ?(  1.670E+00 1.16E+02 6.60E+01 G
                         333.44 0.000E+00 +   8.314E+00 1.00E+03 1.55E+01 G

Sn-126       2.9983E+00                                     3.65E+07
                          87.57 1.325E+00 }   3.562E+00 3.40E+01 3.75E+01 GA
                          64.28 2.998E+00  (  1.131E+01 1.13E+02 9.70E+00 G
                          86.94 0.000E+00 }   1.545E+01 1.61E+03 9.04E+00 GA

PB-210   N  -4.5640E+00                                     8.14E+03
                          46.54-4.564E+00 ?(P 3.156E+01 1.61E+02 4.25E+00 G

PB-212   N   4.5344E+00                                     6.98E+02
                         238.63 4.534E+00  (P 1.181E+00 1.14E+01 4.33E+01 G
                         300.03 7.885E+00 +   4.885E+01 1.84E+02 3.28E+00 GA

PB-214   N   8.6590E+00                                     5.84E+05
                         351.93 8.950E+00  (P 1.182E+00 8.86E+00 3.76E+01 G
                         295.09 8.091E+00  (P 2.936E+00 1.46E+01 1.93E+01 G
                         242.00 1.161E+01 +   6.771E+00 2.09E+01 7.43E+00 GA

BI-207   C   1.8263E-01                                     1.18E+04
                         569.70 1.826E-01 ?(  9.848E-01 1.56E+02 9.77E+01 G
                        1063.66-5.711E-02 & P 1.597E+00 1.20E+03 7.45E+01 G

BI-212   N   4.8608E+00                                     6.98E+02
                         727.17 4.861E+00 ?(  1.373E+01 8.38E+01 7.55E+00 G
                         785.42 7.281E+00 ?   9.018E+01 3.50E+02 1.28E+00 GA
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N	9.2855E-01					2.57E+11	
			143.79	-2.547E-02	%(P	1.082E+01	1.21E+04	1.10E+01 G
			205.33	-5.869E-01	+ P	1.195E+01	7.82E+02	5.01E+00 G
			163.38	2.987E+00	?(P	1.259E+01	1.25E+02	5.08E+00 G
			185.72	4.856E-01		1.167E+00	9.38E+01	5.40E+01 GA
BI-214	N	8.7252E+00					5.84E+05	
			609.31	8.725E+00	(P	1.464E+00	1.03E+01	4.61E+01 G
			1120.29	3.190E+00	- P	1.408E+01	1.30E+02	1.51E+01 G
			1764.49	1.190E+01	+ P	4.910E+00	2.15E+01	1.54E+01 G
BI-210M	T	4.8315E-01					1.10E+09	
			265.83	4.832E-01	?(	1.377E+00	8.51E+01	5.00E+01 G
			304.90	0.000E+00	-	5.963E+00	1.00E+03	2.80E+01 G
AC-228	N	4.9982E+00					2.10E+03	
			911.07	4.998E+00	(	9.956E-01	1.64E+01	2.90E+01 G
			968.97	1.012E+01	+	1.735E+00	1.52E+01	1.75E+01 G
			338.32	9.099E+00	+	4.031E+00	2.44E+01	1.20E+01 G
			93.35	1.224E+01	+	8.407E+00	3.14E+01	5.56E+00 XA
TH-227	N	3.4497E+00					7.95E+03	
			50.14	3.931E+00	&(P	1.443E+01	1.09E+02	8.00E+00 G
			256.24	2.900E+00	&(	8.101E+00	1.12E+02	7.00E+00 G
TH-229	N	5.6416E+00					2.68E+06	
			193.51	4.801E+00	&(	1.212E+01	1.02E+02	4.40E+00 G
			210.85	6.879E+00	?(	2.036E+01	1.20E+02	2.99E+00 G
TH-234	N	-8.2428E+00					1.63E+12	
			63.29	-8.243E+00	(	2.949E+01	1.07E+02	3.81E+00 G
			92.59	-3.891E+00	+	1.994E+01	1.53E+02	5.58E+00 G
PA-231	N	2.8321E+00					1.20E+07	
			302.65	0.000E+00	&(	5.768E+01	1.00E+03	2.88E+00 G
			300.07	6.148E+00	?(	6.641E+01	3.20E+02	2.46E+00 G
PA-233	C	-1.5726E-02					7.82E+08	
			312.01	-1.573E-02	&(P	4.714E+00	4.21E+03	3.60E+01 G
			300.18	0.000E+00	+	2.664E+01	1.00E+03	6.20E+00 G
PA-234	N	-1.2746E+00					1.63E+12	
			131.29	-1.275E+00	&(	6.087E+00	1.43E+02	1.80E+01 G
			946.02	-5.344E+00	+ P	9.771E+00	6.39E+01	1.34E+01 G
			569.47	0.000E+00	+	1.212E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	+	1.339E+01	1.00E+03	9.60E+00 G
			880.53	0.000E+00	&	2.138E+01	1.00E+03	6.00E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	6.2009E+01					1.63E+12	
			1001.00	3.177E+01	?(	1.103E+02	1.01E+02	8.37E-01 G
			766.41	1.481E+02	?(	4.083E+02	8.21E+01	2.94E-01 G
AM-241	T	-2.1149E-01					1.58E+05	
			59.54	-2.115E-01	&(	3.523E+00	4.91E+02	3.59E+01 G
Ir-192	F	3.0730E-01					7.40E+01	
			316.49	2.987E-01	&(	1.061E+00	1.05E+02	8.70E+01 G
			468.06	3.218E-01	?(	1.728E+00	1.56E+02	5.18E+01 G
			308.44	0.000E+00	-	5.301E+00	1.00E+03	3.18E+01 G
Cs-136	F	6.0198E-01					1.30E+01	
			818.50	2.969E-01	?(	9.872E-01	9.74E+01	1.00E+02 G
			1048.07	9.833E-01	?(	7.716E-01	3.04E+01	8.00E+01 G
			340.57	0.000E+00	-	2.790E+00	1.00E+03	4.69E+01 G
Np-239	T	9.3879E-01					2.36E+00	
			103.70	-1.664E-07	%	4.513E+00	8.01E+08	2.40E+01 X
			106.13	9.388E-01	?(	4.503E+00	1.43E+02	2.27E+01 G
			99.50	-1.495E+00	+	7.294E+00	1.46E+02	1.50E+01 X
Nd-147		-6.6867E-01					1.11E+01	
			531.00	-6.687E-01	?(	5.692E+00	3.42E+02	1.30E+01 G
			91.10	-1.461E-07	%	4.585E+00	9.31E+08	2.83E+01 G
TL-210	N	1.4353E-01					5.84E+05	
			799.60	0.000E+00	?(	1.055E+00	1.00E+03	9.90E+01 G
			296.00	3.233E-01	?(	1.990E+00	1.83E+02	7.90E+01 G
			1313.00	1.762E+00	&	3.436E+00	8.74E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	163.	-9.	-0.005	160.68	-4.564E+00	P
AM-241	59.54	299.	-5.	-0.003	491.12	-2.115E-01	
TH-234	63.29	270.	-22.	-0.012	106.99	-8.243E+00	
BA-133	80.99	574.	-24.	-0.014	140.85	-8.208E-01	
EU-155	86.54	762.	-22.	-0.012	179.43	-7.914E-01	
TH-234	92.59	466.	-20.	-0.011	153.07	-3.891E+00	
Gd-153	97.50	491.	-21.	-0.012	149.27	-7.498E-01	
Np-239	99.50	470.	-21.	-0.012	145.81	-1.495E+00	
Gd-153	103.20	448.	-20.	-0.011	148.71	-9.786E-01	
Np-239	106.13	418.	20.	0.011	143.26	9.388E-01	
EU-152	121.78	165.	-6.	-0.004	289.86	-2.321E-01	
EU-154	123.10	123.	19.	0.011	85.86	4.882E-01	
PA-234	131.29	462.	-22.	-0.012	142.74	-1.275E+00	
HF-181	133.02	484.	-22.	-0.012	145.74	-5.328E-01	
CE-141	145.44	117.	-8.	-0.005	245.63	-1.917E-01	
Ba-140	162.66	156.	18.	0.010	102.58	3.376E+00	P
U-235	163.38	120.	13.	0.007	124.69	2.987E+00	P
CE-139	165.85	137.	16.	0.009	105.68	2.366E-01	P
Cf-251	176.60	103.	-20.	-0.011	98.99	-1.413E+00	
U-235	185.72	103.	21.	0.012	93.82	4.856E-01	
TH-229	193.51	68.	16.	0.009	102.10	4.801E+00	
U-235	205.33	80.	-2.	-0.001	781.58	-5.869E-01	P
TH-229	210.85	80.	15.	0.008	119.57	6.879E+00	
Cf-251	227.00	88.	-7.	-0.004	265.09	-1.600E+00	
EU-152	244.69	368.	-19.	-0.010	145.64	-3.768E+00	
Cd-113m	263.70	93.	-3.	-0.002	413.52	-8.846E+02	
BI-210M	265.83	75.	15.	0.008	85.06	4.832E-01	
Hg-203	279.20	109.	14.	0.008	109.72	2.814E-01	
I-131	284.30	48.	12.	0.007	117.99	3.241E+00	P
TL-210	296.00	361.	15.	0.008	183.13	3.233E-01	
PA-231	300.07	383.	9.	0.005	320.16	6.148E+00	
Ir-192	316.49	108.	14.	0.008	105.41	2.987E-01	
CR-51	320.08	86.	-13.	-0.007	105.28	-2.361E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	328.76	197.	5.	0.003	430.10	4.241E-01	P
EU-152	344.29	178.	12.	0.006	166.92	8.300E-01	
HF-181	345.83	214.	-11.	-0.006	182.09	-1.464E+00	
BA-133	356.00	217.	6.	0.003	349.60	1.893E-01	
I-131	364.48	48.	-4.	-0.002	356.47	-1.052E-01	P
BA-133	383.84	128.	-16.	-0.009	100.44	-3.793E+00	
Cf-249	387.95	116.	-14.	-0.008	115.63	-4.279E-01	
SN-113	391.69	155.	-11.	-0.006	147.00	-3.446E-01	P
SB-125	427.88	44.	-11.	-0.006	140.75	-8.318E-01	P
AG-108M	433.94	35.	4.	0.002	305.62	9.957E-02	P
pm-146	453.88	22.	6.	0.003	165.87	2.128E-01	P
SB-125	463.37	56.	11.	0.006	104.20	2.406E+00	P
Ir-192	468.06	56.	7.	0.004	155.84	3.218E-01	
HF-181	482.00	66.	-8.	-0.004	153.78	-2.314E-01	
La-140	487.02	61.	8.	0.004	148.53	4.126E-01	
RU-103	497.05	26.	-3.	-0.002	358.06	-8.507E-02	P
RH-106	511.86	14.	81.	0.045	16.41	1.028E+01	
Nd-147	531.00	30.	-3.	-0.002	341.69	-6.687E-01	
Ba-140	537.26	31.	-4.	-0.002	275.05	-4.402E-01	P
CS-134	563.24	20.	19.	0.011	53.58	6.256E+00	P
CS-134	569.32	37.	-14.	-0.008	65.82	-2.558E+00	
BI-207	569.70	48.	6.	0.004	156.01	1.826E-01	
SB-125	600.50	225.	9.	0.005	245.46	1.396E+00	P
SB-124	602.73	216.	8.	0.004	267.21	2.285E-01	P
CS-134	604.71	223.	9.	0.005	236.26	2.657E-01	
RH-106	621.92	236.	-3.	-0.002	517.42	-8.313E-01	P
I-131	636.97	14.	9.	0.005	93.33	3.827E+00	
AG-110M	657.76	29.	-3.	-0.002	247.65	-1.023E-01	
CS-137	661.66	47.	-6.	-0.003	171.57	-2.101E-01	
PM-144	696.54	88.	-17.	-0.010	80.36	-5.586E-01	
NB-94	702.63	87.	11.	0.006	123.43	3.608E-01	
SB-124	722.79	31.	9.	0.005	97.45	2.630E+00	
ZR-95	724.20	61.	-17.	-0.009	70.70	-1.241E+00	
BI-212	727.17	38.	11.	0.006	83.84	4.861E+00	
pm-146	747.16	28.	-14.	-0.008	85.83	-1.363E+00	
ZR-95	756.73	30.	-11.	-0.006	113.55	-6.862E-01	
AG-110M	763.94	36.	-2.	-0.001	430.12	-3.072E-01	
NB-95	765.79	53.	-13.	-0.007	85.76	-4.351E-01	
PA-234M	766.41	48.	13.	0.007	82.13	1.481E+02	
EU-152	778.92	20.	-5.	-0.003	201.66	-1.342E+00	
BI-212	785.42	42.	3.	0.001	350.45	7.281E+00	
CS-134	795.87	27.	6.	0.003	129.10	2.477E-01	
CS-134	801.95	42.	-9.	-0.005	107.15	-3.678E+00	
CO-58	810.78	40.	8.	0.004	117.26	2.880E-01	
Cs-136	818.50	28.	8.	0.005	97.36	2.969E-01	
MN-54	834.85	15.	2.	0.001	431.57	7.326E-02	
Co-56	846.77	30.	-5.	-0.003	173.71	-1.978E-01	P
NB-94	871.10	0.	21.	0.012	21.82	7.955E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	873.23	40.	-10.	-0.006	106.59	-3.234E+00	P
AG-110M	884.68	54.	-11.	-0.006	97.89	-5.884E-01	
y-88	898.04	31.	-2.	-0.001	554.50	-8.397E-02	P
AG-110M	937.49	25.	-6.	-0.003	187.70	-6.994E-01	
PA-234	946.02	41.	-18.	-0.010	63.87	-5.344E+00	P
EU-152	964.11	66.	-2.	-0.001	773.16	-4.204E-01	
EU-154	996.33	11.	6.	0.003	83.50	2.494E+00	
PA-234M	1001.00	17.	6.	0.004	100.56	3.177E+01	
EU-154	1004.77	57.	-13.	-0.007	88.79	-2.966E+00	
Cs-136	1048.07	6.	18.	0.010	30.43	9.833E-01	
RH-106	1050.36	25.	-1.	-0.001	831.38	-3.870E+00	P
Ga-68	1077.40	16.	-2.	-0.001	460.07	-3.163E+00	
EU-152	1112.07	88.	-15.	-0.008	93.93	-4.946E+00	
ZN-65	1115.55	74.	-15.	-0.008	86.29	-1.339E+00	
Sc-46	1120.55	77.	3.	0.002	390.73	1.481E-01	
Co-56	1238.28	12.	17.	0.010	52.47	1.292E+00	P
NA-22	1274.53	34.	-17.	-0.010	53.91	-8.740E-01	
EU-154	1274.54	51.	-2.	-0.001	540.51	-2.738E-01	
FE-59	1291.60	34.	-17.	-0.009	52.70	-2.040E+00	P
TL-210	1313.00	6.	7.	0.004	87.39	1.762E+00	
AG-110M	1384.30	6.	1.	0.001	427.57	2.995E-01	
EU-152	1408.00	11.	-2.	-0.001	344.64	-6.144E-01	
La-140	1596.21	6.	4.	0.002	160.58	2.503E-01	P
SB-124	1690.98	0.	6.	0.003	41.89	7.952E-01	P
y-88	1836.06	13.	-7.	-0.004	138.11	-4.621E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	7.6488E-02	7.6489E-02	3.670E+03%	9.86E+00
NA-22	#A	-8.7404E-01	-8.7404E-01	5.391E+01%	1.53E+00
K-40		1.2171E+02	1.2171E+02	6.833E+00%	8.09E+00
Sc-46	#A	7.4029E-02	7.4029E-02	3.907E+02%	1.55E+00
CR-51	#A	-2.3615E+00	-2.3615E+00	1.053E+02%	8.40E+00
MN-54	#A	7.3256E-02	7.3256E-02	4.316E+02%	7.60E-01
FE-59	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.71E+00
Co-56	#A	3.9521E-01	3.9521E-01	5.247E+01%	1.05E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.80E-01
CO-58	#A	2.8802E-01	2.8802E-01	1.173E+02%	1.16E+00
CO-60	#	7.1533E-01	7.1533E-01	2.535E+01%	3.90E-01
ZN-65	#A	-1.3387E+00	-1.3387E+00	8.629E+01%	3.88E+00
NB-94	#A	5.8035E-01	5.8035E-01	2.182E+01%	1.51E+00
ZR-95	#A	-6.8616E-01	-6.8617E-01	1.135E+02%	1.76E+00
NB-95	#A	-4.3513E-01	-4.3513E-01	8.576E+01%	1.25E+00

RU-103 #A	-8.5072E-02	-8.5073E-02	3.581E+02%	7.25E-01
RH-106 #A	-8.3130E-01	-8.3130E-01	5.174E+02%	2.19E+01
AG-108M#A	9.9569E-02	9.9569E-02	3.056E+02%	7.54E-01
AG-110M#A	-5.8835E-01	-5.8835E-01	9.789E+01%	1.95E+00
SN-113 #A	-3.4457E-01	-3.4457E-01	1.470E+02%	1.98E+00
SB-124 #A	5.6669E-01	5.6669E-01	4.189E+01%	2.07E+00
SB-125 #A	4.4033E-01	4.4033E-01	1.005E+02%	2.53E+00
I-131 #A	4.0781E-01	4.0782E-01	9.333E+01%	8.55E-01
Gd-153 #A	-7.4979E-01	-7.4979E-01	1.493E+02%	3.74E+00
Ga-68 #A	-3.1439E+00	-3.1627E+00	4.601E+02%	3.38E+01
Tc-99m #A	0.0000E+00	0.0000E+00	1.000E+03%	1.35E+00
BA-133 #A	1.8933E-01	1.8933E-01	3.496E+02%	2.25E+00
CS-134 #A	5.1882E-01	5.1882E-01	5.358E+01%	2.13E+00
CS-137 #A	-2.1014E-01	-2.1014E-01	1.716E+02%	1.25E+00
CE-139 #A	2.3656E-01	2.3656E-01	1.057E+02%	8.40E-01
Ba-140 #A	3.3518E-01	3.3519E-01	1.026E+02%	3.09E+00
La-140 #A	3.1798E-01	3.1799E-01	1.485E+02%	9.13E-01
CE-141 #A	-1.9166E-01	-1.9166E-01	2.456E+02%	1.22E+00
CE-144 #A	-8.5249E-02	-8.5249E-02	3.601E+03%	1.04E+01
PM-144 #A	-5.5860E-01	-5.5860E-01	8.036E+01%	1.50E+00
EU-152 #A	8.3004E-01	8.3004E-01	1.669E+02%	4.69E+00
EU-154 #A	-3.2340E+00	-3.2340E+00	1.066E+02%	9.96E+00
EU-155 #A	-2.1575E-02	-2.1575E-02	6.985E+03%	5.10E+00
HF-181 #A	-2.3144E-01	-2.3144E-01	1.538E+02%	1.22E+00
Ta-182 #A	1.7469E+00	1.7469E+00	8.561E+01%	5.02E+00
Hg-203 #A	2.8140E-01	2.8140E-01	1.097E+02%	1.04E+00
TL-208 #A	8.6863E-01	8.6863E-01	4.822E+01%	9.57E-01
pm-146 #A	-1.3630E+00	-1.3630E+00	8.583E+01%	2.71E+00
y-88 #A	-8.3972E-02	-8.3972E-02	5.545E+02%	1.19E+00
Cd-113m#A	-8.8456E+02	-8.8456E+02	4.135E+02%	1.27E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.57E+01
Cf-251 #A	-1.4129E+00	-1.4129E+00	9.899E+01%	3.59E+00
Cf-249 #A	-4.2790E-01	-4.2790E-01	1.156E+02%	1.67E+00
Sn-126 A	2.9983E+00	2.9983E+00	1.127E+02%	1.13E+01
PB-210 #A	-4.5640E+00	-4.5640E+00	1.607E+02%	3.16E+01
PB-212 #	4.5344E+00	4.5344E+00	1.138E+01%	1.18E+00
PB-214	8.6590E+00	8.6590E+00	8.559E+00%	1.18E+00
BI-207 #A	1.8263E-01	1.8263E-01	1.560E+02%	9.85E-01
BI-212 #A	4.8608E+00	4.8608E+00	8.384E+01%	1.37E+01
U-235 #A	9.2855E-01	9.2855E-01	1.247E+02%	1.08E+01
BI-214	8.7252E+00	8.7252E+00	1.030E+01%	1.46E+00
BI-210M#A	4.8315E-01	4.8315E-01	8.506E+01%	1.38E+00
AC-228	4.9982E+00	4.9982E+00	1.644E+01%	9.96E-01
TH-227 #A	3.4497E+00	3.4497E+00	7.827E+01%	1.44E+01
TH-229 #A	5.6416E+00	5.6416E+00	7.862E+01%	1.21E+01
TH-234 #A	-8.2428E+00	-8.2428E+00	1.070E+02%	2.95E+01
PA-231 #A	2.8321E+00	2.8321E+00	3.202E+02%	5.77E+01
PA-233 #A	-1.5726E-02	-1.5726E-02	4.210E+03%	4.71E+00
PA-234 #A	-1.2746E+00	-1.2746E+00	1.427E+02%	6.09E+00

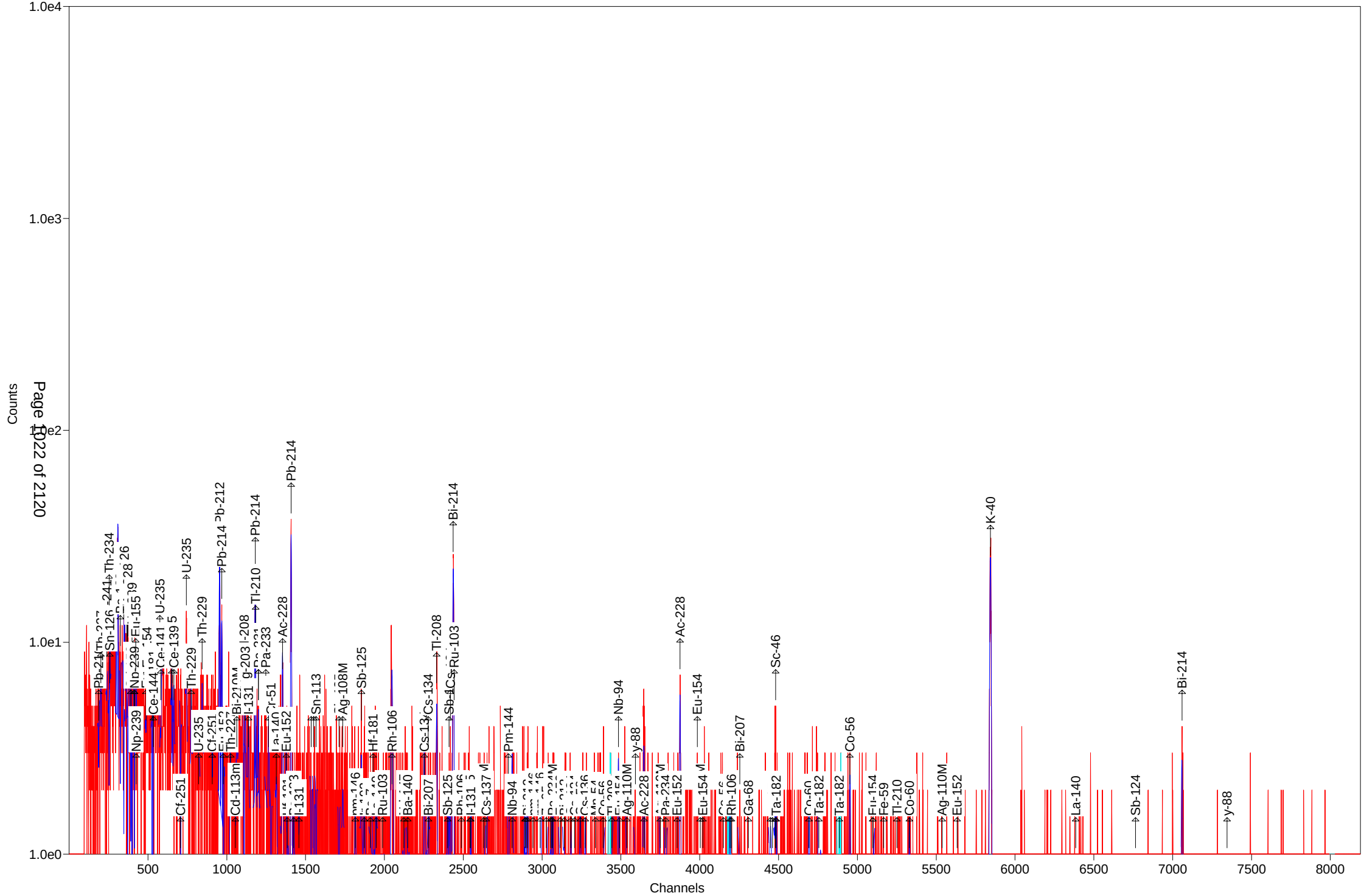
PA-234M#A	6.2009E+01	6.2009E+01	6.492E+01%	1.10E+02
AM-241 #A	-2.1149E-01	-2.1149E-01	4.911E+02%	3.52E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.01E+01
Ir-192 #A	3.0730E-01	3.0730E-01	9.407E+01%	1.06E+00
Cs-136 #A	6.0197E-01	6.0198E-01	3.043E+01%	9.87E-01
Np-239 #A	9.3868E-01	9.3879E-01	1.433E+02%	4.50E+00
Nd-147 #A	-6.6865E-01	-6.6867E-01	3.417E+02%	5.69E+00
TL-210 #A	1.4353E-01	1.4353E-01	1.831E+02%	1.06E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.3 keV) 1.495E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.4949631E+02 Bq/Sample

379951_Gamma_160-29881-A-1-D DU. 9_Gamma_20183564.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20182797

Sample Description: 379951_Gamma_160-29881-A-4-C
Detector: Detector #15
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-4-C

Decay to Time: 8/23/2018 06:27 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:28:00 Real Time: 1819 sec
Analysis Time: 8/23/2018 06:58 Dead Time: 1.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.558E+01	101.0	2.585E+01	2.588E+01	8.554E+01
NA-22	-3.521E+00	63.6	2.240E+00	2.247E+00	7.389E+00
K-40	1.341E+02	22.1	2.961E+01	3.039E+01	6.009E+01
Sc-46	-4.144E+00	83.0	3.440E+00	3.446E+00	1.138E+01
CR-51	-2.482E+01	140.0	3.475E+01	3.478E+01	1.663E+02
MN-54	-4.021E+00	83.1	3.342E+00	3.349E+00	7.423E+00
FE-59	-7.439E+00	85.4	6.355E+00	6.366E+00	1.323E+01
Co-56	3.023E+00	91.8	2.775E+00	2.780E+00	6.186E+00
CO-57	1.927E+00	101.7	1.960E+00	1.963E+00	6.477E+00
CO-58	-3.337E+00	43.4	1.450E+00	1.460E+00	1.284E+01
CO-60	8.984E-01	301.2	2.706E+00	2.706E+00	5.763E+00
ZN-65	5.296E+00	261.5	1.385E+01	1.385E+01	4.595E+01
NB-94	1.077E+01	24.6	2.647E+00	2.705E+00	5.719E+00
ZR-95	-4.427E+00	439.2	1.944E+01	1.944E+01	1.108E+01
NB-95	-4.011E-01	970.3	3.892E+00	3.892E+00	1.296E+01
RU-103	4.347E+00	54.2	2.358E+00	2.369E+00	5.409E+00
RH-106	4.924E+01	104.3	5.136E+01	5.142E+01	2.992E+02
AG-108M	-5.656E-02	11952.8	6.761E+00	6.761E+00	6.248E+00
AG-110M	0.000E+00	1.#INF	2.323E+00	2.323E+00	1.410E+01
SN-113	-4.382E+00	104.0	4.558E+00	4.564E+00	1.508E+01
SB-124	4.003E+00	97.5	3.902E+00	3.908E+00	2.960E+01
SB-125	8.594E+00	89.2	7.664E+00	7.677E+00	2.009E+01
I-131	2.554E+00	102.1	2.606E+00	2.610E+00	6.651E+00
Gd-153	-7.481E+00	243.2	1.819E+01	1.820E+01	6.005E+01
Ga-68	-4.541E+01	186.6	8.474E+01	8.477E+01	2.839E+02
Tc-99m	1.331E-07	2563008013.5	3.411E+00	3.411E+00	1.129E+01
BA-133	-4.148E+00	259.1	1.075E+01	1.075E+01	3.551E+01
CS-134	3.813E+00	216.5	8.256E+00	8.259E+00	2.986E+01
CS-137	-3.183E+00	348.8	1.110E+01	1.110E+01	1.140E+01
CE-139	0.000E+00	1.#INF	1.398E+00	1.398E+00	8.487E+00
Ba-140	5.872E+00	163.1	9.580E+00	9.585E+00	2.221E+01
La-140	-2.564E+00	33.3	8.535E-01	8.642E-01	8.949E+00
CE-141	-4.443E+00	76.9	3.418E+00	3.426E+00	1.280E+01

CE-144	-1.810E+01	144.6	2.618E+01	2.619E+01	8.646E+01
PM-144	-7.416E-01	1345.0	9.974E+00	9.974E+00	5.594E+00
EU-152	6.473E+00	90.1	5.829E+00	5.839E+00	4.611E+01
EU-154	-3.064E+01	66.1	2.026E+01	2.032E+01	6.687E+01
EU-155	1.039E+01	240.4	2.497E+01	2.498E+01	8.243E+01
HF-181	-2.274E-01	79.7	1.811E-01	1.815E-01	9.841E+00
Ta-182	7.207E+00	186.1	1.341E+01	1.342E+01	6.640E+01
Hg-203	2.887E+00	136.7	3.945E+00	3.949E+00	1.304E+01
TL-208	-3.840E+00	77.1	2.959E+00	2.966E+00	7.494E+00
pm-146	5.274E+00	44.3	2.334E+00	2.350E+00	1.728E+01
y-88	2.991E+00	77.7	2.323E+00	2.328E+00	7.671E+00
Cd-113m	-3.021E+03	1821.0	5.501E+04	5.501E+04	1.823E+05
Cd-109	0.000E+00	1.#INF	1.519E+02	1.519E+02	5.013E+02
Cf-251	-1.332E+01	97.2	1.295E+01	1.300E+01	3.239E+01
Cf-249	0.000E+00	1.#INF	3.384E+00	3.384E+00	1.343E+01
Sn-126	2.826E+01	114.5	3.235E+01	3.239E+01	1.069E+02
PB-210	1.076E+03	4.9	5.256E+01	8.217E+01	1.507E+02
PB-212	5.073E+00	161.5	8.191E+00	8.198E+00	2.707E+01
PB-214	1.750E+03	0.6	1.087E+01	9.159E+01	1.548E+01
BI-207	5.779E-01	230.5	1.332E+00	1.332E+00	6.484E+00
BI-212	-2.370E+01	572.1	1.356E+02	1.356E+02	1.152E+02
U-235	6.427E+01	27.9	1.794E+01	1.824E+01	3.789E+01
BI-214	1.611E+03	0.8	1.304E+01	8.474E+01	1.211E+01
BI-210M	4.504E+00	137.9	6.213E+00	6.219E+00	2.054E+01
AC-228	1.044E+01	110.8	1.156E+01	1.157E+01	2.488E+01
TH-227	-4.964E+00	83.7	4.155E+00	4.164E+00	1.766E+02
TH-229	-1.570E+01	284.9	4.474E+01	4.476E+01	1.483E+02
TH-234	5.122E+02	9.5	4.883E+01	5.569E+01	1.534E+02
PA-231	-8.653E+01	231.4	2.002E+02	2.003E+02	6.615E+02
PA-233	9.321E+02	1.5	1.398E+01	5.221E+01	3.739E+01
PA-234	-5.609E-01	112.3	6.299E-01	6.305E-01	5.479E+01
PA-234M	4.541E+02	83.0	3.769E+02	3.776E+02	1.248E+03
AM-241	8.799E+00	102.5	9.022E+00	9.033E+00	2.979E+01
Np-237	0.000E+00	1.#INF	4.483E+01	4.483E+01	1.479E+02
Ir-192	0.000E+00	1.#INF	1.023E+00	1.023E+00	2.245E+01
Cs-136	-3.835E-02	11100.7	4.258E+00	4.258E+00	1.418E+01
Np-239	-9.917E+00	239.4	2.374E+01	2.375E+01	7.837E+01
Nd-147	-2.207E+01	90.2	1.990E+01	1.994E+01	4.587E+01
TL-210	-1.956E+00	189.6	3.708E+00	3.710E+00	1.232E+01
Total	6.727E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-4-C

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182797.An1

Acquisition information
Start time: 8/23/2018 6:28:00 AM
Live time: 1800
Real time: 1819
Dead time: 1.05 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:27:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-08-11_1245.PBC 8/11/2018 12:45:21 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 50 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1430

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
44.06	158.	36.75	0.94	1.788E-02				
46.60	1610.	4.89	0.95	1.960E-02	46.54	4.250	1.076E+03	PB210
53.29	793.	13.36	0.95	2.386E-02				
59.59	156.	102.53	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.42	914.	12.88	1.16	2.930E-02	63.29	3.810	4.557E+02	TH234
					64.28	9.700	1.762E+02	Sn126
74.91	6206.	2.16	0.97	3.384E-02				
77.22	11344.	1.31	0.97	3.455E-02				
79.39	1201.	8.62	0.98	3.516E-02				
81.16	844.	11.94	0.98	3.562E-02	80.99	34.060	PBC<MDA	BA133
83.91	1524.	6.63	0.98	3.626E-02				
87.30	3631.	2.96	0.98	3.693E-02	86.49	13.100	4.187E+02	Np237
					86.54	30.700	1.786E+02	EU155
					86.94	9.040	6.054E+02	Sn126
					87.57	37.500	1.455E+02	Sn126
					88.04	3.790	1.436E+03	Cd109
89.94	1494.	6.28	0.99	3.738E-02				
92.65	1549.	5.88	0.99	3.776E-02	92.59	5.584	4.083E+02	TH234
					93.35	5.561	4.089E+02	AC228
94.89	376.	21.52	0.99	3.803E-02				
105.31	154.	240.40	1.00	3.876E-02	105.31	21.200	PBC<MDA	EU155
121.78	128.	90.06	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					122.06	85.600	2.157E+00	CO57
122.06	114.	101.71	1.02	3.846E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.927E+00	CO57
143.91	384.	27.92	1.80	3.639E-02	143.79	10.960	5.354E+01	U235
154.31	314.	30.24	1.04	3.499E-02				
163.53	268.	39.73	1.95	3.367E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	8.696E+01	U235
186.20	4793.	3.12	1.20	3.117E-02	185.72	54.000	1.579E+02	U235
195.98	261.	33.72	1.72	3.002E-02				
205.69	169.	68.56	2.40	2.900E-02	205.33	5.010	PBC<MDA	U235
226.06	110.	93.38	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
236.04	332.	19.24	1.24	2.613E-02				
238.78	102.	161.46	1.12	2.592E-02	238.63	43.300	PBC<MDA	PB212
242.13	6334.	1.91	1.13	2.564E-02	242.00	7.430	1.847E+03	PB214
256.24	101.	89.94	1.14	2.456E-02	256.24	7.000	PBC<MDA	TH227
258.90	364.	24.34	1.22	2.437E-02				
265.83	97.	137.95	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
269.47	416.	14.27	1.15	2.364E-02				
271.54	311.	19.83	1.15	2.350E-02				
274.62	226.	25.96	1.15	2.330E-02				
279.25	97.	136.68	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
284.30	92.	102.06	1.16	2.269E-02	284.30	6.140	PBC<MDA	I131
295.31	13387.	0.96	1.17	2.204E-02	295.09	19.300	1.748E+03	PB214
					296.00	79.000	4.280E+02	TL210
299.79	132.	38.65	1.17	2.178E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.371E+02	PA231
					300.18	6.200	5.443E+01	PA233
312.01	12755.	1.50	1.18	2.112E-02	312.01	36.000	9.321E+02	PA233
345.83	91.	134.57	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.94	22791.	0.79	1.25	1.923E-02	351.93	37.600	1.751E+03	PB214
383.84	41.	209.40	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
388.11	302.	24.35	2.78	1.780E-02	387.95	66.000	1.426E+01	Cf249
453.88	157.	44.26	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	69.	89.18	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
497.05	104.	54.25	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	362.	25.81	2.60	1.426E-02	511.86	20.000	7.052E+01	RH106
537.14	35.	163.14	1.37	1.371E-02	537.26	24.390	PBC<MDA	Ba140
563.24	11.	472.21	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
600.50	60.	327.49	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
602.93	60.	326.54	1.43	1.247E-02	602.73	98.260	PBC<MDA	SB124
604.90	61.	326.09	1.43	1.244E-02	604.71	97.620	PBC<MDA	CS134
609.47	16831.	0.86	1.47	1.236E-02	609.31	46.090	1.641E+03	BI214
					610.30	5.750	1.317E+04	RU103
621.92	58.	336.71	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
636.97	20.	194.04	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
665.70	612.	9.13	1.39	1.149E-02				
702.63	208.	24.58	1.50	1.098E-02	702.63	97.900	1.077E+01	NB94
768.56	1664.	4.30	1.47	1.018E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.42	221.	22.46	1.57	9.998E-03	785.42	1.280	9.601E+02	BI212
791.75	66.	36.16	0.70	9.930E-03				
801.85	21.	304.43	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
806.64	453.	12.07	1.20	9.775E-03				
846.77	51.	91.82	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
860.56	12.	421.11	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
883.24	30.	168.11	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234
898.04	44.	121.79	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
911.07	48.	110.77	1.66	8.811E-03	911.07	29.000	PBC<MDA	AC228
934.31	819.	5.16	1.49	8.623E-03				
959.24	28.	58.47	0.73	8.431E-03				
964.11	9.	514.60	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
1001.02	56.	83.00	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	8.	596.97	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1050.36	42.	104.31	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	18.	230.46	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1083.00	44.	37.49	0.34	7.589E-03				
1112.07	39.	236.68	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1115.93	36.	261.53	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1120.59	3667.	2.12	1.74	7.366E-03	1120.29	15.100	1.831E+03	BI214
					1120.55	99.987	2.766E+02	Sc46
					1121.30	34.900	7.929E+02	Ta182
1155.60	398.	9.34	1.80	7.171E-03				
1221.41	9.	485.74	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.56	1301.	3.79	1.61	6.747E-03	1238.28	66.070	1.622E+02	Co56
1332.50	10.	301.21	1.94	6.325E-03	1332.50	99.980	PBC<MDA	CO60
1378.00	1007.	4.86	2.11	6.139E-03				
1408.25	519.	8.92	1.53	6.022E-03	1408.00	21.005	2.281E+02	EU152
1460.70	150.	22.08	1.92	5.828E-03	1460.83	10.670	1.341E+02	K40
1661.60	257.	11.23	1.63	5.191E-03				
1689.72	29.	97.47	2.14	5.109E-03	1690.98	47.790	PBC<MDA	SB124
1764.88	2732.	2.09	2.25	4.915E-03	1764.49	15.400	2.005E+03	BI214
1836.06	26.	96.40	2.22	4.741E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
176.12	44.05	1608.	160.	8.939E+03	36.35	0.944	-	sD
212.82	53.29	3134.	793.	3.325E+04	13.36	0.947	-	
299.21	74.91	5984.	6078.	1.796E+05	2.21	0.973	-	D
308.46	77.23	5731.	10904.	3.156E+05	1.37	0.975	-	D
317.11	79.39	5342.	613.	1.743E+04	17.34	0.977	-	sD
324.21	81.17	4713.	299.	8.383E+03	33.02	0.978	-	sD
335.19	83.92	4420.	1042.	2.874E+04	9.54	0.981	-	D
359.29	89.94	3784.	1162.	3.109E+04	8.04	0.986	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
379.07	94.89	3426.	256.	6.741E+03	32.88	0.991	- sD
616.63	154.31	2900.	314.	8.975E+03	30.24	1.041	- M
783.64	195.98	2274.	182.	6.047E+03	37.89	1.083	- sD
943.93	236.04	1623.	420.	1.608E+04	14.40	1.118	- sD
1034.77	258.90	1949.	364.	1.492E+04	24.34	1.221	- s
1077.03	269.42	1526.	440.	1.863E+04	13.42	1.147	- sD
1085.29	271.49	1705.	358.	1.524E+04	17.13	1.149	- sD
1097.60	274.57	1530.	309.	1.326E+04	18.78	1.152	- sD
1199.00	299.77	1239.	135.	6.201E+03	37.84	1.174	- sD
1551.35	388.29	1222.	302.	1.695E+04	24.35	2.784	- sM
2661.47	665.70	430.	612.	5.326E+04	9.13	1.388	- s
3072.87	768.56	534.	1664.	1.635E+05	4.30	1.474	- sM
3165.28	791.75	243.	44.	4.465E+03	51.96	1.571	- sD
3224.84	806.64	328.	388.	3.971E+04	8.32	1.582	- sD
3735.96	934.31	231.	819.	9.496E+04	5.16	1.487	- M
3835.68	959.08	96.	28.	3.321E+03	58.47	0.732	- s
4330.88	1083.00	82.	44.	5.864E+03	37.49	0.344	- s
4621.40	1155.60	203.	398.	5.548E+04	9.34	1.795	-
4953.38	1238.56	193.	1302.	1.929E+05	3.79	1.613	-
5511.47	1378.00	198.	1007.	1.640E+05	4.86	2.107	- s
5632.57	1408.25	244.	519.	8.625E+04	8.92	1.534	- s
6646.80	1661.60	80.	257.	4.948E+04	11.23	1.633	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	2289.	1610.	0.895	4.89	0.946D
TH-227	200.23	50.14	14161.	-119.	-0.066	141.20	0.950s
AM-241	237.79	59.54	12653.	156.	0.086	102.53	0.958s
TH-234	252.78	63.29	4277.	1027.	0.571	9.53	0.962D
Sn-126	256.75	64.28	13999.	147.	0.081	114.47	0.963s
BA-133	323.54	80.99	75642.	-153.	-0.085	97.94	0.978
Np-237	345.53	86.49	75489.	0.	0.000	253.90	0.983A
EU-155	345.74	86.54	75336.	-153.	-0.085	253.64	0.983D
Sn-126	347.33	86.94	73831.	170.	0.094	71.46	0.984D
Sn-126	349.84	87.57	71244.	705.	0.392	16.90	0.984D
Cd-109	351.72	88.04	73678.	0.	0.000	250.48	0.985A
Nd-147	363.95	91.10	71091.	-154.	-0.085	245.36	0.987s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	369.91	92.59	3580.	1306.	0.726	7.04	0.989D
AC-228	372.95	93.35	70937.	-154.	-0.086	244.58	0.990
Gd-153	389.54	97.50	70693.	-155.	-0.086	243.20	0.993s
Np-239	397.53	99.50	70538.	-155.	-0.086	242.49	0.995s
Gd-153	412.32	103.20	70383.	-155.	-0.086	241.44	0.998
Np-239	414.32	103.70	70228.	-156.	-0.086	241.07	0.999s
EU-155	420.77	105.31	68126.	154.	0.085	240.40	1.001
Np-239	424.03	106.13	70662.	-157.	-0.087	239.42	1.001
EU-152	486.57	121.78	6560.	128.	0.071	90.06	1.016s
CO-57	487.72	122.06	6688.	114.	0.063	101.71	1.016s
EU-154	491.87	123.10	6294.	-128.	-0.071	88.45	1.017
PA-234	524.63	131.29	20517.	-136.	-0.076	148.92	1.024s
HF-181	531.54	133.02	19398.	-136.	-0.075	145.54	1.026s
CE-144	533.60	133.54	19167.	-136.	-0.075	144.60	1.026s
HF-181	544.63	136.30	19073.	-45.	-0.025	433.89	1.029
U-235	575.05	143.91	3339.	384.	0.213	27.92	1.802s
CE-141	581.17	145.44	7335.	-139.	-0.077	76.94	1.037s
Ba-140	650.01	162.66	7921.	-131.	-0.073	96.23	1.053
U-235	653.51	163.53	3155.	268.	0.149	39.73	1.950s
CE-139	662.77	165.85	7790.	0.	0.000	1000.00	1.055s
Cf-251	705.73	176.60	4671.	-132.	-0.073	97.19	1.065s
U-235	744.17	186.21	3892.	4759.	2.644	3.04	1.193
TH-229	773.33	193.51	5745.	-38.	-0.021	284.94	1.080
U-235	822.01	205.69	3196.	169.	0.094	68.56	2.401s
TH-229	842.65	210.85	3752.	-107.	-0.059	108.71	1.096
Cf-251	907.22	227.00	2963.	110.	0.061	93.38	1.110s
PB-212	953.72	238.63	13638.	102.	0.057	161.46	1.120
PB-214	967.17	242.00	1792.	6322.	3.512	1.57	1.123D
TH-227	1024.12	256.24	4070.	101.	0.056	89.94	1.136s
BI-210M	1062.46	265.83	8869.	97.	0.054	137.95	1.144s
TL-208	1108.25	277.28	8456.	-100.	-0.055	166.01	1.154
Hg-203	1115.91	279.20	8807.	97.	0.054	136.68	1.156
I-131	1136.30	284.30	2276.	92.	0.051	102.06	1.160s
PB-214	1179.44	295.09	1589.	13390.	7.439	0.96	1.170D
TL-210	1183.08	296.00	25520.	-97.	-0.054	234.32	1.170s
PB-212	1199.19	300.03	25425.	-98.	-0.054	131.70	1.174
PA-231	1199.35	300.07	25327.	-97.	-0.054	232.74	1.174s
PA-233	1199.79	300.18	25230.	-97.	-0.054	232.25	1.174s
PA-231	1209.66	302.65	25133.	-97.	-0.054	231.38	1.176
BA-133	1210.47	302.85	25036.	-97.	-0.054	230.93	1.176
Ba-140	1218.46	304.85	24867.	-97.	-0.054	229.81	1.178
BI-210M	1218.64	304.90	24769.	-97.	-0.054	229.32	1.178
PA-233	1247.09	312.01	11928.	12755.	7.086	1.50	1.184s
Ir-192	1265.00	316.49	24661.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	17318.	-92.	-0.051	140.04	1.191s
La-140	1314.06	328.76	8185.	-94.	-0.052	136.12	1.199s
Cf-249	1332.77	333.44	8201.	-95.	-0.053	135.79	1.203s
AC-228	1352.28	338.32	8296.	-95.	-0.053	136.11	1.207

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	1361.28	340.57	8390.	-27.	-0.015	481.77	1.209s
EU-152	1376.13	344.29	8417.	0.	0.000	1000.00	1.212s
HF-181	1382.30	345.83	7441.	91.	0.051	134.57	1.213s
PB-214	1406.72	351.94	1819.	22791.	12.661	0.79	1.253
BA-133	1422.97	356.00	26110.	-88.	-0.049	259.08	1.222s
I-131	1456.89	364.48	1496.	-25.	-0.014	716.52	1.229s
BA-133	1534.29	383.84	3605.	41.	0.023	209.40	1.246s
Cf-249	1550.72	387.95	3646.	0.	0.000	1000.00	1.249s
SN-113	1565.67	391.69	4262.	-89.	-0.050	104.04	1.253
pm-146	1814.35	453.88	1114.	157.	0.087	44.26	1.304s
SB-125	1852.29	463.37	1873.	69.	0.038	89.18	1.312s
Ir-192	1871.05	468.06	2042.	-74.	-0.041	86.92	1.316s
BE-7	1909.18	477.60	2688.	-73.	-0.041	101.04	1.324s
HF-181	1926.79	482.00	2046.	-76.	-0.042	85.29	1.328s
La-140	1946.87	487.02	2890.	-17.	-0.009	458.98	1.332
RU-103	1987.00	497.05	737.	104.	0.058	54.25	1.340s
RH-106	2046.22	511.86	1225.	362.	0.201	25.81	2.602
Nd-147	2122.75	531.00	979.	-71.	-0.040	90.16	1.368
Ba-140	2147.78	537.26	790.	35.	0.020	163.14	1.373s
CS-134	2251.67	563.24	685.	11.	0.006	472.21	1.394
PA-234	2276.59	569.47	930.	-10.	-0.005	454.37	1.399
BI-207	2277.52	569.70	986.	-7.	-0.004	635.51	1.399
TL-208	2330.79	583.02	947.	-75.	-0.042	77.07	1.410s
SB-125	2400.69	600.50	19462.	60.	0.033	327.49	1.424s
SB-124	2409.62	602.73	19470.	60.	0.034	326.54	1.425s
CS-134	2417.53	604.71	19460.	61.	0.034	326.09	1.427s
BI-214	2435.93	609.31	680.	16527.	9.182	0.81	1.431D
RU-103	2439.88	610.30	19521.	44.	0.025	445.41	1.431s
AG-108M	2455.81	614.28	19565.	0.	0.000	1000.00	1.435s
PM-144	2470.93	618.06	19565.	0.	0.000	1000.00	1.437
RH-106	2486.35	621.92	19294.	58.	0.032	336.71	1.440s
SB-125	2542.23	635.89	682.	-57.	-0.032	66.13	1.451s
I-131	2546.57	636.97	718.	20.	0.011	194.04	1.452s
AG-110M	2629.71	657.76	1888.	-55.	-0.031	112.56	1.469s
CS-137	2645.30	661.66	1825.	-56.	-0.031	348.81	1.472s
NB-94	2809.17	702.63	537.	208.	0.116	24.58	1.503
SB-124	2889.79	722.79	1128.	-63.	-0.035	76.81	1.519s
AG-108M	2890.40	722.94	1191.	-63.	-0.035	78.85	1.519s
EU-154	2892.07	723.36	1253.	-29.	-0.016	175.99	1.519s
ZR-95	2895.44	724.20	1282.	0.	0.000	1000.00	1.520s
BI-212	2907.33	727.17	1242.	-34.	-0.019	572.10	1.522s
ZR-95	3025.56	756.73	551.	-45.	-0.025	439.16	1.544s
AG-110M	3054.42	763.94	2601.	-55.	-0.031	130.70	1.550s
NB-95	3061.80	765.79	2545.	-7.	-0.004	970.28	1.551s
EU-152	3114.33	778.92	569.	-60.	-0.033	85.42	1.561
BI-212	3140.33	785.42	499.	221.	0.123	22.46	1.566s
CS-134	3182.12	795.87	2154.	-56.	-0.031	118.95	1.574
TL-210	3197.05	799.60	2098.	-34.	-0.019	189.61	1.577

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3206.46	801.95	2043.	21.	0.012	304.43	1.578s
CO-58	3241.75	810.78	2251.	-58.	-0.032	43.44	1.585s
La-140	3261.74	815.77	2770.	-52.	-0.029	144.79	1.589
MN-54	3338.05	834.85	709.	-69.	-0.038	83.12	1.603s
Co-56	3385.75	846.77	476.	51.	0.028	91.82	1.612s
TL-208	3440.93	860.56	551.	12.	0.007	421.11	1.622s
NB-94	3483.06	871.10	691.	-6.	-0.003	657.22	1.629
EU-154	3491.60	873.23	805.	-62.	-0.034	66.13	1.631s
PA-234	3520.80	880.53	1246.	-52.	-0.029	96.75	1.636s
PA-234	3531.64	883.24	1268.	30.	0.017	168.11	1.638s
AG-110M	3537.42	884.68	1238.	0.	0.000	1000.00	1.639s
Sc-46	3555.81	889.28	1517.	-67.	-0.037	83.01	1.642s
y-88	3590.85	898.04	585.	44.	0.024	121.79	1.649s
AC-228	3642.98	911.07	575.	48.	0.027	110.77	1.658s
AG-110M	3748.69	937.49	1519.	-58.	-0.032	95.42	1.677s
PA-234	3782.81	946.02	510.	-28.	-0.016	178.32	1.683
EU-152	3855.18	964.11	1068.	9.	0.005	514.60	1.696
AC-228	3874.63	968.97	1143.	-29.	-0.016	167.81	1.699
EU-154	3984.09	996.33	1108.	-58.	-0.032	82.73	1.718s
PA-234M	4002.77	1001.00	1036.	56.	0.031	83.00	1.722
EU-154	4017.88	1004.77	1013.	8.	0.004	596.97	1.724s
Co-56	4150.18	1037.84	495.	-61.	-0.034	76.04	1.747
RH-106	4200.27	1050.36	387.	42.	0.023	104.31	1.755s
BI-207	4253.49	1063.66	350.	18.	0.010	230.46	1.765s
Ga-68	4308.47	1077.40	524.	-18.	-0.010	186.61	1.774s
FE-59	4395.90	1099.25	443.	-57.	-0.031	85.42	1.789
EU-152	4447.22	1112.07	4331.	39.	0.022	236.68	1.797s
ZN-65	4461.11	1115.55	4334.	36.	0.020	261.53	1.800s
BI-214	4480.08	1120.29	321.	3464.	1.925	1.85	1.803D
Sc-46	4481.13	1120.55	4370.	0.	0.000	1000.00	1.803
Ta-182	4484.13	1121.30	4266.	50.	0.028	186.09	1.803
Ta-182	4884.75	1221.41	341.	9.	0.005	485.74	1.869
Co-56	4952.26	1238.28	1634.	-50.	-0.028	129.28	1.879
NA-22	5097.34	1274.53	331.	-42.	-0.023	63.63	1.902s
EU-154	5097.40	1274.54	372.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	267.	-14.	-0.008	272.94	1.913
TL-210	5251.31	1313.00	283.	-20.	-0.011	195.62	1.926s
CO-60	5329.36	1332.50	182.	10.	0.006	301.21	1.938s
AG-110M	5536.68	1384.30	1612.	-24.	-0.013	237.46	1.970s
EU-152	5631.56	1408.00	879.	-51.	-0.028	83.86	1.984s
K-40	5842.52	1460.70	192.	150.	0.083	22.08	1.917
La-140	6384.98	1596.21	295.	-24.	-0.013	33.29	2.092s
SB-124	6764.43	1690.98	132.	29.	0.016	97.47	2.142s
BI-214	7060.33	1764.88	64.	2732.	1.518	2.09	2.248
Co-56	7086.23	1771.35	2978.	-34.	-0.019	227.70	2.184s
y-88	7345.35	1836.06	102.	26.	0.014	96.40	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.5579E+01				5.31E+01	
			477.60	-2.558E+01	(	8.554E+01 1.01E+02 1.05E+01	G
NA-22	C	-3.5207E+00				9.50E+02	
			1274.53	-3.521E+00	?(	7.389E+00 6.36E+01 9.99E+01	G
K-40	N	1.3413E+02				4.66E+11	
			1460.83	1.341E+02	(P	6.009E+01 2.21E+01 1.07E+01	G
Sc-46	F	-4.1438E+00				8.38E+01	
			889.28	-4.144E+00	?(	1.138E+01 8.30E+01 1.00E+02	G
			1120.55	0.000E+00	+	2.344E+01 1.00E+03 1.00E+02	G
CR-51	F	-2.4816E+01				2.77E+01	
			320.08	-2.482E+01	&(P	1.663E+02 1.40E+02 9.94E+00	G
MN-54	C	-4.0210E+00				3.12E+02	
			834.85	-4.021E+00	?(	7.423E+00 8.31E+01 1.00E+02	G
FE-59	F	-7.4391E+00				4.45E+01	
			1099.25	-7.439E+00	&(	1.323E+01 8.54E+01 5.65E+01	G
			1291.60	-2.703E+00	+	1.559E+01 2.73E+02 4.32E+01	G
Co-56	C	3.0226E+00				7.73E+01	
			846.77	3.023E+00	&(	6.186E+00 9.18E+01 9.99E+01	G
			1238.28	-6.178E+00	+ P	2.381E+01 1.29E+02 6.61E+01	G
			1037.84	-3.029E+01	+ P	5.313E+01 7.60E+01 1.41E+01	G
			1771.35	-2.490E+01	+	1.883E+02 2.28E+02 1.55E+01	A
CO-57	C	1.9270E+00				2.72E+02	
			122.06	1.927E+00	*(	6.477E+00 1.02E+02 8.56E+01	G
			136.47	1.066E-06	&	9.040E+01 2.56E+09 1.07E+01	G
CO-58	C	-3.3368E+00				7.09E+01	
			810.78	-3.337E+00	?(P	1.284E+01 4.34E+01 9.95E+01	G
CO-60	F	8.9839E-01				1.93E+03	
			1332.50	8.984E-01	?(P	5.763E+00 3.01E+02 1.00E+02	G
			1173.24	-1.113E-01	& P	7.346E+00 4.53E+03 9.99E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F 5.2961E+00					2.44E+02	
		1115.55	5.296E+00	?(	4.595E+01	2.62E+02	5.06E+01 G
NB-94	I 1.0767E+01					7.41E+06	
		702.63	1.077E+01	(	5.719E+00	2.46E+01	9.79E+01 G
		871.10	-3.442E-01	-	7.604E+00	6.57E+02	9.99E+01 G
ZR-95	I -4.4265E+00					6.40E+01	
		756.73	-4.427E+00	?(P	1.108E+01	4.39E+02	5.45E+01 G
		724.20	0.000E+00	+	1.993E+01	1.00E+03	4.42E+01 G
NB-95	I -4.0109E-01					6.40E+01	
		765.79	-4.011E-01	?(	1.296E+01	9.70E+02	9.98E+01 G
RU-103	I 4.3467E+00					3.93E+01	
		497.05	4.347E+00	(P	5.409E+00	5.42E+01	9.09E+01 G
		610.30	3.474E+01	?	5.117E+02	4.45E+02	5.75E+00 GA
RH-106	I 4.9238E+01					3.74E+02	
		621.92	2.687E+01	(P	2.992E+02	3.37E+02	9.93E+00 G
		1050.36	1.916E+02	?(P	4.313E+02	1.04E+02	1.56E+00 G
		511.86	7.052E+01		3.230E+01	2.58E+01	2.00E+01 GA
AG-108M	C -5.6563E-02					1.53E+05	
		433.94	-5.656E-02	&(P	6.248E+00	1.20E+04	9.05E+01 G
		722.94	-3.576E+00	&	9.327E+00	7.89E+01	9.08E+01 G
		614.28	0.000E+00	&	3.296E+01	1.00E+03	8.98E+01 G
SN-113	F -4.3815E+00					1.15E+02	
		391.69	-4.382E+00	?(	1.508E+01	1.04E+02	6.40E+01 G
SB-124	F 4.0035E+00					6.02E+01	
		602.73	2.741E+00	&(	2.960E+01	3.27E+02	9.83E+01 G
		1690.98	6.599E+00	&(	1.280E+01	9.75E+01	4.78E+01 G
		722.79	-3.005E+01	&	7.631E+01	7.68E+01	1.08E+01 G
SB-125	I 8.5943E+00					1.01E+03	
		427.88	-6.351E-01	%(P	2.009E+01	3.22E+03	2.96E+01 G
		600.50	1.499E+01	&(P	1.623E+02	3.27E+02	1.79E+01 G
		635.89	-2.346E+01	+	5.121E+01	6.61E+01	1.13E+01 G
		463.37	2.378E+01	&(P	7.016E+01	8.92E+01	1.05E+01 G
I-131	I 2.5538E+00					8.02E+00	
		364.48	-9.100E-01	?(P	6.651E+00	7.17E+02	8.17E+01 G
		284.30	3.669E+01	&(	8.975E+01	1.02E+02	6.14E+00 G
		636.97	1.279E+01	?(	8.298E+01	1.94E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-7.4807E+00					2.42E+02	
			97.50	-7.481E+00	&(	6.005E+01	2.43E+02	3.00E+01 G
			103.20	-1.025E+01	+	8.164E+01	2.41E+02	2.18E+01 G
Ga-68	C	-4.5407E+01					4.71E-02	
			1077.40	-4.541E+01	*(	2.839E+02	1.87E+02	3.30E+00 G
Tc-99m	I	1.3309E-07					2.51E-01	
			140.51	1.331E-07	%(	1.129E+01	2.56E+09	8.93E+01 G
BA-133	F	-4.1476E+00					3.85E+03	
			356.00	-4.148E+00	(	3.551E+01	2.59E+02	6.20E+01 G
			302.85	-1.360E+01	+	1.038E+02	2.31E+02	1.83E+01 G
			383.84	1.407E+01		9.776E+01	2.09E+02	8.94E+00 GA
			80.99	-7.001E+00	+ P	5.889E+01	9.79E+01	3.41E+01 GA
CS-134	I	3.8129E+00					7.54E+02	
			604.71	2.770E+00	?(	2.986E+01	3.26E+02	9.76E+01 G
			795.87	-3.648E+00	&	1.439E+01	1.19E+02	8.55E+01 G
			569.32	0.000E+00	}	3.836E+01	3.20E+03	1.54E+01 G
			801.95	1.370E+01	?(	1.388E+02	3.04E+02	8.69E+00 G
			563.24	5.717E+00	(	6.288E+01	4.72E+02	8.35E+00 G
CS-137	I	-3.1827E+00					1.10E+04	
			661.66	-3.183E+00	?(P	1.140E+01	3.49E+02	8.52E+01 G
Ba-140	I	5.8722E+00					1.28E+01	
			537.26	5.872E+00	?(P	2.221E+01	1.63E+02	2.44E+01 G
			162.66	-3.473E+01	+	1.104E+02	9.62E+01	6.22E+00 G
			304.85	-5.851E+01	+	4.442E+02	2.30E+02	4.29E+00 G
La-140	I	-2.5638E+00					1.28E+01	
			1596.21	-2.564E+00	?(P	8.949E+00	3.33E+01	9.54E+01 G
			487.02	-1.364E+00	+	2.083E+01	4.59E+02	4.55E+01 G
			328.76	-1.272E+01	&	5.726E+01	1.36E+02	2.03E+01 G
			815.77	-1.273E+01	-	6.112E+01	1.45E+02	2.33E+01 G
CE-141	I	-4.4430E+00					3.25E+01	
			145.44	-4.443E+00	?(P	1.280E+01	7.69E+01	4.82E+01 G
CE-144	I	-1.8101E+01					2.85E+02	
			133.54	-1.810E+01	&(	8.646E+01	1.45E+02	1.11E+01 G
PM-144	C	-7.4158E-01					3.63E+02	
			696.54	-7.416E-01	&(P	5.594E+00	1.34E+03	9.90E+01 G
			618.06	0.000E+00	&	3.003E+01	1.00E+03	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	6.4727E+00					4.94E+03	
			344.29	0.000E+00	(	4.611E+01	1.00E+03	2.65E+01 G
			1112.07	2.164E+01	&(	1.699E+02	2.37E+02	1.36E+01 G
			121.78	6.457E+00	*(	1.920E+01	9.01E+01	2.86E+01 G
			778.92	-2.556E+01	+	4.857E+01	8.54E+01	1.29E+01 G
			964.11	4.079E+00	(	7.025E+01	5.15E+02	1.46E+01 G
			244.69	6.913E-01	%	1.594E+02	6.96E+03	7.58E+00 G
			1408.00	-2.228E+01	+	6.188E+01	8.39E+01	2.10E+01 GA
EU-154	I	-3.0641E+01					3.14E+03	
			873.23	-3.064E+01	?(	6.687E+01	6.61E+01	1.23E+01 G
			123.10	-4.523E+00	&	1.321E+01	8.84E+01	4.08E+01 G
			1274.54	0.000E+00	+	2.223E+01	1.00E+03	3.52E+01 G
			723.36	-7.335E+00	+	4.299E+01	1.76E+02	2.02E+01 G
			1004.77	2.878E+00	&	5.754E+01	5.97E+02	1.80E+01 G
			996.33	-3.702E+01	+	1.014E+02	8.27E+01	1.06E+01 G
EU-155	I	1.0388E+01					1.81E+03	
			105.31	1.039E+01	&(P	8.243E+01	2.40E+02	2.12E+01 G
			86.54	-7.532E+00	+	6.305E+01	2.54E+02	3.07E+01 G
HF-181	F	-2.2740E-01					4.24E+01	
			482.00	-3.489E+00	?(	9.841E+00	8.53E+01	8.05E+01 G
			133.02	-4.628E+00	&	2.225E+01	1.46E+02	4.33E+01 G
			345.83	1.720E+01	(	7.653E+01	1.35E+02	1.51E+01 G
			136.30	-1.148E+01	&	1.648E+02	4.34E+02	5.85E+00 G
Ta-182	F	7.2075E+00					1.14E+02	
			1121.30	1.076E+01	(	6.640E+01	1.86E+02	3.49E+01 G
			1221.41	2.611E+00	(	2.675E+01	4.86E+02	2.70E+01 G
			1189.05	1.634E-01	%	4.288E+01	1.24E+04	1.62E+01 G
Hg-203	F	2.8865E+00					4.66E+01	
			279.20	2.887E+00	&(P	1.304E+01	1.37E+02	8.15E+01 G
TL-208	N	-3.8395E+00					6.98E+02	
			583.02	-3.840E+00	?(P	7.494E+00	7.71E+01	8.45E+01 G
			277.28	-3.795E+01	& P	1.642E+02	1.66E+02	6.31E+00 G
			860.56	5.730E+00	+ P	5.420E+01	4.21E+02	1.24E+01 G
pm-146	C	5.2741E+00					2.02E+03	
			747.16	-9.188E-01	%(P	1.728E+01	3.35E+03	3.40E+01 G
			735.72	-2.121E+00	% P	2.608E+01	2.17E+03	2.25E+01 G
			453.88	8.513E+00	*(P	8.609E+00	4.43E+01	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	2.9911E+00					1.07E+02	
			898.04	2.924E+00	?(	7.671E+00	1.22E+02	9.37E+01 G
			1836.06	3.054E+00	?(P	5.884E+00	9.64E+01	9.92E+01 G
Cd-113m		-3.0208E+03					5.33E+03	
			263.70	-3.021E+03	&(	1.823E+05	1.82E+03	6.00E-03 K
Cf-251	T	-1.3322E+01					3.28E+05	
			176.60	-1.332E+01	?(	3.239E+01	9.72E+01	1.70E+01 G
			227.00	3.592E+01	&	8.400E+01	9.34E+01	6.30E+00 GA
Sn-126		2.8264E+01					3.65E+07	
			87.57	2.826E+01	}	4.994E+01	1.69E+01	3.75E+01 GA
			64.28	2.826E+01	?(	1.069E+02	1.14E+02	9.70E+00 G
			86.94	2.826E+01	}	2.115E+02	7.15E+01	9.04E+00 GA
PB-210	N	1.0756E+03					8.14E+03	
			46.54	1.076E+03	(P	1.507E+02	4.89E+00	4.25E+00 G
PB-212	N	5.0730E+00					6.98E+02	
			238.63	5.073E+00	?(P	2.707E+01	1.61E+02	4.33E+01 G
			300.03	-7.606E+01	+ P	5.803E+02	1.32E+02	3.28E+00 GA
PB-214	N	1.7502E+03					5.84E+05	
			351.93	1.751E+03	(P	1.548E+01	7.87E-01	3.76E+01 G
			295.09	1.748E+03	(P	2.461E+01	9.61E-01	1.93E+01 G
			242.00	1.843E+03	+	5.831E+01	1.57E+00	7.43E+00 GA
BI-207	C	5.7793E-01					1.18E+04	
			569.70	-3.045E-01	(	6.484E+00	6.36E+02	9.77E+01 G
			1063.66	1.736E+00	&(P	8.696E+00	2.30E+02	7.45E+01 G
BI-212	N	-2.3701E+01					6.98E+02	
			727.17	-2.370E+01	(P	1.152E+02	5.72E+02	7.55E+00 G
			785.42	9.601E+02	?	4.638E+02	2.25E+01	1.28E+00 GA
U-235	N	6.4272E+01					2.57E+11	
			143.79	5.354E+01	(P	3.789E+01	2.79E+01	1.10E+01 G
			205.33	6.476E+01	(P	1.018E+02	6.86E+01	5.01E+00 G
			163.38	8.696E+01	(P	8.590E+01	3.97E+01	5.08E+00 G
			185.72	1.568E+02	+	9.666E+00	3.04E+00	5.40E+01 GA
BI-214	N	1.6115E+03					5.84E+05	
			609.31	1.611E+03	(P	1.211E+01	8.09E-01	4.61E+01 G
			1120.29	1.730E+03	+ P	4.304E+01	1.85E+00	1.51E+01 G
			1764.49	2.005E+03	+ P	2.927E+01	2.09E+00	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	4.5038E+00					1.10E+09	
			265.83	4.504E+00	?(	2.054E+01	1.38E+02	5.00E+01 G
			304.90	-8.966E+00	+	6.793E+01	2.29E+02	2.80E+01 G
AC-228	N	1.0436E+01					2.10E+03	
			911.07	1.044E+01	*(	2.488E+01	1.11E+02	2.90E+01 G
			968.97	-1.092E+01	+	6.101E+01	1.68E+02	1.75E+01 G
			338.32	-2.214E+01	+	9.964E+01	1.36E+02	1.20E+01 G
			93.35	-4.067E+01	&	3.283E+02	2.45E+02	5.56E+00 XA
TH-227	N	-4.9639E+00					7.95E+03	
			50.14	-3.784E+01	(	1.766E+02	1.41E+02	8.00E+00 G
			256.24	3.261E+01	?(	9.694E+01	8.99E+01	7.00E+00 G
TH-229	N	-1.5701E+01					2.68E+06	
			193.51	-1.570E+01	?(	1.483E+02	2.85E+02	4.40E+00 G
			210.85	-6.980E+01	+ P	1.883E+02	1.09E+02	2.99E+00 G
TH-234	N	5.1218E+02					1.63E+12	
			63.29	5.122E+02	(P	1.534E+02	9.53E+00	3.81E+00 G
			92.59	3.442E+02	- P	7.419E+01	7.04E+00	5.58E+00 G
PA-231	N	-8.6531E+01					1.20E+07	
			302.65	-8.653E+01	?(	6.615E+02	2.31E+02	2.88E+00 G
			300.07	-1.004E+02	+	7.723E+02	2.33E+02	2.46E+00 G
PA-233	C	9.3206E+02					7.82E+08	
			312.01	9.321E+02	?(	3.739E+01	1.50E+00	3.60E+01 G
			300.18	-3.987E+01	-	3.059E+02	2.32E+02	6.20E+00 G
PA-234	N	-5.6091E-01					1.63E+12	
			131.29	-1.114E+01	&(	5.479E+01	1.49E+02	1.80E+01 G
			946.02	-1.361E+01	+	5.246E+01	1.78E+02	1.34E+01 G
			569.47	-4.934E+00	}	7.509E+01	4.54E+02	8.20E+00 G
			883.24	1.927E+01	&(	1.079E+02	1.68E+02	9.60E+00 G
			880.53	-5.321E+01	+	1.707E+02	9.68E+01	6.00E+00 GA
PA-234M	N	4.5406E+02					1.63E+12	
			1001.00	4.541E+02	?(P	1.248E+03	8.30E+01	8.37E-01 G
			766.41	-1.333E+01	% P	4.397E+03	2.73E+04	2.94E-01 G
AM-241	T	8.7992E+00					1.58E+05	
			59.54	8.799E+00	?(	2.979E+01	1.03E+02	3.59E+01 G
Cs-136	F	-3.8354E-02					1.30E+01	
			818.50	-3.835E-02	%(	1.418E+01	1.11E+04	1.00E+02 G
			1048.07	1.779E-01	%	9.801E+00	1.63E+03	8.00E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          340.57-1.616E+00 +   2.579E+01 4.82E+02 4.69E+01 G

Np-239   T  -9.9172E+00                                      2.36E+00
                          103.70-9.307E+00 +   7.405E+01 2.41E+02 2.40E+01 X
                          106.13-9.917E+00 ?(  7.837E+01 2.39E+02 2.27E+01 G
                           99.50-1.493E+01 +   1.195E+02 2.42E+02 1.50E+01 X

Nd-147      -2.2070E+01                                      1.11E+01
                          531.00-2.207E+01 ?(  4.587E+01 9.02E+01 1.30E+01 G
                           91.10-8.039E+00 +   6.510E+01 2.45E+02 2.83E+01 G

TL-210   N  -1.9556E+00                                      5.84E+05
                          799.60-1.956E+00 ?(  1.232E+01 1.90E+02 9.90E+01 G
                          296.00-3.086E+00 +   2.389E+01 2.34E+02 7.90E+01 G
                         1313.00-8.119E+00 &   3.346E+01 1.96E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	14161.	-119.	-0.066	141.20	-3.784E+01	
BA-133	80.99	75642.	-153.	-0.085	97.94	-7.001E+00	P
EU-155	86.54	75336.	-153.	-0.085	253.64	-7.532E+00	
Nd-147	91.10	71091.	-154.	-0.085	245.36	-8.039E+00	
AC-228	93.35	70937.	-154.	-0.086	244.58	-4.067E+01	
Gd-153	97.50	70693.	-155.	-0.086	243.20	-7.481E+00	
Np-239	99.50	70538.	-155.	-0.086	242.49	-1.493E+01	
Gd-153	103.20	70383.	-155.	-0.086	241.44	-1.025E+01	
Np-239	103.70	70228.	-156.	-0.086	241.07	-9.307E+00	
EU-155	105.31	68126.	154.	0.085	240.40	1.039E+01	P
Np-239	106.13	70662.	-157.	-0.087	239.42	-9.917E+00	
EU-152	121.78	6560.	128.	0.071	90.06	6.457E+00	
CO-57	122.06	6688.	114.	0.063	101.71	1.927E+00	
EU-154	123.10	6294.	-128.	-0.071	88.45	-4.523E+00	
HF-181	133.02	19398.	-136.	-0.075	145.54	-4.628E+00	
CE-144	133.54	19167.	-136.	-0.075	144.60	-1.810E+01	
HF-181	136.30	19073.	-45.	-0.025	433.89	-1.148E+01	
CE-141	145.44	7335.	-139.	-0.077	76.94	-4.443E+00	P
TH-229	193.51	5745.	-38.	-0.021	284.94	-1.570E+01	
TH-229	210.85	3752.	-107.	-0.059	108.71	-6.980E+01	P
TH-227	256.24	4070.	101.	0.056	89.94	3.261E+01	
BI-210M	265.83	8869.	97.	0.054	137.95	4.504E+00	
TL-208	277.28	8456.	-100.	-0.055	166.01	-3.795E+01	P
I-131	284.30	2276.	92.	0.051	102.06	3.669E+01	
TL-210	296.00	25520.	-97.	-0.054	234.32	-3.086E+00	
PA-231	300.07	25327.	-97.	-0.054	232.74	-1.004E+02	
PA-231	302.65	25133.	-97.	-0.054	231.38	-8.653E+01	
BA-133	302.85	25036.	-97.	-0.054	230.93	-1.360E+01	
BI-210M	304.90	24769.	-97.	-0.054	229.32	-8.966E+00	
CR-51	320.08	17318.	-92.	-0.051	140.04	-2.482E+01	P
La-140	328.76	8185.	-94.	-0.052	136.12	-1.272E+01	
Cf-249	333.44	8201.	-95.	-0.053	135.79	-1.689E+01	
AC-228	338.32	8296.	-95.	-0.053	136.11	-2.214E+01	
Cs-136	340.57	8390.	-27.	-0.015	481.77	-1.616E+00	
HF-181	345.83	7441.	91.	0.051	134.57	1.720E+01	
BA-133	356.00	26110.	-88.	-0.049	259.08	-4.148E+00	
I-131	364.48	1496.	-25.	-0.014	716.52	-9.100E-01	P
BA-133	383.84	3605.	41.	0.023	209.40	1.407E+01	
SN-113	391.69	4262.	-89.	-0.050	104.04	-4.382E+00	
pm-146	453.88	1114.	157.	0.087	44.26	8.513E+00	P
SB-125	463.37	1873.	69.	0.038	89.18	2.378E+01	P
Ir-192	468.06	2042.	-74.	-0.041	86.92	-5.195E+00	
BE-7	477.60	2688.	-73.	-0.041	101.04	-2.558E+01	
HF-181	482.00	2046.	-76.	-0.042	85.29	-3.489E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	487.02	2890.	-17.	-0.009	458.98	-1.364E+00	
RU-103	497.05	737.	104.	0.058	54.25	4.347E+00	P
RH-106	511.86	1225.	362.	0.201	25.81	7.052E+01	
Nd-147	531.00	979.	-71.	-0.040	90.16	-2.207E+01	
BI-207	569.70	986.	-7.	-0.004	635.51	-3.045E-01	
TL-208	583.02	947.	-75.	-0.042	77.07	-3.840E+00	P
SB-125	600.50	19462.	60.	0.033	327.49	1.499E+01	P
RU-103	610.30	19521.	44.	0.025	445.41	3.474E+01	
RH-106	621.92	19294.	58.	0.032	336.71	2.687E+01	P
SB-125	635.89	682.	-57.	-0.032	66.13	-2.346E+01	
I-131	636.97	718.	20.	0.011	194.04	1.279E+01	
AG-110M	657.76	1888.	-55.	-0.031	112.56	-2.782E+00	
CS-137	661.66	1825.	-56.	-0.031	348.81	-3.183E+00	P
AG-108M	722.94	1191.	-63.	-0.035	78.85	-3.576E+00	
EU-154	723.36	1253.	-29.	-0.016	175.99	-7.335E+00	
BI-212	727.17	1242.	-34.	-0.019	572.10	-2.370E+01	P
ZR-95	756.73	551.	-45.	-0.025	439.16	-4.427E+00	P
AG-110M	763.94	2601.	-55.	-0.031	130.70	-1.352E+01	
NB-95	765.79	2545.	-7.	-0.004	970.28	-4.011E-01	
EU-152	778.92	569.	-60.	-0.033	85.42	-2.556E+01	
BI-212	785.42	499.	221.	0.123	22.46	9.601E+02	
TL-210	799.60	2098.	-34.	-0.019	189.61	-1.956E+00	
CO-58	810.78	2251.	-58.	-0.032	43.44	-3.337E+00	P
La-140	815.77	2770.	-52.	-0.029	144.79	-1.273E+01	
MN-54	834.85	709.	-69.	-0.038	83.12	-4.021E+00	
Co-56	846.77	476.	51.	0.028	91.82	3.023E+00	
TL-208	860.56	551.	12.	0.007	421.11	5.730E+00	P
EU-154	873.23	805.	-62.	-0.034	66.13	-3.064E+01	
Sc-46	889.28	1517.	-67.	-0.037	83.01	-4.144E+00	
y-88	898.04	585.	44.	0.024	121.79	2.924E+00	
AC-228	911.07	575.	48.	0.027	110.77	1.044E+01	
AG-110M	937.49	1519.	-58.	-0.032	95.42	-1.097E+01	
EU-152	964.11	1068.	9.	0.005	514.60	4.079E+00	
AC-228	968.97	1143.	-29.	-0.016	167.81	-1.092E+01	
EU-154	996.33	1108.	-58.	-0.032	82.73	-3.702E+01	
EU-154	1004.77	1013.	8.	0.004	596.97	2.878E+00	
Co-56	1037.84	495.	-61.	-0.034	76.04	-3.029E+01	P
RH-106	1050.36	387.	42.	0.023	104.31	1.916E+02	P
BI-207	1063.66	350.	18.	0.010	230.46	1.736E+00	P
Ga-68	1077.40	524.	-18.	-0.010	186.61	-4.541E+01	
FE-59	1099.25	443.	-57.	-0.031	85.42	-7.439E+00	
EU-152	1112.07	4331.	39.	0.022	236.68	2.164E+01	
Ta-182	1121.30	4266.	50.	0.028	186.09	1.076E+01	
Ta-182	1221.41	341.	9.	0.005	485.74	2.611E+00	
Co-56	1238.28	1634.	-50.	-0.028	129.28	-6.178E+00	P
NA-22	1274.53	331.	-42.	-0.023	63.63	-3.521E+00	
FE-59	1291.60	267.	-14.	-0.008	272.94	-2.703E+00	
TL-210	1313.00	283.	-20.	-0.011	195.62	-8.119E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	1332.50	182.	10.	0.006	301.21	8.984E-01	P
AG-110M	1384.30	1612.	-24.	-0.013	237.46	-8.978E+00	
EU-152	1408.00	879.	-51.	-0.028	83.86	-2.228E+01	
La-140	1596.21	295.	-24.	-0.013	33.29	-2.564E+00	P
Co-56	1771.35	2978.	-34.	-0.019	227.70	-2.490E+01	
y-88	1836.06	102.	26.	0.014	96.40	3.054E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-2.5579E+01	-2.5579E+01	1.010E+02%	8.55E+01
NA-22	#A	-3.5207E+00	-3.5207E+00	6.363E+01%	7.39E+00
K-40		1.3413E+02	1.3413E+02	2.208E+01%	6.01E+01
Sc-46	#A	-4.1437E+00	-4.1438E+00	8.301E+01%	1.14E+01
CR-51	#A	-2.4815E+01	-2.4816E+01	1.400E+02%	1.66E+02
MN-54	#A	-4.0210E+00	-4.0210E+00	8.312E+01%	7.42E+00
FE-59	#A	-7.4390E+00	-7.4391E+00	8.542E+01%	1.32E+01
Co-56	#A	3.0226E+00	3.0226E+00	9.182E+01%	6.19E+00
CO-57	#A	1.9270E+00	1.9270E+00	1.017E+02%	6.48E+00
CO-58	#A	-3.3367E+00	-3.3368E+00	4.344E+01%	1.28E+01
CO-60	#A	8.9839E-01	8.9839E-01	3.012E+02%	5.76E+00
ZN-65	#A	5.2960E+00	5.2961E+00	2.615E+02%	4.59E+01
NB-94	#	1.0767E+01	1.0767E+01	2.458E+01%	5.72E+00
ZR-95	#A	-4.4265E+00	-4.4265E+00	4.392E+02%	1.11E+01
NB-95	#A	-4.0109E-01	-4.0109E-01	9.703E+02%	1.30E+01
RU-103	#A	4.3466E+00	4.3467E+00	5.425E+01%	5.41E+00
RH-106	#A	4.9238E+01	4.9238E+01	1.043E+02%	2.99E+02
AG-108M	#A	-5.6563E-02	-5.6563E-02	1.195E+04%	6.25E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.41E+01
SN-113	#A	-4.3815E+00	-4.3815E+00	1.040E+02%	1.51E+01
SB-124	#A	4.0035E+00	4.0035E+00	9.747E+01%	2.96E+01
SB-125	#A	8.5943E+00	8.5943E+00	8.918E+01%	2.01E+01
I-131	#A	2.5537E+00	2.5538E+00	1.021E+02%	6.65E+00
Gd-153	#A	-7.4807E+00	-7.4807E+00	2.432E+02%	6.00E+01
Ga-68	#A	-4.4946E+01	-4.5407E+01	1.866E+02%	2.84E+02
Tc-99m	#A	1.3284E-07	1.3309E-07	2.563E+09%	1.13E+01
BA-133	#A	-4.1476E+00	-4.1476E+00	2.591E+02%	3.55E+01
CS-134	A	3.8129E+00	3.8129E+00	2.165E+02%	2.99E+01
CS-137	#A	-3.1827E+00	-3.1827E+00	3.488E+02%	1.14E+01
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.49E+00
Ba-140	#A	5.8720E+00	5.8722E+00	1.631E+02%	2.22E+01
La-140	#A	-2.5637E+00	-2.5638E+00	3.329E+01%	8.95E+00
CE-141	#A	-4.4430E+00	-4.4430E+00	7.694E+01%	1.28E+01
CE-144	#A	-1.8101E+01	-1.8101E+01	1.446E+02%	8.65E+01

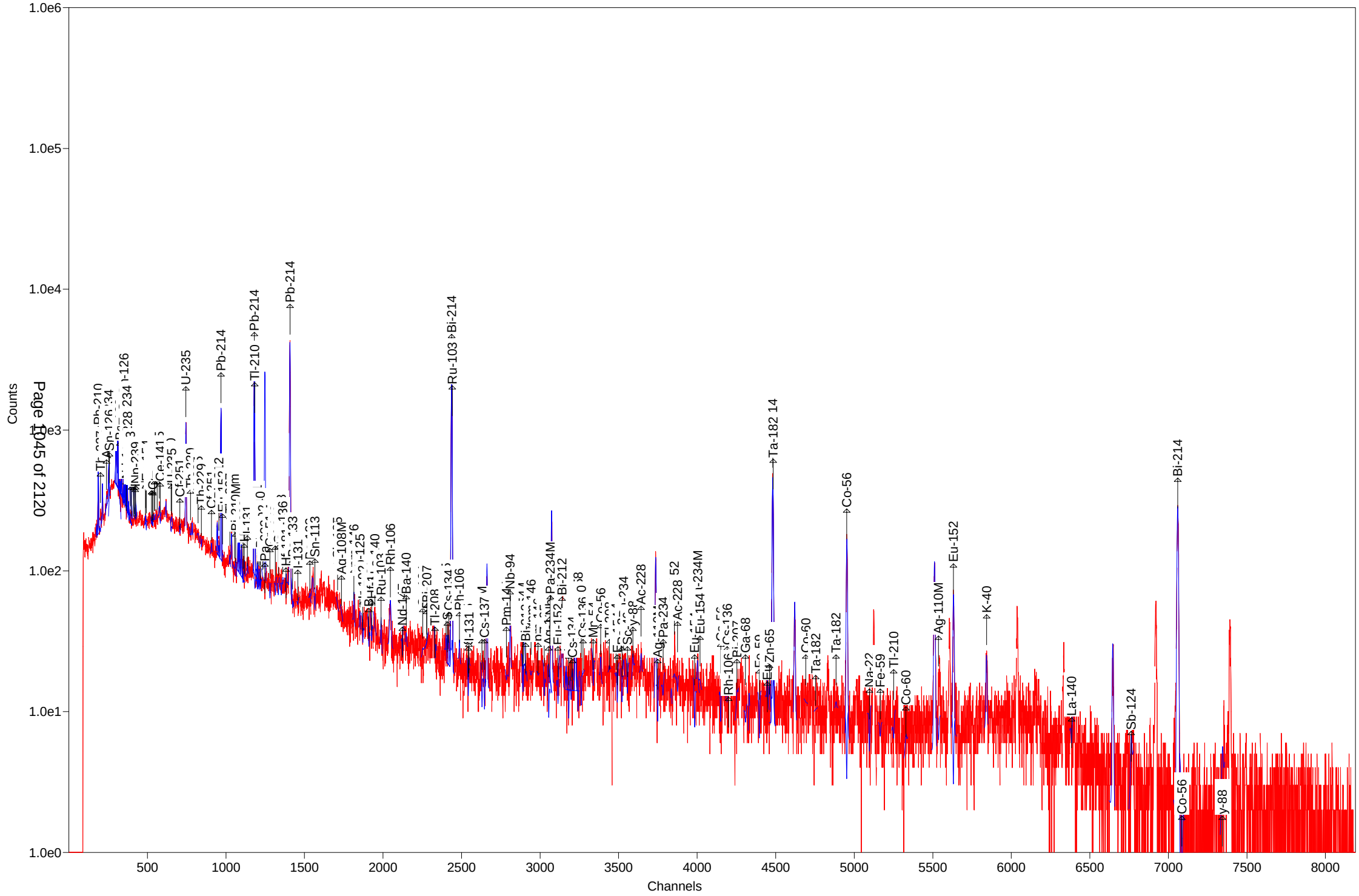
PM-144 #A	-7.4158E-01	-7.4158E-01	1.345E+03%	5.59E+00
EU-152 #A	6.4727E+00	6.4727E+00	9.006E+01%	4.61E+01
EU-154 #A	-3.0641E+01	-3.0641E+01	6.613E+01%	6.69E+01
EU-155 #A	1.0388E+01	1.0388E+01	2.404E+02%	8.24E+01
HF-181 #A	-2.2740E-01	-2.2740E-01	7.966E+01%	9.84E+00
Ta-182 #A	7.2074E+00	7.2075E+00	1.861E+02%	6.64E+01
Hg-203 #A	2.8865E+00	2.8865E+00	1.367E+02%	1.30E+01
TL-208 #A	-3.8395E+00	-3.8395E+00	7.707E+01%	7.49E+00
pm-146 #A	5.2741E+00	5.2741E+00	4.426E+01%	1.73E+01
y-88 #A	2.9911E+00	2.9911E+00	7.766E+01%	7.67E+00
Cd-113m#B	-3.0208E+03	-3.0208E+03	1.821E+03%	1.82E+05
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.01E+02
Cf-251 #A	-1.3322E+01	-1.3322E+01	9.719E+01%	3.24E+01
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.34E+01
Sn-126 #A	2.8264E+01	2.8264E+01	1.145E+02%	1.07E+02
PB-210	1.0756E+03	1.0756E+03	4.886E+00%	1.51E+02
PB-212 #A	5.0730E+00	5.0730E+00	1.615E+02%	2.71E+01
PB-214	1.7502E+03	1.7502E+03	6.212E-01%	1.55E+01
BI-207 #A	5.7793E-01	5.7793E-01	2.305E+02%	6.48E+00
BI-212 #A	-2.3701E+01	-2.3701E+01	5.721E+02%	1.15E+02
U-235	6.4272E+01	6.4272E+01	2.792E+01%	3.79E+01
BI-214	1.6115E+03	1.6115E+03	8.093E-01%	1.21E+01
BI-210M#A	4.5038E+00	4.5038E+00	1.379E+02%	2.05E+01
AC-228 #A	1.0436E+01	1.0436E+01	1.108E+02%	2.49E+01
TH-227 #A	-4.9639E+00	-4.9639E+00	8.371E+01%	1.77E+02
TH-229 #A	-1.5701E+01	-1.5701E+01	2.849E+02%	1.48E+02
TH-234	5.1218E+02	5.1218E+02	9.533E+00%	1.53E+02
PA-231 #A	-8.6531E+01	-8.6531E+01	2.314E+02%	6.62E+02
PA-233 #	9.3206E+02	9.3206E+02	1.500E+00%	3.74E+01
PA-234 #A	-5.6091E-01	-5.6091E-01	1.123E+02%	5.48E+01
PA-234M#A	4.5406E+02	4.5406E+02	8.300E+01%	1.25E+03
AM-241 #A	8.7992E+00	8.7992E+00	1.025E+02%	2.98E+01
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.48E+02
Ir-192 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.24E+01
Cs-136 #A	-3.8352E-02	-3.8354E-02	1.110E+04%	1.42E+01
Np-239 #A	-9.9152E+00	-9.9172E+00	2.394E+02%	7.84E+01
Nd-147 #A	-2.2070E+01	-2.2070E+01	9.016E+01%	4.59E+01
TL-210 #A	-1.9556E+00	-1.9556E+00	1.896E+02%	1.23E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 5.148E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 5.1478481E+03 Bq/Sample

379951_Gamma_160-29881-A-4-C. 15_Gamma_20182797.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20182902

Sample Description: 379951_Gamma_160-29881-A-8-C
Detector: Detector #17
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-8-C

Decay to Time: 8/23/2018 06:28 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:28:53 Real Time: 1832 sec
Analysis Time: 8/23/2018 06:59 Dead Time: 1.73 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev14.lib
Bkgd Correction File: 17_2018-08-11_1255.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.730E+00	198.6	3.436E+00	3.437E+00	1.186E+01
NA-22	-9.920E-01	64.1	6.364E-01	6.383E-01	2.099E+00
K-40	1.575E+02	6.7	1.051E+01	1.324E+01	1.002E+01
Sc-46	-4.328E-01	134.6	5.826E-01	5.831E-01	1.990E+00
CR-51	-2.485E+00	171.8	4.268E+00	4.270E+00	1.108E+01
MN-54	-1.222E-01	458.8	5.605E-01	5.606E-01	1.344E+00
FE-59	1.182E+00	88.1	1.041E+00	1.043E+00	2.353E+00
Co-56	9.767E-01	38.1	3.718E-01	3.752E-01	8.055E-01
CO-57	0.000E+00	1.#INF	2.629E-01	2.629E-01	1.231E+00
CO-58	2.553E-01	158.2	4.038E-01	4.040E-01	1.405E+00
CO-60	-3.393E-01	201.0	6.821E-01	6.823E-01	1.406E+00
ZN-65	-1.779E+00	113.3	2.015E+00	2.017E+00	6.781E+00
NB-94	2.887E-01	73.8	2.130E-01	2.136E-01	1.096E+00
ZR-95	2.605E-01	290.3	7.560E-01	7.561E-01	1.907E+00
NB-95	-9.752E-01	73.2	7.143E-01	7.161E-01	2.372E+00
RU-103	1.672E-01	245.9	4.111E-01	4.112E-01	1.055E+00
RH-106	-4.429E+00	206.2	9.134E+00	9.136E+00	4.472E+01
AG-108M	-2.033E-02	273.6	5.561E-02	5.562E-02	1.202E+00
AG-110M	1.334E+00	50.1	6.680E-01	6.715E-01	1.989E+00
SN-113	2.192E-02	3886.1	8.518E-01	8.518E-01	2.916E+00
SB-124	7.586E-02	82.2	6.239E-02	6.252E-02	4.525E+00
SB-125	1.834E+00	70.0	1.283E+00	1.287E+00	3.203E+00
I-131	5.920E-01	52.4	3.101E-01	3.116E-01	1.370E+00
Gd-153	-8.644E-02	82.4	7.123E-02	7.142E-02	4.258E+00
Ga-68	-1.188E+01	168.9	2.005E+01	2.007E+01	4.661E+01
Tc-99m	2.233E-01	213.0	4.755E-01	4.757E-01	1.597E+00
BA-133	-6.537E-01	226.0	1.478E+00	1.478E+00	4.947E+00
CS-134	6.746E-02	71.8	4.845E-02	4.858E-02	4.510E+00
CS-137	-6.945E-01	84.9	5.899E-01	5.910E-01	1.976E+00
CE-139	1.454E-01	310.7	4.519E-01	4.521E-01	1.529E+00
Ba-140	1.219E+00	119.8	1.461E+00	1.462E+00	3.708E+00
La-140	-4.235E-01	76.7	3.248E-01	3.256E-01	2.176E+00
CE-141	-2.367E-01	360.6	8.534E-01	8.535E-01	2.876E+00

CE-144	7.966E-02	4364.8	3.477E+00	3.477E+00	1.178E+01
PM-144	7.392E-02	176.6	1.305E-01	1.306E-01	1.354E+00
EU-152	-3.296E-01	71.8	2.368E-01	2.374E-01	7.090E+00
EU-154	1.794E+00	32.4	5.808E-01	5.880E-01	1.304E+01
EU-155	-3.116E-02	3990.7	1.243E+00	1.243E+00	5.292E+00
HF-181	-4.847E-01	97.5	4.725E-01	4.732E-01	1.965E+00
Ta-182	1.963E+00	120.6	2.367E+00	2.369E+00	8.017E+00
Hg-203	5.087E-02	877.5	4.464E-01	4.464E-01	1.535E+00
TL-208	-6.478E-02	56.7	3.670E-02	3.686E-02	2.406E+00
pm-146	9.043E-01	135.6	1.226E+00	1.227E+00	3.027E+00
y-88	-7.409E-01	75.6	5.601E-01	5.614E-01	1.611E+00
Cd-113m	5.408E+03	94.8	5.127E+03	5.139E+03	1.721E+04
Cd-109	1.062E+01	139.8	1.485E+01	1.486E+01	4.947E+01
Cf-251	-2.240E+00	106.1	2.376E+00	2.385E+00	6.354E+00
Cf-249	1.572E-01	102.5	1.611E-01	1.613E-01	2.801E+00
Sn-126	0.000E+00	1.#INF	3.187E+00	3.187E+00	1.787E+01
PB-210	3.548E+01	32.9	1.168E+01	1.186E+01	3.238E+01
PB-212	1.113E+01	7.8	8.677E-01	1.127E+00	1.835E+00
PB-214	3.529E+01	4.6	1.606E+00	2.437E+00	2.398E+00
BI-207	-1.705E-01	201.1	3.430E-01	3.431E-01	1.197E+00
BI-212	-4.377E+00	163.9	7.175E+00	7.179E+00	2.457E+01
U-235	1.533E+00	201.5	3.090E+00	3.091E+00	1.154E+01
BI-214	3.328E+01	5.3	1.768E+00	2.473E+00	2.002E+00
BI-210M	4.689E-01	138.9	6.511E-01	6.517E-01	2.206E+00
AC-228	1.219E+01	12.9	1.573E+00	1.691E+00	5.829E+00
TH-227	3.258E+00	129.2	4.209E+00	4.213E+00	1.795E+01
TH-229	3.662E+00	220.2	8.064E+00	8.069E+00	2.189E+01
TH-234	2.246E+01	50.3	1.130E+01	1.136E+01	3.102E+01
PA-231	-1.393E+01	208.4	2.903E+01	2.904E+01	9.711E+01
PA-233	-1.707E-02	4958.1	8.462E-01	8.462E-01	7.729E+00
PA-234	7.502E-01	78.4	5.882E-01	5.894E-01	7.568E+00
PA-234M	7.589E+01	90.6	6.873E+01	6.883E+01	1.842E+02
AM-241	5.233E-02	2493.0	1.305E+00	1.305E+00	3.751E+00
Np-237	-2.974E+00	160.2	4.765E+00	4.768E+00	1.588E+01
Ir-192	2.968E-01	104.9	3.114E-01	3.119E-01	1.290E+00
Cs-136	-6.093E-01	93.2	5.676E-01	5.687E-01	1.911E+00
Np-239	1.289E+00	115.5	1.490E+00	1.492E+00	4.982E+00
Nd-147	3.202E+00	96.6	3.094E+00	3.099E+00	7.729E+00
TL-210	5.057E-01	93.5	4.731E-01	4.739E-01	1.599E+00
Total	5.831E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-8-C

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20182902.An1

Acquisition information
Start time: 8/23/2018 6:28:53 AM
Live time: 1800
Real time: 1832
Dead time: 1.73 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:28:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-08-11_1255.PBC 8/11/2018 12:55:25 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1078

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.73	86.	20.69	0.77	2.115E-02	46.54	4.250	3.548E+01	PB210
50.14	13.	164.08	0.78	2.357E-02	50.14	8.000	PBC<MDA	TH227
63.29	49.	50.31	0.86	3.164E-02	63.29	3.810	PBC<MDA	TH234
74.87	222.	10.91	0.80	3.684E-02				
77.18	364.	7.10	0.80	3.765E-02				
80.99	16.	166.04	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
88.04	29.	139.85	0.81	4.060E-02	88.04	3.790	PBC<MDA	Cd109
91.10	11.	379.91	0.82	4.119E-02	91.10	28.300	PBC<MDA	Nd147
92.58	32.	63.65	0.82	4.144E-02	92.59	5.584	PBC<MDA	TH234
93.34	28.	142.06	0.82	4.156E-02	93.35	5.561	PBC<MDA	AC228
103.20	22.	118.86	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
106.13	23.	115.54	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
121.78	12.	190.78	0.85	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.872E-01	CO57
123.10	12.	183.76	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
136.30	5.	642.99	0.86	4.165E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	6.040E-01	CO57
140.51	14.	212.95	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	14.	201.52	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235
165.85	8.	310.75	0.89	3.825E-02	165.85	79.900	PBC<MDA	CE139
185.86	152.	15.55	0.84	3.543E-02	185.72	54.000	4.418E+00	U235
193.51	10.	220.23	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.33	3.	611.72	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
227.00	20.	101.53	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.58	259.	7.82	0.95	2.989E-02	238.63	43.300	1.111E+01	PB212
241.77	150.	11.95	0.96	2.962E-02	242.00	7.430	3.784E+01	PB214
244.69	18.	198.23	0.96	2.938E-02	244.69	7.580	PBC<MDA	EU152
256.24	9.	199.62	0.97	2.846E-02	256.24	7.000	PBC<MDA	TH227
263.70	16.	94.81	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	12.	138.87	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
279.20	2.	877.50	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
284.30	35.	52.39	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
295.24	312.	7.60	1.02	2.579E-02	295.09	19.300	3.483E+01	PB214
					296.00	79.000	8.527E+00	TL210
300.21	53.	25.82	1.43	2.550E-02	300.03	3.280	3.490E+01	PB212
					300.07	2.460	4.654E+01	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	16.	102.54	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	102.52	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.31	76.	19.27	0.91	2.344E-02	338.32	12.010	1.494E+01	AC228
351.93	548.	5.01	1.28	2.279E-02	351.93	37.600	3.552E+01	PB214
427.88	13.	100.17	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
463.37	13.	97.68	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	13.	104.92	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
497.05	5.	245.91	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	73.	33.36	2.45	1.742E-02	511.86	20.000	1.164E+01	RH106
531.00	13.	96.60	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	119.84	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
563.24	9.	100.97	1.25	1.624E-02	563.24	8.350	PBC<MDA	CS134
569.32	11.	71.82	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.484E+00	PA234
					569.70	97.740	3.763E-01	BI207
583.18	97.	11.85	1.04	1.584E-02	583.02	84.500	4.042E+00	TL208
609.42	427.	5.31	1.41	1.533E-02	609.31	46.090	3.358E+01	BI214
					610.30	5.750	2.695E+02	RU103
618.06	14.	237.73	1.30	1.517E-02	618.06	99.100	PBC<MDA	PM144
636.97	7.	126.95	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
657.76	2.	436.36	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
702.63	5.	196.63	1.37	1.380E-02	702.63	97.900	PBC<MDA	NB94
722.79	14.	82.25	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.170E-01	AG108M
					723.36	20.220	2.773E+00	EU154
722.94	2.	501.66	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.074E-01	AG108M
					723.36	20.220	4.827E-01	EU154
747.16	7.	135.57	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	3.	290.26	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
766.41	17.	90.56	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	4.	264.97	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
799.60	11.	93.55	1.45	1.253E-02	799.60	98.960	PBC<MDA	TL210
810.78	6.	158.17	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58
846.77	21.	38.07	1.49	1.200E-02	846.77	99.935	9.767E-01	Co56
858.96	11.	96.85	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
871.10	7.	73.80	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
880.53	7.	143.45	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
884.68	9.	96.78	1.52	1.161E-02	884.68	72.680	PBC<MDA	AG110M
911.41	54.	29.92	1.55	1.135E-02	911.07	29.000	9.168E+00	AC228
946.02	11.	88.99	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	10.	131.68	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.12	52.	15.22	1.63	1.083E-02	968.97	17.460	1.532E+01	AC228
996.33	20.	32.37	1.62	1.061E-02	996.33	10.600	9.635E+00	EU154
1001.00	3.	309.77	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	155.39	1.62	1.054E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	2.	498.71	1.66	1.019E-02	1050.36	1.560	PBC<MDA	RH106
1099.25	12.	88.08	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1120.60	88.	11.99	1.42	9.697E-03	1120.29	15.100	3.340E+01	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.41	12.	120.58	1.72	9.691E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	6.848E-01	Sc46
					1121.30	34.900	1.963E+00	Ta182
1238.28	50.	20.56	1.81	8.977E-03	1238.28	66.070	4.724E+00	Co56
1384.30	13.	50.07	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	10.	84.08	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1461.08	239.	6.67	1.85	7.894E-03	1460.83	10.670	1.575E+02	K40
1690.98	2.	304.14	2.16	7.037E-03	1690.98	47.790	PBC<MDA	SB124
1764.81	61.	17.04	2.21	6.804E-03	1764.49	15.400	3.227E+01	BI214
1771.35	8.	162.72	2.22	6.783E-03	1771.35	15.480	PBC<MDA	Co56
1836.06	6.	40.82	2.26	6.593E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.91	74.92	182.	222.	6.028E+03	10.91	0.802	- D
308.11	77.22	151.	364.	9.664E+03	7.10	0.804	- D
742.66	185.86	105.	172.	4.854E+03	13.50	0.841	- sM
2331.56	583.18	6.	102.	6.420E+03	11.13	1.045	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.41	46.73	112.	57.	0.032	32.91	0.770
TH-227	200.03	50.14	156.	13.	0.007	164.08	0.778s
TH-234	252.60	63.29	192.	49.	0.027	50.31	0.863s
Sn-126	256.56	64.28	439.	0.	0.000	1000.00	0.792
BA-133	323.36	80.99	241.	16.	0.009	166.04	0.807s
Np-237	345.35	86.49	1009.	-28.	-0.016	160.19	0.813s
EU-155	345.56	86.54	975.	-29.	-0.016	151.60	0.813s
Sn-126	347.15	86.94	946.	-29.	-0.016	149.29	0.813
Sn-126	349.67	87.57	916.	-29.	-0.016	146.86	0.814
Cd-109	351.55	88.04	831.	29.	0.016	139.85	0.814s
Nd-147	363.79	91.10	860.	11.	0.006	379.91	0.817s
TH-234	369.74	92.59	187.	32.	0.018	63.65	0.818D
AC-228	372.78	93.35	803.	28.	0.016	142.06	0.819s
Gd-153	389.37	97.50	408.	-25.	-0.014	114.15	0.823s
Np-239	397.37	99.50	389.	-25.	-0.014	112.03	0.825s
Gd-153	412.16	103.20	340.	22.	0.012	118.86	0.828s
Np-239	414.16	103.70	341.	-19.	-0.011	137.31	0.829s
Np-239	423.88	106.13	328.	23.	0.013	115.54	0.831
EU-152	486.43	121.78	271.	12.	0.007	190.78	0.846s
CO-57	487.57	122.06	283.	0.	0.000	1000.00	0.846s
EU-154	491.73	123.10	251.	12.	0.007	183.76	0.847s
PA-234	524.49	131.29	466.	-24.	-0.013	129.11	0.855s
HF-181	531.41	133.02	490.	-20.	-0.011	158.94	0.856s
HF-181	544.50	136.30	480.	5.	0.003	642.99	0.859s
CO-57	545.20	136.47	476.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	459.	14.	0.008	212.95	0.863
U-235	574.43	143.79	374.	14.	0.008	201.52	0.866s
CE-141	581.05	145.44	447.	-8.	-0.005	360.60	0.868
Ba-140	649.90	162.66	324.	-19.	-0.011	135.93	0.884
CE-139	662.67	165.85	305.	8.	0.004	310.75	0.887s
Cf-251	705.64	176.60	217.	-25.	-0.014	106.11	0.897s
U-235	742.10	185.72	390.	-43.	-0.024	66.39	0.905s
TH-229	773.25	193.51	150.	10.	0.006	220.23	0.913
U-235	820.52	205.33	141.	3.	0.002	611.72	0.924s
TH-229	842.58	210.85	177.	-10.	-0.005	246.79	0.929
Cf-251	907.16	227.00	127.	20.	0.011	101.53	0.944s
PB-212	953.67	238.63	74.	259.	0.144	7.80	0.954D
PB-214	967.13	242.00	91.	153.	0.085	11.95	0.957D
EU-152	977.91	244.69	647.	18.	0.010	198.23	0.960s
TH-227	1024.08	256.24	107.	9.	0.005	199.62	0.971s
Cd-113m	1053.91	263.70	111.	16.	0.009	94.81	0.978
BI-210M	1062.44	265.83	126.	12.	0.007	138.87	0.979s
TL-208	1108.23	277.28	145.	-13.	-0.007	133.90	0.990s
Hg-203	1115.89	279.20	153.	2.	0.001	877.50	0.992s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1136.28	284.30	84.	35.	0.019	52.39	0.996s
PB-214	1180.05	295.24	63.	312.	0.173	7.60	1.025
TL-210	1183.07	296.00	750.	-18.	-0.010	222.60	1.007s
PB-212	1199.91	300.21	34.	53.	0.029	25.82	1.430s
PA-231	1199.35	300.07	733.	-18.	-0.010	219.23	1.011
PA-233	1199.79	300.18	736.	-18.	-0.010	211.49	1.011s
PA-231	1209.66	302.65	718.	-18.	-0.010	208.42	1.013
BA-133	1210.47	302.85	700.	-18.	-0.010	205.78	1.013s
BI-210M	1218.64	304.90	680.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	680.	0.	0.000	1000.00	1.019
CR-51	1279.38	320.08	96.	-11.	-0.006	171.76	1.029s
La-140	1314.07	328.76	70.	16.	0.009	102.54	1.037s
Cf-249	1332.79	333.44	55.	14.	0.008	102.52	1.041
AC-228	1352.26	338.31	37.	76.	0.042	19.27	0.912
Cs-136	1361.30	340.57	280.	-18.	-0.010	134.67	1.048s
EU-152	1376.16	344.29	263.	-19.	-0.011	71.84	1.051s
PB-214	1406.73	351.93	54.	548.	0.304	5.01	1.275s
BA-133	1423.00	356.00	688.	-17.	-0.009	226.04	1.062
I-131	1456.93	364.48	82.	-18.	-0.010	156.32	1.070s
BA-133	1534.34	383.84	196.	-17.	-0.010	116.86	1.087s
Cf-249	1550.77	387.95	213.	-8.	-0.004	271.11	1.091s
SB-125	1710.44	427.88	45.	13.	0.007	100.17	1.127s
AG-108M	1734.69	433.94	59.	-5.	-0.003	273.56	1.132s
pm-146	1814.44	453.88	64.	-10.	-0.006	159.79	1.150s
SB-125	1852.38	463.37	69.	13.	0.007	97.68	1.158s
Ir-192	1871.15	468.06	92.	13.	0.007	104.92	1.163
BE-7	1909.29	477.59	68.	-6.	-0.003	198.61	1.171s
HF-181	1926.89	482.00	111.	-16.	-0.009	97.48	1.175s
La-140	1946.98	487.02	68.	-17.	-0.009	98.55	1.180s
RU-103	1987.11	497.05	36.	5.	0.003	245.91	1.188s
RH-106	2046.35	511.86	80.	73.	0.041	33.36	2.452s
Nd-147	2122.88	531.00	36.	13.	0.007	96.60	1.219s
Ba-140	2147.92	537.26	28.	9.	0.005	119.84	1.224
CS-134	2251.82	563.24	20.	9.	0.005	100.97	1.247s
CS-134	2276.15	569.32	24.	11.	0.006	71.82	1.252s
PA-234	2276.75	569.47	48.	-9.	-0.005	112.08	1.253s
BI-207	2277.67	569.70	45.	-5.	-0.003	201.13	1.253s
TL-208	2330.95	583.02	141.	-17.	-0.009	58.83	1.264
SB-125	2400.86	600.50	691.	-17.	-0.009	224.61	1.280s
SB-124	2409.78	602.73	674.	-17.	-0.009	221.58	1.282s
CS-134	2417.70	604.71	657.	-17.	-0.009	218.56	1.284s
BI-214	2436.55	609.42	24.	427.	0.237	5.31	1.406
RU-103	2440.05	610.30	641.	-17.	-0.009	215.00	1.288s
AG-108M	2455.98	614.28	624.	-17.	-0.009	211.63	1.292s
PM-144	2471.11	618.06	509.	14.	0.008	237.73	1.295s
RH-106	2486.52	621.92	641.	-17.	-0.010	206.22	1.299s
SB-125	2542.41	635.89	40.	-4.	-0.002	262.64	1.311
I-131	2546.75	636.97	40.	7.	0.004	126.95	1.312

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	2629.90	657.76	51.	2.	0.001	436.36	1.330s
CS-137	2645.49	661.66	78.	-15.	-0.009	84.93	1.333s
PM-144	2785.03	696.54	44.	-9.	-0.005	261.10	1.363s
NB-94	2809.38	702.63	26.	5.	0.003	196.63	1.368s
SB-124	2890.01	722.79	56.	14.	0.008	82.25	1.386s
AG-108M	2890.61	722.94	70.	2.	0.001	501.66	1.386s
EU-154	2892.29	723.36	72.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	72.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	82.	-8.	-0.004	163.94	1.390s
pm-146	2941.74	735.72	39.	-9.	-0.005	145.51	1.397s
pm-146	2987.51	747.16	22.	7.	0.004	135.57	1.407s
ZR-95	3025.79	756.73	22.	3.	0.002	290.26	1.415s
AG-110M	3054.64	763.94	56.	-11.	-0.006	100.82	1.421s
NB-95	3062.03	765.79	126.	-23.	-0.013	73.25	1.423s
PA-234M	3064.52	766.41	106.	17.	0.009	90.56	1.423s
EU-152	3114.56	778.92	31.	-3.	-0.001	600.29	1.434s
BI-212	3140.56	785.42	26.	4.	0.002	264.97	1.440s
CS-134	3182.35	795.87	65.	-14.	-0.008	84.52	1.448s
TL-210	3197.29	799.60	50.	11.	0.006	93.55	1.451
CS-134	3206.69	801.95	62.	-7.	-0.004	175.26	1.454s
CO-58	3241.99	810.78	37.	6.	0.003	158.17	1.461s
La-140	3261.97	815.77	48.	-9.	-0.005	112.05	1.465s
Cs-136	3272.90	818.50	72.	-14.	-0.008	93.16	1.467s
MN-54	3338.30	834.85	33.	-3.	-0.001	458.77	1.481s
Co-56	3385.99	846.77	10.	21.	0.012	38.07	1.491s
TL-208	3441.18	860.56	24.	11.	0.006	96.85	1.503s
NB-94	3483.32	871.10	11.	7.	0.004	73.80	1.512s
EU-154	3491.85	873.23	44.	-13.	-0.007	78.24	1.514s
PA-234	3521.06	880.53	52.	7.	0.004	143.45	1.520s
PA-234	3531.90	883.24	59.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	35.	9.	0.005	96.78	1.523s
Sc-46	3556.06	889.28	69.	-9.	-0.005	134.61	1.527s
y-88	3591.11	898.04	37.	-14.	-0.008	75.60	1.534s
AC-228	3643.24	911.07	47.	54.	0.030	29.92	1.545
AG-110M	3748.95	937.49	47.	-17.	-0.010	87.46	1.567s
PA-234	3783.07	946.02	19.	11.	0.006	88.99	1.574
EU-152	3855.45	964.11	75.	10.	0.005	131.68	1.589s
AC-228	3875.49	969.12	3.	52.	0.029	15.22	1.631
EU-154	3984.36	996.33	10.	20.	0.011	32.37	1.616
PA-234M	4003.04	1001.00	33.	3.	0.001	309.77	1.620s
EU-154	4018.15	1004.77	36.	6.	0.003	155.39	1.623s
Co-56	4150.45	1037.84	20.	-2.	-0.001	383.68	1.650s
Cs-136	4191.39	1048.07	80.	-21.	-0.012	64.72	1.658s
RH-106	4200.55	1050.36	74.	2.	0.001	498.71	1.661s
Ga-68	4308.74	1077.40	20.	-6.	-0.003	168.87	1.683s
FE-59	4396.18	1099.25	20.	12.	0.007	88.08	1.700
EU-152	4447.49	1112.07	167.	-16.	-0.009	118.94	1.711s
ZN-65	4461.38	1115.55	152.	-16.	-0.009	113.29	1.713s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4481.62	1120.60	7.	88.	0.049	11.99	1.424
Sc-46	4481.41	1120.55	136.	-7.	-0.004	244.35	1.717
Ta-182	4484.41	1121.30	98.	12.	0.007	120.58	1.718
CO-60	4692.24	1173.24	35.	-14.	-0.008	75.10	1.760s
Ta-182	4755.52	1189.05	20.	0.	0.000	1000.00	1.772
Ta-182	4885.02	1221.41	27.	-6.	-0.003	211.36	1.798
Co-56	4952.53	1238.28	12.	50.	0.028	20.56	1.812s
NA-22	5097.60	1274.53	43.	-16.	-0.009	64.15	1.840s
EU-154	5097.66	1274.54	58.	0.	0.000	1000.00	1.840s
TL-210	5251.56	1313.00	21.	-6.	-0.004	170.46	1.870s
CO-60	5329.61	1332.50	16.	-5.	-0.003	201.03	1.886s
AG-110M	5536.92	1384.30	5.	13.	0.007	50.07	1.926s
EU-152	5631.79	1408.00	11.	10.	0.005	84.08	1.944s
K-40	5844.25	1461.08	7.	239.	0.133	6.67	1.851
La-140	6385.15	1596.21	28.	-11.	-0.006	114.08	2.087s
SB-124	6764.55	1690.98	6.	2.	0.001	304.14	2.157s
BI-214	7058.84	1764.49	23.	61.	0.034	17.04	2.211s
Co-56	7086.31	1771.35	75.	8.	0.004	162.72	2.216s
y-88	7345.39	1836.06	0.	6.	0.003	40.82	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.7299E+00				5.31E+01	
			477.60	-1.730E+00	?(	1.186E+01 1.99E+02 1.05E+01	G
NA-22	C	-9.9205E-01				9.50E+02	
			1274.53	-9.920E-01	?(	2.099E+00 6.41E+01 9.99E+01	G
K-40	N	1.5751E+02				4.66E+11	
			1460.83	1.575E+02	(P	1.002E+01 6.67E+00 1.07E+01	G
Sc-46	F	-4.3285E-01				8.38E+01	
			889.28	-4.328E-01	?(	1.990E+00 1.35E+02 1.00E+02	G
			1120.55	-3.914E-01	+	3.268E+00 2.44E+02 1.00E+02	G
CR-51	F	-2.4847E+00				2.77E+01	
			320.08	-2.485E+00	?(	1.108E+01 1.72E+02 9.94E+00	G
MN-54	C	-1.2218E-01				3.12E+02	
			834.85	-1.222E-01	&(	1.344E+00 4.59E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	1.1818E+00					4.45E+01	
			1099.25	1.182E+00	?(	2.353E+00	8.81E+01	5.65E+01 G
			1291.60	-1.140E-01	% P	2.665E+00	1.35E+03	4.32E+01 G
Co-56	C	9.7670E-01					7.73E+01	
			846.77	9.767E-01	&(P	8.055E-01	3.81E+01	9.99E+01 G
			1238.28	4.724E+00	+ P	1.739E+00	2.06E+01	6.61E+01 G
			1037.84	-8.274E-01	& P	9.038E+00	3.84E+02	1.41E+01 G
			1771.35	4.079E+00	?	2.276E+01	1.63E+02	1.55E+01 A
CO-58	C	2.5531E-01					7.09E+01	
			810.78	2.553E-01	?(	1.405E+00	1.58E+02	9.95E+01 G
CO-60	F	-3.3930E-01					1.93E+03	
			1332.50	-3.393E-01	?(P	1.406E+00	2.01E+02	1.00E+02 G
			1173.24	-8.370E-01	+ P	1.801E+00	7.51E+01	9.99E+01 G
ZN-65	F	-1.7791E+00					2.44E+02	
			1115.55	-1.779E+00	?(	6.781E+00	1.13E+02	5.06E+01 G
NB-94	I	2.8867E-01					7.41E+06	
			702.63	2.240E-01	?(P	1.096E+00	1.97E+02	9.79E+01 G
			871.10	3.520E-01	?(	8.712E-01	7.38E+01	9.99E+01 G
ZR-95	I	2.6046E-01					6.40E+01	
			756.73	2.605E-01	?(	1.907E+00	2.90E+02	5.45E+01 G
			724.20	0.000E+00	&	3.941E+00	1.00E+03	4.42E+01 G
NB-95	I	-9.7523E-01					6.40E+01	
			765.79	-9.752E-01	&(	2.372E+00	7.32E+01	9.98E+01 G
RU-103	I	1.6717E-01					3.93E+01	
			497.05	1.672E-01	&(P	1.055E+00	2.46E+02	9.09E+01 G
			610.30	-1.057E+01	+	7.612E+01	2.15E+02	5.75E+00 GA
RH-106	I	-4.4291E+00					3.74E+02	
			621.92	-6.477E+00	?(	4.472E+01	2.06E+02	9.93E+00 G
			1050.36	8.605E+00	&(	1.497E+02	4.99E+02	1.56E+00 G
			511.86	1.164E+01	?	7.079E+00	3.34E+01	2.00E+01 GA
AG-108M	C	-2.0329E-02					1.53E+05	
			433.94	-1.486E-01	?(P	1.202E+00	2.74E+02	9.05E+01 G
			722.94	1.074E-01	&(	1.883E+00	5.02E+02	9.08E+01 G
			614.28	-6.817E-01	+	4.832E+00	2.12E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	1.3342E+00					2.50E+02	
			884.68	6.041E-01	?(	1.989E+00	9.68E+01	7.27E+01 G
			657.76	9.452E-02	&	1.454E+00	4.36E+02	9.46E+01 G
			937.49	-2.508E+00	+	5.027E+00	8.75E+01	3.44E+01 G
			1384.30	3.519E+00	?(	3.743E+00	5.01E+01	2.43E+01 G
			763.94	-2.116E+00	+	7.229E+00	1.01E+02	2.23E+01 G
SN-113	F	2.1921E-02					1.15E+02	
			391.69	2.192E-02	%(P	2.916E+00	3.89E+03	6.40E+01 G
SB-124	F	7.5862E-02					6.02E+01	
			602.73	-6.099E-01	?(	4.525E+00	2.22E+02	9.83E+01 G
			1690.98	3.304E-01	?(	2.333E+00	3.04E+02	4.78E+01 G
			722.79	5.184E+00	?(	1.430E+01	8.22E+01	1.08E+01 G
SB-125	I	1.8342E+00					1.01E+03	
			427.88	1.226E+00	&(P	3.203E+00	1.00E+02	2.96E+01 G
			600.50	-3.341E+00	&	2.512E+01	2.25E+02	1.79E+01 G
			635.89	-1.157E+00	-	1.070E+01	2.63E+02	1.13E+01 G
			463.37	3.554E+00	?(P	1.171E+01	9.77E+01	1.05E+01 G
I-131	I	5.9201E-01					8.02E+00	
			364.48	-5.380E-01	?(P	1.370E+00	1.56E+02	8.17E+01 G
			284.30	1.185E+01	?(	1.555E+01	5.24E+01	6.14E+00 G
			636.97	3.829E+00	?(	1.674E+01	1.27E+02	7.17E+00 G
Gd-153	F	-8.6441E-02					2.42E+02	
			97.50	-1.117E+00	?(	4.258E+00	1.14E+02	3.00E+01 G
			103.20	1.332E+00	&(	5.296E+00	1.19E+02	2.18E+01 G
Ga-68	C	-1.1875E+01					4.71E-02	
			1077.40	-1.188E+01	?(	4.661E+01	1.69E+02	3.30E+00 G
Tc-99m	I	2.2329E-01					2.51E-01	
			140.51	2.233E-01	&(	1.597E+00	2.13E+02	8.93E+01 G
BA-133	F	-6.5367E-01					3.85E+03	
			356.00	-6.537E-01	?(	4.947E+00	2.26E+02	6.20E+01 G
			302.85	-2.189E+00	+	1.507E+01	2.06E+02	1.83E+01 G
			383.84	-5.021E+00	+	1.970E+01	1.17E+02	8.94E+00 GA
			80.99	6.684E-01	P	3.153E+00	1.66E+02	3.41E+01 GA
CS-134	I	6.7462E-02					7.54E+02	
			604.71	-6.162E-01	?(	4.510E+00	2.19E+02	9.76E+01 G
			795.87	-7.359E-01	+	2.086E+00	8.45E+01	8.55E+01 G
			569.32	2.390E+00	&(	5.724E+00	7.18E+01	1.54E+01 G
			801.95	-3.346E+00	+	2.022E+01	1.75E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	3.782E+00	?(P	9.743E+00	1.01E+02	8.35E+00 G
CS-137	I	-6.9455E-01					1.10E+04	
			661.66	-6.945E-01	?(	1.976E+00	8.49E+01	8.52E+01 G
CE-139	F	1.4542E-01					1.38E+02	
			165.85	1.454E-01	&(	1.529E+00	3.11E+02	7.99E+01 G
Ba-140	I	1.2192E+00					1.28E+01	
			537.26	1.219E+00	?(	3.708E+00	1.20E+02	2.44E+01 G
			162.66	-4.450E+00	+	2.028E+01	1.36E+02	6.22E+00 G
			304.85	-8.087E-01	&	6.387E+01	2.35E+03	4.29E+00 G
La-140	I	-4.2353E-01					1.28E+01	
			1596.21	-8.962E-01	?(	2.176E+00	1.14E+02	9.54E+01 G
			487.02	-1.143E+00	+	2.781E+00	9.85E+01	4.55E+01 G
			328.76	1.798E+00	?(	4.761E+00	1.03E+02	2.03E+01 G
			815.77	-1.773E+00	+	6.778E+00	1.12E+02	2.33E+01 G
CE-141	I	-2.3665E-01					3.25E+01	
			145.44	-2.367E-01	?(	2.876E+00	3.61E+02	4.82E+01 G
CE-144	I	7.9663E-02					2.85E+02	
			133.54	7.966E-02	&(	1.178E+01	4.36E+03	1.11E+01 G
PM-144	C	7.3917E-02					3.63E+02	
			696.54	-3.516E-01	?(P	1.354E+00	2.61E+02	9.90E+01 G
			618.06	4.990E-01	?(	3.984E+00	2.38E+02	9.91E+01 G
EU-152	F	-3.2958E-01					4.94E+03	
			344.29	-1.728E+00	(P	7.090E+00	7.18E+01	2.65E+01 G
			1112.07	-6.571E+00	+	2.630E+01	1.19E+02	1.36E+01 G
			121.78	5.605E-01	+	3.608E+00	1.91E+02	2.86E+01 G
			778.92	-8.484E-01	+ P	9.562E+00	6.00E+02	1.29E+01 G
			964.11	3.348E+00	+	1.503E+01	1.32E+02	1.46E+01 G
			244.69	4.560E+00	&(	3.025E+01	1.98E+02	7.58E+00 G
			1408.00	3.114E+00	?	5.837E+00	8.41E+01	2.10E+01 GA
EU-154	I	1.7944E+00					3.14E+03	
			873.23	-4.979E+00	?(	1.304E+01	7.82E+01	1.23E+01 G
			123.10	3.934E-01	+	2.440E+00	1.84E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.888E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	&	8.597E+00	1.00E+03	2.02E+01 G
			1004.77	1.652E+00	+	8.935E+00	1.55E+02	1.80E+01 G
			996.33	9.635E+00	(	8.680E+00	3.24E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-3.1157E-02					1.81E+03	
			105.31	-3.116E-02	&(P	5.292E+00	3.99E+03	2.12E+01 G
			86.54	-1.319E+00	&	6.661E+00	1.52E+02	3.07E+01 G
HF-181	F	-4.8472E-01					4.24E+01	
			482.00	-6.000E-01	?(	1.965E+00	9.75E+01	8.05E+01 G
			133.02	-6.081E-01	&	3.236E+00	1.59E+02	4.33E+01 G
			345.83	-3.081E-01	%	1.206E+01	1.15E+03	1.51E+01 G
			136.30	1.102E+00	?(	2.391E+01	6.43E+02	5.85E+00 G
Ta-182	F	1.9629E+00					1.14E+02	
			1121.30	1.963E+00	(	8.017E+00	1.21E+02	3.49E+01 G
			1221.41	-1.285E+00	-	6.072E+00	2.11E+02	2.70E+01 G
			1189.05	0.000E+00	-	8.719E+00	1.00E+03	1.62E+01 G
Hg-203	F	5.0873E-02					4.66E+01	
			279.20	5.087E-02	?(	1.535E+00	8.77E+02	8.15E+01 G
TL-208	N	-6.4778E-02					6.98E+02	
			583.02	-6.946E-01	(P	2.406E+00	5.88E+01	8.45E+01 G
			277.28	-4.248E+00	+	1.922E+01	1.34E+02	6.31E+00 G
			860.56	4.220E+00	&(P	9.608E+00	9.68E+01	1.24E+01 G
pm-146	C	9.0430E-01					2.02E+03	
			747.16	9.043E-01	?(P	3.027E+00	1.36E+02	3.40E+01 G
			735.72	-1.667E+00	+	5.891E+00	1.46E+02	2.25E+01 G
			453.88	-4.498E-01	&	1.799E+00	1.60E+02	6.50E+01 G
y-88	F	-7.4093E-01					1.07E+02	
			898.04	-7.409E-01	?(P	1.611E+00	7.56E+01	9.37E+01 G
			1836.06	5.097E-01	+	6.260E-01	4.08E+01	9.92E+01 G
Cd-113m		5.4080E+03					5.33E+03	
			263.70	5.408E+03	(	1.721E+04	9.48E+01	6.00E-03 K
Cd-109	F	1.0616E+01					4.53E+02	
			88.04	1.062E+01	?(	4.947E+01	1.40E+02	3.79E+00 G
Cf-251	T	-2.2396E+00					3.28E+05	
			176.60	-2.240E+00	(	6.354E+00	1.06E+02	1.70E+01 G
			227.00	5.764E+00	&	1.573E+01	1.02E+02	6.30E+00 GA
Cf-249	T	1.5717E-01					1.28E+05	
			387.95	-3.043E-01	*(	2.801E+00	2.71E+02	6.60E+01 G
			333.44	2.121E+00	?(	5.638E+00	1.03E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	3.5480E+01					8.14E+03	
			46.54	3.548E+01	(P	3.238E+01	3.29E+01	4.25E+00 G
PB-212	N	1.1126E+01					6.98E+02	
			238.63	1.113E+01	(P	1.835E+00	7.80E+00	4.33E+01 G
			300.03	3.490E+01	+ P	1.997E+01	2.58E+01	3.28E+00 GA
PB-214	N	3.5285E+01					5.84E+05	
			351.93	3.552E+01	(P	2.398E+00	5.01E+00	3.76E+01 G
			295.09	3.483E+01	(P	4.425E+00	7.60E+00	1.93E+01 G
			242.00	3.869E+01		1.190E+01	1.19E+01	7.43E+00 GA
BI-207	C	-1.7054E-01					1.18E+04	
			569.70	-1.705E-01	?(	1.197E+00	2.01E+02	9.77E+01 G
			1063.66	6.557E-02	% P	1.745E+00	1.12E+03	7.45E+01 G
BI-212	N	-4.3768E+00					6.98E+02	
			727.17	-4.377E+00	(	2.457E+01	1.64E+02	7.55E+00 G
			785.42	1.367E+01	&	9.049E+01	2.65E+02	1.28E+00 GA
U-235	N	1.5332E+00					2.57E+11	
			143.79	1.704E+00	(P	1.154E+01	2.02E+02	1.10E+01 G
			205.33	1.159E+00	&(P	1.940E+01	6.12E+02	5.01E+00 G
			163.38	-3.328E-01	% P	2.564E+01	2.39E+03	5.08E+00 G
			185.72	-1.244E+00	+ P	2.748E+00	6.64E+01	5.40E+01 GA
BI-214	N	3.3280E+01					5.84E+05	
			609.31	3.358E+01	(P	2.002E+00	5.31E+00	4.61E+01 G
			1120.29	3.340E+01	(P	5.693E+00	1.20E+01	1.51E+01 G
			1764.49	3.227E+01	?(P	1.332E+01	1.70E+01	1.54E+01 G
BI-210M	T	4.6887E-01					1.10E+09	
			265.83	4.689E-01	&(	2.206E+00	1.39E+02	5.00E+01 G
			304.90	0.000E+00	&	9.776E+00	1.00E+03	2.80E+01 G
AC-228	N	1.2189E+01					2.10E+03	
			911.07	9.168E+00	?(	5.829E+00	2.99E+01	2.90E+01 G
			968.97	1.532E+01	(	3.099E+00	1.52E+01	1.75E+01 G
			338.32	1.494E+01	(	6.155E+00	1.93E+01	1.20E+01 G
			93.35	6.842E+00	-	3.240E+01	1.42E+02	5.56E+00 XA
TH-227	N	3.2578E+00					7.95E+03	
			50.14	3.831E+00	?(	1.795E+01	1.64E+02	8.00E+00 G
			256.24	2.603E+00	&(	1.418E+01	2.00E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	3.6617E+00					2.68E+06	
			193.51	3.662E+00	(	2.189E+01	2.20E+02	4.40E+00 G
			210.85	-5.521E+00	+	3.693E+01	2.47E+02	2.99E+00 G
TH-234	N	2.2464E+01					1.63E+12	
			63.29	2.246E+01	*(P	3.102E+01	5.03E+01	3.81E+00 G
			92.59	7.642E+00	- P	1.596E+01	6.37E+01	5.58E+00 G
PA-231	N	-1.3928E+01					1.20E+07	
			302.65	-1.393E+01	(	9.711E+01	2.08E+02	2.88E+00 G
			300.07	-1.556E+01	+	1.141E+02	2.19E+02	2.46E+00 G
PA-233	C	-1.7068E-02					7.82E+08	
			312.01	-1.707E-02	&(P	7.729E+00	4.96E+03	3.60E+01 G
			300.18	-6.418E+00	+	4.541E+01	2.11E+02	6.20E+00 G
PA-234	N	7.5016E-01					1.63E+12	
			131.29	-1.754E+00	?(	7.568E+00	1.29E+02	1.80E+01 G
			946.02	4.114E+00	?(	8.583E+00	8.90E+01	1.34E+01 G
			569.47	-3.853E+00	+	1.474E+01	1.12E+02	8.20E+00 G
			883.24	0.000E+00	-	1.917E+01	1.00E+03	9.60E+00 G
			880.53	5.828E+00	?	2.878E+01	1.43E+02	6.00E+00 GA
PA-234M	N	7.5891E+01					1.63E+12	
			1001.00	1.677E+01	?(P	1.842E+02	3.10E+02	8.37E-01 G
			766.41	2.442E+02	&(P	7.410E+02	9.06E+01	2.94E-01 G
AM-241	T	5.2335E-02					1.58E+05	
			59.54	5.233E-02	%(	3.751E+00	2.49E+03	3.59E+01 G
Np-237	F	-2.9743E+00					2.14E+06	
			86.49	-2.974E+00	?(	1.588E+01	1.60E+02	1.31E+01 G
Ir-192	F	2.9682E-01					7.40E+01	
			316.49	1.299E-02	%(	1.290E+00	2.85E+03	8.70E+01 G
			468.06	7.742E-01	?(	2.741E+00	1.05E+02	5.18E+01 G
			308.44	0.000E+00	-	8.691E+00	1.00E+03	3.18E+01 G
Cs-136	F	-6.0930E-01					1.30E+01	
			818.50	-6.093E-01	?(	1.911E+00	9.32E+01	1.00E+02 G
			1048.07	-1.415E+00	+	3.024E+00	6.47E+01	8.00E+01 G
			340.57	-9.060E-01	+	4.095E+00	1.35E+02	4.69E+01 G
Np-239	T	1.2894E+00					2.36E+00	
			103.70	-1.047E+00	+	4.816E+00	1.37E+02	2.40E+01 X
			106.13	1.289E+00	?(	4.982E+00	1.16E+02	2.27E+01 G
			99.50	-2.214E+00	+	8.282E+00	1.12E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	3.2024E+00					1.11E+01	
		531.00	3.202E+00	?(	7.729E+00	9.66E+01	1.30E+01 G
		91.10	5.220E-01	-	6.643E+00	3.80E+02	2.83E+01 G
TL-210 N	5.0567E-01					5.84E+05	
		799.60	5.057E-01	&(	1.599E+00	9.35E+01	9.90E+01 G
		296.00	-4.781E-01	-	3.561E+00	2.23E+02	7.90E+01 G
		1313.00	-1.953E+00	+	7.473E+00	1.70E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	156.	13.	0.007	164.08	3.831E+00	
BA-133	80.99	241.	16.	0.009	166.04	6.684E-01	P
Np-237	86.49	1009.	-28.	-0.016	160.19	-2.974E+00	
EU-155	86.54	975.	-29.	-0.016	151.60	-1.319E+00	
Sn-126	86.94	946.	-29.	-0.016	149.29	-4.471E+00	
Sn-126	87.57	916.	-29.	-0.016	146.86	-1.075E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Nd-147	91.10	860.	11.	0.006	379.91	5.220E-01		
Gd-153	97.50	408.	-25.	-0.014	114.15	-1.117E+00		
Np-239	99.50	389.	-25.	-0.014	112.03	-2.214E+00		
Gd-153	103.20	340.	22.	0.012	118.86	1.332E+00		
Np-239	103.70	341.	-19.	-0.011	137.31	-1.047E+00		
Np-239	106.13	328.	23.	0.013	115.54	1.289E+00		
EU-152	121.78	271.	12.	0.007	190.78	5.605E-01		
EU-154	123.10	251.	12.	0.007	183.76	3.934E-01		
PA-234	131.29	466.	-24.	-0.013	129.11	-1.754E+00		
HF-181	133.02	490.	-20.	-0.011	158.94	-6.081E-01		
HF-181	136.30	480.	5.	0.003	642.99	1.102E+00		
Tc-99m	140.51	459.	14.	0.008	212.95	2.233E-01		
U-235	143.79	374.	14.	0.008	201.52	1.704E+00		P
CE-141	145.44	447.	-8.	-0.005	360.60	-2.367E-01		
Ba-140	162.66	324.	-19.	-0.011	135.93	-4.450E+00		
CE-139	165.85	305.	8.	0.004	310.75	1.454E-01		
Cf-251	176.60	217.	-25.	-0.014	106.11	-2.240E+00		
U-235	185.72	390.	-43.	-0.024	66.39	-1.244E+00		P
U-235	205.33	141.	3.	0.002	611.72	1.159E+00		P
Cf-251	227.00	127.	20.	0.011	101.53	5.764E+00		
EU-152	244.69	647.	18.	0.010	198.23	4.560E+00		
TH-227	256.24	107.	9.	0.005	199.62	2.603E+00		
BI-210M	265.83	126.	12.	0.007	138.87	4.689E-01		
Hg-203	279.20	153.	2.	0.001	877.50	5.087E-02		
I-131	284.30	84.	35.	0.019	52.39	1.185E+01		
TL-210	296.00	750.	-18.	-0.010	222.60	-4.781E-01		
PA-231	300.07	733.	-18.	-0.010	219.23	-1.556E+01		
PA-233	300.18	736.	-18.	-0.010	211.49	-6.418E+00		
PA-231	302.65	718.	-18.	-0.010	208.42	-1.393E+01		
BA-133	302.85	700.	-18.	-0.010	205.78	-2.189E+00		
CR-51	320.08	96.	-11.	-0.006	171.76	-2.485E+00		
La-140	328.76	70.	16.	0.009	102.54	1.798E+00		
Cf-249	333.44	55.	14.	0.008	102.52	2.121E+00		
Cs-136	340.57	280.	-18.	-0.010	134.67	-9.060E-01		
EU-152	344.29	263.	-19.	-0.011	71.84	-1.728E+00		P
BA-133	356.00	688.	-17.	-0.009	226.04	-6.537E-01		
I-131	364.48	82.	-18.	-0.010	156.32	-5.380E-01		P
BA-133	383.84	196.	-17.	-0.010	116.86	-5.021E+00		
Cf-249	387.95	213.	-8.	-0.004	271.11	-3.043E-01		
SB-125	427.88	45.	13.	0.007	100.17	1.226E+00		P
AG-108M	433.94	59.	-5.	-0.003	273.56	-1.486E-01		P
pm-146	453.88	64.	-10.	-0.006	159.79	-4.498E-01		
SB-125	463.37	69.	13.	0.007	97.68	3.554E+00		P
Ir-192	468.06	92.	13.	0.007	104.92	7.742E-01		
BE-7	477.59	68.	-6.	-0.003	198.61	-1.730E+00		
HF-181	482.00	111.	-16.	-0.009	97.48	-6.000E-01		
La-140	487.02	68.	-17.	-0.009	98.55	-1.143E+00		
RU-103	497.05	36.	5.	0.003	245.91	1.672E-01		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
RH-106	511.86	80.	73.	0.041	33.36	1.164E+01		
Nd-147	531.00	36.	13.	0.007	96.60	3.202E+00		
Ba-140	537.26	28.	9.	0.005	119.84	1.219E+00		
CS-134	563.24	20.	9.	0.005	100.97	3.782E+00		P
CS-134	569.32	24.	11.	0.006	71.82	2.390E+00		
PA-234	569.47	48.	-9.	-0.005	112.08	-3.853E+00		
BI-207	569.70	45.	-5.	-0.003	201.13	-1.705E-01		
SB-125	600.50	691.	-17.	-0.009	224.61	-3.341E+00		
SB-124	602.73	674.	-17.	-0.009	221.58	-6.099E-01		
CS-134	604.71	657.	-17.	-0.009	218.56	-6.162E-01		
RU-103	610.30	641.	-17.	-0.009	215.00	-1.057E+01		
AG-108M	614.28	624.	-17.	-0.009	211.63	-6.817E-01		
PM-144	618.06	509.	14.	0.008	237.73	4.990E-01		
RH-106	621.92	641.	-17.	-0.010	206.22	-6.477E+00		
SB-125	635.89	40.	-4.	-0.002	262.64	-1.157E+00		
I-131	636.97	40.	7.	0.004	126.95	3.829E+00		
AG-110M	657.76	51.	2.	0.001	436.36	9.452E-02		
CS-137	661.66	78.	-15.	-0.009	84.93	-6.945E-01		
PM-144	696.54	44.	-9.	-0.005	261.10	-3.516E-01		P
NB-94	702.63	26.	5.	0.003	196.63	2.240E-01		P
SB-124	722.79	56.	14.	0.008	82.25	5.184E+00		
AG-108M	722.94	70.	2.	0.001	501.66	1.074E-01		
BI-212	727.17	82.	-8.	-0.004	163.94	-4.377E+00		
pm-146	735.72	39.	-9.	-0.005	145.51	-1.667E+00		
pm-146	747.16	22.	7.	0.004	135.57	9.043E-01		P
ZR-95	756.73	22.	3.	0.002	290.26	2.605E-01		
AG-110M	763.94	56.	-11.	-0.006	100.82	-2.116E+00		
NB-95	765.79	126.	-23.	-0.013	73.25	-9.752E-01		
PA-234M	766.41	106.	17.	0.009	90.56	2.442E+02		P
EU-152	778.92	31.	-3.	-0.001	600.29	-8.484E-01		P
BI-212	785.42	26.	4.	0.002	264.97	1.367E+01		
CS-134	795.87	65.	-14.	-0.008	84.52	-7.359E-01		
TL-210	799.60	50.	11.	0.006	93.55	5.057E-01		
CS-134	801.95	62.	-7.	-0.004	175.26	-3.346E+00		
CO-58	810.78	37.	6.	0.003	158.17	2.553E-01		
La-140	815.77	48.	-9.	-0.005	112.05	-1.773E+00		
Cs-136	818.50	72.	-14.	-0.008	93.16	-6.093E-01		
MN-54	834.85	33.	-3.	-0.001	458.77	-1.222E-01		
NB-94	871.10	11.	7.	0.004	73.80	3.520E-01		
EU-154	873.23	44.	-13.	-0.007	78.24	-4.979E+00		
PA-234	880.53	52.	7.	0.004	143.45	5.828E+00		
AG-110M	884.68	35.	9.	0.005	96.78	6.041E-01		
Sc-46	889.28	69.	-9.	-0.005	134.61	-4.328E-01		
y-88	898.04	37.	-14.	-0.008	75.60	-7.409E-01		P
AG-110M	937.49	47.	-17.	-0.010	87.46	-2.508E+00		
PA-234	946.02	19.	11.	0.006	88.99	4.114E+00		
EU-152	964.11	75.	10.	0.005	131.68	3.348E+00		
EU-154	996.33	10.	20.	0.011	32.37	9.635E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	1001.00	33.	3.	0.001	309.77	1.677E+01	P
EU-154	1004.77	36.	6.	0.003	155.39	1.652E+00	
Cs-136	1048.07	80.	-21.	-0.012	64.72	-1.415E+00	
RH-106	1050.36	74.	2.	0.001	498.71	8.605E+00	
Ga-68	1077.40	20.	-6.	-0.003	168.87	-1.188E+01	
FE-59	1099.25	20.	12.	0.007	88.08	1.182E+00	
EU-152	1112.07	167.	-16.	-0.009	118.94	-6.571E+00	
ZN-65	1115.55	152.	-16.	-0.009	113.29	-1.779E+00	
Sc-46	1120.55	136.	-7.	-0.004	244.35	-3.914E-01	
Ta-182	1121.30	98.	12.	0.007	120.58	1.963E+00	
CO-60	1173.24	35.	-14.	-0.008	75.10	-8.370E-01	P
Ta-182	1221.41	27.	-6.	-0.003	211.36	-1.285E+00	
NA-22	1274.53	43.	-16.	-0.009	64.15	-9.920E-01	
TL-210	1313.00	21.	-6.	-0.004	170.46	-1.953E+00	
CO-60	1332.50	16.	-5.	-0.003	201.03	-3.393E-01	P
AG-110M	1384.30	5.	13.	0.007	50.07	3.519E+00	
EU-152	1408.00	11.	10.	0.005	84.08	3.114E+00	
La-140	1596.21	28.	-11.	-0.006	114.08	-8.962E-01	
SB-124	1690.98	6.	2.	0.001	304.14	3.304E-01	
y-88	1836.06	0.	6.	0.003	40.82	5.097E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.7298E+00	-1.7299E+00	1.986E+02%	1.19E+01
NA-22	#A	-9.9205E-01	-9.9205E-01	6.415E+01%	2.10E+00
K-40		1.5751E+02	1.5751E+02	6.672E+00%	1.00E+01
Sc-46	#A	-4.3284E-01	-4.3285E-01	1.346E+02%	1.99E+00
CR-51	#A	-2.4847E+00	-2.4847E+00	1.718E+02%	1.11E+01
MN-54	#A	-1.2218E-01	-1.2218E-01	4.588E+02%	1.34E+00
FE-59	#A	1.1817E+00	1.1818E+00	8.808E+01%	2.35E+00
Co-56	#	9.7670E-01	9.7670E-01	3.807E+01%	8.06E-01
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.23E+00
CO-58	#A	2.5531E-01	2.5531E-01	1.582E+02%	1.40E+00
CO-60	#A	-3.3930E-01	-3.3930E-01	2.010E+02%	1.41E+00
ZN-65	#A	-1.7791E+00	-1.7791E+00	1.133E+02%	6.78E+00
NB-94	#A	2.8867E-01	2.8867E-01	7.380E+01%	1.10E+00
ZR-95	#A	2.6045E-01	2.6046E-01	2.903E+02%	1.91E+00
NB-95	#A	-9.7523E-01	-9.7523E-01	7.325E+01%	2.37E+00
RU-103	#A	1.6717E-01	1.6717E-01	2.459E+02%	1.06E+00
RH-106	#A	-4.4291E+00	-4.4291E+00	2.062E+02%	4.47E+01
AG-108M	#A	-2.0329E-02	-2.0329E-02	2.736E+02%	1.20E+00
AG-110M	#A	1.3342E+00	1.3342E+00	5.007E+01%	1.99E+00
SN-113	#A	2.1921E-02	2.1921E-02	3.886E+03%	2.92E+00

SB-124 #A	7.5861E-02	7.5862E-02	8.225E+01%		4.52E+00
SB-125 #A	1.8342E+00	1.8342E+00	6.996E+01%		3.20E+00
I-131 #A	5.9198E-01	5.9201E-01	5.239E+01%		1.37E+00
Gd-153 #A	-8.6441E-02	-8.6441E-02	8.240E+01%		4.26E+00
Ga-68 #A	-1.1768E+01	-1.1875E+01	1.689E+02%		4.66E+01
Tc-99m #A	2.2291E-01	2.2329E-01	2.130E+02%		1.60E+00
BA-133 #A	-6.5367E-01	-6.5367E-01	2.260E+02%		4.95E+00
CS-134 #A	6.7462E-02	6.7462E-02	7.182E+01%		4.51E+00
CS-137 #A	-6.9455E-01	-6.9455E-01	8.493E+01%		1.98E+00
CE-139 #A	1.4542E-01	1.4542E-01	3.107E+02%		1.53E+00
Ba-140 #A	1.2192E+00	1.2192E+00	1.198E+02%		3.71E+00
La-140 #A	-4.2351E-01	-4.2353E-01	7.670E+01%		2.18E+00
CE-141 #A	-2.3665E-01	-2.3665E-01	3.606E+02%		2.88E+00
CE-144 #A	7.9662E-02	7.9663E-02	4.365E+03%		1.18E+01
PM-144 #A	7.3917E-02	7.3917E-02	1.766E+02%		1.35E+00
EU-152 #A	-3.2958E-01	-3.2958E-01	7.184E+01%		7.09E+00
EU-154 #A	1.7944E+00	1.7944E+00	3.237E+01%		1.30E+01
EU-155 #A	-3.1157E-02	-3.1157E-02	3.991E+03%		5.29E+00
HF-181 #A	-4.8471E-01	-4.8472E-01	9.748E+01%		1.96E+00
Ta-182 #A	1.9629E+00	1.9629E+00	1.206E+02%		8.02E+00
Hg-203 #A	5.0872E-02	5.0873E-02	8.775E+02%		1.54E+00
TL-208 #A	-6.4778E-02	-6.4778E-02	5.666E+01%		2.41E+00
pm-146 #A	9.0430E-01	9.0430E-01	1.356E+02%		3.03E+00
y-88 #A	-7.4092E-01	-7.4093E-01	7.560E+01%		1.61E+00
Cd-113m A	5.4080E+03	5.4080E+03	9.481E+01%		1.72E+04
Cd-109 #A	1.0616E+01	1.0616E+01	1.398E+02%		4.95E+01
Cf-251 #A	-2.2396E+00	-2.2396E+00	1.061E+02%		6.35E+00
Cf-249 #A	1.5717E-01	1.5717E-01	1.025E+02%		2.80E+00
Sn-126 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.79E+01
PB-210	3.5480E+01	3.5480E+01	3.291E+01%		3.24E+01
PB-212	1.1126E+01	1.1126E+01	7.798E+00%		1.84E+00
PB-214	3.5285E+01	3.5285E+01	4.552E+00%		2.40E+00
BI-207 #A	-1.7054E-01	-1.7054E-01	2.011E+02%		1.20E+00
BI-212 #A	-4.3768E+00	-4.3768E+00	1.639E+02%		2.46E+01
U-235 #A	1.5332E+00	1.5332E+00	2.015E+02%		1.15E+01
BI-214	3.3280E+01	3.3280E+01	5.314E+00%		2.00E+00
BI-210M#A	4.6887E-01	4.6887E-01	1.389E+02%		2.21E+00
AC-228	1.2189E+01	1.2189E+01	1.290E+01%		5.83E+00
TH-227 #A	3.2578E+00	3.2578E+00	1.292E+02%		1.79E+01
TH-229 A	3.6617E+00	3.6617E+00	2.202E+02%		2.19E+01
TH-234 #A	2.2464E+01	2.2464E+01	5.031E+01%		3.10E+01
PA-231 #A	-1.3928E+01	-1.3928E+01	2.084E+02%		9.71E+01
PA-233 #A	-1.7068E-02	-1.7068E-02	4.958E+03%		7.73E+00
PA-234 #A	7.5016E-01	7.5016E-01	7.841E+01%		7.57E+00
PA-234M#A	7.5891E+01	7.5891E+01	9.056E+01%		1.84E+02
AM-241 #A	5.2335E-02	5.2335E-02	2.493E+03%		3.75E+00
Np-237 #A	-2.9743E+00	-2.9743E+00	1.602E+02%		1.59E+01
Ir-192 #A	2.9682E-01	2.9682E-01	1.049E+02%		1.29E+00
Cs-136 #A	-6.0928E-01	-6.0930E-01	9.316E+01%		1.91E+00

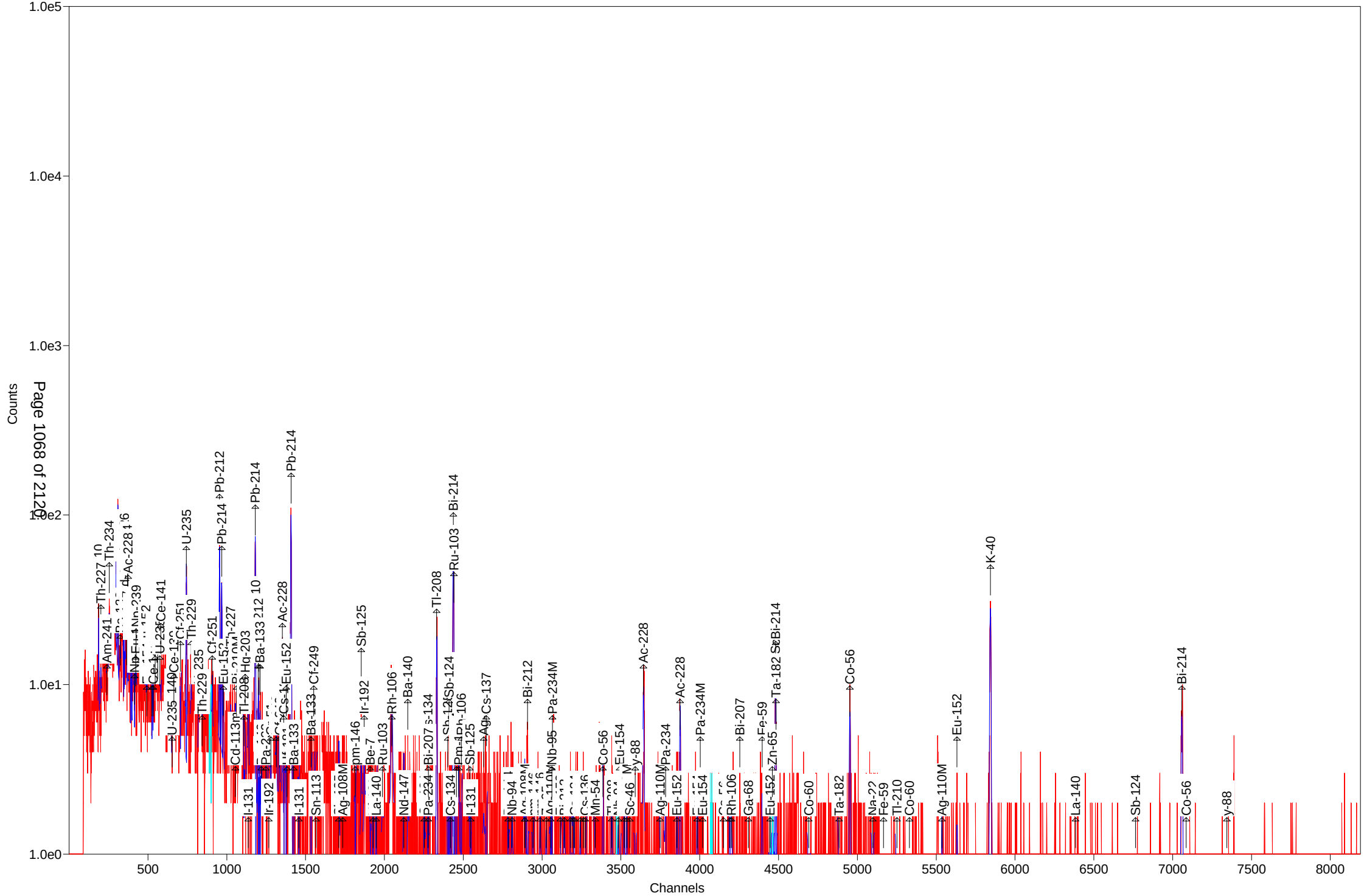
Np-239 #A	1.2892E+00	1.2894E+00	1.155E+02%	4.98E+00
Nd-147 #A	3.2023E+00	3.2024E+00	9.660E+01%	7.73E+00
TL-210 #A	5.0567E-01	5.0567E-01	9.355E+01%	1.60E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 3.073E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 3.0733807E+02 Bq/Sample

379951_Gamma_160-29881-A-8-C. 17_Gamma_20182902.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20181612

Sample Description: 379951_Gamma_160-29881-A-9-C
Detector: Detector #19
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-9-C

Decay to Time: 8/23/2018 06:28 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:28:26 Real Time: 1805 sec
Analysis Time: 8/27/2018 19:33 Dead Time: 0.27 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.176E+01	108.5	1.276E+01	1.278E+01	4.250E+01
NA-22	1.660E-01	495.0	8.219E-01	8.219E-01	2.905E+00
K-40	1.230E+02	13.8	1.694E+01	1.804E+01	2.921E+01
Sc-46	-1.798E+00	86.0	1.547E+00	1.550E+00	5.146E+00
CR-51	0.000E+00	1.#INF	5.314E+00	5.314E+00	8.482E+01
MN-54	-1.951E+00	84.5	1.649E+00	1.652E+00	3.708E+00
FE-59	-3.322E-01	228.3	7.586E-01	7.588E-01	5.819E+00
Co-56	9.444E+00	11.7	1.109E+00	1.209E+00	2.996E+00
CO-57	5.251E-01	134.4	7.057E-01	7.063E-01	3.259E+00
CO-58	-1.869E+00	84.8	1.585E+00	1.588E+00	5.267E+00
CO-60	1.276E+00	63.2	8.058E-01	8.083E-01	2.148E+00
ZN-65	-7.326E-02	3492.1	2.558E+00	2.558E+00	1.922E+01
NB-94	1.803E+00	45.4	8.187E-01	8.238E-01	2.036E+00
ZR-95	-1.450E+00	147.8	2.144E+00	2.145E+00	5.273E+00
NB-95	0.000E+00	1.#INF	2.124E+00	2.124E+00	7.009E+00
RU-103	1.057E+00	102.9	1.087E+00	1.089E+00	2.554E+00
RH-106	6.188E+00	148.9	9.214E+00	9.220E+00	2.198E+01
AG-108M	6.793E-01	203.3	1.381E+00	1.381E+00	2.740E+00
AG-110M	1.200E+00	92.5	1.110E+00	1.111E+00	6.467E+00
SN-113	6.972E-01	259.1	1.807E+00	1.807E+00	6.063E+00
SB-124	9.559E-01	173.2	1.656E+00	1.656E+00	1.266E+01
SB-125	3.630E+00	72.9	2.648E+00	2.654E+00	9.713E+00
I-131	5.884E-01	198.8	1.170E+00	1.170E+00	2.867E+00
Gd-153	-3.480E+00	253.2	8.812E+00	8.814E+00	2.915E+01
Ga-68	2.064E+01	232.6	4.800E+01	4.802E+01	1.076E+02
Tc-99m	1.031E+00	151.9	1.566E+00	1.567E+00	5.192E+00
BA-133	-1.866E+00	245.7	4.586E+00	4.587E+00	1.522E+01
CS-134	8.033E-01	93.7	7.525E-01	7.536E-01	1.281E+01
CS-137	0.000E+00	1.#INF	8.263E-01	8.264E-01	5.164E+00
CE-139	4.327E-01	105.1	4.549E-01	4.555E-01	1.525E+00
Ba-140	4.841E-01	954.0	4.618E+00	4.618E+00	1.102E+01
La-140	2.554E+00	37.1	9.485E-01	9.578E-01	2.695E+00
CE-141	1.885E+00	151.2	2.851E+00	2.853E+00	9.453E+00

CE-144	7.882E+00	150.1	1.183E+01	1.184E+01	3.922E+01
PM-144	-2.844E-01	414.3	1.179E+00	1.179E+00	2.719E+00
EU-152	-4.601E+00	52.4	2.409E+00	2.421E+00	1.956E+01
EU-154	2.494E+00	78.6	1.960E+00	1.964E+00	2.808E+01
EU-155	-5.029E+00	69.3	3.486E+00	3.497E+00	4.051E+01
HF-181	1.503E+00	148.9	2.238E+00	2.239E+00	4.873E+00
Ta-182	-6.578E-01	83.8	5.514E-01	5.523E-01	2.730E+01
Hg-203	-1.505E+00	83.1	1.251E+00	1.254E+00	4.145E+00
TL-208	4.141E+00	22.9	9.490E-01	9.720E-01	2.175E+00
pm-146	4.702E-01	89.5	4.208E-01	4.215E-01	8.189E+00
y-88	1.076E+00	89.0	9.580E-01	9.595E-01	2.856E+00
Cd-113m	3.379E+03	357.0	1.206E+04	1.206E+04	4.067E+04
Cd-109	2.705E+01	225.5	6.098E+01	6.100E+01	2.018E+02
Cf-251	-2.621E+00	222.4	5.830E+00	5.831E+00	1.476E+01
Cf-249	1.563E+00	103.6	1.620E+00	1.622E+00	5.393E+00
Sn-126	-1.172E+01	180.5	2.116E+01	2.117E+01	7.008E+01
PB-210	2.486E+02	12.0	2.980E+01	3.360E+01	7.415E+01
PB-212	9.872E+00	15.3	1.508E+00	1.593E+00	4.496E+00
PB-214	2.892E+02	2.1	5.971E+00	1.584E+01	7.067E+00
BI-207	3.716E-01	224.9	8.358E-01	8.360E-01	2.704E+00
BI-212	1.886E-02	79269.3	1.495E+01	1.495E+01	5.121E+01
U-235	2.538E-01	88.6	2.248E-01	2.252E-01	4.157E+01
BI-214	2.769E+02	2.1	5.944E+00	1.530E+01	5.289E+00
BI-210M	-3.331E-01	499.3	1.663E+00	1.663E+00	5.598E+00
AC-228	8.687E+00	31.7	2.754E+00	2.789E+00	1.069E+01
TH-227	-1.941E+01	189.2	3.671E+01	3.673E+01	1.216E+02
TH-229	9.590E+00	97.0	9.298E+00	9.312E+00	5.874E+01
TH-234	2.119E+02	10.1	2.135E+01	2.447E+01	6.244E+01
PA-231	0.000E+00	1.#INF	1.685E+01	1.685E+01	2.800E+02
PA-233	0.000E+00	1.#INF	1.927E+00	1.927E+00	2.295E+01
PA-234	5.395E+00	103.6	5.591E+00	5.598E+00	2.455E+01
PA-234M	1.802E+02	91.3	1.646E+02	1.648E+02	5.491E+02
AM-241	-3.383E+00	184.5	6.243E+00	6.246E+00	2.068E+01
Np-237	0.000E+00	1.#INF	2.127E+01	2.127E+01	7.037E+01
Ir-192	3.132E-01	229.8	7.198E-01	7.200E-01	9.600E+00
Cs-136	-1.821E+00	90.4	1.647E+00	1.650E+00	5.478E+00
Np-239	-3.909E+00	291.7	1.140E+01	1.141E+01	3.773E+01
Nd-147	3.021E+00	222.0	6.707E+00	6.709E+00	1.990E+01
TL-210	5.586E-01	237.7	1.328E+00	1.328E+00	3.975E+00
Total	4.849E+03				

Analyst: conrad.reuscher

Sample description
379951_Gamma_160-29881-A-9-C

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181612.An1

Acquisition information
Start time: 8/23/2018 6:28:26 AM
Live time: 1800
Real time: 1805
Dead time: 0.27 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/16/2018 12:11:21 PM
Type: Polynomial
Uncertainty: 0.841 %
Coefficients: -0.371612 -4.869309 0.466742
-0.049787 0.002234 -0.000039

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.71keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:28:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 34 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1681

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.73	362.	10.62	0.88	1.725E-02	46.54	4.250	2.486E+02	PB210
53.37	112.	30.19	0.94	2.277E-02				
56.10	20.	145.29	0.94	2.439E-02				
63.47	371.	12.87	0.95	2.770E-02	63.29	3.810	1.956E+02	TH234
					64.28	9.700	7.585E+01	Sn126
74.94	938.	5.63	0.96	3.099E-02				
77.29	1627.	3.67	0.96	3.149E-02				
79.43	72.	60.87	0.96	3.191E-02				
81.23	87.	46.94	0.97	3.222E-02	80.99	34.060	4.414E+00	BA133
84.18	208.	20.57	0.97	3.269E-02				
87.36	478.	9.35	0.97	3.312E-02	86.49	13.100	6.139E+01	Np237
					86.54	30.700	2.619E+01	EU155
					86.94	9.040	8.880E+01	Sn126
					87.57	37.500	2.136E+01	Sn126
					88.04	3.790	2.110E+02	Cd109
89.97	207.	18.97	0.97	3.341E-02				
91.12	61.	222.04	0.97	3.352E-02	91.10	28.300	PBC<MDA	Nd147
92.94	582.	7.78	0.98	3.369E-02	92.59	5.584	1.641E+02	TH234
					93.35	5.561	1.724E+02	AC228
98.67	88.	51.60	1.29	3.407E-02	99.50	15.000	9.501E+00	Np239
108.59	43.	63.20	0.69	3.432E-02				
123.10	51.	90.53	1.00	3.395E-02	123.10	40.790	PBC<MDA	EU154
131.29	54.	149.52	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
133.02	52.	148.86	1.01	3.336E-02	133.02	43.300	PBC<MDA	HF181
133.54	52.	150.07	1.01	3.333E-02	133.54	11.090	PBC<MDA	CE144
135.59	53.	151.21	1.02	3.312E-02	136.47	10.680	PBC<MDA	CO57
136.30	53.	150.97	1.02	3.313E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
140.51	53.	151.93	1.02	3.280E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	53.	151.22	1.02	3.240E-02	145.44	48.200	PBC<MDA	CE141
166.14	19.	105.13	0.64	3.053E-02	165.85	79.900	PBC<MDA	CE139
167.34	19.	105.13	0.64	3.039E-02				
186.17	935.	6.36	1.23	2.860E-02	185.72	54.000	3.360E+01	U235
205.33	47.	98.98	1.08	2.685E-02	205.33	5.010	PBC<MDA	U235
210.85	45.	96.96	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229
236.29	109.	23.77	1.10	2.431E-02				
238.71	186.	15.70	1.11	2.413E-02	238.63	43.300	9.890E+00	PB212
242.01	975.	4.04	1.11	2.388E-02	242.00	7.430	3.051E+02	PB214
263.70	8.	356.96	1.13	2.238E-02	263.70	0.006	PBC<MDA	Cd113m
277.43	30.	51.71	0.34	2.152E-02	277.28	6.310	PBC<MDA	TL208
295.18	1926.	2.56	1.16	2.050E-02	295.09	19.300	2.705E+02	PB214
					296.00	79.000	6.624E+01	TL210
299.79	50.	42.66	1.16	2.025E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.564E+01	PA231
					300.18	6.200	2.208E+01	PA233
328.76	26.	138.51	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
338.21	66.	31.70	1.55	1.839E-02	338.32	12.010	1.650E+01	AC228
351.89	3489.	2.06	1.23	1.783E-02	351.93	37.600	2.892E+02	PB214
364.48	15.	198.77	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	31.	103.59	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	13.	259.14	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
433.94	13.	203.29	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	29.	89.49	1.29	1.458E-02	453.88	65.000	PBC<MDA	pm146
463.37	29.	90.62	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	229.80	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
482.00	5.	596.20	1.31	1.391E-02	482.00	80.500	PBC<MDA	HF181
487.26	48.	37.13	1.71	1.380E-02	487.02	45.500	4.277E+00	La140
497.05	23.	102.87	1.33	1.358E-02	497.05	90.900	PBC<MDA	RU103
511.86	95.	41.11	2.59	1.328E-02	511.86	20.000	1.987E+01	RH106
530.86	5.	473.33	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	3.	953.97	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
569.32	9.	182.24	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.982E+00	PA234
					569.70	97.740	4.181E-01	BI207
569.47	12.	143.54	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.366E+00	PA234
					569.70	97.740	5.342E-01	BI207
569.70	5.	328.94	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.860E+00	PA234
					569.70	97.740	2.400E-01	BI207
583.49	76.	22.91	1.04	1.202E-02	583.02	84.500	4.141E+00	TL208
602.50	14.	564.06	1.41	1.172E-02	602.73	98.260	PBC<MDA	SB124
609.50	2671.	2.15	1.37	1.163E-02	609.31	46.090	2.769E+02	BI214
					610.30	5.750	2.222E+03	RU103
614.28	15.	520.03	1.42	1.156E-02	614.28	89.850	PBC<MDA	AG108M
621.92	13.	148.90	1.43	1.145E-02	621.92	9.930	PBC<MDA	RH106

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
635.89	19.	72.94	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	14.	173.58	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
665.80	82.	26.42	0.63	1.088E-02				
703.10	33.	45.42	2.04	1.045E-02	702.63	97.900	PBC<MDA	NB94
785.42	57.	40.32	1.56	9.628E-03	785.42	1.280	2.550E+02	BI212
795.87	20.	93.68	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
860.56	19.	85.29	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
870.93	13.	108.95	1.62	8.920E-03	871.10	99.890	PBC<MDA	NB94
898.04	20.	93.98	1.64	8.721E-03	898.04	93.700	PBC<MDA	y88
910.86	25.	87.90	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
934.32	142.	11.78	0.93	8.469E-03				
969.84	22.	79.33	1.69	8.244E-03	968.97	17.460	PBC<MDA	AC228
1002.09	22.	91.32	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	21.	80.26	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1063.66	6.	306.91	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	8.	232.63	1.77	7.615E-03	1077.40	3.300	PBC<MDA	Ga68
1120.59	614.	5.26	1.63	7.392E-03	1120.29	15.100	3.053E+02	BI214
					1120.55	99.987	4.612E+01	Sc46
					1121.30	34.900	1.322E+02	Ta182
1173.24	18.	90.61	1.84	7.138E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	18.	83.82	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	202.	11.74	1.89	6.848E-03	1238.28	66.070	2.475E+01	Co56
1274.53	2.	494.97	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	4.716E-01	EU154
1291.60	4.	396.86	1.92	6.626E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	17.	88.96	1.94	6.541E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	13.	88.05	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	18.	92.49	1.98	6.272E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	57.	32.51	2.00	6.187E-03	1408.00	21.005	2.418E+01	EU152
1461.01	142.	13.77	1.74	6.004E-03	1460.83	10.670	1.230E+02	K40
1593.35	14.	87.95	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140
1690.85	7.	173.21	2.18	5.307E-03	1690.98	47.790	PBC<MDA	SB124
1764.73	468.	4.66	1.93	5.112E-03	1764.49	15.400	3.299E+02	BI214
1836.06	7.	151.19	2.26	4.933E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
212.61	53.24	520.	112.	4.938E+03	30.19	0.941	-	D
223.53	55.97	418.	20.	8.255E+02	145.29	0.943	-	c
298.94	74.96	929.	943.	3.041E+04	5.62	0.960	-	D
308.33	77.31	961.	1625.	5.158E+04	3.67	0.962	-	D
316.89	79.45	918.	71.	2.220E+03	61.62	0.964	-	sD
324.08	81.24	793.	87.	2.702E+03	46.97	0.966	-	sD
335.86	84.19	745.	206.	6.290E+03	20.03	0.969	-	sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
358.98	89.98	665.	207.	6.196E+03	18.94	0.974	- sD
393.66	98.67	558.	88.	2.568E+03	51.60	1.293	- s
433.31	108.59	293.	43.	1.243E+03	63.20	0.689	- s
668.16	167.34	190.	19.	6.252E+02	105.13	0.637	- sc
743.45	186.17	608.	935.	3.271E+04	6.36	1.228	-
943.88	236.29	279.	108.	4.438E+03	23.93	1.104	- sD
1108.29	277.43	97.	30.	1.402E+03	51.35	0.337	- sM
1198.02	299.78	179.	50.	2.479E+03	40.24	1.159	- sD
2661.39	665.80	75.	82.	7.535E+03	26.42	0.625	- s
3735.60	934.32	37.	142.	1.673E+04	11.78	0.933	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.06	46.73	409.	325.	0.181	11.99	0.885
TH-227	199.70	50.14	5839.	-57.	-0.032	189.16	0.938s
AM-241	237.25	59.54	5528.	-57.	-0.032	184.54	0.946s
TH-234	252.25	63.29	616.	402.	0.223	10.08	0.950D
Sn-126	256.21	64.28	5317.	-57.	-0.032	180.48	0.951
BA-133	323.00	80.99	13738.	-64.	-0.036	257.51	0.966s
Np-237	344.99	86.49	13674.	0.	0.000	255.59	0.971A
EU-155	345.20	86.54	9813.	61.	0.034	229.38	0.971s
Sn-126	346.79	86.94	9444.	61.	0.034	78.18	0.971D
Sn-126	349.31	87.57	9209.	61.	0.034	80.00	0.972D
Cd-109	351.19	88.04	9505.	61.	0.034	225.45	0.972A
Nd-147	363.42	91.10	9270.	61.	0.034	222.04	0.975
TH-234	369.37	92.59	763.	548.	0.305	8.31	0.976D
AC-228	372.41	93.35	13126.	-64.	-0.035	254.80	0.977
Gd-153	389.00	97.50	13063.	-64.	-0.036	253.18	0.981s
Np-239	396.99	99.50	12999.	-64.	-0.036	252.10	0.982s
Gd-153	411.78	103.20	12935.	-64.	-0.036	250.62	0.986s
Np-239	413.78	103.70	12870.	-64.	-0.036	249.88	0.986s
EU-155	420.23	105.31	12808.	-66.	-0.037	69.32	0.988s
Np-239	423.49	106.13	12742.	-55.	-0.030	291.68	0.988s
EU-152	486.04	121.78	1337.	-55.	-0.031	95.07	1.002s
CO-57	487.18	122.06	1300.	-23.	-0.013	222.26	1.003s
EU-154	491.33	123.10	1046.	51.	0.028	90.53	1.004s
PA-234	524.09	131.29	3200.	54.	0.030	149.52	1.011s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	531.00	133.02	3018.	52.	0.029	148.86	1.013
CE-144	533.06	133.54	3070.	52.	0.029	150.07	1.013
HF-181	544.09	136.30	3123.	53.	0.029	150.97	1.015s
CO-57	544.79	136.47	3134.	53.	0.029	151.21	1.016s
Tc-99m	560.92	140.51	3187.	53.	0.029	151.93	1.019
U-235	574.02	143.79	3212.	-55.	-0.030	146.92	1.022s
CE-141	580.63	145.44	3185.	53.	0.029	151.22	1.024s
Ba-140	649.47	162.66	1431.	-38.	-0.021	140.51	1.039s
CE-139	662.23	165.85	190.	19.	0.011	105.13	0.637D
Cf-251	705.19	176.60	785.	-24.	-0.013	222.38	1.051s
U-235	741.65	185.72	1821.	-52.	-0.029	116.44	1.060
TH-229	772.79	193.51	745.	-13.	-0.007	474.12	1.066s
U-235	820.06	205.33	610.	47.	0.026	98.98	1.077
TH-229	842.11	210.85	543.	45.	0.025	96.96	1.082s
Cf-251	906.68	227.00	572.	-34.	-0.019	132.71	1.096s
PB-212	953.18	238.63	309.	186.	0.103	15.27	1.106D
PB-214	966.63	242.00	288.	975.	0.541	4.04	1.109D
EU-152	977.41	244.69	2528.	-46.	-0.025	156.89	1.111s
TH-227	1023.58	256.24	572.	-34.	-0.019	82.33	1.122s
Cd-113m	1053.40	263.70	421.	8.	0.005	356.96	1.128s
BI-210M	1061.92	265.83	551.	-7.	-0.004	499.30	1.130s
TL-208	1107.70	277.28	760.	-44.	-0.025	63.89	1.140
Hg-203	1115.37	279.20	748.	-47.	-0.026	83.11	1.141s
I-131	1135.76	284.30	444.	-37.	-0.021	112.71	1.146s
PB-214	1178.90	295.09	253.	1926.	1.070	2.56	1.155D
TL-210	1182.54	296.00	3766.	37.	0.020	237.71	1.156s
PB-212	1198.65	300.03	3803.	36.	0.020	243.26	1.159
PA-233	1199.25	300.18	3847.	0.	0.000	1000.00	1.159s
PA-231	1209.13	302.65	3847.	0.	0.000	1000.00	1.162s
BA-133	1209.93	302.85	3847.	0.	0.000	1000.00	1.162s
Ba-140	1217.92	304.85	3847.	0.	0.000	1000.00	1.164s
BI-210M	1218.11	304.90	3847.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	3847.	0.	0.000	1000.00	1.167
PA-233	1246.56	312.01	3847.	0.	0.000	1000.00	1.170
Ir-192	1264.46	316.49	3847.	0.	0.000	1000.00	1.173
CR-51	1278.83	320.08	3847.	0.	0.000	1000.00	1.177s
La-140	1313.52	328.76	325.	26.	0.014	138.51	1.184
Cf-249	1332.23	333.44	1473.	-39.	-0.022	139.49	1.188
AC-228	1351.32	338.21	122.	66.	0.036	31.70	1.546s
Cs-136	1360.74	340.57	1434.	-39.	-0.022	136.94	1.194
EU-152	1375.60	344.29	1277.	-40.	-0.022	52.37	1.197s
HF-181	1381.77	345.83	1405.	-40.	-0.022	135.05	1.199s
PB-214	1406.01	351.89	314.	3489.	1.938	2.06	1.226
BA-133	1422.43	356.00	4074.	-37.	-0.020	245.74	1.207s
I-131	1456.35	364.48	228.	15.	0.008	198.77	1.215s
BA-133	1533.76	383.84	535.	-16.	-0.009	439.17	1.231s
Cf-249	1550.19	387.95	488.	31.	0.017	103.59	1.235s
SN-113	1565.14	391.69	574.	13.	0.007	259.14	1.238s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1709.84	427.88	268.	-5.	-0.003	675.38	1.268s
AG-108M	1734.08	433.94	193.	13.	0.007	203.29	1.273s
pm-146	1813.83	453.88	164.	29.	0.016	89.49	1.290s
SB-125	1851.76	463.37	320.	29.	0.016	90.62	1.298s
Ir-192	1870.53	468.06	322.	11.	0.006	229.80	1.302s
BE-7	1908.66	477.60	558.	-31.	-0.017	108.48	1.310s
HF-181	1926.26	482.00	420.	5.	0.003	596.20	1.313s
La-140	1947.32	487.26	75.	48.	0.027	37.13	1.709s
RU-103	1986.48	497.05	135.	23.	0.013	102.87	1.326s
RH-106	2045.71	511.86	220.	95.	0.053	41.11	2.588
Nd-147	2122.23	531.00	152.	5.	0.003	473.33	1.354s
Ba-140	2147.27	537.26	161.	3.	0.002	953.97	1.359s
CS-134	2251.16	563.24	160.	-9.	-0.005	274.92	1.380s
CS-134	2275.49	569.32	130.	9.	0.005	182.24	1.385
PA-234	2276.09	569.47	130.	12.	0.006	143.54	1.385
BI-207	2277.02	569.70	142.	5.	0.003	328.94	1.385
TL-208	2332.16	583.49	63.	76.	0.042	22.91	1.040s
SB-125	2400.20	600.50	3147.	-22.	-0.012	358.54	1.410s
SB-124	2409.12	602.73	3111.	14.	0.008	564.06	1.412s
CS-134	2417.03	604.71	3125.	0.	0.000	1000.00	1.414s
BI-214	2436.19	609.50	108.	2671.	1.484	2.15	1.370
RU-103	2439.39	610.30	3125.	0.	0.000	1000.00	1.418s
AG-108M	2455.31	614.28	3103.	15.	0.008	520.03	1.421s
RH-106	2485.86	621.92	82.	13.	0.007	148.90	1.427s
SB-125	2541.74	635.89	88.	19.	0.011	72.94	1.439s
I-131	2546.08	636.97	129.	-22.	-0.012	74.95	1.440s
AG-110M	2629.23	657.76	310.	14.	0.008	173.58	1.456s
CS-137	2644.82	661.66	324.	0.	0.000	1000.00	1.459s
PM-144	2784.35	696.54	107.	-5.	-0.003	414.34	1.487s
NB-94	2810.58	703.10	56.	33.	0.018	45.42	2.044s
SB-124	2889.33	722.79	204.	-15.	-0.008	140.06	1.507s
AG-108M	2889.93	722.94	218.	0.	0.000	1000.00	1.507s
EU-154	2891.61	723.36	218.	0.	0.000	1000.00	1.508s
pm-146	2941.07	735.72	117.	-15.	-0.008	139.65	1.518s
pm-146	2986.83	747.16	103.	-11.	-0.006	184.20	1.526s
ZR-95	3025.11	756.73	108.	-14.	-0.008	147.84	1.534s
AG-110M	3053.97	763.94	214.	-35.	-0.019	59.43	1.539s
NB-95	3061.35	765.79	672.	0.	0.000	65.72	1.541A
EU-152	3113.88	778.92	79.	-2.	-0.001	812.41	1.551s
BI-212	3139.88	785.42	103.	57.	0.031	40.32	1.556s
CS-134	3181.68	795.87	172.	20.	0.011	93.68	1.564s
TL-210	3196.61	799.60	192.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	229.	-27.	-0.015	82.39	1.569s
CO-58	3241.32	810.78	340.	-31.	-0.017	84.80	1.575s
La-140	3261.30	815.77	361.	-32.	-0.018	87.07	1.579s
Cs-136	3272.22	818.50	368.	-31.	-0.017	90.42	1.581s
MN-54	3337.63	834.85	159.	-32.	-0.018	84.53	1.594s
Co-56	3385.32	846.77	99.	-11.	-0.006	173.72	1.603s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	3440.51	860.56	56.	19.	0.011	85.29	1.614
NB-94	3482.65	871.10	93.	13.	0.007	108.95	1.621s
EU-154	3491.19	873.23	127.	-8.	-0.004	202.33	1.623s
PA-234	3520.39	880.53	224.	-14.	-0.008	153.53	1.628
PA-234	3531.23	883.24	238.	0.	0.000	1000.00	1.630s
AG-110M	3537.01	884.68	238.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	285.	-28.	-0.016	86.03	1.635s
y-88	3590.45	898.04	71.	20.	0.011	93.98	1.642
AC-228	3642.58	911.07	95.	25.	0.014	87.90	1.651s
AG-110M	3748.30	937.49	292.	-28.	-0.016	67.35	1.671s
PA-234	3782.42	946.02	105.	-15.	-0.009	123.01	1.677s
EU-152	3854.81	964.11	252.	-28.	-0.015	83.52	1.691s
AC-228	3874.26	968.97	142.	22.	0.012	79.33	1.694
EU-154	3983.73	996.33	210.	-25.	-0.014	83.32	1.714s
PA-234M	4002.41	1001.00	188.	22.	0.012	91.32	1.718s
EU-154	4017.53	1004.77	128.	21.	0.012	80.26	1.721s
Co-56	4149.84	1037.84	75.	-11.	-0.006	175.20	1.745s
RH-106	4199.94	1050.36	87.	-7.	-0.004	291.18	1.754s
BI-207	4253.17	1063.66	60.	6.	0.003	306.91	1.763s
Ga-68	4308.15	1077.40	70.	8.	0.004	232.63	1.773s
FE-59	4395.60	1099.25	80.	-9.	-0.005	228.34	1.789s
EU-152	4446.92	1112.07	763.	-19.	-0.010	92.04	1.798s
BI-214	4480.98	1120.59	55.	614.	0.341	5.26	1.628
Sc-46	4480.84	1120.55	762.	-18.	-0.010	214.26	1.804
Ta-182	4483.84	1121.30	708.	-25.	-0.014	151.22	1.804
CO-60	4691.70	1173.24	48.	18.	0.010	90.61	1.841
Ta-182	4754.99	1189.05	64.	-5.	-0.003	366.42	1.852
Ta-182	4884.51	1221.41	43.	18.	0.010	83.82	1.874
Co-56	4952.04	1238.28	69.	202.	0.112	11.74	1.886
NA-22	5097.14	1274.53	48.	2.	0.001	494.97	1.910
EU-154	5097.19	1274.54	50.	0.	0.000	1000.00	1.910
FE-59	5165.45	1291.60	48.	4.	0.002	396.86	1.922s
TL-210	5251.13	1313.00	43.	17.	0.010	88.96	1.936s
CO-60	5329.19	1332.50	23.	13.	0.007	88.05	1.949s
AG-110M	5536.55	1384.30	45.	18.	0.010	92.49	1.984s
EU-152	5631.44	1408.00	51.	57.	0.031	32.51	1.999
K-40	5843.68	1461.01	44.	142.	0.079	13.77	1.736
La-140	6385.01	1596.21	25.	14.	0.008	87.95	2.119s
SB-124	6764.54	1690.98	24.	7.	0.004	173.21	2.176s
BI-214	7059.88	1764.73	3.	468.	0.260	4.66	1.933
y-88	7345.60	1836.06	18.	7.	0.004	151.19	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C  -1.1765E+01                                   5.31E+01
                          477.60-1.176E+01 &(  4.250E+01 1.08E+02 1.05E+01 G

NA-22    C   1.6605E-01                                   9.50E+02
                         1274.53 1.660E-01 &(  2.905E+00 4.95E+02 9.99E+01 G

K-40     N   1.2297E+02                                   4.66E+11
                         1460.83 1.230E+02  (P 2.921E+01 1.38E+01 1.07E+01 G

Sc-46    F  -1.7981E+00                                   8.38E+01
                          889.28-1.798E+00 ?(  5.146E+00 8.60E+01 1.00E+02 G
                         1120.55-1.378E+00 +   9.874E+00 2.14E+02 1.00E+02 G

MN-54    C  -1.9512E+00                                   3.12E+02
                          834.85-1.951E+00 ?(  3.708E+00 8.45E+01 1.00E+02 G

FE-59    F  -3.3223E-01                                   4.45E+01
                         1099.25-1.180E+00 ?(  5.819E+00 2.28E+02 5.65E+01 G
                         1291.60 7.763E-01 ?(  6.792E+00 3.97E+02 4.32E+01 G

Co-56    C   9.4440E+00                                   7.73E+01
                          846.77-6.723E-01 &(P 2.996E+00 1.74E+02 9.99E+01 G
                         1238.28 2.475E+01  (P 5.103E+00 1.17E+01 6.61E+01 G
                         1037.84-5.724E+00 & P 2.167E+01 1.75E+02 1.41E+01 G
                         1771.35 1.996E+00 %   7.399E+01 1.10E+03 1.55E+01  A

CO-57    C   5.2506E-01                                   2.72E+02
                          122.06-4.399E-01 &(  3.259E+00 2.22E+02 8.56E+01 G
                          136.47 8.259E+00 &(  4.140E+01 1.51E+02 1.07E+01 G

CO-58    C  -1.8691E+00                                   7.09E+01
                          810.78-1.869E+00 ?(  5.267E+00 8.48E+01 9.95E+01 G

CO-60    F   1.2755E+00                                   1.93E+03
                         1332.50 1.149E+00 ?(P 2.148E+00 8.80E+01 1.00E+02 G
                         1173.24 1.402E+00 ?(  2.726E+00 9.06E+01 9.99E+01 G

ZN-65    F  -7.3260E-02                                   2.44E+02
                         1115.55-7.326E-02 %(P 1.922E+01 3.49E+03 5.06E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	1.8026E+00					7.41E+06	
			702.63	1.803E+00	(P	2.036E+00	4.54E+01	9.79E+01 G
			871.10	8.077E-01	- P	2.972E+00	1.09E+02	9.99E+01 G
ZR-95	I	-1.4504E+00					6.40E+01	
			756.73	-1.450E+00	?(P	5.273E+00	1.48E+02	5.45E+01 G
			724.20	-7.061E-02	% P	8.820E+00	2.64E+03	4.42E+01 G
RU-103	I	1.0568E+00					3.93E+01	
			497.05	1.057E+00	?(P	2.554E+00	1.03E+02	9.09E+01 G
			610.30	0.000E+00	-	2.190E+02	1.00E+03	5.75E+00 GA
RH-106	I	6.1884E+00					3.74E+02	
			621.92	6.188E+00	(	2.198E+01	1.49E+02	9.93E+00 G
			1050.36	-3.155E+01	& P	2.117E+02	2.91E+02	1.56E+00 G
			511.86	1.987E+01		1.503E+01	4.11E+01	2.00E+01 GA
AG-108M	C	6.7927E-01					1.53E+05	
			433.94	5.481E-01	?(P	2.740E+00	2.03E+02	9.05E+01 G
			722.94	0.000E+00	-	4.276E+00	1.00E+03	9.08E+01 G
			614.28	8.113E-01	?(	1.403E+01	5.20E+02	8.98E+01 G
AG-110M	F	1.1996E+00					2.50E+02	
			884.68	0.000E+00	?(	6.467E+00	1.00E+03	7.27E+01 G
			657.76	7.751E-01	?(	4.527E+00	1.74E+02	9.46E+01 G
			937.49	-5.407E+00	+ P	1.575E+01	6.74E+01	3.44E+01 G
			1384.30	6.443E+00	&(	1.243E+01	9.25E+01	2.43E+01 G
			763.94	-8.899E+00	+ P	1.798E+01	5.94E+01	2.23E+01 G
SN-113	F	6.9721E-01					1.15E+02	
			391.69	6.972E-01	?(P	6.063E+00	2.59E+02	6.40E+01 G
SB-124	F	9.5590E-01					6.02E+01	
			602.73	6.751E-01	?(	1.266E+01	5.64E+02	9.83E+01 G
			1690.98	1.533E+00	?(	5.594E+00	1.73E+02	4.78E+01 G
			722.79	-7.363E+00	+	3.475E+01	1.40E+02	1.08E+01 G
SB-125	I	3.6305E+00					1.01E+03	
			427.88	-6.204E-01	?(P	9.713E+00	6.75E+02	2.96E+01 G
			600.50	-5.865E+00	&	6.988E+01	3.59E+02	1.79E+01 G
			635.89	8.345E+00	?(P	2.022E+01	7.29E+01	1.13E+01 G
			463.37	1.056E+01	*(	3.184E+01	9.06E+01	1.05E+01 G
I-131	I	5.8843E-01					8.02E+00	
			364.48	5.884E-01	&(	2.867E+00	1.99E+02	8.17E+01 G
			284.30	-1.586E+01	&	4.325E+01	1.13E+02	6.14E+00 G
			636.97	-1.541E+01	&	3.838E+01	7.49E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-3.4803E+00					2.42E+02	
			97.50	-3.480E+00	?(	2.915E+01	2.53E+02	3.00E+01 G
			103.20	-4.782E+00	+	3.964E+01	2.51E+02	2.18E+01 G
Ga-68	C	2.0636E+01					4.71E-02	
			1077.40	2.064E+01	&(	1.076E+02	2.33E+02	3.30E+00 G
Tc-99m	I	1.0307E+00					2.51E-01	
			140.51	1.031E+00	?(	5.192E+00	1.52E+02	8.93E+01 G
BA-133	F	-1.8663E+00					3.85E+03	
			356.00	-1.866E+00	&(	1.522E+01	2.46E+02	6.20E+01 G
			302.85	0.000E+00	+	4.402E+01	1.00E+03	1.83E+01 G
			383.84	-6.128E+00	& P	4.129E+01	4.39E+02	8.94E+00 GA
			80.99	-3.266E+00	+	2.782E+01	2.58E+02	3.41E+01 GA
CS-134	I	8.0328E-01					7.54E+02	
			604.71	0.000E+00	?(	1.281E+01	1.00E+03	9.76E+01 G
			795.87	1.387E+00	?(P	4.344E+00	9.37E+01	8.55E+01 G
			569.32	2.656E+00	?(	1.648E+01	1.82E+02	1.54E+01 G
			801.95	-1.802E+01	&	4.938E+01	8.24E+01	8.69E+00 G
			563.24	-5.089E+00	+ P	3.328E+01	2.75E+02	8.35E+00 G
CE-139	F	4.3273E-01					1.38E+02	
			165.85	4.327E-01	(	1.525E+00	1.05E+02	7.99E+01 G
Ba-140	I	4.8410E-01					1.28E+01	
			537.26	4.841E-01	?(P	1.102E+01	9.54E+02	2.44E+01 G
			162.66	-1.110E+01	&	5.186E+01	1.41E+02	6.22E+00 G
			304.85	0.000E+00	&	1.891E+02	1.00E+03	4.29E+00 G
La-140	I	2.5543E+00					1.28E+01	
			1596.21	1.480E+00	&(P	2.695E+00	8.79E+01	9.54E+01 G
			487.02	4.277E+00	*(	3.803E+00	3.71E+01	4.55E+01 G
			328.76	3.742E+00	(P	1.262E+01	1.39E+02	2.03E+01 G
			815.77	-8.041E+00	+	2.328E+01	8.71E+01	2.33E+01 G
CE-141	I	1.8855E+00					3.25E+01	
			145.44	1.885E+00	?(	9.453E+00	1.51E+02	4.82E+01 G
CE-144	I	7.8820E+00					2.85E+02	
			133.54	7.882E+00	?(	3.922E+01	1.50E+02	1.11E+01 G
PM-144	C	-2.8443E-01					3.63E+02	
			696.54	-2.844E-01	(	2.719E+00	4.14E+02	9.90E+01 G
			618.06	-2.049E-02	% P	1.281E+01	1.36E+04	9.91E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F	-4.6005E+00					4.94E+03	
			344.29	-4.601E+00	(P	1.956E+01	5.24E+01	2.65E+01 G
			1112.07	-1.026E+01	& P	7.196E+01	9.20E+01	1.36E+01 G
			121.78	-3.141E+00 +		9.894E+00	9.51E+01	2.86E+01 G
			778.92	-1.034E+00 +		1.960E+01	8.12E+02	1.29E+01 G
			964.11	-1.268E+01 +		3.522E+01	8.35E+01	1.46E+01 G
			244.69	-1.409E+01 &		7.333E+01	1.57E+02	7.58E+00 G
			1408.00	2.418E+01 +	P	1.545E+01	3.25E+01	2.10E+01 GA
EU-154	I	2.4943E+00					3.14E+03	
			873.23	-4.068E+00 ?(		2.808E+01	2.02E+02	1.23E+01 G
			123.10	2.051E+00 &(		6.153E+00	9.05E+01	4.08E+01 G
			1274.54	0.000E+00 &		8.409E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00 -		1.922E+01	1.00E+03	2.02E+01 G
			1004.77	7.969E+00 ?(		2.131E+01	8.03E+01	1.80E+01 G
			996.33	-1.642E+01 +		4.554E+01	8.33E+01	1.06E+01 G
EU-155	I	-5.0292E+00					1.81E+03	
			105.31	-5.029E+00 &(P		4.051E+01	6.93E+01	2.12E+01 G
			86.54	3.353E+00 +		2.545E+01	2.29E+02	3.07E+01 G
HF-181	F	1.5033E+00					4.24E+01	
			482.00	2.419E-01 &(		4.873E+00	5.96E+02	8.05E+01 G
			133.02	2.016E+00 ?(		9.949E+00	1.49E+02	4.33E+01 G
			345.83	-8.061E+00 &		3.617E+01	1.35E+02	1.51E+01 G
			136.30	1.507E+01 &(		7.542E+01	1.51E+02	5.85E+00 G
Ta-182	F	-6.5784E-01					1.14E+02	
			1121.30	-5.408E+00 (		2.730E+01	1.51E+02	3.49E+01 G
			1221.41	5.483E+00 (		9.856E+00	8.38E+01	2.70E+01 G
			1189.05	-2.427E+00 +		1.941E+01	3.66E+02	1.62E+01 G
Hg-203	F	-1.5054E+00					4.66E+01	
			279.20	-1.505E+00 ?(		4.145E+00	8.31E+01	8.15E+01 G
TL-208	N	4.1414E+00					6.98E+02	
			583.02	4.141E+00 (P		2.175E+00	2.29E+01	8.45E+01 G
			277.28	-1.819E+01 - P		5.364E+01	6.39E+01	6.31E+00 G
			860.56	9.605E+00 + P		1.870E+01	8.53E+01	1.24E+01 G
pm-146	C	4.7019E-01					2.02E+03	
			747.16	-1.843E+00 &(P		8.189E+00	1.84E+02	3.40E+01 G
			735.72	-3.626E+00 & P		1.297E+01	1.40E+02	2.25E+01 G
			453.88	1.680E+00 (P		3.659E+00	8.95E+01	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
y-88	F	1.0763E+00					1.07E+02	
			898.04	1.374E+00	&(P	2.856E+00	9.40E+01	9.37E+01 G
			1836.06	7.947E-01	?(	2.552E+00	1.51E+02	9.92E+01 G
Cd-113m		3.3789E+03					5.33E+03	
			263.70	3.379E+03	&(	4.067E+04	3.57E+02	6.00E-03 K
Cd-109	F	2.7048E+01					4.53E+02	
								Derived Ave Activity
			88.04	2.705E+01	}(	2.018E+02	2.25E+02	3.79E+00 G
Cf-251	T	-2.6215E+00					3.28E+05	
			176.60	-2.621E+00	?(	1.476E+01	2.22E+02	1.70E+01 G
			227.00	-1.198E+01	&	4.022E+01	1.33E+02	6.30E+00 GA
Cf-249	T	1.5634E+00					1.28E+05	
			387.95	1.563E+00	&(	5.393E+00	1.04E+02	6.60E+01 G
			333.44	-7.540E+00	+	3.495E+01	1.39E+02	1.55E+01 G
Sn-126		-1.1723E+01					3.65E+07	
			87.57	2.737E+00	}	2.011E+01	8.00E+01	3.75E+01 GA
			64.28	-1.172E+01	&(	7.008E+01	1.80E+02	9.70E+00 G
			86.94	1.138E+01	}	8.468E+01	7.82E+01	9.04E+00 GA
PB-210	N	2.4865E+02					8.14E+03	
			46.54	2.486E+02	(P	7.415E+01	1.20E+01	4.25E+00 G
PB-212	N	9.8725E+00					6.98E+02	
			238.63	9.872E+00	(P	4.496E+00	1.53E+01	4.33E+01 G
			300.03	3.008E+01	+ P	2.428E+02	2.43E+02	3.28E+00 GA
PB-214	N	2.8922E+02					5.84E+05	
			351.93	2.892E+02	(P	7.067E+00	2.06E+00	3.76E+01 G
			295.09	2.705E+02	- P	1.078E+01	2.56E+00	1.93E+01 G
			242.00	3.051E+02		2.562E+01	4.04E+00	7.43E+00 GA
BI-207	C	3.7156E-01					1.18E+04	
			569.70	2.400E-01	?(	2.704E+00	3.29E+02	9.77E+01 G
			1063.66	5.441E-01	?(P	3.775E+00	3.07E+02	7.45E+01 G
BI-212	N	1.8861E-02					6.98E+02	
			727.17	1.886E-02	%(P	5.121E+01	7.93E+04	7.55E+00 G
			785.42	2.550E+02	? P	2.259E+02	4.03E+01	1.28E+00 GA
U-235	N	2.5384E-01					2.57E+11	
			143.79	-8.536E+00	*(	4.157E+01	1.47E+02	1.10E+01 G
			205.33	1.948E+01	(P	4.864E+01	9.90E+01	5.01E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	-4.979E-07	%	6.281E+01	3.77E+09	5.08E+00 G
			185.72	-1.875E+00	+	7.240E+00	1.16E+02	5.40E+01 GA
BI-214	N	2.7690E+02					5.84E+05	
			609.31	2.769E+02	(P	5.289E+00	2.15E+00	4.61E+01 G
			1120.29	3.053E+02	+ P	1.860E+01	5.26E+00	1.51E+01 G
			1764.49	3.299E+02	+ P	8.038E+00	4.66E+00	1.54E+01 G
BI-210M	T	-3.3305E-01					1.10E+09	
			265.83	-3.331E-01	?(	5.598E+00	4.99E+02	5.00E+01 G
			304.90	0.000E+00	+	2.897E+01	1.00E+03	2.80E+01 G
AC-228	N	8.6868E+00					2.10E+03	
			911.07	5.558E+00	?(	1.069E+01	8.79E+01	2.90E+01 G
			968.97	8.510E+00	&(	2.247E+01	7.93E+01	1.75E+01 G
			338.32	1.650E+01	(P	1.365E+01	3.17E+01	1.20E+01 G
			93.35	-1.886E+01	+	1.590E+02	2.55E+02	5.56E+00 XA
TH-227	N	-1.9408E+01					7.95E+03	
			50.14	-1.941E+01	?(	1.216E+02	1.89E+02	8.00E+00 G
			256.24	-1.196E+01	+ P	3.962E+01	8.23E+01	7.00E+00 G
TH-229	N	9.5900E+00					2.68E+06	
			193.51	-5.676E+00	&(P	5.874E+01	4.74E+02	4.40E+00 G
			210.85	3.205E+01	&(P	7.841E+01	9.70E+01	2.99E+00 G
TH-234	N	2.1185E+02					1.63E+12	
			63.29	2.119E+02	(P	6.244E+01	1.01E+01	3.81E+00 G
			92.59	1.621E+02	- P	3.884E+01	8.31E+00	5.58E+00 G
PA-234	N	5.3953E+00					1.63E+12	
			131.29	4.953E+00	&(	2.455E+01	1.50E+02	1.80E+01 G
			946.02	-7.655E+00	& P	2.499E+01	1.23E+02	1.34E+01 G
			569.47	6.366E+00	?(	3.097E+01	1.44E+02	8.20E+00 G
			883.24	0.000E+00	&	4.890E+01	1.00E+03	9.60E+00 G
			880.53	-1.465E+01	+	7.581E+01	1.54E+02	6.00E+00 GA
PA-234M	N	1.8020E+02					1.63E+12	
			1001.00	1.802E+02	&(P	5.491E+02	9.13E+01	8.37E-01 G
			766.41	0.000E+00	} P	1.963E+03	2.09E+03	2.94E-01 G
AM-241	T	-3.3827E+00					1.58E+05	
			59.54	-3.383E+00	&(	2.068E+01	1.85E+02	3.59E+01 G
Ir-192	F	3.1323E-01					7.40E+01	
			316.49	0.000E+00	(	9.600E+00	1.00E+03	8.70E+01 G
			468.06	8.401E-01	(	6.511E+00	2.30E+02	5.18E+01 G
			308.44	0.000E+00	-	2.579E+01	1.00E+03	3.18E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Cs-136   F  -1.8213E+00                                     1.30E+01
                          818.50-1.821E+00 ?(  5.478E+00 9.04E+01 1.00E+02 G
                         1048.07-8.932E-02 &   3.965E+00 1.27E+03 8.00E+01 G
                          340.57-2.549E+00 +   1.160E+01 1.37E+02 4.69E+01 G

Np-239   T  -3.9095E+00                                     2.36E+00
                          103.70-4.344E+00 +   3.591E+01 2.50E+02 2.40E+01 X
                          106.13-3.909E+00  (  3.773E+01 2.92E+02 2.27E+01 G
                           99.50-6.953E+00 &   5.798E+01 2.52E+02 1.50E+01 X

Nd-147       3.0205E+00                                     1.11E+01
                          531.00 1.766E+00 ?(  1.990E+01 4.73E+02 1.30E+01 G
                           91.10 3.597E+00 ?(  2.643E+01 2.22E+02 2.83E+01 G

TL-210   N   5.5864E-01                                     5.84E+05
                          799.60 0.000E+00 ?(  3.975E+00 1.00E+03 9.90E+01 G
                          296.00 1.258E+00 ?(  9.927E+00 2.38E+02 7.90E+01 G
                         1313.00 7.010E+00 &   1.341E+01 8.90E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	5839.	-57.	-0.032	189.16	-1.941E+01	
AM-241	59.54	5528.	-57.	-0.032	184.54	-3.383E+00	
BA-133	80.99	13738.	-64.	-0.036	257.51	-3.266E+00	
EU-155	86.54	9813.	61.	0.034	229.38	3.353E+00	
Gd-153	97.50	13063.	-64.	-0.036	253.18	-3.480E+00	
Np-239	99.50	12999.	-64.	-0.036	252.10	-6.953E+00	
Gd-153	103.20	12935.	-64.	-0.036	250.62	-4.782E+00	
Np-239	103.70	12870.	-64.	-0.036	249.88	-4.344E+00	
EU-155	105.31	12808.	-66.	-0.037	69.32	-5.029E+00	P
Np-239	106.13	12742.	-55.	-0.030	291.68	-3.909E+00	
EU-152	121.78	1337.	-55.	-0.031	95.07	-3.141E+00	
EU-154	123.10	1046.	51.	0.028	90.53	2.051E+00	
PA-234	131.29	3200.	54.	0.030	149.52	4.953E+00	
HF-181	133.02	3018.	52.	0.029	148.86	2.016E+00	
CE-144	133.54	3070.	52.	0.029	150.07	7.882E+00	
HF-181	136.30	3123.	53.	0.029	150.97	1.507E+01	
Tc-99m	140.51	3187.	53.	0.029	151.93	1.031E+00	
U-235	143.79	3212.	-55.	-0.030	146.92	-8.536E+00	
CE-141	145.44	3185.	53.	0.029	151.22	1.885E+00	
Ba-140	162.66	1431.	-38.	-0.021	140.51	-1.110E+01	
Cf-251	176.60	785.	-24.	-0.013	222.38	-2.621E+00	
U-235	185.72	1821.	-52.	-0.029	116.44	-1.875E+00	
TH-229	193.51	745.	-13.	-0.007	474.12	-5.676E+00	P
U-235	205.33	610.	47.	0.026	98.98	1.948E+01	P
TH-229	210.85	543.	45.	0.025	96.96	3.205E+01	P
Cf-251	227.00	572.	-34.	-0.019	132.71	-1.198E+01	
EU-152	244.69	2528.	-46.	-0.025	156.89	-1.409E+01	
TH-227	256.24	572.	-34.	-0.019	82.33	-1.196E+01	P
Cd-113m	263.70	421.	8.	0.005	356.96	3.379E+03	
BI-210M	265.83	551.	-7.	-0.004	499.30	-3.331E-01	
Hg-203	279.20	748.	-47.	-0.026	83.11	-1.505E+00	
I-131	284.30	444.	-37.	-0.021	112.71	-1.586E+01	
TL-210	296.00	3766.	37.	0.020	237.71	1.258E+00	
Cs-136	340.57	1434.	-39.	-0.022	136.94	-2.549E+00	
EU-152	344.29	1277.	-40.	-0.022	52.37	-4.601E+00	P
HF-181	345.83	1405.	-40.	-0.022	135.05	-8.061E+00	
BA-133	356.00	4074.	-37.	-0.020	245.74	-1.866E+00	
I-131	364.48	228.	15.	0.008	198.77	5.884E-01	
BA-133	383.84	535.	-16.	-0.009	439.17	-6.128E+00	P
SB-125	427.88	268.	-5.	-0.003	675.38	-6.204E-01	P
AG-108M	433.94	193.	13.	0.007	203.29	5.481E-01	P
pm-146	453.88	164.	29.	0.016	89.49	1.680E+00	P
SB-125	463.37	320.	29.	0.016	90.62	1.056E+01	
Ir-192	468.06	322.	11.	0.006	229.80	8.401E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	477.60	558.	-31.	-0.017	108.48	-1.176E+01	
HF-181	482.00	420.	5.	0.003	596.20	2.419E-01	
RU-103	497.05	135.	23.	0.013	102.87	1.057E+00	P
RH-106	511.86	220.	95.	0.053	41.11	1.987E+01	
Ba-140	537.26	161.	3.	0.002	953.97	4.841E-01	P
CS-134	563.24	160.	-9.	-0.005	274.92	-5.089E+00	P
CS-134	569.32	130.	9.	0.005	182.24	2.656E+00	
PA-234	569.47	130.	12.	0.006	143.54	6.366E+00	
BI-207	569.70	142.	5.	0.003	328.94	2.400E-01	
SB-125	600.50	3147.	-22.	-0.012	358.54	-5.865E+00	
AG-108M	614.28	3103.	15.	0.008	520.03	8.113E-01	
RH-106	621.92	82.	13.	0.007	148.90	6.188E+00	
SB-125	635.89	88.	19.	0.011	72.94	8.345E+00	P
I-131	636.97	129.	-22.	-0.012	74.95	-1.541E+01	
AG-110M	657.76	310.	14.	0.008	173.58	7.751E-01	
PM-144	696.54	107.	-5.	-0.003	414.34	-2.844E-01	
pm-146	735.72	117.	-15.	-0.008	139.65	-3.626E+00	P
pm-146	747.16	103.	-11.	-0.006	184.20	-1.843E+00	P
ZR-95	756.73	108.	-14.	-0.008	147.84	-1.450E+00	P
AG-110M	763.94	214.	-35.	-0.019	59.43	-8.899E+00	P
EU-152	778.92	79.	-2.	-0.001	812.41	-1.034E+00	
BI-212	785.42	103.	57.	0.031	40.32	2.550E+02	P
CS-134	795.87	172.	20.	0.011	93.68	1.387E+00	P
CS-134	801.95	229.	-27.	-0.015	82.39	-1.802E+01	
CO-58	810.78	340.	-31.	-0.017	84.80	-1.869E+00	
Cs-136	818.50	368.	-31.	-0.017	90.42	-1.821E+00	
MN-54	834.85	159.	-32.	-0.018	84.53	-1.951E+00	
EU-154	873.23	127.	-8.	-0.004	202.33	-4.068E+00	
PA-234	880.53	224.	-14.	-0.008	153.53	-1.465E+01	
Sc-46	889.28	285.	-28.	-0.016	86.03	-1.798E+00	
y-88	898.04	71.	20.	0.011	93.98	1.374E+00	P
AG-110M	937.49	292.	-28.	-0.016	67.35	-5.407E+00	P
PA-234	946.02	105.	-15.	-0.009	123.01	-7.655E+00	P
EU-152	964.11	252.	-28.	-0.015	83.52	-1.268E+01	
EU-154	996.33	210.	-25.	-0.014	83.32	-1.642E+01	
EU-154	1004.77	128.	21.	0.012	80.26	7.969E+00	
RH-106	1050.36	87.	-7.	-0.004	291.18	-3.155E+01	P
BI-207	1063.66	60.	6.	0.003	306.91	5.441E-01	P
Ga-68	1077.40	70.	8.	0.004	232.63	2.064E+01	
FE-59	1099.25	80.	-9.	-0.005	228.34	-1.180E+00	
EU-152	1112.07	763.	-19.	-0.010	92.04	-1.026E+01	P
Sc-46	1120.55	762.	-18.	-0.010	214.26	-1.378E+00	
Ta-182	1121.30	708.	-25.	-0.014	151.22	-5.408E+00	
CO-60	1173.24	48.	18.	0.010	90.61	1.402E+00	
Ta-182	1189.05	64.	-5.	-0.003	366.42	-2.427E+00	
Ta-182	1221.41	43.	18.	0.010	83.82	5.483E+00	
NA-22	1274.53	48.	2.	0.001	494.97	1.660E-01	
FE-59	1291.60	48.	4.	0.002	396.86	7.763E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
TL-210	1313.00	43.	17.	0.010	88.96	7.010E+00		
CO-60	1332.50	23.	13.	0.007	88.05	1.149E+00		P
AG-110M	1384.30	45.	18.	0.010	92.49	6.443E+00		
EU-152	1408.00	51.	57.	0.031	32.51	2.418E+01		P
y-88	1836.06	18.	7.	0.004	151.19	7.947E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

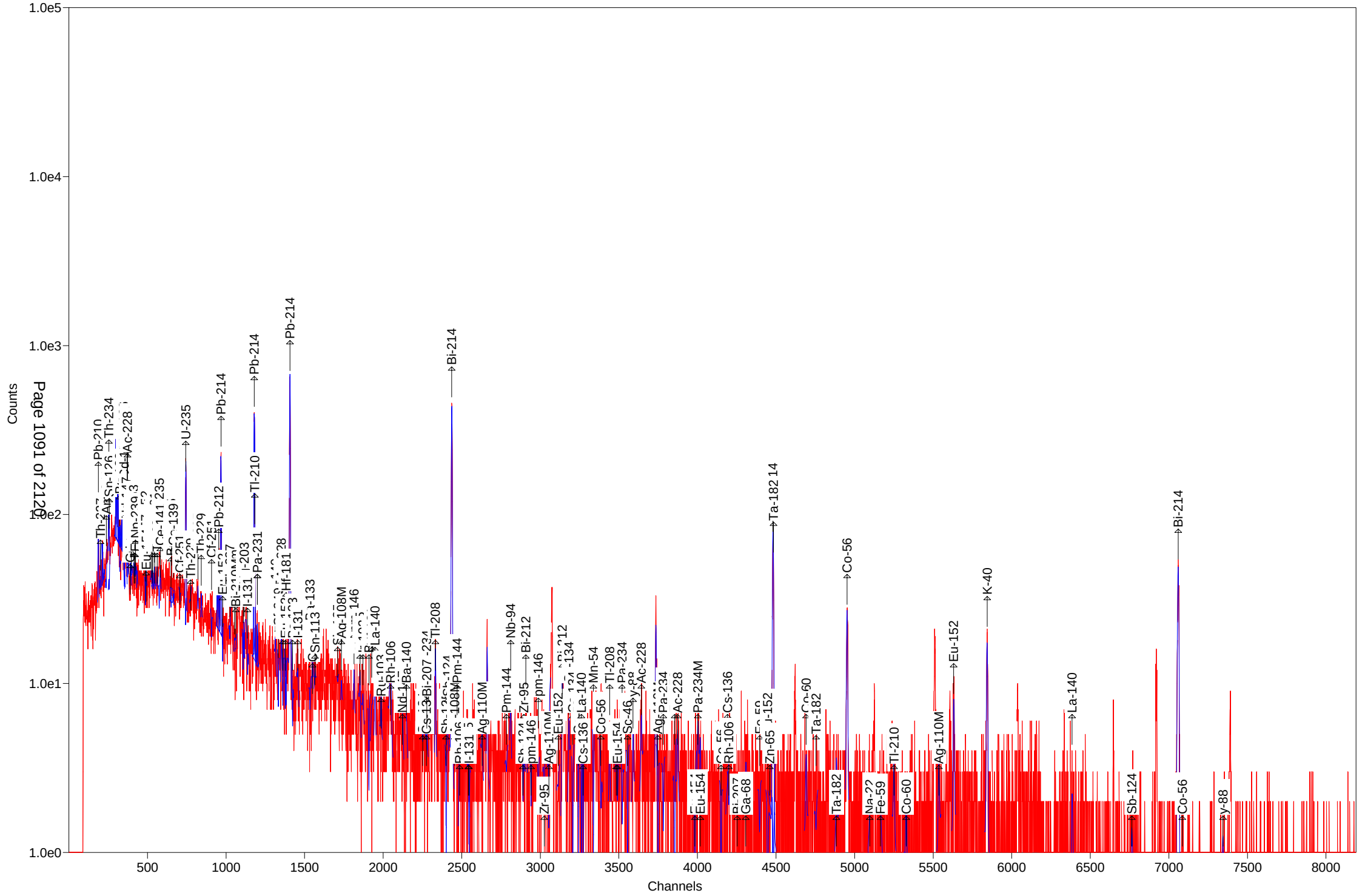
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-1.1765E+01	-1.1765E+01	1.085E+02%	4.25E+01
NA-22	#A	1.6605E-01	1.6605E-01	4.950E+02%	2.91E+00
K-40		1.2297E+02	1.2297E+02	1.377E+01%	2.92E+01
Sc-46	#A	-1.7981E+00	-1.7981E+00	8.603E+01%	5.15E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.48E+01
MN-54	#A	-1.9512E+00	-1.9512E+00	8.453E+01%	3.71E+00
FE-59	#A	-3.3222E-01	-3.3223E-01	2.283E+02%	5.82E+00
Co-56	#C	9.4440E+00	9.4440E+00	1.174E+01%	3.00E+00
CO-57	#A	5.2506E-01	5.2506E-01	1.344E+02%	3.26E+00
CO-58	#A	-1.8690E+00	-1.8691E+00	8.480E+01%	5.27E+00
CO-60	#A	1.2755E+00	1.2755E+00	6.317E+01%	2.15E+00
ZN-65	#A	-7.3260E-02	-7.3260E-02	3.492E+03%	1.92E+01
NB-94	A	1.8026E+00	1.8026E+00	4.542E+01%	2.04E+00
ZR-95	#A	-1.4503E+00	-1.4504E+00	1.478E+02%	5.27E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.01E+00
RU-103	#A	1.0568E+00	1.0568E+00	1.029E+02%	2.55E+00
RH-106	#A	6.1884E+00	6.1884E+00	1.489E+02%	2.20E+01
AG-108M	#A	6.7927E-01	6.7927E-01	2.033E+02%	2.74E+00
AG-110M	#A	1.1996E+00	1.1996E+00	9.249E+01%	6.47E+00
SN-113	#A	6.9721E-01	6.9721E-01	2.591E+02%	6.06E+00
SB-124	#A	9.5589E-01	9.5590E-01	1.732E+02%	1.27E+01
SB-125	#A	3.6305E+00	3.6305E+00	7.294E+01%	9.71E+00
I-131	#A	5.8842E-01	5.8843E-01	1.988E+02%	2.87E+00
Gd-153	#A	-3.4803E+00	-3.4803E+00	2.532E+02%	2.91E+01
Ga-68	#A	2.0544E+01	2.0636E+01	2.326E+02%	1.08E+02
Tc-99m	#A	1.0298E+00	1.0307E+00	1.519E+02%	5.19E+00
BA-133	#A	-1.8663E+00	-1.8663E+00	2.457E+02%	1.52E+01
CS-134	#A	8.0328E-01	8.0328E-01	9.368E+01%	1.28E+01
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.16E+00
CE-139	A	4.3273E-01	4.3273E-01	1.051E+02%	1.52E+00
Ba-140	#A	4.8409E-01	4.8410E-01	9.540E+02%	1.10E+01
La-140	A	2.5543E+00	2.5543E+00	3.713E+01%	2.70E+00
CE-141	#A	1.8855E+00	1.8855E+00	1.512E+02%	9.45E+00
CE-144	#A	7.8820E+00	7.8820E+00	1.501E+02%	3.92E+01
PM-144	#A	-2.8443E-01	-2.8443E-01	4.143E+02%	2.72E+00

EU-152 #A	-4.6005E+00	-4.6005E+00	5.237E+01%	1.96E+01
EU-154 #A	2.4943E+00	2.4943E+00	7.858E+01%	2.81E+01
EU-155 #A	-5.0292E+00	-5.0292E+00	6.932E+01%	4.05E+01
HF-181 #A	1.5033E+00	1.5033E+00	1.489E+02%	4.87E+00
Ta-182 #A	-6.5784E-01	-6.5784E-01	8.382E+01%	2.73E+01
Hg-203 #A	-1.5053E+00	-1.5054E+00	8.311E+01%	4.15E+00
TL-208	4.1414E+00	4.1414E+00	2.291E+01%	2.18E+00
pm-146 #A	4.7019E-01	4.7019E-01	8.949E+01%	8.19E+00
y-88 #A	1.0763E+00	1.0763E+00	8.901E+01%	2.86E+00
Cd-113m#A	3.3789E+03	3.3789E+03	3.570E+02%	4.07E+04
Cd-109 #A	2.7048E+01	2.7048E+01	2.255E+02%	2.02E+02
Cf-251 #A	-2.6215E+00	-2.6215E+00	2.224E+02%	1.48E+01
Cf-249 #A	1.5634E+00	1.5634E+00	1.036E+02%	5.39E+00
Sn-126 #A	-1.1723E+01	-1.1723E+01	1.805E+02%	7.01E+01
PB-210	2.4865E+02	2.4865E+02	1.199E+01%	7.42E+01
PB-212	9.8725E+00	9.8725E+00	1.527E+01%	4.50E+00
PB-214	2.8922E+02	2.8922E+02	2.065E+00%	7.07E+00
BI-207 #A	3.7156E-01	3.7156E-01	2.249E+02%	2.70E+00
BI-212 #A	1.8861E-02	1.8861E-02	7.927E+04%	5.12E+01
U-235 #A	2.5384E-01	2.5384E-01	8.857E+01%	4.16E+01
BI-214	2.7690E+02	2.7690E+02	2.147E+00%	5.29E+00
BI-210M#A	-3.3305E-01	-3.3305E-01	4.993E+02%	5.60E+00
AC-228 A	8.6868E+00	8.6868E+00	3.170E+01%	1.07E+01
TH-227 #A	-1.9408E+01	-1.9408E+01	1.892E+02%	1.22E+02
TH-229 #A	9.5900E+00	9.5900E+00	9.696E+01%	5.87E+01
TH-234	2.1185E+02	2.1185E+02	1.008E+01%	6.24E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.80E+02
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.30E+01
PA-234 #A	5.3953E+00	5.3953E+00	1.036E+02%	2.46E+01
PA-234M A	1.8020E+02	1.8020E+02	9.132E+01%	5.49E+02
AM-241 #A	-3.3827E+00	-3.3827E+00	1.845E+02%	2.07E+01
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.04E+01
Ir-192 #A	3.1323E-01	3.1323E-01	2.298E+02%	9.60E+00
Cs-136 #A	-1.8212E+00	-1.8213E+00	9.042E+01%	5.48E+00
Np-239 #A	-3.9091E+00	-3.9095E+00	2.917E+02%	3.77E+01
Nd-147 #A	3.0205E+00	3.0205E+00	2.220E+02%	1.99E+01
TL-210 #A	5.5864E-01	5.5864E-01	2.377E+02%	3.98E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

```
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.7 to  1999.4 keV)     1.177E+03  Bq/Sample
Total Decayed Activity (   37.7 to  1999.4 keV) 1.1766528E+03  Bq/Sample
```

379951_Gamma_160-29881-A-9-C. 19_Gamma_20181612.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20182986

Sample Description: 379951_Gamma_160-29881-A-12-C
Detector: Detector # 8
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-12-C

Decay to Time: 8/23/2018 06:29 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:29:13 Real Time: 1848 sec
Analysis Time: 8/23/2018 07:00 Dead Time: 2.61 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-08-11_1318.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	6.565E+00	100.0	6.562E+00	6.571E+00	2.197E+01
NA-22	8.011E-02	806.2	6.458E-01	6.458E-01	2.329E+00
K-40	1.554E+02	7.9	1.234E+01	1.468E+01	1.341E+01
Sc-46	7.356E-01	91.8	6.751E-01	6.762E-01	3.190E+00
CR-51	5.955E+00	267.0	1.590E+01	1.590E+01	5.293E+01
MN-54	-1.255E+00	86.6	1.087E+00	1.089E+00	2.468E+00
FE-59	1.920E+00	62.0	1.190E+00	1.193E+00	3.531E+00
Co-56	4.507E+00	17.3	7.777E-01	8.115E-01	1.771E+00
CO-57	-6.846E-01	92.9	6.358E-01	6.368E-01	2.109E+00
CO-58	-1.171E+00	74.7	8.749E-01	8.770E-01	3.225E+00
CO-60	1.387E-02	7213.7	1.000E+00	1.000E+00	2.344E+00
ZN-65	0.000E+00	1.#INF	3.990E-01	3.990E-01	1.179E+01
NB-94	1.398E+00	46.7	6.533E-01	6.574E-01	1.448E+00
ZR-95	-1.478E+00	119.7	1.770E+00	1.771E+00	4.056E+00
NB-95	-9.555E-01	112.6	1.076E+00	1.077E+00	3.608E+00
RU-103	1.998E-01	332.2	6.635E-01	6.636E-01	1.609E+00
RH-106	1.465E+00	364.7	5.344E+00	5.344E+00	1.325E+01
AG-108M	-6.874E-01	128.6	8.841E-01	8.848E-01	2.008E+00
AG-110M	7.633E-01	165.0	1.259E+00	1.260E+00	4.743E+00
SN-113	-1.206E+00	105.0	1.266E+00	1.268E+00	4.226E+00
SB-124	-1.057E-01	2129.3	2.250E+00	2.250E+00	7.528E+00
SB-125	2.265E+00	110.5	2.503E+00	2.505E+00	5.457E+00
I-131	7.901E-01	116.4	9.198E-01	9.207E-01	1.806E+00
Gd-153	2.001E+00	236.3	4.729E+00	4.731E+00	1.567E+01
Ga-68	2.453E+01	124.5	3.054E+01	3.057E+01	6.926E+01
Tc-99m	0.000E+00	1.#INF	3.913E-01	3.913E-01	3.361E+00
BA-133	-1.129E+00	245.0	2.766E+00	2.766E+00	9.204E+00
CS-134	1.898E-01	297.8	5.652E-01	5.653E-01	7.591E+00
CS-137	-1.661E+00	118.3	1.966E+00	1.967E+00	3.712E+00
CE-139	0.000E+00	1.#INF	3.861E-01	3.861E-01	2.414E+00
Ba-140	2.488E+00	108.1	2.689E+00	2.692E+00	6.406E+00
La-140	1.409E+00	26.7	3.765E-01	3.838E-01	7.522E-01
CE-141	1.244E+00	142.7	1.774E+00	1.776E+00	5.893E+00

CE-144	-5.252E+00	143.2	7.520E+00	7.525E+00	2.497E+01
PM-144	5.575E-01	93.8	5.229E-01	5.237E-01	1.222E+00
EU-152	-6.498E-01	85.6	5.562E-01	5.572E-01	1.276E+01
EU-154	7.442E-01	193.3	1.439E+00	1.439E+00	1.896E+01
EU-155	-2.350E+00	53.7	1.261E+00	1.268E+00	2.188E+01
HF-181	5.435E-01	165.4	8.991E-01	8.996E-01	3.038E+00
Ta-182	2.008E+00	90.5	1.817E+00	1.820E+00	1.662E+01
Hg-203	-4.168E-01	194.8	8.117E-01	8.120E-01	1.991E+00
TL-208	6.248E-01	156.7	9.789E-01	9.794E-01	2.360E+00
pm-146	5.971E-01	282.9	1.689E+00	1.690E+00	4.934E+00
y-88	3.042E-01	176.2	5.360E-01	5.363E-01	2.091E+00
Cd-113m	3.648E+03	194.4	7.092E+03	7.096E+03	2.404E+04
Cd-109	0.000E+00	1.#INF	3.966E+01	3.966E+01	1.314E+02
Cf-251	-1.448E+00	239.6	3.470E+00	3.473E+00	8.851E+00
Cf-249	1.028E+00	145.1	1.492E+00	1.493E+00	3.841E+00
Sn-126	1.700E+00	522.9	8.890E+00	8.890E+00	2.973E+01
PB-210	9.559E+01	22.9	2.187E+01	2.258E+01	5.143E+01
PB-212	1.085E+01	9.5	1.030E+00	1.247E+00	2.573E+00
PB-214	1.210E+02	2.2	2.715E+00	6.846E+00	3.946E+00
BI-207	3.218E-01	100.9	3.249E-01	3.253E-01	1.633E+00
BI-212	1.137E+01	83.1	9.452E+00	9.470E+00	3.159E+01
U-235	5.636E+00	108.3	6.103E+00	6.110E+00	2.396E+01
BI-214	1.055E+02	3.2	3.376E+00	6.436E+00	2.840E+00
BI-210M	-1.304E+00	74.5	9.717E-01	9.747E-01	3.599E+00
AC-228	1.243E+01	19.8	2.462E+00	2.543E+00	7.157E+00
TH-227	6.944E+00	181.7	1.261E+01	1.262E+01	4.212E+01
TH-229	-1.187E+01	120.1	1.425E+01	1.429E+01	3.616E+01
TH-234	-3.401E+01	41.3	1.404E+01	1.415E+01	7.574E+01
PA-231	0.000E+00	1.#INF	1.501E+01	1.501E+01	1.761E+02
PA-233	0.000E+00	1.#INF	8.778E-01	8.778E-01	1.443E+01
PA-234	-1.911E-01	84.9	1.623E-01	1.626E-01	1.517E+01
PA-234M	4.600E+01	123.9	5.701E+01	5.706E+01	3.916E+02
AM-241	2.198E+00	70.4	1.548E+00	1.552E+00	4.228E+00
Np-237	0.000E+00	1.#INF	1.185E+01	1.185E+01	3.925E+01
Ir-192	0.000E+00	1.#INF	2.358E-01	2.358E-01	6.035E+00
Cs-136	4.109E-01	69.3	2.848E-01	2.857E-01	3.669E+00
Np-239	-2.829E+00	219.3	6.204E+00	6.206E+00	2.056E+01
Nd-147	4.438E+00	92.9	4.124E+00	4.132E+00	9.844E+00
TL-210	-8.016E-02	1114.6	8.934E-01	8.934E-01	3.083E+00
Total	4.292E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-12-C

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182986.An1

Acquisition information
Start time: 8/23/2018 6:29:13 AM
Live time: 1800
Real time: 1848
Dead time: 2.61 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.97keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:29:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-08-11_1318.PBC 8/11/2018 1:18:09 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1637

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.12	147.	22.77	0.51	1.974E-02	46.54	4.250	9.559E+01	PB210
50.14	23.	181.65	1.01	2.267E-02	50.14	8.000	PBC<MDA	TH227
59.17	41.	70.41	1.70	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.07	9.	522.90	1.03	3.146E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	1.700E+00	Sn126
74.78	519.	7.28	1.03	3.616E-02				
77.10	832.	5.11	1.04	3.699E-02				
83.89	134.	19.83	1.04	3.898E-02				
87.14	265.	11.77	1.04	3.973E-02	86.49	13.100	2.841E+01	Np237
					86.54	30.700	1.212E+01	EU155
					86.94	9.040	4.107E+01	Sn126
					87.57	37.500	9.868E+00	Sn126
					88.04	3.790	9.740E+01	Cd109
92.70	141.	28.68	0.56	4.073E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.442E+01	AC228
97.37	45.	236.29	1.05	4.133E-02	97.50	30.000	PBC<MDA	Gd153
123.10	18.	193.34	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
143.79	33.	165.83	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
145.95	28.	51.26	0.44	3.867E-02	145.44	48.200	8.330E-01	CE141
185.98	348.	10.70	1.15	3.326E-02	185.72	54.000	1.075E+01	U235
205.33	24.	139.33	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
236.19	53.	30.20	1.16	2.766E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.67	232.	9.50	1.16	2.744E-02	238.63	43.300	1.085E+01	PB212
242.04	468.	5.66	1.16	2.714E-02	242.00	7.430	1.288E+02	PB214
263.70	10.	194.42	1.18	2.539E-02	263.70	0.006	PBC<MDA	Cd113m
284.30	3.	896.70	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.19	1002.	3.93	1.05	2.323E-02	295.09	19.300	1.242E+02	PB214
					296.00	79.000	3.041E+01	TL210
320.08	23.	266.98	1.22	2.179E-02	320.08	9.940	PBC<MDA	CR51
328.76	27.	134.38	1.23	2.133E-02	328.76	20.300	PBC<MDA	La140
333.44	18.	197.56	1.23	2.110E-02	333.44	15.510	PBC<MDA	Cf249
351.86	1630.	2.92	1.18	2.021E-02	351.93	37.600	1.192E+02	PB214
364.48	18.	116.42	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	24.	102.13	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
387.95	12.	212.58	1.27	1.869E-02	387.95	66.000	PBC<MDA	Cf249
427.88	18.	113.40	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
463.37	10.	189.62	1.32	1.620E-02	463.37	10.470	PBC<MDA	SB125
477.60	20.	99.96	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	12.	165.43	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
487.02	17.	111.96	1.34	1.555E-02	487.02	45.500	PBC<MDA	La140
497.05	5.	332.16	1.35	1.530E-02	497.05	90.900	PBC<MDA	RU103
511.86	41.	77.94	2.61	1.494E-02	511.86	20.000	PBC<MDA	RH106
531.00	15.	92.92	1.37	1.449E-02	531.00	13.000	PBC<MDA	Nd147
537.26	16.	108.08	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
563.24	5.	297.77	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.47	13.	92.63	1.40	1.369E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.436E+00	PA234
					569.70	97.740	5.401E-01	BI207
583.03	13.	156.66	1.40	1.342E-02	583.02	84.500	PBC<MDA	TL208
609.17	1132.	3.20	1.34	1.295E-02	609.31	46.090	1.055E+02	BI214
					610.30	5.750	8.464E+02	RU103
621.92	3.	364.69	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
636.97	4.	344.25	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
696.54	12.	93.79	1.48	1.158E-02	696.54	99.000	PBC<MDA	PM144
702.63	28.	46.73	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
724.20	6.	293.45	1.50	1.121E-02	724.20	44.150	PBC<MDA	ZR95
727.17	17.	83.15	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
735.72	5.	282.95	1.51	1.107E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	780.06	1.51	1.093E-02	747.16	34.000	PBC<MDA	pm146
766.41	15.	123.93	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
768.09	135.	10.59	1.54	1.068E-02				
778.92	2.	875.02	1.53	1.055E-02	778.92	12.940	PBC<MDA	EU152
785.42	41.	31.52	1.54	1.048E-02	785.42	1.280	1.698E+02	BI212
846.77	3.	400.00	1.58	9.836E-03	846.77	99.935	PBC<MDA	Co56
860.76	1.	980.04	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
871.10	2.	458.87	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
873.23	3.	452.04	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
889.28	18.	91.78	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
898.04	4.	375.54	1.61	9.360E-03	898.04	93.700	PBC<MDA	y88

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.07	37.	42.13	1.62	9.247E-03	911.07	29.000	7.735E+00	AC228
964.11	8.	118.92	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
968.97	56.	19.81	1.65	8.776E-03	968.97	17.460	2.023E+01	AC228
1001.00	-4.	395.35	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	15.	69.31	1.70	8.209E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	11.	100.94	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	10.	124.50	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	15.	86.86	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1120.21	264.	6.47	1.72	7.754E-03	1120.29	15.100	1.252E+02	BI214
					1120.55	99.987	1.892E+01	Sc46
					1121.30	34.900	5.423E+01	Ta182
1189.05	6.	204.80	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	9.	90.50	1.80	7.199E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	93.	17.25	1.81	7.114E-03	1238.28	66.070	1.104E+01	Co56
1274.53	1.	806.23	1.83	6.939E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.275E-01	EU154
1291.60	11.	88.38	1.84	6.860E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	9.	164.99	1.88	6.460E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	17.	83.45	1.90	6.366E-03	1408.00	21.005	PBC<MDA	EU152
1460.60	192.	7.36	0.96	6.166E-03	1460.83	10.670	1.623E+02	K40
1596.21	14.	26.73	1.99	5.706E-03	1596.21	95.400	1.429E+00	La140
1764.26	182.	7.47	1.97	5.226E-03	1764.49	15.400	1.255E+02	BI214
1836.06	3.	176.21	2.10	5.046E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.93	74.79	454.	519.	1.434E+04	7.28	1.034	-	sD
308.20	77.10	488.	832.	2.249E+04	5.11	1.036	-	D
335.21	83.87	284.	134.	3.437E+03	19.77	1.041	-	D
370.62	92.70	345.	192.	4.714E+03	20.65	0.562	-	s
743.75	185.98	259.	348.	1.046E+04	10.70	1.147	-	s
944.75	236.19	101.	53.	1.916E+03	30.18	1.157	-	sD
3072.30	768.09	13.	135.	1.264E+04	10.59	1.536	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	184.27	46.12	267.	147.	0.081	22.88	0.514s
TH-227	200.37	50.14	836.	23.	0.013	181.65	1.015
AM-241	236.49	59.17	266.	41.	0.023	70.41	1.699s
TH-234	252.96	63.29	1149.	-72.	-0.040	41.27	1.025s
Sn-126	256.93	64.28	1188.	9.	0.005	522.90	1.026
BA-133	323.77	80.99	6138.	-46.	-0.026	239.23	1.039
Np-237	345.77	86.49	6092.	0.	0.000	237.35	1.043A
EU-155	345.98	86.54	5982.	-47.	-0.026	235.20	1.043A
Sn-126	347.57	86.94	5857.	11.	0.006	318.24	1.044D
Sn-126	350.09	87.57	5654.	46.	0.025	78.17	1.044D
Cd-109	351.97	88.04	5810.	0.	0.000	231.57	1.044A
Nd-147	364.21	91.10	5607.	-15.	-0.008	696.79	1.047s
TH-234	370.17	92.59	5643.	-51.	-0.029	61.52	1.048s
AC-228	373.21	93.35	5592.	0.	0.000	1000.00	1.049s
Gd-153	389.81	97.50	5547.	45.	0.025	236.29	1.052s
Np-239	397.81	99.50	5592.	0.	0.000	1000.00	1.053s
Gd-153	412.62	103.20	5592.	0.	0.000	1000.00	1.056s
Np-239	414.62	103.70	5571.	-48.	-0.027	220.19	1.057s
EU-155	421.07	105.31	5536.	-38.	-0.021	53.68	1.058s
Np-239	424.34	106.13	5609.	-48.	-0.027	219.30	1.058s
EU-152	486.92	121.78	759.	-44.	-0.024	90.38	1.071s
CO-57	488.06	122.06	803.	-44.	-0.024	92.86	1.071s
EU-154	492.22	123.10	627.	18.	0.010	193.34	1.072s
PA-234	525.00	131.29	1785.	-42.	-0.023	142.31	1.078s
HF-181	531.92	133.02	1771.	-42.	-0.023	141.59	1.079s
CE-144	533.98	133.54	1813.	-42.	-0.023	143.20	1.080s
HF-181	545.02	136.30	1856.	-42.	-0.024	144.56	1.082s
CO-57	545.72	136.47	1898.	-22.	-0.012	285.59	1.082s
Tc-99m	561.86	140.51	1920.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	1519.	33.	0.019	165.83	1.087
CE-141	581.59	145.44	1758.	42.	0.023	142.65	1.089s
Ba-140	650.47	162.66	760.	-34.	-0.019	115.94	1.102s
CE-139	663.24	165.85	700.	0.	0.000	1000.00	1.104s
Cf-251	706.23	176.60	381.	-15.	-0.009	239.62	1.112s
U-235	742.71	185.72	804.	-65.	-0.036	86.53	1.119s
TH-229	773.87	193.51	370.	-30.	-0.017	120.07	1.125
U-235	821.17	205.33	301.	24.	0.013	139.33	1.134
TH-229	843.24	210.85	348.	-15.	-0.008	215.87	1.138s
Cf-251	907.84	227.00	280.	-21.	-0.012	157.53	1.151s
PB-212	954.37	238.63	126.	232.	0.129	9.50	1.159D
PB-214	967.84	242.00	116.	468.	0.260	5.66	1.162D
EU-152	978.62	244.69	1390.	-34.	-0.019	156.67	1.164s
TH-227	1024.81	256.24	272.	-34.	-0.019	65.51	1.172s
Cd-113m	1054.65	263.70	184.	10.	0.006	194.42	1.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1063.18	265.83	287.	-30.	-0.016	74.51	1.179s
Hg-203	1116.66	279.20	214.	-15.	-0.008	194.75	1.189
I-131	1137.05	284.30	188.	3.	0.002	896.70	1.193s
PB-214	1180.22	295.09	84.	1005.	0.558	3.41	1.201D
TL-210	1183.86	296.00	2063.	-29.	-0.016	222.69	1.202s
PB-212	1199.98	300.03	2018.	-29.	-0.016	41.33	1.205s
PA-231	1200.14	300.07	1989.	-29.	-0.016	218.16	1.205s
PA-233	1200.58	300.18	1960.	-21.	-0.012	296.80	1.205s
PA-231	1210.46	302.65	1939.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	1939.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	1939.	0.	0.000	1000.00	1.208s
BI-210M	1219.45	304.90	1939.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	1939.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	1939.	0.	0.000	1000.00	1.214s
Ir-192	1265.82	316.49	1939.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	1910.	23.	0.013	266.98	1.219
La-140	1314.91	328.76	624.	27.	0.015	134.38	1.226
Cf-249	1333.63	333.44	651.	18.	0.010	197.56	1.229s
AC-228	1353.15	338.32	669.	0.	0.000	1000.00	1.233
Cs-136	1362.15	340.57	669.	0.	0.000	1000.00	1.234s
EU-152	1377.01	344.29	690.	-29.	-0.016	123.16	1.237s
HF-181	1383.19	345.83	691.	-29.	-0.016	131.52	1.238s
PB-214	1407.33	351.86	121.	1630.	0.906	2.92	1.184
BA-133	1423.87	356.00	1900.	-25.	-0.014	244.97	1.245s
I-131	1457.81	364.48	113.	18.	0.010	116.42	1.252s
BA-133	1535.24	383.84	290.	24.	0.013	102.13	1.266s
Cf-249	1551.68	387.95	314.	12.	0.007	212.58	1.269s
SN-113	1566.64	391.69	353.	-26.	-0.014	105.01	1.271s
SB-125	1711.39	427.88	104.	18.	0.010	113.40	1.297s
AG-108M	1735.64	433.94	130.	-19.	-0.011	128.62	1.301s
pm-146	1815.41	453.88	130.	-25.	-0.014	96.74	1.315s
SB-125	1853.36	463.37	160.	10.	0.005	189.62	1.322
Ir-192	1872.14	468.06	175.	-14.	-0.008	136.28	1.325s
BE-7	1910.28	477.60	183.	20.	0.011	99.96	1.332s
HF-181	1927.89	482.00	203.	12.	0.007	165.43	1.335s
La-140	1947.98	487.02	181.	17.	0.010	111.96	1.339s
RU-103	1988.12	497.05	65.	5.	0.003	332.16	1.346s
RH-106	2047.36	511.86	140.	41.	0.023	77.94	2.606s
Nd-147	2123.91	531.00	43.	15.	0.008	92.92	1.369s
Ba-140	2148.95	537.26	65.	16.	0.009	108.08	1.373
CS-134	2252.86	563.24	52.	5.	0.003	297.77	1.391s
CS-134	2277.20	569.32	65.	-12.	-0.007	99.30	1.395
PA-234	2277.80	569.47	66.	13.	0.007	92.63	1.395
BI-207	2278.73	569.70	62.	-6.	-0.003	200.43	1.396
TL-208	2332.01	583.02	95.	13.	0.007	156.66	1.405s
SB-125	2401.92	600.50	1366.	-17.	-0.009	307.41	1.416s
CS-134	2418.76	604.71	1347.	0.	0.000	1000.00	1.419s
BI-214	2436.60	609.17	36.	1132.	0.629	3.20	1.342

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RU-103	2441.12	610.30	1347.	0.	0.000	1000.00	1.423s
AG-108M	2457.05	614.28	1347.	0.	0.000	1000.00	1.426
RH-106	2487.60	621.92	35.	3.	0.002	364.69	1.431s
SB-125	2543.49	635.89	77.	-19.	-0.010	70.16	1.440s
I-131	2547.83	636.97	81.	4.	0.002	344.25	1.441s
AG-110M	2630.98	657.76	113.	-21.	-0.012	75.44	1.455s
CS-137	2646.58	661.66	201.	-31.	-0.017	118.30	1.457s
PM-144	2786.11	696.54	23.	12.	0.006	93.79	1.480s
NB-94	2810.46	702.63	33.	28.	0.016	46.73	1.484s
SB-124	2891.09	722.79	122.	-16.	-0.009	104.13	1.497s
AG-108M	2891.70	722.94	138.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	138.	0.	0.000	1000.00	1.498s
ZR-95	2896.74	724.20	128.	6.	0.003	293.45	1.498s
BI-212	2908.63	727.17	94.	17.	0.010	83.15	1.500s
pm-146	2942.83	735.72	42.	5.	0.003	282.95	1.506s
pm-146	2988.59	747.16	42.	2.	0.001	780.06	1.513s
ZR-95	3026.87	756.73	75.	-16.	-0.009	119.70	1.519s
AG-110M	3055.73	763.94	223.	-18.	-0.010	117.40	1.524s
NB-95	3063.11	765.79	205.	-18.	-0.010	112.58	1.525s
PA-234M	3065.60	766.41	155.	15.	0.008	123.93	1.526s
EU-152	3115.64	778.92	56.	2.	0.001	875.02	1.534s
BI-212	3141.64	785.42	28.	41.	0.023	31.52	1.538s
CS-134	3183.43	795.87	115.	-19.	-0.011	81.51	1.544s
CS-134	3207.77	801.95	162.	-22.	-0.012	86.37	1.548s
CO-58	3243.06	810.78	145.	-21.	-0.012	74.73	1.554s
La-140	3263.04	815.77	166.	-21.	-0.012	75.94	1.557s
Cs-136	3273.97	818.50	189.	-5.	-0.003	424.71	1.559s
MN-54	3339.36	834.85	79.	-22.	-0.012	86.61	1.569s
Co-56	3387.05	846.77	38.	3.	0.002	400.00	1.577s
TL-208	3442.23	860.56	38.	1.	0.001	980.04	1.585s
NB-94	3484.36	871.10	52.	2.	0.001	458.87	1.592s
EU-154	3492.89	873.23	64.	3.	0.001	452.04	1.593s
PA-234	3522.10	880.53	128.	-17.	-0.009	97.19	1.598
PA-234	3532.94	883.24	145.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	145.	0.	0.000	1000.00	1.600s
Sc-46	3557.10	889.28	122.	18.	0.010	91.78	1.603s
y-88	3592.14	898.04	42.	4.	0.002	375.54	1.608s
AC-228	3644.26	911.07	47.	37.	0.021	42.13	1.616s
AG-110M	3749.96	937.49	135.	-30.	-0.017	46.64	1.633s
PA-234	3784.07	946.02	70.	-21.	-0.012	89.02	1.638s
EU-152	3856.43	964.11	43.	8.	0.005	118.92	1.649s
AC-228	3875.88	968.97	33.	56.	0.031	19.81	1.652s
EU-154	3985.31	996.33	94.	-6.	-0.004	215.11	1.668s
PA-234M	4003.99	1001.00	105.	-4.	-0.002	395.35	1.671
Co-56	4151.36	1037.84	50.	-9.	-0.005	155.86	1.693s
Cs-136	4192.29	1048.07	44.	15.	0.008	69.31	1.698s
BI-207	4254.65	1063.66	26.	11.	0.006	100.94	1.708
Ga-68	4309.61	1077.40	30.	10.	0.006	124.50	1.716s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	4397.02	1099.25	30.	15.	0.008	86.86	1.728s
ZN-65	4462.20	1115.55	301.	0.	0.000	1000.00	1.738s
BI-214	4480.85	1120.21	5.	264.	0.147	6.47	1.720
Sc-46	4482.22	1120.55	276.	6.	0.003	390.06	1.740
Ta-182	4485.22	1121.30	281.	6.	0.003	394.06	1.741s
CO-60	4692.97	1173.24	54.	-6.	-0.003	310.58	1.770s
Ta-182	4756.23	1189.05	30.	6.	0.003	204.80	1.779
Ta-182	4885.67	1221.41	11.	9.	0.005	90.50	1.797
Co-56	4953.16	1238.28	33.	93.	0.052	17.25	1.806s
NA-22	5098.16	1274.53	32.	1.	0.001	806.23	1.826s
EU-154	5098.22	1274.54	33.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	16.	11.	0.006	88.38	1.835s
TL-210	5252.05	1313.00	21.	-3.	-0.002	319.69	1.847s
AG-110M	5537.25	1384.30	37.	9.	0.005	164.99	1.884s
EU-152	5632.07	1408.00	37.	17.	0.010	83.45	1.896
K-40	5842.29	1460.55	8.	184.	0.102	7.94	0.955s
La-140	6384.93	1596.21	0.	14.	0.008	26.73	1.990s
BI-214	7057.13	1764.26	1.	182.	0.101	7.47	1.970
Co-56	7085.51	1771.35	204.	-10.	-0.006	200.76	2.070s
y-88	7344.36	1836.06	6.	3.	0.002	176.21	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	6.5652E+00				5.31E+01	
			477.60	6.565E+00	?(	2.197E+01 1.00E+02 1.05E+01	G
NA-22	C	8.0106E-02				9.50E+02	
			1274.53	8.011E-02	?(	2.329E+00 8.06E+02 9.99E+01	G
K-40	N	1.5540E+02				4.66E+11	
			1460.83	1.554E+02	(P	1.341E+01 7.94E+00 1.07E+01	G
Sc-46	F	7.3560E-01				8.38E+01	
			889.28	1.038E+00	?(	3.190E+00 9.18E+01 1.00E+02	G
			1120.55	4.337E-01	(	5.738E+00 3.90E+02 1.00E+02	G
CR-51	F	5.9553E+00				2.77E+01	
			320.08	5.955E+00	&(P	5.293E+01 2.67E+02 9.94E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C	-1.2555E+00					3.12E+02	
			834.85	-1.255E+00	(	2.468E+00	8.66E+01	1.00E+02 G
FE-59	F	1.9200E+00					4.45E+01	
			1099.25	1.817E+00	&(P	3.531E+00	8.69E+01	5.65E+01 G
			1291.60	2.055E+00	?(P	4.012E+00	8.84E+01	4.32E+01 G
Co-56	C	4.5073E+00					7.73E+01	
			846.77	1.854E-01	?(P	1.771E+00	4.00E+02	9.99E+01 G
			1238.28	1.104E+01	?(P	3.463E+00	1.73E+01	6.61E+01 G
			1037.84	-4.342E+00	+ P	1.696E+01	1.56E+02	1.41E+01 G
			1771.35	-7.014E+00	+	4.770E+01	2.01E+02	1.55E+01 A
CO-57	C	-6.8464E-01					2.72E+02	
			122.06	-6.846E-01	&(	2.109E+00	9.29E+01	8.56E+01 G
			136.47	-2.814E+00	&	2.676E+01	2.86E+02	1.07E+01 G
CO-58	C	-1.1707E+00					7.09E+01	
			810.78	-1.171E+00	?(P	3.225E+00	7.47E+01	9.95E+01 G
CO-60	F	1.3869E-02					1.93E+03	
			1332.50	1.387E-02	%(P	2.344E+00	7.21E+03	1.00E+02 G
			1173.24	-4.157E-01	& P	2.747E+00	3.11E+02	9.99E+01 G
NB-94	I	1.3980E+00					7.41E+06	
			702.63	1.398E+00	@(	1.448E+00	4.67E+01	9.79E+01 G
			871.10	1.298E-01	- P	2.098E+00	4.59E+02	9.99E+01 G
ZR-95	I	-1.4784E+00					6.40E+01	
			756.73	-1.478E+00	?(	4.056E+00	1.20E+02	5.45E+01 G
			724.20	6.171E-01	+	6.208E+00	2.93E+02	4.42E+01 G
NB-95	I	-9.5547E-01					6.40E+01	
			765.79	-9.555E-01	&(	3.608E+00	1.13E+02	9.98E+01 G
RU-103	I	1.9976E-01					3.93E+01	
			497.05	1.998E-01	?(	1.609E+00	3.32E+02	9.09E+01 G
			610.30	0.000E+00	-	1.299E+02	1.00E+03	5.75E+00 GA
RH-106	I	1.4653E+00					3.74E+02	
			621.92	1.465E+00	?(	1.325E+01	3.65E+02	9.93E+00 G
			1050.36	-7.244E-01	%	1.689E+02	6.59E+03	1.56E+00 G
			511.86	7.535E+00	?	1.076E+01	7.79E+01	2.00E+01 GA
AG-108M	C	-6.8740E-01					1.53E+05	
			433.94	-6.874E-01	?(P	2.008E+00	1.29E+02	9.05E+01 G
			722.94	0.000E+00	+	3.129E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	+	8.355E+00	1.00E+03	8.98E+01 G
AG-110M	F	7.6329E-01					2.50E+02	
			884.68	0.000E+00	?(	4.743E+00	1.00E+03	7.27E+01 G
			657.76	-1.008E+00	+	2.528E+00	7.54E+01	9.46E+01 G
			937.49	-5.354E+00	+ P	1.020E+01	4.66E+01	3.44E+01 G
			1384.30	3.047E+00	?(P	1.105E+01	1.65E+02	2.43E+01 G
			763.94	-4.268E+00	+	1.681E+01	1.17E+02	2.23E+01 G
SN-113	F	-1.2060E+00					1.15E+02	
			391.69	-1.206E+00	?(	4.226E+00	1.05E+02	6.40E+01 G
SB-124	F	-1.0567E-01					6.02E+01	
			602.73	-1.057E-01	%(	7.528E+00	2.13E+03	9.83E+01 G
			1690.98	1.429E-01	%	3.943E+00	1.19E+03	4.78E+01 G
			722.79	-7.091E+00	&	2.484E+01	1.04E+02	1.08E+01 G
SB-125	I	2.2654E+00					1.01E+03	
			427.88	1.956E+00	?(	5.457E+00	1.13E+02	2.96E+01 G
			600.50	-4.051E+00	&	4.155E+01	3.07E+02	1.79E+01 G
			635.89	-7.365E+00	+	1.714E+01	7.02E+01	1.13E+01 G
			463.37	3.141E+00	&(P	2.022E+01	1.90E+02	1.05E+01 G
I-131	I	7.9009E-01					8.02E+00	
			364.48	6.301E-01	&(P	1.806E+00	1.16E+02	8.17E+01 G
			284.30	1.134E+00	?(	2.518E+01	8.97E+02	6.14E+00 G
			636.97	2.319E+00	?(	2.768E+01	3.44E+02	7.17E+00 G
Gd-153	F	2.0013E+00					2.42E+02	
			97.50	2.001E+00	?(	1.567E+01	2.36E+02	3.00E+01 G
			103.20	0.000E+00	-	2.143E+01	1.00E+03	2.18E+01 G
Ga-68	C	2.4532E+01					4.71E-02	
			1077.40	2.453E+01	?(	6.926E+01	1.24E+02	3.30E+00 G
BA-133	F	-1.1290E+00					3.85E+03	
			356.00	-1.129E+00	&(	9.204E+00	2.45E+02	6.20E+01 G
			302.85	0.000E+00	&	2.768E+01	1.00E+03	1.83E+01 G
			383.84	7.934E+00	? P	2.705E+01	1.02E+02	8.94E+00 GA
			80.99	-1.981E+00	+	1.570E+01	2.39E+02	3.41E+01 GA
CS-134	I	1.8981E-01					7.54E+02	
			604.71	0.000E+00	?(	7.591E+00	1.00E+03	9.76E+01 G
			795.87	-1.213E+00	+	3.300E+00	8.15E+01	8.55E+01 G
			569.32	-3.167E+00	&	1.063E+01	9.93E+01	1.54E+01 G
			801.95	-1.337E+01	+	3.853E+01	8.64E+01	8.69E+00 G
			563.24	2.409E+00	?(	1.750E+01	2.98E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	-1.6615E+00					1.10E+04	
			661.66	-1.661E+00	&(P	3.712E+00	1.18E+02	8.52E+01 G
Ba-140	I	2.4884E+00					1.28E+01	
			537.26	2.488E+00	?(P	6.406E+00	1.08E+02	2.44E+01 G
			162.66	-8.452E+00	+	3.261E+01	1.16E+02	6.22E+00 G
			304.85	0.000E+00	-	1.189E+02	1.00E+03	4.29E+00 G
La-140	I	1.4088E+00					1.28E+01	
			1596.21	1.429E+00	?(	7.522E-01	2.67E+01	9.54E+01 G
			487.02	1.367E+00	@(	5.139E+00	1.12E+02	4.55E+01 G
			328.76	3.408E+00	& P	1.528E+01	1.34E+02	2.03E+01 G
			815.77	-4.951E+00	- P	1.475E+01	7.59E+01	2.33E+01 G
CE-141	I	1.2439E+00					3.25E+01	
			145.44	1.244E+00	?(	5.893E+00	1.43E+02	4.82E+01 G
CE-144	I	-5.2516E+00					2.85E+02	
			133.54	-5.252E+00	?(	2.497E+01	1.43E+02	1.11E+01 G
PM-144	C	5.5745E-01					3.63E+02	
			696.54	5.575E-01	?(	1.222E+00	9.38E+01	9.90E+01 G
			618.06	-1.931E-02	% P	7.615E+00	8.23E+03	9.91E+01 G
EU-152	F	-6.4975E-01					4.94E+03	
			344.29	-2.956E+00	?(P	1.276E+01	1.23E+02	2.65E+01 G
			1112.07	1.131E+00	%	4.345E+01	1.13E+03	1.36E+01 G
			121.78	-2.049E+00	+	6.144E+00	9.04E+01	2.86E+01 G
			778.92	7.415E-01	+ P	1.531E+01	8.75E+02	1.29E+01 G
			964.11	3.535E+00	&(	1.441E+01	1.19E+02	1.46E+01 G
			244.69	-9.219E+00	+	4.805E+01	1.57E+02	7.58E+00 G
			1408.00	7.223E+00	P	1.297E+01	8.34E+01	2.10E+01 GA
EU-154	I	7.4418E-01					3.14E+03	
			873.23	1.199E+00	?(P	1.896E+01	4.52E+02	1.23E+01 G
			123.10	6.075E-01	&(	3.931E+00	1.93E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.707E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.406E+01	1.00E+03	2.02E+01 G
			1004.77	1.813E-01	&	1.809E+01	2.87E+03	1.80E+01 G
			996.33	-3.975E+00	+	2.936E+01	2.15E+02	1.06E+01 G
EU-155	I	-2.3496E+00					1.81E+03	
			105.31	-2.350E+00	&(P	2.188E+01	5.37E+01	2.12E+01 G
			86.54	-2.129E+00	}	1.659E+01	2.35E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	5.4351E-01					4.24E+01	
			482.00	5.435E-01	&(	3.038E+00	1.65E+02	8.05E+01 G
			133.02	-1.343E+00	+	6.313E+00	1.42E+02	4.33E+01 G
			345.83	-5.136E+00	+	2.252E+01	1.32E+02	1.51E+01 G
			136.30	-1.006E+01	&	4.829E+01	1.45E+02	5.85E+00 G
Ta-182	F	2.0080E+00					1.14E+02	
			1121.30	1.243E+00	?(	1.662E+01	3.94E+02	3.49E+01 G
			1221.41	2.525E+00	(	5.125E+00	9.05E+01	2.70E+01 G
			1189.05	2.793E+00	(	1.314E+01	2.05E+02	1.62E+01 G
Hg-203	F	-4.1677E-01					4.66E+01	
			279.20	-4.168E-01	&(	1.991E+00	1.95E+02	8.15E+01 G
TL-208	N	6.2485E-01					6.98E+02	
			583.02	6.265E-01	?(P	2.360E+00	1.57E+02	8.45E+01 G
			277.28	6.614E-01	%	3.054E+01	1.36E+03	6.31E+00 G
			860.56	6.135E-01	?(P	1.443E+01	9.80E+02	1.24E+01 G
pm-146	C	5.9708E-01					2.02E+03	
			747.16	2.652E-01	?(P	4.934E+00	7.80E+02	3.40E+01 G
			735.72	1.099E+00	?(P	7.348E+00	2.83E+02	2.25E+01 G
			453.88	-1.321E+00	+ P	2.902E+00	9.67E+01	6.50E+01 G
y-88	F	3.0421E-01					1.07E+02	
			898.04	2.346E-01	&(P	2.091E+00	3.76E+02	9.37E+01 G
			1836.06	3.700E-01	?(	1.532E+00	1.76E+02	9.92E+01 G
Cd-113m		3.6475E+03					5.33E+03	
			263.70	3.648E+03	(	2.404E+04	1.94E+02	6.00E-03 K
Cf-251	T	-1.4483E+00					3.28E+05	
			176.60	-1.448E+00	&(	8.851E+00	2.40E+02	1.70E+01 G
			227.00	-6.491E+00	+	2.494E+01	1.58E+02	6.30E+00 GA
Cf-249	T	1.0280E+00					1.28E+05	
			387.95	5.359E-01	*(	3.841E+00	2.13E+02	6.60E+01 G
			333.44	3.122E+00	&(	2.064E+01	1.98E+02	1.55E+01 G
Sn-126		1.7001E+00					3.65E+07	
			87.57	1.700E+00	}	1.314E+01	7.82E+01	3.75E+01 GA
			64.28	1.700E+00	&(	2.973E+01	5.23E+02	9.70E+00 G
			86.94	1.700E+00	}	5.564E+01	3.18E+02	9.04E+00 GA
PB-210	N	9.5594E+01					8.14E+03	
			46.54	9.559E+01	@(P	5.143E+01	2.29E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.0846E+01					6.98E+02	
			238.63	1.085E+01	(P	2.573E+00	9.50E+00	4.33E+01 G
			300.03	-2.165E+01	- P	1.566E+02	4.13E+01	3.28E+00 GA
PB-214	N	1.2096E+02					5.84E+05	
			351.93	1.192E+02	(P	3.946E+00	2.92E+00	3.76E+01 G
			295.09	1.244E+02	(P	5.629E+00	3.41E+00	1.93E+01 G
			242.00	1.288E+02		1.459E+01	5.66E+00	7.43E+00 GA
BI-207	C	3.2184E-01					1.18E+04	
			569.70	-2.354E-01	?(	1.633E+00	2.00E+02	9.77E+01 G
			1063.66	1.053E+00	?(P	2.416E+00	1.01E+02	7.45E+01 G
BI-212	N	1.1367E+01					6.98E+02	
			727.17	1.137E+01	?(P	3.159E+01	8.31E+01	7.55E+00 G
			785.42	1.698E+02	?	1.134E+02	3.15E+01	1.28E+00 GA
U-235	N	5.6358E+00					2.57E+11	
			143.79	4.346E+00	(P	2.396E+01	1.66E+02	1.10E+01 G
			205.33	8.458E+00	(P	3.008E+01	1.39E+02	5.01E+00 G
			163.38	-6.119E-01	& P	3.849E+01	2.77E+03	5.08E+00 G
			185.72	-2.014E+00	- P	4.166E+00	8.65E+01	5.40E+01 GA
BI-214	N	1.0546E+02					5.84E+05	
			609.31	1.055E+02	(P	2.840E+00	3.20E+00	4.61E+01 G
			1120.29	1.252E+02	+ P	6.257E+00	6.47E+00	1.51E+01 G
			1764.49	1.255E+02	+ P	5.480E+00	7.47E+00	1.54E+01 G
BI-210M	T	-1.3040E+00					1.10E+09	
			265.83	-1.304E+00	&(P	3.599E+00	7.45E+01	5.00E+01 G
			304.90	0.000E+00	+	1.822E+01	1.00E+03	2.80E+01 G
AC-228	N	1.2432E+01					2.10E+03	
			911.07	7.735E+00	@(	7.157E+00	4.21E+01	2.90E+01 G
			968.97	2.023E+01	(	1.072E+01	1.98E+01	1.75E+01 G
			338.32	0.000E+00	-	2.734E+01	1.00E+03	1.20E+01 G
			93.35	0.000E+00	&	8.593E+01	1.00E+03	5.56E+00 XA
TH-227	N	6.9445E+00					7.95E+03	
			50.14	6.944E+00	?(	4.212E+01	1.82E+02	8.00E+00 G
			256.24	-1.029E+01	+ P	2.433E+01	6.55E+01	7.00E+00 G
TH-229	N	-1.1871E+01					2.68E+06	
			193.51	-1.187E+01	?(	3.616E+01	1.20E+02	4.40E+00 G
			210.85	-9.340E+00	+ P	5.516E+01	2.16E+02	2.99E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N  -3.4011E+01                                      1.63E+12
                          63.29-3.401E+01  (P 7.574E+01 4.13E+01 3.81E+00 G
                          92.59-1.254E+01 + P 8.620E+01 6.15E+01 5.58E+00 G

PA-234   N  -1.9112E-01                                      1.63E+12
                         131.29-3.210E+00 &(  1.517E+01 1.42E+02 1.80E+01 G
                         946.02-9.862E+00 &   1.930E+01 8.90E+01 1.34E+01 G
                         569.47 6.436E+00 ?(  2.008E+01 9.26E+01 8.20E+00 G
                         883.24 0.000E+00 +   3.586E+01 1.00E+03 9.60E+00 G
                         880.53-1.654E+01 +   5.393E+01 9.72E+01 6.00E+00 GA

PA-234M  N   4.6002E+01                                      1.63E+12
                        1001.00-2.799E+01 ?(P 3.916E+02 3.95E+02 8.37E-01 G
                         766.41 2.567E+02 ?(P 1.072E+03 1.24E+02 2.94E-01 G

AM-241   T   2.1981E+00                                      1.58E+05
                          59.54 2.198E+00  (P 4.228E+00 7.04E+01 3.59E+01 G

Cs-136   F   4.1087E-01                                      1.30E+01
                         818.50-2.530E-01 ?(  3.669E+00 4.25E+02 1.00E+02 G
                        1048.07 1.241E+00 ?(  2.854E+00 6.93E+01 8.00E+01 G
                         340.57 0.000E+00 -   7.037E+00 1.00E+03 4.69E+01 G

Np-239   T  -2.8291E+00                                      2.36E+00
                         103.70-2.662E+00 +   1.942E+01 2.20E+02 2.40E+01 X
                         106.13-2.829E+00 ?(  2.056E+01 2.19E+02 2.27E+01 G
                          99.50 0.000E+00 &   3.133E+01 1.00E+03 1.50E+01 X

Nd-147       4.4380E+00                                      1.11E+01
                         531.00 4.438E+00 ?(  9.844E+00 9.29E+01 1.30E+01 G
                          91.10-7.375E-01 -   1.705E+01 6.97E+02 2.83E+01 G

TL-210   N  -8.0155E-02                                      5.84E+05
                         799.60-8.016E-02 %(  3.083E+00 1.11E+03 9.90E+01 G
                         296.00-8.781E-01 +   6.503E+00 2.23E+02 7.90E+01 G
                        1313.00-1.304E+00 +   9.479E+00 3.20E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
```

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	836.	23.	0.013	181.65	6.944E+00	
TH-234	63.29	1149.	-72.	-0.040	41.27	-3.401E+01	P
BA-133	80.99	6138.	-46.	-0.026	239.23	-1.981E+00	
EU-155	86.54	5982.	-47.	-0.026	235.20	-2.129E+00	
Nd-147	91.10	5607.	-15.	-0.008	696.79	-7.375E-01	
TH-234	92.59	5643.	-51.	-0.029	61.52	-1.254E+01	P
Np-239	103.70	5571.	-48.	-0.027	220.19	-2.662E+00	
EU-155	105.31	5536.	-38.	-0.021	53.68	-2.350E+00	P
Np-239	106.13	5609.	-48.	-0.027	219.30	-2.829E+00	
EU-152	121.78	759.	-44.	-0.024	90.38	-2.049E+00	
CO-57	122.06	803.	-44.	-0.024	92.86	-6.846E-01	
EU-154	123.10	627.	18.	0.010	193.34	6.075E-01	
PA-234	131.29	1785.	-42.	-0.023	142.31	-3.210E+00	
HF-181	133.02	1771.	-42.	-0.023	141.59	-1.343E+00	
CE-144	133.54	1813.	-42.	-0.023	143.20	-5.252E+00	
HF-181	136.30	1856.	-42.	-0.024	144.56	-1.006E+01	
CO-57	136.47	1898.	-22.	-0.012	285.59	-2.814E+00	
U-235	143.79	1519.	33.	0.019	165.83	4.346E+00	P
Ba-140	162.66	760.	-34.	-0.019	115.94	-8.452E+00	
Cf-251	176.60	381.	-15.	-0.009	239.62	-1.448E+00	
U-235	185.72	804.	-65.	-0.036	86.53	-2.014E+00	P
TH-229	193.51	370.	-30.	-0.017	120.07	-1.187E+01	
U-235	205.33	301.	24.	0.013	139.33	8.458E+00	P
TH-229	210.85	348.	-15.	-0.008	215.87	-9.340E+00	P
Cf-251	227.00	280.	-21.	-0.012	157.53	-6.491E+00	
EU-152	244.69	1390.	-34.	-0.019	156.67	-9.219E+00	
TH-227	256.24	272.	-34.	-0.019	65.51	-1.029E+01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	263.70	184.	10.	0.006	194.42	3.648E+03	
BI-210M	265.83	287.	-30.	-0.016	74.51	-1.304E+00	P
Hg-203	279.20	214.	-15.	-0.008	194.75	-4.168E-01	
I-131	284.30	188.	3.	0.002	896.70	1.134E+00	
TL-210	296.00	2063.	-29.	-0.016	222.69	-8.781E-01	
PA-231	300.07	1989.	-29.	-0.016	218.16	-2.857E+01	
PA-233	300.18	1960.	-21.	-0.012	296.80	-8.267E+00	
CR-51	320.08	1910.	23.	0.013	266.98	5.955E+00	P
Cf-249	333.44	651.	18.	0.010	197.56	3.122E+00	
EU-152	344.29	690.	-29.	-0.016	123.16	-2.956E+00	P
HF-181	345.83	691.	-29.	-0.016	131.52	-5.136E+00	
BA-133	356.00	1900.	-25.	-0.014	244.97	-1.129E+00	
I-131	364.48	113.	18.	0.010	116.42	6.301E-01	P
BA-133	383.84	290.	24.	0.013	102.13	7.934E+00	P
Cf-249	387.95	314.	12.	0.007	212.58	5.359E-01	
SN-113	391.69	353.	-26.	-0.014	105.01	-1.206E+00	
SB-125	427.88	104.	18.	0.010	113.40	1.956E+00	
AG-108M	433.94	130.	-19.	-0.011	128.62	-6.874E-01	P
pm-146	453.88	130.	-25.	-0.014	96.74	-1.321E+00	P
SB-125	463.37	160.	10.	0.005	189.62	3.141E+00	P
Ir-192	468.06	175.	-14.	-0.008	136.28	-9.356E-01	
BE-7	477.60	183.	20.	0.011	99.96	6.565E+00	
HF-181	482.00	203.	12.	0.007	165.43	5.435E-01	
RU-103	497.05	65.	5.	0.003	332.16	1.998E-01	
RH-106	511.86	140.	41.	0.023	77.94	7.535E+00	
Nd-147	531.00	43.	15.	0.008	92.92	4.438E+00	
Ba-140	537.26	65.	16.	0.009	108.08	2.488E+00	P
CS-134	563.24	52.	5.	0.003	297.77	2.409E+00	
CS-134	569.32	65.	-12.	-0.007	99.30	-3.167E+00	
PA-234	569.47	66.	13.	0.007	92.63	6.436E+00	
BI-207	569.70	62.	-6.	-0.003	200.43	-2.354E-01	
SB-125	600.50	1366.	-17.	-0.009	307.41	-4.051E+00	
RH-106	621.92	35.	3.	0.002	364.69	1.465E+00	
SB-125	635.89	77.	-19.	-0.010	70.16	-7.365E+00	
I-131	636.97	81.	4.	0.002	344.25	2.319E+00	
AG-110M	657.76	113.	-21.	-0.012	75.44	-1.008E+00	
CS-137	661.66	201.	-31.	-0.017	118.30	-1.661E+00	P
PM-144	696.54	23.	12.	0.006	93.79	5.575E-01	
NB-94	702.63	33.	28.	0.016	46.73	1.398E+00	
SB-124	722.79	122.	-16.	-0.009	104.13	-7.091E+00	
ZR-95	724.20	128.	6.	0.003	293.45	6.171E-01	
BI-212	727.17	94.	17.	0.010	83.15	1.137E+01	P
pm-146	735.72	42.	5.	0.003	282.95	1.099E+00	P
pm-146	747.16	42.	2.	0.001	780.06	2.652E-01	P
ZR-95	756.73	75.	-16.	-0.009	119.70	-1.478E+00	
AG-110M	763.94	223.	-18.	-0.010	117.40	-4.268E+00	
NB-95	765.79	205.	-18.	-0.010	112.58	-9.555E-01	
PA-234M	766.41	155.	15.	0.008	123.93	2.567E+02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	778.92	56.	2.	0.001	875.02	7.415E-01	P
BI-212	785.42	28.	41.	0.023	31.52	1.698E+02	
CS-134	795.87	115.	-19.	-0.011	81.51	-1.213E+00	
CS-134	801.95	162.	-22.	-0.012	86.37	-1.337E+01	
CO-58	810.78	145.	-21.	-0.012	74.73	-1.171E+00	P
Cs-136	818.50	189.	-5.	-0.003	424.71	-2.530E-01	
MN-54	834.85	79.	-22.	-0.012	86.61	-1.255E+00	
NB-94	871.10	52.	2.	0.001	458.87	1.298E-01	P
EU-154	873.23	64.	3.	0.001	452.04	1.199E+00	P
PA-234	880.53	128.	-17.	-0.009	97.19	-1.654E+01	
Sc-46	889.28	122.	18.	0.010	91.78	1.038E+00	
y-88	898.04	42.	4.	0.002	375.54	2.346E-01	P
AG-110M	937.49	135.	-30.	-0.017	46.64	-5.354E+00	P
PA-234	946.02	70.	-21.	-0.012	89.02	-9.862E+00	
EU-152	964.11	43.	8.	0.005	118.92	3.535E+00	
EU-154	996.33	94.	-6.	-0.004	215.11	-3.975E+00	
PA-234M	1001.00	105.	-4.	-0.002	395.35	-2.799E+01	P
Cs-136	1048.07	44.	15.	0.008	69.31	1.241E+00	
BI-207	1063.66	26.	11.	0.006	100.94	1.053E+00	P
Ga-68	1077.40	30.	10.	0.006	124.50	2.453E+01	
FE-59	1099.25	30.	15.	0.008	86.86	1.817E+00	P
Sc-46	1120.55	276.	6.	0.003	390.06	4.337E-01	
Ta-182	1121.30	281.	6.	0.003	394.06	1.243E+00	
CO-60	1173.24	54.	-6.	-0.003	310.58	-4.157E-01	P
Ta-182	1189.05	30.	6.	0.003	204.80	2.793E+00	
Ta-182	1221.41	11.	9.	0.005	90.50	2.525E+00	
NA-22	1274.53	32.	1.	0.001	806.23	8.011E-02	
FE-59	1291.60	16.	11.	0.006	88.38	2.055E+00	P
TL-210	1313.00	21.	-3.	-0.002	319.69	-1.304E+00	
AG-110M	1384.30	37.	9.	0.005	164.99	3.047E+00	P
EU-152	1408.00	37.	17.	0.010	83.45	7.223E+00	P
y-88	1836.06	6.	3.	0.002	176.21	3.700E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	6.5652E+00	6.5652E+00	9.996E+01%	2.20E+01
NA-22	#A	8.0106E-02	8.0106E-02	8.062E+02%	2.33E+00
K-40		1.5540E+02	1.5540E+02	7.939E+00%	1.34E+01
Sc-46	#A	7.3560E-01	7.3560E-01	9.178E+01%	3.19E+00
CR-51	#A	5.9552E+00	5.9553E+00	2.670E+02%	5.29E+01
MN-54	#A	-1.2555E+00	-1.2555E+00	8.661E+01%	2.47E+00
FE-59	#A	1.9200E+00	1.9200E+00	6.196E+01%	3.53E+00
Co-56	#C	4.5073E+00	4.5073E+00	1.725E+01%	1.77E+00

CO-57	#A	-6.8464E-01	-6.8464E-01	9.286E+01%	2.11E+00
CO-58	#A	-1.1707E+00	-1.1707E+00	7.473E+01%	3.23E+00
CO-60	#A	1.3869E-02	1.3869E-02	7.214E+03%	2.34E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.18E+01
NB-94	#A	1.3980E+00	1.3980E+00	4.673E+01%	1.45E+00
ZR-95	#A	-1.4784E+00	-1.4784E+00	1.197E+02%	4.06E+00
NB-95	#A	-9.5547E-01	-9.5547E-01	1.126E+02%	3.61E+00
RU-103	#A	1.9976E-01	1.9976E-01	3.322E+02%	1.61E+00
RH-106	#A	1.4653E+00	1.4653E+00	3.647E+02%	1.33E+01
AG-108M	#A	-6.8740E-01	-6.8740E-01	1.286E+02%	2.01E+00
AG-110M	#A	7.6329E-01	7.6329E-01	1.650E+02%	4.74E+00
SN-113	#A	-1.2060E+00	-1.2060E+00	1.050E+02%	4.23E+00
SB-124	#A	-1.0567E-01	-1.0567E-01	2.129E+03%	7.53E+00
SB-125	#A	2.2654E+00	2.2654E+00	1.105E+02%	5.46E+00
I-131	#A	7.9008E-01	7.9009E-01	1.164E+02%	1.81E+00
Gd-153	#A	2.0013E+00	2.0013E+00	2.363E+02%	1.57E+01
Ga-68	#A	2.4477E+01	2.4532E+01	1.245E+02%	6.93E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.36E+00
BA-133	#A	-1.1290E+00	-1.1290E+00	2.450E+02%	9.20E+00
CS-134	#A	1.8981E-01	1.8981E-01	2.978E+02%	7.59E+00
CS-137	#A	-1.6615E+00	-1.6615E+00	1.183E+02%	3.71E+00
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.41E+00
Ba-140	#A	2.4884E+00	2.4884E+00	1.081E+02%	6.41E+00
La-140	#	1.4088E+00	1.4088E+00	2.673E+01%	7.52E-01
CE-141	#A	1.2439E+00	1.2439E+00	1.427E+02%	5.89E+00
CE-144	#A	-5.2516E+00	-5.2516E+00	1.432E+02%	2.50E+01
PM-144	#A	5.5745E-01	5.5745E-01	9.379E+01%	1.22E+00
EU-152	#A	-6.4975E-01	-6.4975E-01	8.560E+01%	1.28E+01
EU-154	#A	7.4418E-01	7.4418E-01	1.933E+02%	1.90E+01
EU-155	#A	-2.3496E+00	-2.3496E+00	5.368E+01%	2.19E+01
HF-181	#A	5.4351E-01	5.4351E-01	1.654E+02%	3.04E+00
Ta-182	#A	2.0080E+00	2.0080E+00	9.050E+01%	1.66E+01
Hg-203	#A	-4.1677E-01	-4.1677E-01	1.948E+02%	1.99E+00
TL-208	#A	6.2485E-01	6.2485E-01	1.567E+02%	2.36E+00
pm-146	#A	5.9708E-01	5.9708E-01	2.829E+02%	4.93E+00
y-88	#A	3.0421E-01	3.0421E-01	1.762E+02%	2.09E+00
Cd-113m	#A	3.6475E+03	3.6475E+03	1.944E+02%	2.40E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.31E+02
Cf-251	#A	-1.4483E+00	-1.4483E+00	2.396E+02%	8.85E+00
Cf-249	#A	1.0280E+00	1.0280E+00	1.451E+02%	3.84E+00
Sn-126	#A	1.7001E+00	1.7001E+00	5.229E+02%	2.97E+01
PB-210	#	9.5594E+01	9.5594E+01	2.288E+01%	5.14E+01
PB-212		1.0846E+01	1.0846E+01	9.501E+00%	2.57E+00
PB-214		1.2096E+02	1.2096E+02	2.244E+00%	3.95E+00
BI-207	#A	3.2184E-01	3.2184E-01	1.009E+02%	1.63E+00
BI-212	#A	1.1367E+01	1.1367E+01	8.315E+01%	3.16E+01
U-235	#A	5.6358E+00	5.6358E+00	1.083E+02%	2.40E+01
BI-214		1.0546E+02	1.0546E+02	3.201E+00%	2.84E+00
BI-210M	#A	-1.3040E+00	-1.3040E+00	7.451E+01%	3.60E+00

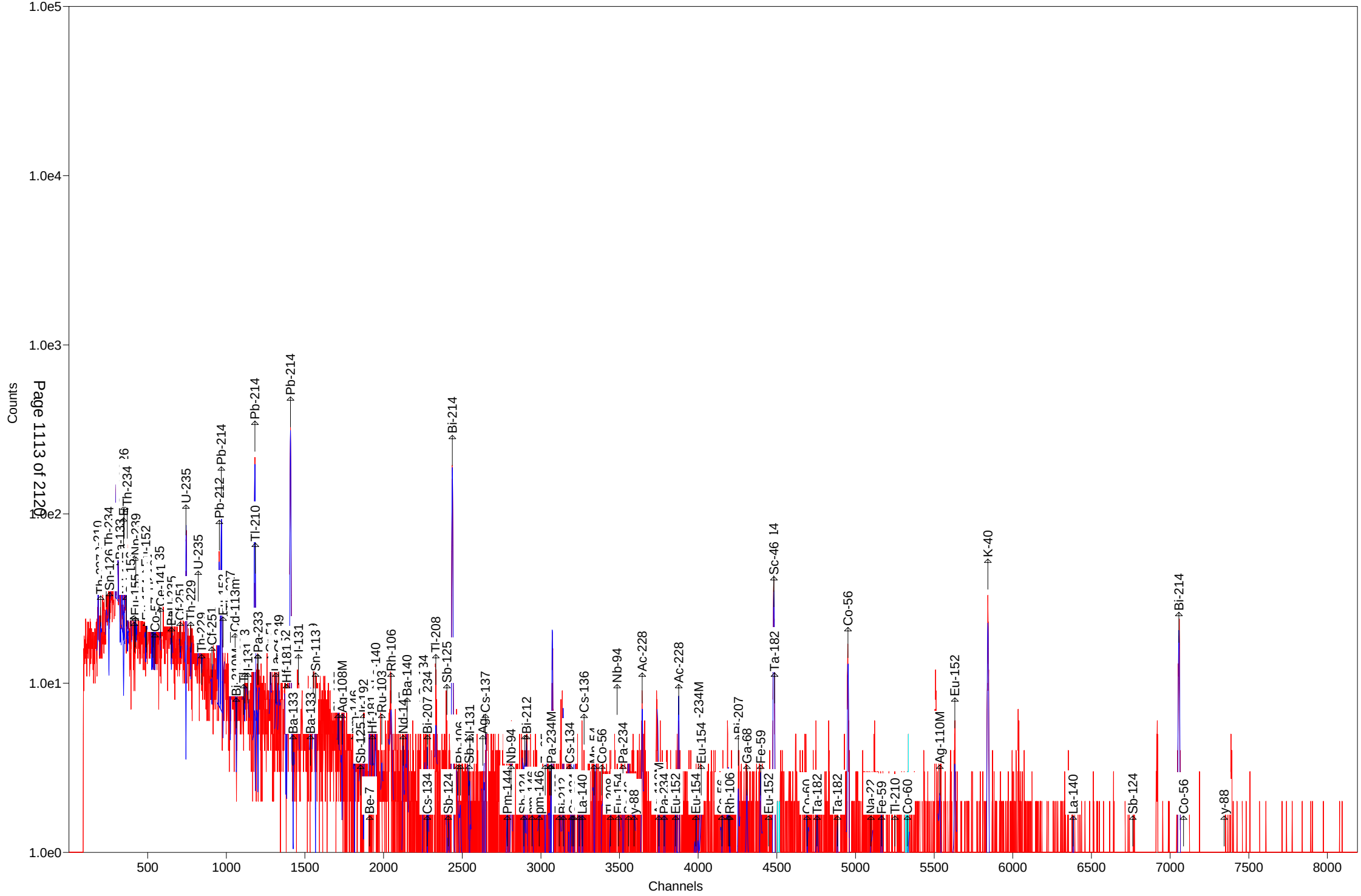
AC-228 #	1.2432E+01	1.2432E+01	1.981E+01%		7.16E+00
TH-227 #A	6.9445E+00	6.9445E+00	1.817E+02%		4.21E+01
TH-229 #A	-1.1871E+01	-1.1871E+01	1.201E+02%		3.62E+01
TH-234 #A	-3.4011E+01	-3.4011E+01	4.127E+01%		7.57E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.76E+02
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.44E+01
PA-234 #A	-1.9112E-01	-1.9112E-01	8.490E+01%		1.52E+01
PA-234M#A	4.6002E+01	4.6002E+01	1.239E+02%		3.92E+02
AM-241 A	2.1981E+00	2.1981E+00	7.041E+01%		4.23E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.92E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.04E+00
Cs-136 #A	4.1087E-01	4.1087E-01	6.931E+01%		3.67E+00
Np-239 #A	-2.8290E+00	-2.8291E+00	2.193E+02%		2.06E+01
Nd-147 #A	4.4380E+00	4.4380E+00	9.292E+01%		9.84E+00
TL-210 #A	-8.0155E-02	-8.0155E-02	1.115E+03%		3.08E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 4.905E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 4.9045435E+02 Bq/Sample

379951_Gamma_160-29881-A-12-C. 8_Gamma_20182986.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20183082

Sample Description: 379951_Gamma_160-29881-A-13-B
Detector: Detector # 7
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-13-B

Decay to Time: 8/23/2018 06:30 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:31:02 Real Time: 1827 sec
Analysis Time: 8/23/2018 07:01 Dead Time: 1.46 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev14.lib
Bkgd Correction File: 7_2018-08-11_1303.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.349E+00	105.8	3.545E+00	3.549E+00	1.198E+01
NA-22	-2.685E-01	154.1	4.138E-01	4.141E-01	1.472E+00
K-40	9.850E+01	9.6	9.444E+00	1.070E+01	1.170E+01
Sc-46	1.952E-01	189.6	3.702E-01	3.703E-01	1.348E+00
CR-51	0.000E+00	1.#INF	7.964E-01	7.965E-01	1.350E+01
MN-54	-4.121E-01	129.1	5.320E-01	5.325E-01	1.253E+00
FE-59	8.011E-01	67.8	5.435E-01	5.450E-01	1.398E+00
Co-56	2.165E-01	146.4	3.170E-01	3.171E-01	7.863E-01
CO-57	9.778E-02	180.9	1.768E-01	1.769E-01	5.998E-01
CO-58	0.000E+00	1.#INF	6.342E-02	6.342E-02	1.247E+00
CO-60	-7.669E-01	79.5	6.100E-01	6.112E-01	1.750E+00
ZN-65	-1.504E+00	88.1	1.325E+00	1.327E+00	4.459E+00
NB-94	3.132E-01	31.6	9.905E-02	1.004E-01	6.796E-01
ZR-95	3.285E-01	138.0	4.533E-01	4.537E-01	1.305E+00
NB-95	4.488E-02	605.6	2.718E-01	2.718E-01	9.990E-01
RU-103	2.036E-01	102.0	2.076E-01	2.079E-01	5.232E-01
RH-106	1.750E+00	263.5	4.613E+00	4.614E+00	1.594E+01
AG-108M	-3.872E-01	94.9	3.673E-01	3.679E-01	9.149E-01
AG-110M	4.283E-01	44.2	1.891E-01	1.904E-01	1.038E+00
SN-113	-3.953E-02	1493.8	5.905E-01	5.905E-01	1.428E+00
SB-124	1.376E-01	85.5	1.177E-01	1.179E-01	1.876E+00
SB-125	1.032E+00	86.5	8.929E-01	8.945E-01	1.833E+00
I-131	2.356E-01	90.9	2.142E-01	2.146E-01	7.873E-01
Gd-153	3.374E-01	142.1	4.796E-01	4.800E-01	2.049E+00
Ga-68	2.258E+01	30.2	6.807E+00	6.924E+00	1.513E+01
Tc-99m	-1.082E-01	177.4	1.921E-01	1.922E-01	6.542E-01
BA-133	-1.059E-01	130.7	1.384E-01	1.385E-01	1.896E+00
CS-134	2.604E-01	86.5	2.254E-01	2.258E-01	1.893E+00
CS-137	5.825E-02	630.5	3.673E-01	3.673E-01	1.317E+00
CE-139	-2.278E-01	148.2	3.374E-01	3.381E-01	7.841E-01
Ba-140	-5.253E-03	139.7	7.340E-03	7.345E-03	2.809E+00
La-140	2.219E-01	124.4	2.760E-01	2.763E-01	6.371E-01
CE-141	-9.538E-02	543.2	5.182E-01	5.182E-01	1.760E+00

CE-144	0.000E+00	1.#INF	3.179E-01	3.179E-01	5.692E+00
PM-144	-5.286E-02	728.3	3.850E-01	3.850E-01	9.927E-01
EU-152	1.901E+00	24.3	4.612E-01	4.717E-01	3.270E+00
EU-154	7.275E-01	103.2	7.507E-01	7.517E-01	6.777E+00
EU-155	-9.059E-03	12050.7	1.092E+00	1.092E+00	3.105E+00
HF-181	-1.927E-01	80.6	1.554E-01	1.557E-01	1.673E+00
Ta-182	6.967E-01	88.5	6.169E-01	6.178E-01	6.269E+00
Hg-203	6.180E-02	407.0	2.515E-01	2.515E-01	8.785E-01
TL-208	1.314E+00	34.4	4.525E-01	4.576E-01	9.179E-01
pm-146	2.991E-01	101.1	3.025E-01	3.029E-01	2.086E+00
y-88	2.511E-01	183.2	4.600E-01	4.602E-01	1.089E+00
Cd-113m	-1.958E+03	154.5	3.026E+03	3.028E+03	1.042E+04
Cd-109	4.380E+00	134.5	5.891E+00	5.896E+00	1.982E+01
Cf-251	7.288E-01	128.8	9.388E-01	9.410E-01	2.460E+00
Cf-249	4.335E-01	104.7	4.537E-01	4.542E-01	1.383E+00
Sn-126	2.129E+00	101.1	2.153E+00	2.155E+00	7.241E+00
PB-210	-4.293E+00	208.9	8.970E+00	8.974E+00	3.129E+01
PB-212	1.955E+00	21.1	4.130E-01	4.319E-01	1.135E+00
PB-214	3.667E+00	17.6	6.453E-01	6.729E-01	1.197E+00
BI-207	2.984E-01	83.6	2.495E-01	2.500E-01	7.890E-01
BI-212	2.345E+00	179.5	4.209E+00	4.211E+00	1.482E+01
U-235	-2.564E-01	96.1	2.464E-01	2.468E-01	7.940E+00
BI-214	4.419E+00	15.6	6.879E-01	7.252E-01	9.034E-01
BI-210M	-4.450E-01	96.5	4.295E-01	4.303E-01	1.448E+00
AC-228	2.380E+00	39.6	9.428E-01	9.505E-01	2.242E+00
TH-227	8.963E-01	495.7	4.443E+00	4.443E+00	1.522E+01
TH-229	-3.431E+00	147.0	5.042E+00	5.049E+00	1.310E+01
TH-234	-8.307E+00	79.4	6.597E+00	6.611E+00	2.091E+01
PA-231	5.736E+00	152.1	8.725E+00	8.731E+00	4.130E+01
PA-233	3.813E-01	210.4	8.024E-01	8.027E-01	3.646E+00
PA-234	1.656E+00	70.0	1.160E+00	1.163E+00	3.280E+00
PA-234M	0.000E+00	1.#INF	9.105E+00	9.106E+00	1.733E+02
AM-241	1.310E+00	49.7	6.510E-01	6.546E-01	1.704E+00
Np-237	-1.535E+00	136.7	2.098E+00	2.100E+00	7.034E+00
Ir-192	1.517E-01	107.9	1.636E-01	1.638E-01	1.526E+00
Cs-136	-3.748E-01	111.9	4.196E-01	4.201E-01	1.437E+00
Np-239	-6.227E-01	148.3	9.233E-01	9.241E-01	3.112E+00
Nd-147	-2.382E-02	110.8	2.639E-02	2.642E-02	5.757E+00
TL-210	2.155E-01	105.3	2.270E-01	2.274E-01	8.962E-01
Total	1.661E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-13-B

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20183082.An1

Acquisition information
Start time: 8/23/2018 6:31:02 AM
Live time: 1800
Real time: 1827
Dead time: 1.46 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:30:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-08-11_1303.PBC 8/11/2018 1:03:03 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-8.	208.94	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	4.	495.68	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
59.54	31.	49.69	0.85	3.701E-02	59.54	35.900	PBC<MDA	AM241
64.28	15.	101.10	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
80.99	2.	802.50	0.87	5.069E-02	80.99	34.060	PBC<MDA	BA133
86.94	16.	140.77	0.88	5.294E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	1.846E+00	Sn126
87.57	16.	136.10	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
88.04	16.	134.48	0.88	5.329E-02	88.04	3.790	PBC<MDA	Cd109
91.10	16.	138.57	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-9.	255.64	0.89	5.452E-02	92.59	5.584	PBC<MDA	TH234
93.35	16.	146.32	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
97.50	13.	142.14	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
99.50	13.	147.19	0.89	5.580E-02	99.50	15.000	PBC<MDA	Np239
103.20	5.	407.89	0.90	5.622E-02	103.20	21.800	PBC<MDA	Gd153
136.47	9.	180.85	0.93	5.410E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	8.815E-01	CO57
176.60	10.	128.81	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
185.72	38.	29.53	0.99	4.443E-02	185.72	54.000	8.875E-01	U235
205.33	10.	127.05	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
238.64	55.	21.12	1.04	3.602E-02	238.63	43.300	1.955E+00	PB212
242.01	10.	160.02	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	10.	169.77	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
279.20	3.	406.96	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
295.06	34.	41.15	1.10	3.009E-02	295.09	19.300	PBC<MDA	PB214
296.00	8.	203.12	1.10	3.001E-02	296.00	79.000	PBC<MDA	TL210
300.03	7.	214.24	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	8.	214.84	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.849E+00	PA231
					300.18	6.200	2.321E+00	PA233
300.18	9.	210.43	1.10	2.965E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.539E+00	PA231
					300.18	6.200	2.595E+00	PA233
302.65	9.	215.40	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.866E-01	BA133
302.85	9.	220.68	1.11	2.943E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.868E-01	BA133
304.85	9.	225.47	1.11	2.926E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	5.849E-01	BI210M
333.44	10.	104.65	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.32	4.	299.91	1.14	2.677E-02	338.32	12.010	PBC<MDA	AC228
345.83	9.	121.89	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.14	68.	17.60	1.66	2.588E-02	351.93	37.600	3.863E+00	PB214
387.95	6.	190.32	1.19	2.380E-02	387.95	66.000	PBC<MDA	Cf249
427.88	4.	202.07	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
453.88	6.	101.11	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	9.	86.50	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	107.85	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
487.02	11.	124.40	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	6.	101.96	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	22.	76.86	2.56	1.870E-02	511.86	20.000	PBC<MDA	RH106
563.24	8.	98.56	1.36	1.720E-02	563.24	8.350	PBC<MDA	CS134
569.47	9.	93.70	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.513E+00	PA234
					569.70	97.740	2.948E-01	BI207
569.70	5.	139.05	1.37	1.703E-02	569.32	15.380	1.025E+00	CS134
					569.47	8.200	1.922E+00	PA234
					569.70	97.740	1.613E-01	BI207
583.02	18.	52.85	1.38	1.669E-02	583.02	84.500	PBC<MDA	TL208
600.50	8.	203.31	1.40	1.626E-02	600.50	17.860	PBC<MDA	SB125
609.24	56.	15.57	1.08	1.605E-02	609.31	46.090	4.205E+00	BI214
621.92	5.	263.52	1.42	1.576E-02	621.92	9.930	PBC<MDA	RH106
636.97	7.	90.94	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	109.66	1.45	1.500E-02	657.76	94.640	PBC<MDA	AG110M
661.66	1.	630.48	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
702.63	4.	184.30	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	5.	85.53	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.377E-01	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	1.068E+00	EU154
722.94	5.	107.08	1.51	1.380E-02	722.79	10.810	1.956E+00	SB124
					722.94	90.840	2.329E-01	AG108M
					723.36	20.220	1.047E+00	EU154
723.36	5.	123.55	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.329E-01	AG108M
					723.36	20.220	1.047E+00	EU154
724.20	5.	138.02	1.51	1.378E-02	724.20	44.150	PBC<MDA	ZR95
727.17	4.	179.51	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
735.72	3.	195.95	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
747.16	1.	452.95	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
756.73	3.	250.62	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
763.94	8.	74.65	1.55	1.314E-02	763.94	22.280	PBC<MDA	AG110M
765.79	1.	605.61	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.524E+01	PA234M
778.92	17.	24.25	1.56	1.291E-02	778.92	12.940	5.653E+00	EU152
785.42	8.	91.92	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
795.87	5.	86.54	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
799.60	5.	105.34	1.58	1.261E-02	799.60	98.960	PBC<MDA	TL210
846.77	5.	146.39	1.62	1.198E-02	846.77	99.935	PBC<MDA	Co56
860.56	14.	44.13	1.63	1.181E-02	860.56	12.420	5.303E+00	TL208
871.10	10.	31.62	1.64	1.168E-02	871.10	99.890	4.761E-01	NB94
880.53	7.	95.13	1.65	1.157E-02	880.53	6.000	PBC<MDA	PA234
889.28	1.	798.39	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
898.04	5.	183.18	1.66	1.137E-02	898.04	93.700	PBC<MDA	y88
911.07	16.	39.61	1.68	1.122E-02	911.07	29.000	2.732E+00	AC228
937.49	1.	587.47	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
946.02	10.	90.83	1.70	1.085E-02	946.02	13.400	PBC<MDA	PA234
968.97	6.	85.08	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
996.33	7.	103.20	1.75	1.035E-02	996.33	10.600	PBC<MDA	EU154
1063.66	6.	92.90	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	11.	30.15	1.81	9.646E-03	1077.40	3.300	2.258E+01	Ga68
1099.25	6.	101.72	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1120.55	6.	189.60	1.85	9.309E-03	1120.29	15.100	2.276E+00	BI214
					1120.55	99.987	3.438E-01	Sc46
					1121.30	34.900	9.856E-01	Ta182
1120.61	13.	97.35	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	7.659E-01	Sc46
					1121.30	34.900	2.195E+00	Ta182
1173.24	5.	145.77	1.89	8.929E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	7.	88.54	1.90	8.821E-03	1189.05	16.200	PBC<MDA	Ta182
1291.60	7.	89.81	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	6.	44.16	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1461.17	220.	6.84	2.06	7.307E-03	1460.83	10.670	1.567E+02	K40
1771.35	5.	44.72	2.29	6.119E-03	1771.35	15.480	PBC<MDA	Co56

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	148.	-8.	-0.005	208.94	0.836s
TH-227	200.12	50.14	163.	4.	0.002	495.68	0.840s
AM-241	237.70	59.54	67.	31.	0.017	49.69	0.850s
TH-234	252.71	63.29	138.	-23.	-0.013	79.41	0.854s
Sn-126	256.68	64.28	110.	15.	0.008	101.10	0.856s
BA-133	323.52	80.99	91.	2.	0.001	802.50	0.874s
Np-237	345.53	86.49	332.	-19.	-0.011	136.72	0.880s
EU-155	345.74	86.54	351.	-7.	-0.004	359.86	0.880s
Sn-126	347.33	86.94	242.	16.	0.009	140.77	0.880s
Sn-126	349.85	87.57	227.	16.	0.009	136.10	0.881s
Cd-109	351.73	88.04	221.	16.	0.009	134.48	0.881s
Nd-147	363.97	91.10	237.	16.	0.009	138.57	0.885s
TH-234	369.93	92.59	278.	-9.	-0.005	255.64	0.886s
AC-228	372.97	93.35	257.	16.	0.009	146.32	0.887s
Gd-153	389.57	97.50	159.	13.	0.007	142.14	0.892s
Np-239	397.57	99.50	171.	13.	0.007	147.19	0.894s
Gd-153	412.38	103.20	184.	5.	0.003	407.89	0.898s
Np-239	414.38	103.70	189.	0.	0.000	1000.00	0.898s
Np-239	424.10	106.13	219.	-14.	-0.008	148.28	0.901s
EU-152	486.69	121.78	100.	-11.	-0.006	132.05	0.918s
CO-57	487.83	122.06	111.	0.	0.000	1000.00	0.918s
EU-154	491.98	123.10	107.	-6.	-0.003	392.16	0.919s
PA-234	524.77	131.29	143.	-14.	-0.008	164.63	0.928
HF-181	531.68	133.02	157.	-5.	-0.003	328.37	0.930s
CE-144	533.74	133.54	162.	0.	0.000	1000.00	0.930s
HF-181	544.79	136.30	162.	0.	0.000	1000.00	0.933s
CO-57	545.48	136.47	133.	9.	0.005	180.85	0.933s
Tc-99m	561.63	140.51	123.	-9.	-0.005	177.43	0.938s
U-235	574.73	143.79	294.	-16.	-0.009	144.22	0.941s
CE-141	581.35	145.44	275.	-4.	-0.002	543.24	0.943
Ba-140	650.24	162.66	114.	-10.	-0.006	230.24	0.961
CE-139	663.01	165.85	126.	-16.	-0.009	148.16	0.965s
Cf-251	706.00	176.60	48.	10.	0.006	128.81	0.976
U-235	742.49	185.72	26.	38.	0.021	29.53	0.986s
TH-229	773.64	193.51	81.	-12.	-0.006	146.97	0.994s
U-235	820.94	205.33	40.	10.	0.005	127.05	1.007s
TH-229	843.01	210.85	51.	-4.	-0.002	313.03	1.012
Cf-251	907.62	227.00	77.	-16.	-0.009	103.10	1.029s
PB-212	954.15	238.63	39.	55.	0.030	21.12	1.041D
PB-214	967.61	242.00	130.	10.	0.006	160.02	1.045

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	978.39	244.69	148.	10.	0.006	169.77	1.048
TH-227	1024.59	256.24	37.	-4.	-0.002	313.34	1.060s
Cd-113m	1054.43	263.70	55.	-7.	-0.004	154.52	1.067s
BI-210M	1062.96	265.83	74.	-13.	-0.007	96.52	1.070s
TL-208	1108.77	277.28	60.	-13.	-0.007	88.55	1.081s
Hg-203	1116.44	279.20	66.	3.	0.002	406.96	1.083s
I-131	1136.83	284.30	40.	-1.	-0.001	895.30	1.089s
PB-214	1180.00	295.09	83.	34.	0.019	41.15	1.100s
TL-210	1183.64	296.00	117.	8.	0.004	203.12	1.101
PB-212	1199.76	300.03	125.	7.	0.004	214.24	1.105
PA-231	1199.92	300.07	132.	8.	0.004	214.84	1.105s
PA-233	1200.36	300.18	159.	9.	0.005	210.43	1.105s
PA-231	1210.24	302.65	168.	9.	0.005	215.40	1.107s
BA-133	1211.05	302.85	176.	9.	0.005	220.68	1.108s
Ba-140	1219.04	304.85	185.	9.	0.005	225.47	1.110s
Ir-192	1233.41	308.44	195.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	195.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	195.	0.	0.000	1000.00	1.122s
CR-51	1279.99	320.08	195.	0.	0.000	1000.00	1.125s
La-140	1314.69	328.76	55.	-7.	-0.004	154.52	1.134s
Cf-249	1333.41	333.44	55.	10.	0.006	104.65	1.139s
AC-228	1352.93	338.32	64.	4.	0.002	299.91	1.144s
Cs-136	1361.93	340.57	68.	0.	0.000	1000.00	1.146s
EU-152	1376.80	344.29	68.	0.	0.000	1000.00	1.150s
HF-181	1382.97	345.83	58.	9.	0.005	121.89	1.151
PB-214	1408.21	352.14	15.	68.	0.038	17.60	1.663s
BA-133	1423.66	356.00	122.	-11.	-0.006	140.10	1.162s
I-131	1457.59	364.48	32.	-2.	-0.001	558.27	1.170s
BA-133	1535.03	383.84	65.	-11.	-0.006	108.77	1.189s
Cf-249	1551.47	387.95	61.	6.	0.003	190.32	1.193s
SB-125	1711.18	427.88	16.	4.	0.002	202.07	1.233s
AG-108M	1735.43	433.94	40.	-14.	-0.008	94.86	1.239s
pm-146	1815.20	453.88	8.	6.	0.003	101.11	1.258s
SB-125	1853.15	463.37	25.	9.	0.005	86.50	1.268s
Ir-192	1871.93	468.06	30.	8.	0.004	107.85	1.272s
BE-7	1910.07	477.60	83.	-13.	-0.007	105.84	1.282s
HF-181	1927.68	482.00	94.	-13.	-0.007	105.60	1.286s
La-140	1947.77	487.02	88.	11.	0.006	124.40	1.291s
RU-103	1987.91	497.05	9.	6.	0.004	101.96	1.301s
RH-106	2047.15	511.86	40.	22.	0.012	76.86	2.565s
Nd-147	2123.70	531.00	22.	-6.	-0.003	172.86	1.333s
Ba-140	2148.74	537.26	17.	-5.	-0.003	165.12	1.339s
CS-134	2252.65	563.24	13.	8.	0.004	98.56	1.364s
CS-134	2276.99	569.32	30.	-7.	-0.004	112.45	1.369s
PA-234	2277.59	569.47	30.	9.	0.005	93.70	1.370s
BI-207	2278.51	569.70	20.	5.	0.003	139.05	1.370s
TL-208	2331.79	583.02	20.	18.	0.010	52.85	1.382s
SB-125	2401.71	600.50	112.	8.	0.004	203.31	1.399

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2410.64	602.73	120.	0.	0.000	1000.00	1.401s
CS-134	2418.55	604.71	120.	0.	0.000	1000.00	1.403s
BI-214	2436.69	609.24	4.	56.	0.031	15.57	1.078s
RU-103	2440.91	610.30	120.	0.	0.000	1000.00	1.408s
AG-108M	2456.84	614.28	120.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	120.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	82.	5.	0.003	263.52	1.419s
SB-125	2543.28	635.89	21.	-7.	-0.004	103.92	1.432s
I-131	2547.62	636.97	17.	7.	0.004	90.94	1.433s
AG-110M	2630.77	657.76	29.	7.	0.004	109.66	1.452s
CS-137	2646.36	661.66	35.	1.	0.001	630.48	1.455s
PM-144	2785.90	696.54	23.	-1.	-0.001	728.27	1.487s
NB-94	2810.25	702.63	9.	4.	0.002	184.30	1.493s
SB-124	2890.87	722.79	8.	5.	0.003	85.53	1.511s
AG-108M	2891.48	722.94	13.	5.	0.003	107.08	1.511s
EU-154	2893.15	723.36	18.	5.	0.003	123.55	1.511s
ZR-95	2896.52	724.20	24.	5.	0.003	138.02	1.512s
BI-212	2908.41	727.17	29.	4.	0.002	179.51	1.515s
pm-146	2942.61	735.72	10.	3.	0.002	195.95	1.523s
pm-146	2988.37	747.16	10.	1.	0.001	452.95	1.533s
ZR-95	3026.65	756.73	9.	3.	0.001	250.62	1.541
AG-110M	3055.51	763.94	12.	8.	0.004	74.65	1.548s
NB-95	3062.89	765.79	20.	1.	0.001	605.61	1.549s
PA-234M	3065.38	766.41	21.	0.	0.000	1000.00	1.550s
EU-152	3115.41	778.92	0.	17.	0.009	24.25	1.561s
BI-212	3141.41	785.42	9.	8.	0.004	91.92	1.567s
CS-134	3183.20	795.87	8.	5.	0.003	86.54	1.576
TL-210	3198.14	799.60	14.	5.	0.003	105.34	1.579s
CS-134	3207.54	801.95	29.	-2.	-0.001	469.35	1.581s
CO-58	3242.84	810.78	29.	0.	0.000	1000.00	1.589s
La-140	3262.82	815.77	29.	0.	0.000	1000.00	1.593s
Cs-136	3273.74	818.50	39.	-8.	-0.005	111.93	1.596s
MN-54	3339.13	834.85	28.	-9.	-0.005	129.10	1.610s
Co-56	3386.82	846.77	9.	5.	0.003	146.39	1.620s
TL-208	3442.00	860.56	5.	14.	0.008	44.13	1.632s
NB-94	3484.13	871.10	0.	10.	0.006	31.62	1.641s
EU-154	3492.66	873.23	10.	0.	0.000	1000.00	1.643s
PA-234	3521.86	880.53	21.	7.	0.004	95.13	1.649s
PA-234	3532.70	883.24	28.	0.	0.000	1000.00	1.652s
Sc-46	3556.86	889.28	29.	1.	0.001	798.39	1.657s
y-88	3591.90	898.04	15.	5.	0.003	183.18	1.664s
AC-228	3644.02	911.07	5.	16.	0.009	39.61	1.675s
AG-110M	3749.71	937.49	16.	1.	0.001	587.47	1.697
PA-234	3783.82	946.02	15.	10.	0.006	90.83	1.704s
EU-152	3856.18	964.11	27.	-2.	-0.001	444.97	1.719s
AC-228	3875.62	968.97	10.	6.	0.003	85.08	1.724s
EU-154	3985.06	996.33	20.	7.	0.004	103.20	1.746s
PA-234M	4003.73	1001.00	27.	0.	0.000	1000.00	1.750s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4018.84	1004.77	28.	-1.	-0.001	754.98	1.753s
Co-56	4151.10	1037.84	15.	-2.	-0.001	413.41	1.780s
Cs-136	4192.02	1048.07	20.	-6.	-0.003	121.29	1.788s
RH-106	4201.18	1050.36	26.	-1.	-0.001	728.01	1.790s
BI-207	4254.38	1063.66	5.	6.	0.003	92.90	1.801s
Ga-68	4309.34	1077.40	0.	11.	0.006	30.15	1.812s
FE-59	4396.74	1099.25	5.	6.	0.003	101.72	1.829s
EU-152	4448.04	1112.07	70.	-13.	-0.007	96.67	1.839s
ZN-65	4461.92	1115.55	57.	-13.	-0.007	88.09	1.842s
BI-214	4480.88	1120.29	72.	13.	0.007	97.35	1.845s
Sc-46	4481.94	1120.55	57.	6.	0.003	189.60	1.846s
CO-60	4692.68	1173.24	11.	5.	0.003	145.77	1.886s
Ta-182	4755.93	1189.05	5.	7.	0.004	88.54	1.899s
Ta-182	4885.37	1221.41	21.	-4.	-0.002	246.99	1.923s
Co-56	4952.84	1238.28	21.	-3.	-0.002	319.69	1.936s
NA-22	5097.84	1274.53	17.	-4.	-0.002	154.11	1.963s
EU-154	5097.89	1274.54	21.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	6.	7.	0.004	89.81	1.975s
CO-60	5329.71	1332.50	23.	-11.	-0.006	79.53	2.005s
AG-110M	5536.89	1384.30	0.	6.	0.003	44.16	2.042s
EU-152	5631.70	1408.00	17.	-8.	-0.004	125.93	2.059s
K-40	5843.01	1460.83	9.	138.	0.077	9.59	2.095s
La-140	6384.49	1596.21	0.	0.	0.000	1000.00	2.185s
SB-124	6763.55	1690.98	0.	0.	0.000	1000.00	2.245s
BI-214	7057.56	1764.49	0.	0.	0.000	1000.00	2.290s
Co-56	7084.99	1771.35	0.	5.	0.003	44.72	2.294s
y-88	7343.81	1836.06	0.	0.	0.000	1000.00	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.3495E+00				5.31E+01	
			477.60	-3.349E+00	?(	1.198E+01 1.06E+02 1.05E+01	G
NA-22	C	-2.6853E-01				9.50E+02	
			1274.53	-2.685E-01	?(	1.472E+00 1.54E+02 9.99E+01	G
K-40	N	9.8495E+01				4.66E+11	
			1460.83	9.850E+01	?(P	1.170E+01 9.59E+00 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	1.9524E-01					8.38E+01	
			889.28	4.666E-02	?(P	1.348E+00	7.98E+02	1.00E+02 G
			1120.55	3.438E-01	?(	2.257E+00	1.90E+02	1.00E+02 G
MN-54	C	-4.1212E-01					3.12E+02	
			834.85	-4.121E-01	?(	1.253E+00	1.29E+02	1.00E+02 G
FE-59	F	8.0112E-01					4.45E+01	
			1099.25	5.882E-01	?(	1.398E+00	1.02E+02	5.65E+01 G
			1291.60	1.080E+00	?(	2.170E+00	8.98E+01	4.32E+01 G
Co-56	C	2.1652E-01					7.73E+01	
			846.77	2.165E-01	?(	7.863E-01	1.46E+02	9.99E+01 G
			1238.28	-3.297E-01	+	2.397E+00	3.20E+02	6.61E+01 G
			1037.84	-8.280E-01	+ P	8.204E+00	4.13E+02	1.41E+01 G
			1771.35	2.933E+00	?	4.323E+00	4.47E+01	1.55E+01 A
CO-57	C	9.7779E-02					2.72E+02	
			122.06	0.000E+00	?(	5.998E-01	1.00E+03	8.56E+01 G
			136.47	8.815E-01	?(	5.425E+00	1.81E+02	1.07E+01 G
CO-60	F	-7.6695E-01					1.93E+03	
			1332.50	-7.669E-01	?(P	1.750E+00	7.95E+01	1.00E+02 G
			1173.24	3.322E-01	+	1.117E+00	1.46E+02	9.99E+01 G
ZN-65	F	-1.5042E+00					2.44E+02	
			1115.55	-1.504E+00	?(	4.459E+00	8.81E+01	5.06E+01 G
NB-94	I	3.1323E-01					7.41E+06	
			702.63	1.470E-01	?(	6.796E-01	1.84E+02	9.79E+01 G
			871.10	4.761E-01	?(	3.509E-01	3.16E+01	9.99E+01 G
ZR-95	I	3.2845E-01					6.40E+01	
			756.73	2.054E-01	?(	1.305E+00	2.51E+02	5.45E+01 G
			724.20	4.803E-01	?(	2.320E+00	1.38E+02	4.42E+01 G
NB-95	I	4.4878E-02					6.40E+01	
			765.79	4.488E-02	?(	9.990E-01	6.06E+02	9.98E+01 G
RU-103	I	2.0365E-01					3.93E+01	
			497.05	2.036E-01	&(	5.232E-01	1.02E+02	9.09E+01 G
			610.30	0.000E+00	-	3.241E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.7505E+00					3.74E+02	
			621.92	1.750E+00	&(	1.594E+01	2.64E+02	9.93E+00 G
			1050.36	-3.608E+00	+	9.551E+01	7.28E+02	1.56E+00 G
			511.86	3.244E+00	?	4.779E+00	7.69E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	-3.8722E-01					1.53E+05	
			433.94	-3.872E-01	?(	9.149E-01	9.49E+01	9.05E+01 G
			722.94	2.329E-01	+	8.705E-01	1.07E+02	9.08E+01 G
			614.28	0.000E+00	+	2.086E+00	1.00E+03	8.98E+01 G
AG-110M	F	4.2832E-01					2.50E+02	
			884.68	-2.457E-02	%(P	1.038E+00	1.81E+03	7.27E+01 G
			657.76	2.869E-01	?(	1.082E+00	1.10E+02	9.46E+01 G
			937.49	2.181E-01	?(P	3.115E+00	5.87E+02	3.44E+01 G
			1384.30	1.699E+00	?(P	2.195E+00	4.42E+01	2.43E+01 G
			763.94	1.445E+00	&(	3.621E+00	7.47E+01	2.23E+01 G
SN-113	F	-3.9528E-02					1.15E+02	
			391.69	-3.953E-02	%(P	1.428E+00	1.49E+03	6.40E+01 G
SB-124	F	1.3761E-01					6.02E+01	
			602.73	0.000E+00	?(	1.876E+00	1.00E+03	9.83E+01 G
			1690.98	0.000E+00	?(	1.341E+00	1.00E+03	4.78E+01 G
			722.79	1.997E+00	?(	5.867E+00	8.55E+01	1.08E+01 G
SB-125	I	1.0322E+00					1.01E+03	
			427.88	3.434E-01	?(	1.833E+00	2.02E+02	2.96E+01 G
			600.50	1.435E+00	?(	9.975E+00	2.03E+02	1.79E+01 G
			635.89	-2.119E+00	+	7.593E+00	1.04E+02	1.13E+01 G
			463.37	2.293E+00	?(	6.724E+00	8.65E+01	1.05E+01 G
I-131	I	2.3556E-01					8.02E+00	
			364.48	-5.416E-02	&(	7.873E-01	5.58E+02	8.17E+01 G
			284.30	-3.885E-01	+	9.413E+00	8.95E+02	6.14E+00 G
			636.97	3.537E+00	?(	1.101E+01	9.09E+01	7.17E+00 G
Gd-153	F	3.3740E-01					2.42E+02	
			97.50	4.265E-01	?(	2.049E+00	1.42E+02	3.00E+01 G
			103.20	2.147E-01	?(	2.990E+00	4.08E+02	2.18E+01 G
Ga-68	C	2.2577E+01					4.71E-02	
			1077.40	2.258E+01	?(	1.513E+01	3.02E+01	3.30E+00 G
Tc-99m	I	-1.0825E-01					2.51E-01	
			140.51	-1.082E-01	?(	6.542E-01	1.77E+02	8.93E+01 G
BA-133	F	-1.0586E-01					3.85E+03	
			356.00	-3.991E-01	?(	1.896E+00	1.40E+02	6.20E+01 G
			302.85	8.868E-01	?(	6.650E+00	2.21E+02	1.83E+01 G
			383.84	-2.831E+00	+	1.045E+01	1.09E+02	8.94E+00 GA
			80.99	6.818E-02	? P	1.517E+00	8.03E+02	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	2.6043E-01					7.54E+02	
			604.71	0.000E+00	?(	1.893E+00	1.00E+03	9.76E+01 G
			795.87	2.810E-01	?(	8.358E-01	8.65E+01	8.55E+01 G
			569.32	-1.555E+00	+	6.015E+00	1.12E+02	1.54E+01 G
			801.95	-8.311E-01	+	1.405E+01	4.69E+02	8.69E+00 G
			563.24	3.094E+00	?(	7.547E+00	9.86E+01	8.35E+00 G
CS-137	I	5.8250E-02					1.10E+04	
			661.66	5.825E-02	(	1.317E+00	6.30E+02	8.52E+01 G
CE-139	F	-2.2776E-01					1.38E+02	
			165.85	-2.278E-01	?(P	7.841E-01	1.48E+02	7.99E+01 G
Ba-140	I	-5.2528E-03					1.28E+01	
			537.26	-6.776E-01	?(	2.809E+00	1.65E+02	2.44E+01 G
			162.66	-1.891E+00	& P	9.686E+00	2.30E+02	6.22E+00 G
			304.85	3.817E+00	?(	2.924E+01	2.25E+02	4.29E+00 G
La-140	I	2.2189E-01					1.28E+01	
			1596.21	0.000E+00	?(	6.371E-01	1.00E+03	9.54E+01 G
			487.02	6.871E-01	&(	2.902E+00	1.24E+02	4.55E+01 G
			328.76	-6.983E-01	+	3.718E+00	1.55E+02	2.03E+01 G
			815.77	0.000E+00	-	5.356E+00	1.00E+03	2.33E+01 G
CE-141	I	-9.5384E-02					3.25E+01	
			145.44	-9.538E-02	?(	1.760E+00	5.43E+02	4.82E+01 G
PM-144	C	-5.2865E-02					3.63E+02	
			696.54	-5.286E-02	?(P	9.927E-01	7.28E+02	9.90E+01 G
			618.06	0.000E+00	+	1.901E+00	1.00E+03	9.91E+01 G
EU-152	F	1.9015E+00					4.94E+03	
			344.29	0.000E+00	&(	3.270E+00	1.00E+03	2.65E+01 G
			1112.07	-5.554E+00	+	1.811E+01	9.67E+01	1.36E+01 G
			121.78	-3.813E-01	+	1.709E+00	1.32E+02	2.86E+01 G
			778.92	5.653E+00	?(	2.451E+00	2.43E+01	1.29E+01 G
			964.11	-5.945E-01	+	9.550E+00	4.45E+02	1.46E+01 G
			244.69	2.144E+00	?(P	1.235E+01	1.70E+02	7.58E+00 G
			1408.00	-2.799E+00	+	7.670E+00	1.26E+02	2.10E+01 GA
EU-154	I	7.2746E-01					3.14E+03	
			873.23	0.000E+00	?(	6.777E+00	1.00E+03	1.23E+01 G
			123.10	-1.459E-01	& P	1.239E+00	3.92E+02	4.08E+01 G
			1274.54	0.000E+00	?(	4.588E+00	1.00E+03	3.52E+01 G
			723.36	1.047E+00	&(	4.528E+00	1.24E+02	2.02E+01 G
			1004.77	-3.002E-01	+	8.217E+00	7.55E+02	1.80E+01 G
			996.33	3.375E+00	?(	1.201E+01	1.03E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-9.0585E-03					1.81E+03	
			105.31	-9.059E-03	&(P	3.105E+00	1.21E+04	2.12E+01 G
			86.54	-2.535E-01	+	3.083E+00	3.60E+02	3.07E+01 G
HF-181	F	-1.9271E-01					4.24E+01	
			482.00	-4.696E-01	?(	1.673E+00	1.06E+02	8.05E+01 G
			133.02	-1.276E-01	+	1.432E+00	3.28E+02	4.33E+01 G
			345.83	1.286E+00	?(	5.353E+00	1.22E+02	1.51E+01 G
			136.30	0.000E+00	+	1.088E+01	1.00E+03	5.85E+00 G
Ta-182	F	6.9667E-01					1.14E+02	
			1121.30	-1.711E-01	%(	6.269E+00	1.03E+03	3.49E+01 G
			1221.41	-1.036E+00	+	5.793E+00	2.47E+02	2.70E+01 G
			1189.05	2.566E+00	?(	5.238E+00	8.85E+01	1.62E+01 G
Hg-203	F	6.1796E-02					4.66E+01	
			279.20	6.180E-02	*(	8.785E-01	4.07E+02	8.15E+01 G
TL-208	N	1.3145E+00					6.98E+02	
			583.02	7.283E-01	?(P	9.179E-01	5.29E+01	8.45E+01 G
			277.28	-3.615E+00	-	1.077E+01	8.86E+01	6.31E+00 G
			860.56	5.303E+00	?(	4.973E+00	4.41E+01	1.24E+01 G
pm-146	C	2.9915E-01					2.02E+03	
			747.16	1.785E-01	?(P	2.086E+00	4.53E+02	3.40E+01 G
			735.72	6.288E-01	?(P	3.109E+00	1.96E+02	2.25E+01 G
			453.88	2.481E-01	?(P	6.592E-01	1.01E+02	6.50E+01 G
y-88	F	2.5111E-01					1.07E+02	
			898.04	2.511E-01	&(P	1.089E+00	1.83E+02	9.37E+01 G
			1836.06	0.000E+00	-	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		-1.9580E+03					5.33E+03	
			263.70	-1.958E+03	?(	1.042E+04	1.55E+02	6.00E-03 K
Cd-109	F	4.3803E+00					4.53E+02	
			88.04	4.380E+00	&(	1.982E+01	1.34E+02	3.79E+00 G
Cf-251	T	7.2881E-01					3.28E+05	
			176.60	7.288E-01	?(	2.460E+00	1.29E+02	1.70E+01 G
			227.00	-3.850E+00	+	1.024E+01	1.03E+02	6.30E+00 GA
Cf-249	T	4.3350E-01					1.28E+05	
			387.95	2.101E-01	&(	1.383E+00	1.90E+02	6.60E+01 G
			333.44	1.384E+00	&(	4.918E+00	1.05E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		2.1291E+00					3.65E+07	
			87.57	4.437E-01	-	2.031E+00	1.36E+02	3.75E+01 GA
			64.28	2.129E+00	&(	7.241E+00	1.01E+02	9.70E+00 G
			86.94	1.846E+00	?	8.739E+00	1.41E+02	9.04E+00 GA
PB-210	N	-4.2932E+00					8.14E+03	
			46.54	-4.293E+00	&(P	3.129E+01	2.09E+02	4.25E+00 G
PB-212	N	1.9550E+00					6.98E+02	
			238.63	1.955E+00	(P	1.135E+00	2.11E+01	4.33E+01 G
			300.03	4.275E+00	+ P	3.128E+01	2.14E+02	3.28E+00 GA
PB-214	N	3.6672E+00					5.84E+05	
			351.93	3.863E+00	*(	1.197E+00	1.76E+01	3.76E+01 G
			295.09	3.285E+00	?(	4.313E+00	4.12E+01	1.93E+01 G
			242.00	2.159E+00	&	1.173E+01	1.60E+02	7.43E+00 GA
BI-207	C	2.9843E-01					1.18E+04	
			569.70	1.613E-01	?(	7.890E-01	1.39E+02	9.77E+01 G
			1063.66	4.783E-01	?(	1.029E+00	9.29E+01	7.45E+01 G
BI-212	N	2.3446E+00					6.98E+02	
			727.17	2.345E+00	&(	1.482E+01	1.80E+02	7.55E+00 G
			785.42	2.597E+01	?	5.740E+01	9.19E+01	1.28E+00 GA
U-235	N	-2.5642E-01					2.57E+11	
			143.79	-1.573E+00	?(P	7.940E+00	1.44E+02	1.10E+01 G
			205.33	2.623E+00	(	8.766E+00	1.27E+02	5.01E+00 G
			163.38	-2.107E-01	% P	1.242E+01	2.54E+03	5.08E+00 G
			185.72	8.875E-01	*	6.094E-01	2.95E+01	5.40E+01 GA
BI-214	N	4.4188E+00					5.84E+05	
			609.31	4.205E+00	@(	9.034E-01	1.56E+01	4.61E+01 G
			1120.29	5.070E+00	?(	1.665E+01	9.73E+01	1.51E+01 G
			1764.49	0.000E+00	-	4.329E+00	1.00E+03	1.54E+01 G
BI-210M	T	-4.4497E-01					1.10E+09	
			265.83	-4.450E-01	?(	1.448E+00	9.65E+01	5.00E+01 G
			304.90	1.048E-01	%	4.579E+00	1.28E+03	2.80E+01 G
AC-228	N	2.3801E+00					2.10E+03	
			911.07	2.732E+00	?(	2.242E+00	3.96E+01	2.90E+01 G
			968.97	1.796E+00	?(	5.229E+00	8.51E+01	1.75E+01 G
			338.32	6.624E-01	-	6.918E+00	3.00E+02	1.20E+01 G
			93.35	2.873E+00	*	1.414E+01	1.46E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	8.9634E-01					7.95E+03	
			50.14	8.963E-01	&(	1.522E+01	4.96E+02	8.00E+00 G
			256.24	-8.580E-01	+	7.237E+00	3.13E+02	7.00E+00 G
TH-229	N	-3.4306E+00					2.68E+06	
			193.51	-3.431E+00	?(	1.310E+01	1.47E+02	4.40E+00 G
			210.85	-2.015E+00	&	1.678E+01	3.13E+02	2.99E+00 G
TH-234	N	-8.3067E+00					1.63E+12	
			63.29	-8.307E+00	*(P	2.091E+01	7.94E+01	3.81E+00 G
			92.59	-1.675E+00	+ P	1.468E+01	2.56E+02	5.58E+00 G
PA-231	N	5.7359E+00					1.20E+07	
			302.65	5.639E+00	?(	4.130E+01	2.15E+02	2.88E+00 G
			300.07	5.849E+00	&(	4.288E+01	2.15E+02	2.46E+00 G
PA-233	C	3.8131E-01					7.82E+08	
			312.01	0.000E+00	&(	3.646E+00	1.00E+03	3.60E+01 G
			300.18	2.595E+00	&(	1.858E+01	2.10E+02	6.20E+00 G
PA-234	N	1.6560E+00					1.63E+12	
			131.29	-8.026E-01	&(P	3.280E+00	1.65E+02	1.80E+01 G
			946.02	3.822E+00	?(	7.934E+00	9.08E+01	1.34E+01 G
			569.47	3.513E+00	?(	1.120E+01	9.37E+01	8.20E+00 G
			883.24	0.000E+00	-	1.373E+01	1.00E+03	9.60E+00 G
			880.53	5.869E+00	?	1.912E+01	9.51E+01	6.00E+00 GA
AM-241	T	1.3101E+00					1.58E+05	
			59.54	1.310E+00	?(	1.704E+00	4.97E+01	3.59E+01 G
Np-237	F	-1.5346E+00					2.14E+06	
			86.49	-1.535E+00	?(	7.034E+00	1.37E+02	1.31E+01 G
Ir-192	F	1.5166E-01					7.40E+01	
			316.49	0.000E+00	?(	1.526E+00	1.00E+03	8.70E+01 G
			468.06	4.067E-01	?(	1.506E+00	1.08E+02	5.18E+01 G
			308.44	0.000E+00	-	4.094E+00	1.00E+03	3.18E+01 G
Cs-136	F	-3.7484E-01					1.30E+01	
			818.50	-3.748E-01	?(	1.437E+00	1.12E+02	1.00E+02 G
			1048.07	-3.862E-01	+	1.635E+00	1.21E+02	8.00E+01 G
			340.57	0.000E+00	+	1.831E+00	1.00E+03	4.69E+01 G
Np-239	T	-6.2269E-01					2.36E+00	
			103.70	0.000E+00	+	2.748E+00	1.00E+03	2.40E+01 X
			106.13	-6.227E-01	&(	3.112E+00	1.48E+02	2.27E+01 G
			99.50	8.507E-01	&	4.231E+00	1.47E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147      -2.3822E-02                                      1.11E+01
                          531.00-1.337E+00 ?(  5.757E+00 1.73E+02 1.30E+01 G
                           91.10 5.794E-01 ?(  2.700E+00 1.39E+02 2.83E+01 G

TL-210   N   2.1551E-01                                      5.84E+05
                          799.60 2.444E-01 &(  8.962E-01 1.05E+02 9.90E+01 G
                          296.00 1.794E-01  (  1.245E+00 2.03E+02 7.90E+01 G
                         1313.00 1.094E-01 %   4.531E+00 1.68E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	148.	-8.	-0.005	208.94	-4.293E+00	P
TH-227	50.14	163.	4.	0.002	495.68	8.963E-01	
AM-241	59.54	67.	31.	0.017	49.69	1.310E+00	
TH-234	63.29	138.	-23.	-0.013	79.41	-8.307E+00	P
Sn-126	64.28	110.	15.	0.008	101.10	2.129E+00	
BA-133	80.99	91.	2.	0.001	802.50	6.818E-02	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	86.49	332.	-19.	-0.011	136.72	-1.535E+00	
EU-155	86.54	351.	-7.	-0.004	359.86	-2.535E-01	
Sn-126	86.94	242.	16.	0.009	140.77	1.846E+00	
Sn-126	87.57	227.	16.	0.009	136.10	4.437E-01	
Cd-109	88.04	221.	16.	0.009	134.48	4.380E+00	
Nd-147	91.10	237.	16.	0.009	138.57	5.794E-01	
TH-234	92.59	278.	-9.	-0.005	255.64	-1.675E+00	P
Gd-153	97.50	159.	13.	0.007	142.14	4.265E-01	
Np-239	99.50	171.	13.	0.007	147.19	8.507E-01	
Gd-153	103.20	184.	5.	0.003	407.89	2.147E-01	
Np-239	106.13	219.	-14.	-0.008	148.28	-6.227E-01	
EU-152	121.78	100.	-11.	-0.006	132.05	-3.813E-01	
EU-154	123.10	107.	-6.	-0.003	392.16	-1.459E-01	P
PA-234	131.29	143.	-14.	-0.008	164.63	-8.026E-01	P
HF-181	133.02	157.	-5.	-0.003	328.37	-1.276E-01	
CO-57	136.47	133.	9.	0.005	180.85	8.815E-01	
Tc-99m	140.51	123.	-9.	-0.005	177.43	-1.082E-01	
U-235	143.79	294.	-16.	-0.009	144.22	-1.573E+00	P
CE-141	145.44	275.	-4.	-0.002	543.24	-9.538E-02	
Ba-140	162.66	114.	-10.	-0.006	230.24	-1.891E+00	P
CE-139	165.85	126.	-16.	-0.009	148.16	-2.278E-01	P
Cf-251	176.60	48.	10.	0.006	128.81	7.288E-01	
U-235	185.72	26.	38.	0.021	29.53	8.875E-01	
TH-229	193.51	81.	-12.	-0.006	146.97	-3.431E+00	
U-235	205.33	40.	10.	0.005	127.05	2.623E+00	
TH-229	210.85	51.	-4.	-0.002	313.03	-2.015E+00	
Cf-251	227.00	77.	-16.	-0.009	103.10	-3.850E+00	
EU-152	244.69	148.	10.	0.006	169.77	2.144E+00	P
TH-227	256.24	37.	-4.	-0.002	313.34	-8.580E-01	
Cd-113m	263.70	55.	-7.	-0.004	154.52	-1.958E+03	
BI-210M	265.83	74.	-13.	-0.007	96.52	-4.450E-01	
Hg-203	279.20	66.	3.	0.002	406.96	6.180E-02	
I-131	284.30	40.	-1.	-0.001	895.30	-3.885E-01	
TL-210	296.00	117.	8.	0.004	203.12	1.794E-01	
PA-231	300.07	132.	8.	0.004	214.84	5.849E+00	
PA-233	300.18	159.	9.	0.005	210.43	2.595E+00	
PA-231	302.65	168.	9.	0.005	215.40	5.639E+00	
BA-133	302.85	176.	9.	0.005	220.68	8.868E-01	
Ba-140	304.85	185.	9.	0.005	225.47	3.817E+00	
La-140	328.76	55.	-7.	-0.004	154.52	-6.983E-01	
Cf-249	333.44	55.	10.	0.006	104.65	1.384E+00	
HF-181	345.83	58.	9.	0.005	121.89	1.286E+00	
BA-133	356.00	122.	-11.	-0.006	140.10	-3.991E-01	
I-131	364.48	32.	-2.	-0.001	558.27	-5.416E-02	
BA-133	383.84	65.	-11.	-0.006	108.77	-2.831E+00	
Cf-249	387.95	61.	6.	0.003	190.32	2.101E-01	
SB-125	427.88	16.	4.	0.002	202.07	3.434E-01	
AG-108M	433.94	40.	-14.	-0.008	94.86	-3.872E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	453.88	8.	6.	0.003	101.11	2.481E-01	P
SB-125	463.37	25.	9.	0.005	86.50	2.293E+00	
Ir-192	468.06	30.	8.	0.004	107.85	4.067E-01	
BE-7	477.60	83.	-13.	-0.007	105.84	-3.349E+00	
HF-181	482.00	94.	-13.	-0.007	105.60	-4.696E-01	
La-140	487.02	88.	11.	0.006	124.40	6.871E-01	
RU-103	497.05	9.	6.	0.004	101.96	2.036E-01	
RH-106	511.86	40.	22.	0.012	76.86	3.244E+00	
Nd-147	531.00	22.	-6.	-0.003	172.86	-1.337E+00	
Ba-140	537.26	17.	-5.	-0.003	165.12	-6.776E-01	
CS-134	563.24	13.	8.	0.004	98.56	3.094E+00	
CS-134	569.32	30.	-7.	-0.004	112.45	-1.555E+00	
PA-234	569.47	30.	9.	0.005	93.70	3.513E+00	
BI-207	569.70	20.	5.	0.003	139.05	1.613E-01	
SB-125	600.50	112.	8.	0.004	203.31	1.435E+00	
RH-106	621.92	82.	5.	0.003	263.52	1.750E+00	
SB-125	635.89	21.	-7.	-0.004	103.92	-2.119E+00	
I-131	636.97	17.	7.	0.004	90.94	3.537E+00	
AG-110M	657.76	29.	7.	0.004	109.66	2.869E-01	
CS-137	661.66	35.	1.	0.001	630.48	5.825E-02	
PM-144	696.54	23.	-1.	-0.001	728.27	-5.286E-02	P
NB-94	702.63	9.	4.	0.002	184.30	1.470E-01	
SB-124	722.79	8.	5.	0.003	85.53	1.997E+00	
AG-108M	722.94	13.	5.	0.003	107.08	2.329E-01	
EU-154	723.36	18.	5.	0.003	123.55	1.047E+00	
ZR-95	724.20	24.	5.	0.003	138.02	4.803E-01	
BI-212	727.17	29.	4.	0.002	179.51	2.345E+00	
pm-146	735.72	10.	3.	0.002	195.95	6.288E-01	P
pm-146	747.16	10.	1.	0.001	452.95	1.785E-01	P
ZR-95	756.73	9.	3.	0.001	250.62	2.054E-01	
AG-110M	763.94	12.	8.	0.004	74.65	1.445E+00	
NB-95	765.79	20.	1.	0.001	605.61	4.488E-02	
EU-152	778.92	0.	17.	0.009	24.25	5.653E+00	
BI-212	785.42	9.	8.	0.004	91.92	2.597E+01	
CS-134	795.87	8.	5.	0.003	86.54	2.810E-01	
TL-210	799.60	14.	5.	0.003	105.34	2.444E-01	
CS-134	801.95	29.	-2.	-0.001	469.35	-8.311E-01	
Cs-136	818.50	39.	-8.	-0.005	111.93	-3.748E-01	
MN-54	834.85	28.	-9.	-0.005	129.10	-4.121E-01	
Co-56	846.77	9.	5.	0.003	146.39	2.165E-01	
NB-94	871.10	0.	10.	0.006	31.62	4.761E-01	
PA-234	880.53	21.	7.	0.004	95.13	5.869E+00	
Sc-46	889.28	29.	1.	0.001	798.39	4.666E-02	P
y-88	898.04	15.	5.	0.003	183.18	2.511E-01	P
AG-110M	937.49	16.	1.	0.001	587.47	2.181E-01	P
PA-234	946.02	15.	10.	0.006	90.83	3.822E+00	
EU-152	964.11	27.	-2.	-0.001	444.97	-5.945E-01	
EU-154	996.33	20.	7.	0.004	103.20	3.375E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	1004.77	28.	-1.	-0.001	754.98	-3.002E-01		
Co-56	1037.84	15.	-2.	-0.001	413.41	-8.280E-01		P
Cs-136	1048.07	20.	-6.	-0.003	121.29	-3.862E-01		
RH-106	1050.36	26.	-1.	-0.001	728.01	-3.608E+00		
BI-207	1063.66	5.	6.	0.003	92.90	4.783E-01		
FE-59	1099.25	5.	6.	0.003	101.72	5.882E-01		
EU-152	1112.07	70.	-13.	-0.007	96.67	-5.554E+00		
ZN-65	1115.55	57.	-13.	-0.007	88.09	-1.504E+00		
Sc-46	1120.55	57.	6.	0.003	189.60	3.438E-01		
CO-60	1173.24	11.	5.	0.003	145.77	3.322E-01		
Ta-182	1189.05	5.	7.	0.004	88.54	2.566E+00		
Ta-182	1221.41	21.	-4.	-0.002	246.99	-1.036E+00		
Co-56	1238.28	21.	-3.	-0.002	319.69	-3.297E-01		
NA-22	1274.53	17.	-4.	-0.002	154.11	-2.685E-01		
FE-59	1291.60	6.	7.	0.004	89.81	1.080E+00		
CO-60	1332.50	23.	-11.	-0.006	79.53	-7.669E-01		P
AG-110M	1384.30	0.	6.	0.003	44.16	1.699E+00		P
EU-152	1408.00	17.	-8.	-0.004	125.93	-2.799E+00		
Co-56	1771.35	0.	5.	0.003	44.72	2.933E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.3494E+00	-3.3495E+00	1.058E+02%	1.20E+01
NA-22	#A	-2.6853E-01	-2.6853E-01	1.541E+02%	1.47E+00
K-40	#	9.8495E+01	9.8495E+01	9.588E+00%	1.17E+01
Sc-46	#A	1.9524E-01	1.9524E-01	1.896E+02%	1.35E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.35E+01
MN-54	#A	-4.1212E-01	-4.1212E-01	1.291E+02%	1.25E+00
FE-59	#A	8.0111E-01	8.0112E-01	6.784E+01%	1.40E+00
Co-56	#A	2.1652E-01	2.1652E-01	1.464E+02%	7.86E-01
CO-57	#A	9.7778E-02	9.7779E-02	1.809E+02%	6.00E-01
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.25E+00
CO-60	#A	-7.6695E-01	-7.6695E-01	7.953E+01%	1.75E+00
ZN-65	#A	-1.5042E+00	-1.5042E+00	8.809E+01%	4.46E+00
NB-94	#A	3.1323E-01	3.1323E-01	3.162E+01%	6.80E-01
ZR-95	#A	3.2845E-01	3.2845E-01	1.380E+02%	1.31E+00
NB-95	#A	4.4878E-02	4.4878E-02	6.056E+02%	9.99E-01
RU-103	#A	2.0364E-01	2.0365E-01	1.020E+02%	5.23E-01
RH-106	#A	1.7505E+00	1.7505E+00	2.635E+02%	1.59E+01
AG-108M	#A	-3.8722E-01	-3.8722E-01	9.486E+01%	9.15E-01
AG-110M	#A	4.2832E-01	4.2832E-01	4.416E+01%	1.04E+00
SN-113	#A	-3.9528E-02	-3.9528E-02	1.494E+03%	1.43E+00
SB-124	#A	1.3761E-01	1.3761E-01	8.553E+01%	1.88E+00

SB-125	#A	1.0322E+00	1.0322E+00	8.650E+01%	1.83E+00
I-131	#A	2.3554E-01	2.3556E-01	9.094E+01%	7.87E-01
Gd-153	#A	3.3740E-01	3.3740E-01	1.421E+02%	2.05E+00
Ga-68	#	2.2340E+01	2.2577E+01	3.015E+01%	1.51E+01
Tc-99m	#A	-1.0803E-01	-1.0825E-01	1.774E+02%	6.54E-01
BA-133	#A	-1.0586E-01	-1.0586E-01	1.307E+02%	1.90E+00
CS-134	#A	2.6043E-01	2.6043E-01	8.654E+01%	1.89E+00
CS-137	#A	5.8250E-02	5.8250E-02	6.305E+02%	1.32E+00
CE-139	#A	-2.2776E-01	-2.2776E-01	1.482E+02%	7.84E-01
Ba-140	#A	-5.2526E-03	-5.2528E-03	1.397E+02%	2.81E+00
La-140	#A	2.2188E-01	2.2189E-01	1.244E+02%	6.37E-01
CE-141	#A	-9.5383E-02	-9.5384E-02	5.432E+02%	1.76E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.69E+00
PM-144	#A	-5.2865E-02	-5.2865E-02	7.283E+02%	9.93E-01
EU-152	#A	1.9015E+00	1.9015E+00	2.425E+01%	3.27E+00
EU-154	#A	7.2746E-01	7.2746E-01	1.032E+02%	6.78E+00
EU-155	#A	-9.0585E-03	-9.0585E-03	1.205E+04%	3.11E+00
HF-181	#A	-1.9271E-01	-1.9271E-01	8.063E+01%	1.67E+00
Ta-182	#A	6.9667E-01	6.9667E-01	8.854E+01%	6.27E+00
Hg-203	#A	6.1795E-02	6.1796E-02	4.070E+02%	8.78E-01
TL-208	#	1.3145E+00	1.3145E+00	3.443E+01%	9.18E-01
pm-146	#A	2.9915E-01	2.9915E-01	1.011E+02%	2.09E+00
y-88	#A	2.5111E-01	2.5111E-01	1.832E+02%	1.09E+00
Cd-113m	#A	-1.9580E+03	-1.9580E+03	1.545E+02%	1.04E+04
Cd-109	#A	4.3803E+00	4.3803E+00	1.345E+02%	1.98E+01
Cf-251	#A	7.2881E-01	7.2881E-01	1.288E+02%	2.46E+00
Cf-249	#A	4.3350E-01	4.3350E-01	1.047E+02%	1.38E+00
Sn-126	#A	2.1291E+00	2.1291E+00	1.011E+02%	7.24E+00
PB-210	#A	-4.2932E+00	-4.2932E+00	2.089E+02%	3.13E+01
PB-212		1.9550E+00	1.9550E+00	2.112E+01%	1.13E+00
PB-214	#	3.6672E+00	3.6672E+00	1.760E+01%	1.20E+00
BI-207	#A	2.9843E-01	2.9843E-01	8.361E+01%	7.89E-01
BI-212	#A	2.3446E+00	2.3446E+00	1.795E+02%	1.48E+01
U-235	#A	-2.5642E-01	-2.5642E-01	9.610E+01%	7.94E+00
BI-214	#	4.4188E+00	4.4188E+00	1.557E+01%	9.03E-01
BI-210M	#A	-4.4497E-01	-4.4497E-01	9.652E+01%	1.45E+00
AC-228	#	2.3801E+00	2.3801E+00	3.961E+01%	2.24E+00
TH-227	#A	8.9634E-01	8.9634E-01	4.957E+02%	1.52E+01
TH-229	#A	-3.4306E+00	-3.4306E+00	1.470E+02%	1.31E+01
TH-234	#A	-8.3067E+00	-8.3067E+00	7.941E+01%	2.09E+01
PA-231	#A	5.7359E+00	5.7359E+00	1.521E+02%	4.13E+01
PA-233	#A	3.8131E-01	3.8131E-01	2.104E+02%	3.65E+00
PA-234	#A	1.6560E+00	1.6560E+00	7.003E+01%	3.28E+00
PA-234M	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.73E+02
AM-241	#A	1.3101E+00	1.3101E+00	4.969E+01%	1.70E+00
Np-237	#A	-1.5346E+00	-1.5346E+00	1.367E+02%	7.03E+00
Ir-192	#A	1.5166E-01	1.5166E-01	1.079E+02%	1.53E+00
Cs-136	#A	-3.7483E-01	-3.7484E-01	1.119E+02%	1.44E+00
Np-239	#A	-6.2255E-01	-6.2269E-01	1.483E+02%	3.11E+00

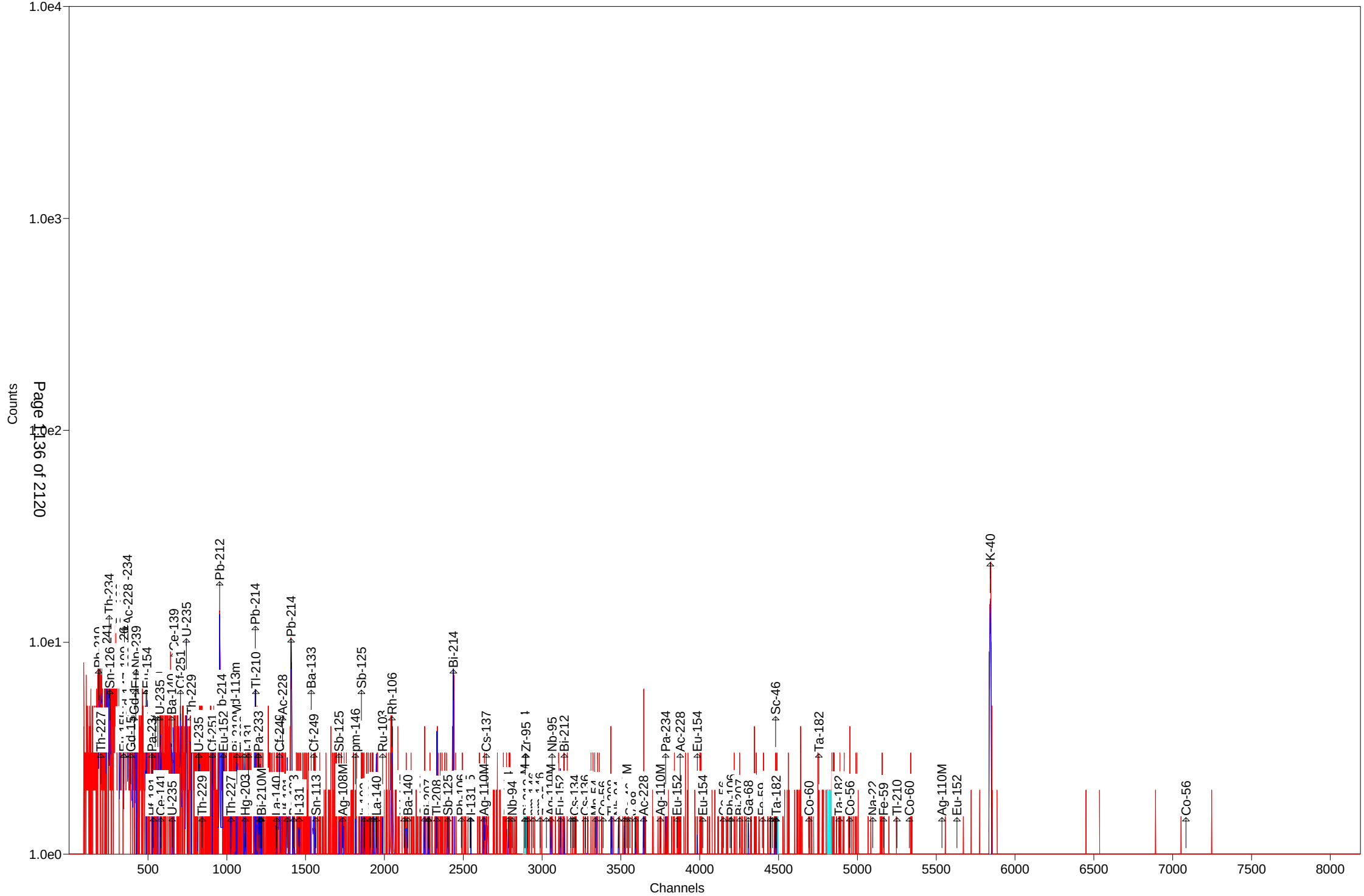
Nd-147 #A	-2.3821E-02	-2.3822E-02	1.108E+02%	5.76E+00
TL-210 #A	2.1551E-01	2.1551E-01	1.053E+02%	8.96E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.085E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.0853638E+02 Bq/Sample

379951_Gamma_160-29881-A-13-B. 7_Gamma_20183082.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20182908

Sample Description: 379951_Gamma_160-29881-A-14-B
Detector: Detector # 5
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-14-B

Decay to Time: 8/23/2018 06:31 Live Time: 1800 sec
Acquisition Time: 8/23/2018 06:32:05 Real Time: 1810 sec
Analysis Time: 8/23/2018 07:02 Dead Time: 0.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.489E+00	95.3	4.278E+00	4.284E+00	1.448E+01
NA-22	3.237E-01	149.0	4.823E-01	4.825E-01	1.741E+00
K-40	1.448E+02	8.6	1.252E+01	1.455E+01	1.239E+01
Sc-46	3.867E-01	101.1	3.910E-01	3.915E-01	1.360E+00
CR-51	-3.429E+00	180.8	6.199E+00	6.201E+00	1.228E+01
MN-54	-2.041E-01	270.8	5.526E-01	5.527E-01	1.370E+00
FE-59	-2.021E+00	22.6	4.573E-01	4.684E-01	4.303E+00
Co-56	4.367E-01	36.9	1.614E-01	1.629E-01	1.387E+00
CO-57	0.000E+00	1.#INF	1.281E-01	1.281E-01	8.906E-01
CO-58	-1.714E-01	310.7	5.324E-01	5.324E-01	1.556E+00
CO-60	0.000E+00	1.#INF	1.008E-01	1.008E-01	7.427E-01
ZN-65	0.000E+00	1.#INF	6.858E-01	6.858E-01	4.813E+00
NB-94	-9.708E-01	90.8	8.811E-01	8.826E-01	2.097E+00
ZR-95	9.952E-01	91.7	9.129E-01	9.143E-01	2.248E+00
NB-95	-3.804E-01	142.7	5.429E-01	5.433E-01	1.886E+00
RU-103	2.913E-01	100.8	2.937E-01	2.941E-01	7.706E-01
RH-106	-6.166E-01	85.7	5.284E-01	5.293E-01	3.181E+01
AG-108M	5.530E-01	52.2	2.888E-01	2.902E-01	7.016E-01
AG-110M	0.000E+00	1.#INF	1.965E-01	1.965E-01	2.430E+00
SN-113	4.418E-01	99.3	4.386E-01	4.392E-01	1.172E+00
SB-124	0.000E+00	1.#INF	3.162E-01	3.162E-01	2.932E+00
SB-125	1.770E+00	30.6	5.417E-01	5.492E-01	2.506E+00
I-131	-1.516E-01	277.1	4.201E-01	4.202E-01	1.170E+00
Gd-153	4.847E-01	114.6	5.554E-01	5.562E-01	2.192E+00
Ga-68	4.200E+01	26.7	1.122E+01	1.147E+01	2.211E+01
Tc-99m	2.101E-01	143.0	3.003E-01	3.005E-01	1.019E+00
BA-133	-5.774E-01	151.0	8.721E-01	8.726E-01	2.960E+00
CS-134	6.604E-01	50.3	3.324E-01	3.342E-01	2.959E+00
CS-137	2.479E-01	233.0	5.776E-01	5.777E-01	2.029E+00
CE-139	2.707E-01	119.4	3.233E-01	3.243E-01	1.094E+00
Ba-140	-5.634E-02	2652.2	1.494E+00	1.494E+00	4.150E+00
La-140	8.456E-01	38.9	3.288E-01	3.319E-01	9.063E-01
CE-141	-3.506E-01	148.4	5.201E-01	5.204E-01	1.474E+00

CE-144	1.573E+00	143.1	2.250E+00	2.252E+00	7.636E+00
PM-144	-7.014E-01	92.3	6.472E-01	6.482E-01	1.563E+00
EU-152	1.828E+00	45.7	8.356E-01	8.410E-01	6.648E+00
EU-154	-5.884E+00	84.5	4.974E+00	4.983E+00	1.679E+01
EU-155	7.744E-01	172.6	1.337E+00	1.338E+00	4.530E+00
HF-181	3.994E-01	139.1	5.557E-01	5.561E-01	1.957E+00
Ta-182	0.000E+00	1.#INF	9.986E-01	9.986E-01	5.124E+00
Hg-203	-1.223E-01	288.4	3.528E-01	3.529E-01	1.234E+00
TL-208	9.907E-01	59.3	5.870E-01	5.892E-01	1.124E+00
pm-146	-1.397E+00	129.1	1.804E+00	1.805E+00	4.448E+00
y-88	-4.116E-01	196.9	8.106E-01	8.108E-01	1.946E+00
Cd-113m	-5.238E+03	98.0	5.133E+03	5.144E+03	1.734E+04
Cd-109	0.000E+00	1.#INF	2.074E+00	2.074E+00	3.434E+01
Cf-251	-1.605E+00	105.2	1.689E+00	1.695E+00	4.581E+00
Cf-249	2.603E-01	119.9	3.121E-01	3.124E-01	2.119E+00
Sn-126	-5.540E-01	592.9	3.285E+00	3.285E+00	1.133E+01
PB-210	1.996E+01	46.2	9.220E+00	9.294E+00	2.476E+01
PB-212	4.290E+00	14.4	6.198E-01	6.791E-01	1.398E+00
PB-214	6.494E+00	13.6	8.828E-01	9.451E-01	1.478E+00
BI-207	2.829E-01	93.7	2.651E-01	2.655E-01	1.049E+00
BI-212	7.926E+00	97.7	7.747E+00	7.758E+00	2.631E+01
U-235	-1.559E-01	1451.2	2.262E+00	2.262E+00	8.519E+00
BI-214	5.537E+00	19.1	1.058E+00	1.097E+00	1.991E+00
BI-210M	4.407E-01	138.6	6.108E-01	6.113E-01	2.091E+00
AC-228	6.653E+00	15.2	1.013E+00	1.069E+00	1.860E+00
TH-227	2.762E+00	158.6	4.380E+00	4.383E+00	1.276E+01
TH-229	-5.035E+00	128.9	6.490E+00	6.502E+00	1.776E+01
TH-234	9.462E+00	77.6	7.342E+00	7.359E+00	2.434E+01
PA-231	0.000E+00	1.#INF	4.297E+00	4.297E+00	7.033E+01
PA-233	8.023E-01	204.0	1.637E+00	1.638E+00	5.552E+00
PA-234	9.961E-01	139.3	1.388E+00	1.389E+00	4.255E+00
PA-234M	4.080E+01	126.4	5.156E+01	5.161E+01	2.055E+02
AM-241	3.327E-01	239.9	7.982E-01	7.984E-01	2.362E+00
Np-237	-1.973E+00	163.1	3.217E+00	3.219E+00	1.081E+01
Ir-192	2.850E-01	93.1	2.653E-01	2.659E-01	9.047E-01
Cs-136	3.304E-01	93.9	3.102E-01	3.107E-01	8.547E-01
Np-239	-8.663E-01	162.0	1.404E+00	1.405E+00	4.740E+00
Nd-147	-3.225E+00	119.8	3.865E+00	3.869E+00	9.806E+00
TL-210	7.778E-02	416.5	3.239E-01	3.240E-01	1.785E+00
Total	3.079E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-14-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182908.An1

Acquisition information
Start time: 8/23/2018 6:32:05 AM
Live time: 1800
Real time: 1810
Dead time: 0.55 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:31:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2111

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.75	27.	46.20	0.95	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	8.	158.61	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
59.54	5.	239.94	0.80	2.533E-02	59.54	35.900	PBC<MDA	AM241
63.29	18.	77.60	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
77.17	62.	24.71	0.61	3.221E-02				
80.99	7.	231.84	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
92.59	-9.	211.40	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
92.88	68.	21.55	0.84	3.536E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.921E+01	AC228
97.50	11.	114.59	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	11.	117.88	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
103.20	5.	289.67	0.84	3.612E-02	103.20	21.800	PBC<MDA	Gd153
105.31	11.	172.63	0.84	3.618E-02	105.31	21.200	PBC<MDA	EU155
123.10	4.	369.41	0.86	3.575E-02	123.10	40.790	PBC<MDA	EU154
131.29	10.	139.33	0.87	3.509E-02	131.29	18.000	PBC<MDA	PA234
133.02	11.	139.12	0.87	3.492E-02	133.02	43.300	PBC<MDA	HF181
133.54	11.	143.06	0.87	3.487E-02	133.54	11.090	PBC<MDA	CE144
136.30	11.	148.84	0.88	3.458E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.653E+00	CO57
140.51	11.	142.96	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	12.	119.41	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.72	31.	38.75	0.93	2.854E-02	185.72	54.000	1.130E+00	U235
227.00	10.	101.94	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
238.60	76.	17.81	0.74	2.320E-02	238.63	43.300	4.178E+00	PB212
242.03	31.	28.68	0.98	2.293E-02	242.00	7.430	1.000E+01	PB214
265.83	8.	138.58	1.00	2.121E-02	265.83	50.000	PBC<MDA	BI210M
277.28	9.	88.51	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
295.51	76.	16.96	1.28	1.945E-02	295.09	19.300	1.120E+01	PB214
					296.00	79.000	PBC<MDA	TL210
296.00	5.	416.46	1.03	1.940E-02	295.09	19.300	PBC<MDA	PB214
					296.00	79.000	1.752E-01	TL210
300.91	4.	475.10	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
312.01	10.	204.03	1.05	1.857E-02	312.01	36.000	PBC<MDA	PA233
316.49	8.	93.11	1.05	1.835E-02	316.49	87.040	PBC<MDA	Ir192
333.44	6.	119.90	1.07	1.757E-02	333.44	15.510	PBC<MDA	Cf249
338.67	25.	23.59	0.50	1.736E-02	338.32	12.010	6.750E+00	AC228
345.83	8.	151.82	1.08	1.705E-02	345.83	15.070	PBC<MDA	HF181
352.16	78.	12.53	1.14	1.679E-02	351.93	37.600	6.494E+00	PB214
391.69	8.	99.29	1.12	1.537E-02	391.69	64.000	PBC<MDA	SN113
427.88	7.	109.76	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
433.94	13.	52.22	1.16	1.411E-02	433.94	90.480	PBC<MDA	AG108M
453.88	4.	123.50	1.18	1.360E-02	453.88	65.000	PBC<MDA	pm146
463.37	1.	809.27	1.19	1.336E-02	463.37	10.470	PBC<MDA	SB125
468.06	1.	781.02	1.20	1.325E-02	468.06	51.750	PBC<MDA	Ir192
497.05	6.	100.81	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	48.	27.99	2.48	1.230E-02	511.86	20.000	1.076E+01	RH106
563.24	10.	50.33	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	74.72	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.808E+00	PA234
					569.70	97.740	3.196E-01	BI207
583.02	8.	93.85	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
600.50	4.	434.94	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
609.35	49.	19.11	0.63	1.063E-02	609.31	46.090	5.537E+00	BI214
					610.30	5.750	4.444E+01	RU103
635.89	11.	30.61	1.34	1.026E-02	635.89	11.310	5.232E+00	SB125
661.66	4.	232.97	1.37	9.924E-03	661.66	85.210	PBC<MDA	CS137
727.17	10.	97.74	1.42	9.170E-03	727.17	7.550	PBC<MDA	BI212
735.72	2.	305.71	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
756.73	9.	91.73	1.45	8.869E-03	756.73	54.460	PBC<MDA	ZR95
766.41	1.	776.96	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.512E+01	PA234M
778.92	2.	403.11	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
785.42	4.	216.89	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
818.50	5.	98.47	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
860.56	6.	122.29	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
871.10	8.	74.35	1.54	7.882E-03	871.10	99.890	PBC<MDA	NB94
889.28	5.	101.11	1.55	7.747E-03	889.28	99.984	PBC<MDA	Sc46
911.25	24.	20.41	1.92	7.591E-03	911.07	29.000	6.057E+00	AC228
946.02	2.	403.11	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
965.02	17.	33.38	1.61	7.209E-03	968.97	17.460	7.577E+00	AC228
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	5.	126.39	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	8.	36.94	1.66	6.805E-03	1037.84	14.130	4.500E+00	Co56
1048.07	3.	159.86	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	85.69	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	93.70	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	14.	26.73	1.69	6.594E-03	1077.40	3.300	4.200E+01	Ga68
1112.07	15.	45.70	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1274.53	3.	149.00	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	9.192E-01	EU154
1313.00	7.	37.80	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1408.00	5.	44.72	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.18	142.	8.65	2.20	5.103E-03	1460.83	10.670	1.448E+02	K40
1596.21	7.	38.89	2.02	4.736E-03	1596.21	95.400	PBC<MDA	La140
1764.56	4.	83.79	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.31	77.17	54.	62.	1.920E+03	24.71	0.613	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.52	46.75	45.	27.	0.015	46.20	0.949s
TH-227	200.11	50.14	54.	8.	0.004	158.61	0.787s
AM-241	237.72	59.54	60.	5.	0.003	239.94	0.797
TH-234	252.74	63.29	83.	18.	0.010	77.60	0.801s
Sn-126	256.71	64.28	124.	-3.	-0.001	592.93	0.802s
BA-133	323.61	80.99	73.	7.	0.004	231.84	0.819s
Np-237	345.63	86.49	332.	-16.	-0.009	163.09	0.825
EU-155	345.84	86.54	316.	-16.	-0.009	159.20	0.825
Sn-126	347.43	86.94	300.	-16.	-0.009	155.17	0.825s
Cd-109	351.83	88.04	283.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	283.	0.	0.000	1000.00	0.829s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	370.05	92.59	190.	-9.	-0.005	211.40	0.831
AC-228	371.22	92.88	40.	68.	0.038	21.55	0.844s
Gd-153	389.70	97.50	72.	11.	0.006	114.59	0.836s
Np-239	397.71	99.50	72.	11.	0.006	117.88	0.838s
Gd-153	412.52	103.20	117.	5.	0.003	289.67	0.842s
Np-239	414.52	103.70	122.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	165.	11.	0.006	172.63	0.844s
Np-239	424.25	106.13	209.	-13.	-0.007	162.05	0.845s
EU-152	486.88	121.78	97.	-3.	-0.001	525.00	0.861
CO-57	488.03	122.06	99.	0.	0.000	1000.00	0.861
EU-154	492.18	123.10	82.	4.	0.002	369.41	0.862s
PA-234	524.99	131.29	96.	10.	0.006	139.33	0.871
HF-181	531.91	133.02	106.	11.	0.006	139.12	0.872s
CE-144	533.97	133.54	117.	11.	0.006	143.06	0.873
HF-181	545.02	136.30	128.	11.	0.006	148.84	0.876s
CO-57	545.72	136.47	174.	-13.	-0.007	142.95	0.876s
Tc-99m	561.88	140.51	122.	11.	0.006	142.96	0.880s
CE-141	581.61	145.44	74.	-10.	-0.006	148.36	0.885s
Ba-140	650.54	162.66	126.	-14.	-0.008	113.45	0.902s
U-235	653.42	163.38	140.	-6.	-0.003	301.47	0.903s
CE-139	663.32	165.85	100.	12.	0.007	119.41	0.905s
Cf-251	706.34	176.60	70.	-15.	-0.008	105.24	0.916s
U-235	742.85	185.72	37.	31.	0.017	38.75	0.925s
TH-229	774.03	193.51	60.	-11.	-0.006	128.89	0.933s
U-235	821.35	205.33	50.	-8.	-0.004	161.21	0.945s
TH-229	843.44	210.85	67.	-6.	-0.003	259.82	0.950s
Cf-251	908.08	227.00	27.	10.	0.005	101.94	0.966s
PB-212	954.64	238.63	23.	78.	0.043	14.45	0.978D
PB-214	968.10	242.00	23.	31.	0.017	28.68	0.981D
EU-152	978.89	244.69	214.	-13.	-0.007	89.45	0.984
TH-227	1025.11	256.24	40.	-4.	-0.002	278.36	0.995
Cd-113m	1054.97	263.70	64.	-12.	-0.007	97.98	1.002s
BI-210M	1063.50	265.83	64.	8.	0.005	138.58	1.005s
TL-208	1109.33	277.28	25.	9.	0.005	88.51	1.016s
Hg-203	1117.00	279.20	54.	-4.	-0.002	288.37	1.017
I-131	1137.41	284.30	37.	-6.	-0.003	181.06	1.022s
PB-214	1182.29	295.51	23.	76.	0.042	16.96	1.281s
TL-210	1184.24	296.00	200.	5.	0.003	416.46	1.034s
PB-212	1200.37	300.03	201.	4.	0.002	475.10	1.038s
PA-231	1200.53	300.07	205.	0.	0.000	1000.00	1.038s
PA-233	1200.97	300.18	205.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	205.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	205.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	205.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	205.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	205.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	189.	10.	0.005	204.03	1.049s
Ir-192	1266.25	316.49	25.	8.	0.005	93.11	1.053

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1280.63	320.08	64.	-11.	-0.006	180.76	1.057s
La-140	1315.35	328.76	37.	-3.	-0.001	429.21	1.065
Cf-249	1334.08	333.44	15.	6.	0.004	119.90	1.070s
AC-228	1355.00	338.67	4.	25.	0.014	23.59	0.500s
Cs-136	1362.62	340.57	135.	-13.	-0.007	129.84	1.077s
EU-152	1377.49	344.29	122.	-13.	-0.007	123.39	1.080s
HF-181	1383.66	345.83	75.	8.	0.005	151.82	1.082s
PB-214	1409.02	352.16	9.	74.	0.041	13.59	1.138s
BA-133	1424.36	356.00	126.	-11.	-0.006	151.02	1.091s
I-131	1458.32	364.48	30.	-4.	-0.002	277.08	1.099s
BA-133	1535.78	383.84	66.	-4.	-0.002	333.81	1.117s
SN-113	1567.19	391.69	15.	8.	0.004	99.29	1.125s
SB-125	1711.99	427.88	12.	7.	0.004	109.76	1.158
AG-108M	1736.25	433.94	8.	13.	0.007	52.22	1.164s
pm-146	1816.05	453.88	4.	4.	0.002	123.50	1.182s
SB-125	1854.01	463.37	29.	1.	0.001	809.27	1.191s
Ir-192	1872.79	468.06	30.	1.	0.001	781.02	1.195s
BE-7	1910.94	477.59	50.	-11.	-0.006	95.29	1.204s
La-140	1948.65	487.02	44.	-14.	-0.008	96.64	1.212s
RU-103	1988.80	497.05	8.	6.	0.003	100.81	1.221s
RH-106	2048.06	511.86	20.	48.	0.026	27.99	2.485s
Nd-147	2124.62	531.00	28.	-9.	-0.005	119.84	1.252s
CS-134	2253.60	563.24	4.	10.	0.006	50.33	1.280s
CS-134	2277.94	569.32	8.	6.	0.004	74.72	1.286s
BI-207	2279.47	569.70	15.	0.	0.000	1000.00	1.286s
TL-208	2332.76	583.02	12.	8.	0.004	93.85	1.298s
SB-125	2402.69	600.50	125.	4.	0.002	434.94	1.313s
SB-124	2411.61	602.73	129.	0.	0.000	1000.00	1.315s
CS-134	2419.53	604.71	129.	0.	0.000	1000.00	1.317
BI-214	2438.08	609.35	10.	49.	0.027	19.11	0.627s
RU-103	2441.89	610.30	129.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	129.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	129.	0.	0.000	1000.00	1.328s
RH-106	2488.37	621.92	148.	-10.	-0.006	169.16	1.332s
SB-125	2544.26	635.89	0.	11.	0.006	30.61	1.344s
I-131	2548.61	636.97	27.	-8.	-0.005	41.24	1.345s
AG-110M	2631.76	657.76	32.	-12.	-0.006	74.94	1.362s
CS-137	2647.36	661.66	37.	4.	0.002	232.97	1.366s
PM-144	2786.90	696.54	26.	-12.	-0.007	92.28	1.395s
NB-94	2811.25	702.63	48.	-16.	-0.009	90.76	1.400s
SB-124	2891.88	722.79	43.	-12.	-0.007	82.06	1.417s
EU-154	2894.16	723.36	56.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	56.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	42.	10.	0.005	97.74	1.421s
pm-146	2943.61	735.72	14.	2.	0.001	305.71	1.428s
pm-146	2989.37	747.16	22.	-8.	-0.004	129.09	1.437s
ZR-95	3027.65	756.73	13.	9.	0.005	91.73	1.445s
AG-110M	3056.50	763.94	21.	-5.	-0.003	129.90	1.451s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-95	3063.89	765.79	34.	-6.	-0.003	142.72	1.453
PA-234M	3066.38	766.41	40.	1.	0.001	776.96	1.453
EU-152	3116.41	778.92	14.	2.	0.001	403.11	1.463s
BI-212	3142.41	785.42	19.	4.	0.002	216.89	1.468s
CS-134	3184.19	795.87	26.	-2.	-0.001	483.05	1.477s
TL-210	3199.12	799.60	27.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	46.	-12.	-0.006	88.03	1.482s
CO-58	3243.82	810.78	20.	-3.	-0.001	310.65	1.489s
Cs-136	3274.72	818.50	5.	5.	0.003	98.47	1.495s
MN-54	3340.10	834.85	14.	-3.	-0.002	270.80	1.508s
Co-56	3387.78	846.77	14.	-2.	-0.001	403.11	1.518s
TL-208	3442.95	860.56	9.	6.	0.003	122.29	1.529s
NB-94	3485.08	871.10	12.	8.	0.004	74.35	1.537s
EU-154	3493.61	873.23	32.	-10.	-0.006	84.53	1.539s
PA-234	3522.80	880.53	21.	-2.	-0.001	393.45	1.544s
PA-234	3533.64	883.24	22.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	22.	0.	0.000	1000.00	1.547s
Sc-46	3557.79	889.28	12.	5.	0.003	101.11	1.551s
y-88	3592.83	898.04	23.	-5.	-0.003	196.95	1.558s
AC-228	3645.67	911.25	0.	24.	0.013	20.41	1.917s
AG-110M	3750.60	937.49	23.	-12.	-0.007	87.74	1.589s
PA-234	3784.70	946.02	14.	2.	0.001	403.11	1.595s
EU-152	3857.05	964.11	16.	0.	0.000	1000.00	1.609s
AC-228	3876.48	968.97	8.	17.	0.010	33.38	1.612s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s
PA-234M	4004.55	1001.00	17.	5.	0.003	126.39	1.636s
EU-154	4019.65	1004.77	33.	-6.	-0.003	148.03	1.639s
Co-56	4151.87	1037.84	0.	8.	0.004	36.94	1.664s
Cs-136	4192.77	1048.07	10.	3.	0.002	159.86	1.671s
RH-106	4201.93	1050.36	10.	6.	0.003	85.69	1.673s
BI-207	4255.11	1063.66	5.	6.	0.003	93.70	1.682s
Ga-68	4310.04	1077.40	0.	14.	0.008	26.73	1.692s
FE-59	4397.41	1099.25	30.	-13.	-0.007	22.63	1.708s
EU-152	4448.68	1112.07	15.	15.	0.008	45.70	1.717s
ZN-65	4462.56	1115.55	30.	0.	0.000	1000.00	1.720s
Ta-182	4485.56	1121.30	15.	0.	0.000	1000.00	1.724s
CO-60	4693.21	1173.24	16.	-3.	-0.001	168.14	1.760s
Ta-182	4756.42	1189.05	25.	-12.	-0.007	96.04	1.771s
Co-56	4953.23	1238.28	27.	-7.	-0.004	62.48	1.804s
NA-22	5098.13	1274.53	11.	3.	0.002	149.00	1.828s
EU-154	5098.19	1274.54	14.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	0.	0.	0.000	1000.00	1.840s
TL-210	5251.91	1313.00	0.	7.	0.004	37.80	1.854s
CO-60	5329.85	1332.50	0.	0.	0.000	1000.00	1.866s
AG-110M	5536.88	1384.30	5.	-1.	-0.001	403.11	1.899s
EU-152	5631.62	1408.00	0.	5.	0.003	44.72	1.914s
K-40	5844.16	1461.18	4.	142.	0.079	8.65	2.199
La-140	6383.73	1596.21	0.	7.	0.004	38.89	2.024s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	6762.39	1690.98	6.	-3.	-0.002	95.02	2.076s
BI-214	7056.06	1764.49	2.	4.	0.002	83.79	2.114s
Co-56	7083.46	1771.35	6.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	0.	0.	0.000	1000.00	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.4892E+00				5.31E+01	
			477.60	-4.489E+00	?(	1.448E+01 9.53E+01 1.05E+01	G
NA-22	C	3.2367E-01				9.50E+02	
			1274.53	3.237E-01	?(	1.741E+00 1.49E+02 9.99E+01	G
K-40	N	1.4478E+02				4.66E+11	
			1460.83	1.448E+02	(P	1.239E+01 8.65E+00 1.07E+01	G
Sc-46	F	3.8674E-01				8.38E+01	
			889.28	3.867E-01	?(	1.360E+00 1.01E+02 1.00E+02	G
			1120.55	-2.734E-02	% P	1.804E+00 1.30E+03 1.00E+02	G
CR-51	F	-3.4292E+00				2.77E+01	
			320.08	-3.429E+00	?(P	1.228E+01 1.81E+02 9.94E+00	G
MN-54	C	-2.0408E-01				3.12E+02	
			834.85	-2.041E-01	?(	1.370E+00 2.71E+02 1.00E+02	G
FE-59	F	-2.0211E+00				4.45E+01	
			1099.25	-2.021E+00	?(P	4.303E+00 2.26E+01 5.65E+01	G
			1291.60	0.000E+00	+	1.674E+00 1.00E+03 4.32E+01	G
Co-56	C	4.3673E-01				7.73E+01	
			846.77	-1.377E-01	?(	1.387E+00 4.03E+02 9.99E+01	G
			1238.28	-9.870E-01	+ P	3.852E+00 6.25E+01 6.61E+01	G
			1037.84	4.500E+00	?(P	4.258E+00 3.69E+01 1.41E+01	G
			1771.35	0.000E+00	-	1.169E+01 1.00E+03 1.55E+01	A
CO-58	C	-1.7137E-01				7.09E+01	
			810.78	-1.714E-01	?(P	1.556E+00 3.11E+02 9.95E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	-9.7081E-01					7.41E+06	
			702.63	-9.708E-01	?(	2.097E+00	9.08E+01	9.79E+01 G
			871.10	5.331E-01	+	1.330E+00	7.43E+01	9.99E+01 G
ZR-95	I	9.9523E-01					6.40E+01	
			756.73	9.952E-01	?(P	2.248E+00	9.17E+01	5.45E+01 G
			724.20	0.000E+00	&	5.139E+00	1.00E+03	4.42E+01 G
NB-95	I	-3.8039E-01					6.40E+01	
			765.79	-3.804E-01	?(	1.886E+00	1.43E+02	9.98E+01 G
RU-103	I	2.9131E-01					3.93E+01	
			497.05	2.913E-01	?(	7.706E-01	1.01E+02	9.09E+01 G
			610.30	0.000E+00	-	5.063E+01	1.00E+03	5.75E+00 GA
RH-106	I	-6.1663E-01					3.74E+02	
			621.92	-5.542E+00	?(	3.181E+01	1.69E+02	9.93E+00 G
			1050.36	3.073E+01	?(	9.026E+01	8.57E+01	1.56E+00 G
			511.86	1.076E+01	?	5.319E+00	2.80E+01	2.00E+01 GA
AG-108M	C	5.5299E-01					1.53E+05	
			433.94	5.530E-01	?(P	7.016E-01	5.22E+01	9.05E+01 G
			722.94	-6.184E-02	%	2.475E+00	1.13E+03	9.08E+01 G
			614.28	0.000E+00	-	3.258E+00	1.00E+03	8.98E+01 G
SN-113	F	4.4179E-01					1.15E+02	
			391.69	4.418E-01	?(	1.172E+00	9.93E+01	6.40E+01 G
SB-125	I	1.7697E+00					1.01E+03	
			427.88	8.751E-01	?(P	2.506E+00	1.10E+02	2.96E+01 G
			600.50	1.060E+00	?(	1.586E+01	4.35E+02	1.79E+01 G
			635.89	5.232E+00	?(P	3.529E+00	3.06E+01	1.13E+01 G
			463.37	3.774E-01	& P	1.105E+01	8.09E+02	1.05E+01 G
I-131	I	-1.5162E-01					8.02E+00	
			364.48	-1.516E-01	?(P	1.170E+00	2.77E+02	8.17E+01 G
			284.30	-2.817E+00	+ P	1.405E+01	1.81E+02	6.14E+00 G
			636.97	-6.395E+00	+ P	2.032E+01	4.12E+01	7.17E+00 G
Gd-153	F	4.8470E-01					2.42E+02	
			97.50	5.634E-01	?(	2.192E+00	1.15E+02	3.00E+01 G
			103.20	3.763E-01	(	3.743E+00	2.90E+02	2.18E+01 G
Ga-68	C	4.2000E+01					4.71E-02	
			1077.40	4.200E+01	?(	2.211E+01	2.67E+01	3.30E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Tc-99m	I	2.1005E-01					2.51E-01	
			140.51	2.101E-01	*(	1.019E+00	1.43E+02	8.93E+01 G
BA-133	F	-5.7742E-01					3.85E+03	
			356.00	-5.774E-01	&(	2.960E+00	1.51E+02	6.20E+01 G
			302.85	0.000E+00	+	1.106E+01	1.00E+03	1.83E+01 G
			383.84	-1.391E+00	+	1.618E+01	3.34E+02	8.94E+00 GA
			80.99	3.275E-01	?	2.094E+00	2.32E+02	3.41E+01 GA
CS-134	I	6.6044E-01					7.54E+02	
			604.71	0.000E+00	?(	2.959E+00	1.00E+03	9.76E+01 G
			795.87	-1.146E-01	&	2.005E+00	4.83E+02	8.55E+01 G
			569.32	2.030E+00	&(	5.101E+00	7.47E+01	1.54E+01 G
			801.95	-8.718E+00	+	2.588E+01	8.80E+01	8.69E+00 G
			563.24	5.860E+00	?(	7.049E+00	5.03E+01	8.35E+00 G
CS-137	I	2.4792E-01					1.10E+04	
			661.66	2.479E-01	?(P	2.029E+00	2.33E+02	8.52E+01 G
CE-139	F	2.7074E-01					1.38E+02	
			165.85	2.707E-01	?(	1.094E+00	1.19E+02	7.99E+01 G
Ba-140	I	-5.6337E-02					1.28E+01	
			537.26	-5.634E-02	%(P	4.150E+00	2.65E+03	2.44E+01 G
			162.66	-4.128E+00	+	1.579E+01	1.13E+02	6.22E+00 G
			304.85	0.000E+00	+	4.750E+01	1.00E+03	4.29E+00 G
La-140	I	8.4563E-01					1.28E+01	
			1596.21	8.456E-01	?(P	9.063E-01	3.89E+01	9.54E+01 G
			487.02	-1.332E+00	-	3.202E+00	9.66E+01	4.55E+01 G
			328.76	-4.105E-01	-	4.761E+00	4.29E+02	2.03E+01 G
			815.77	-5.737E-02	% P	7.021E+00	4.00E+03	2.33E+01 G
CE-141	I	-3.5057E-01					3.25E+01	
			145.44	-3.506E-01	?(P	1.474E+00	1.48E+02	4.82E+01 G
CE-144	I	1.5729E+00					2.85E+02	
			133.54	1.573E+00	?(	7.636E+00	1.43E+02	1.11E+01 G
PM-144	C	-7.0136E-01					3.63E+02	
			696.54	-7.014E-01	?(	1.563E+00	9.23E+01	9.90E+01 G
			618.06	0.000E+00	+	2.969E+00	1.00E+03	9.91E+01 G
EU-152	F	1.8285E+00					4.94E+03	
			344.29	-1.594E+00	&(	6.648E+00	1.23E+02	2.65E+01 G
			1112.07	9.269E+00	?(	1.316E+01	4.57E+01	1.36E+01 G
			121.78	-1.446E-01	-	2.632E+00	5.25E+02	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	9.918E-01	?(	9.991E+00	4.03E+02	1.29E+01 G
			964.11	0.000E+00	-	1.122E+01	1.00E+03	1.46E+01 G
			244.69	-4.054E+00	+ P	2.288E+01	8.95E+01	7.58E+00 G
			1408.00	2.512E+00	?	3.703E+00	4.47E+01	2.10E+01 GA
EU-154	I	-5.8838E+00					3.14E+03	
			873.23	-5.884E+00	?(	1.679E+01	8.45E+01	1.23E+01 G
			123.10	1.333E-01	+	1.709E+00	3.69E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.556E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.121E+01	1.00E+03	2.02E+01 G
			1004.77	-2.513E+00	+	1.295E+01	1.48E+02	1.80E+01 G
			996.33	4.224E+00	+	1.308E+01	8.99E+01	1.06E+01 G
EU-155	I	7.7440E-01					1.81E+03	
			105.31	7.744E-01	?(P	4.530E+00	1.73E+02	2.12E+01 G
			86.54	-8.415E-01	+	4.502E+00	1.59E+02	3.07E+01 G
HF-181	F	3.9942E-01					4.24E+01	
			482.00	-4.930E-02	&(	1.957E+00	1.12E+03	8.05E+01 G
			133.02	3.951E-01	?(P	1.866E+00	1.39E+02	4.33E+01 G
			345.83	1.793E+00	?(P	9.313E+00	1.52E+02	1.51E+01 G
			136.30	3.016E+00	?(	1.523E+01	1.49E+02	5.85E+00 G
Hg-203	F	-1.2234E-01					4.66E+01	
			279.20	-1.223E-01	?(	1.234E+00	2.88E+02	8.15E+01 G
TL-208	N	9.9065E-01					6.98E+02	
			583.02	4.659E-01	*(	1.124E+00	9.39E+01	8.45E+01 G
			277.28	3.720E+00	&(	1.118E+01	8.85E+01	6.31E+00 G
			860.56	3.174E+00	?(P	9.526E+00	1.22E+02	1.24E+01 G
pm-146	C	-1.3974E+00					2.02E+03	
			747.16	-1.397E+00	?(	4.448E+00	1.29E+02	3.40E+01 G
			735.72	6.759E-01	+ P	5.395E+00	3.06E+02	2.25E+01 G
			453.88	2.278E-01	& P	7.910E-01	1.24E+02	6.50E+01 G
y-88	F	-4.1155E-01					1.07E+02	
			898.04	-4.116E-01	?(	1.946E+00	1.97E+02	9.37E+01 G
			1836.06	0.000E+00	+	9.809E-01	1.00E+03	9.92E+01 G
Cd-113m		-5.2384E+03					5.33E+03	
			263.70	-5.238E+03	?(	1.734E+04	9.80E+01	6.00E-03 K
Cf-251	T	-1.6046E+00					3.28E+05	
			176.60	-1.605E+00	?(	4.581E+00	1.05E+02	1.70E+01 G
			227.00	3.469E+00		9.768E+00	1.02E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	2.6031E-01					1.28E+05	
			387.95	1.811E-02	%(	2.119E+00	3.31E+03	6.60E+01 G
			333.44	1.291E+00	?(	4.190E+00	1.20E+02	1.55E+01 G
Sn-126		-5.5404E-01					3.65E+07	
			87.57	-2.411E-02	%	3.482E+00	4.24E+03	3.75E+01 GA
			64.28	-5.540E-01	?(	1.133E+01	5.93E+02	9.70E+00 G
			86.94	-2.853E+00	+	1.488E+01	1.55E+02	9.04E+00 GA
PB-210	N	1.9957E+01					8.14E+03	
			46.54	1.996E+01	*(P	2.476E+01	4.62E+01	4.25E+00 G
PB-212	N	4.2898E+00					6.98E+02	
			238.63	4.290E+00	(P	1.398E+00	1.44E+01	4.33E+01 G
			300.03	3.744E+00	& P	6.069E+01	4.75E+02	3.28E+00 GA
PB-214	N	6.4941E+00					5.84E+05	
			351.93	6.494E+00	(P	1.478E+00	1.36E+01	3.76E+01 G
			295.09	1.120E+01	+ P	3.731E+00	1.70E+01	1.93E+01 G
			242.00	1.000E+01	+	8.226E+00	2.87E+01	7.43E+00 GA
BI-207	C	2.8292E-01					1.18E+04	
			569.70	0.000E+00	?(	1.049E+00	1.00E+03	9.77E+01 G
			1063.66	6.541E-01	?(	1.469E+00	9.37E+01	7.45E+01 G
BI-212	N	7.9262E+00					6.98E+02	
			727.17	7.926E+00	?(	2.631E+01	9.77E+01	7.55E+00 G
			785.42	2.188E+01	&	1.153E+02	2.17E+02	1.28E+00 GA
U-235	N	-1.5590E-01					2.57E+11	
			143.79	-1.559E-01	&(P	8.519E+00	1.45E+03	1.10E+01 G
			205.33	-3.378E+00	+	1.506E+01	1.61E+02	5.01E+00 G
			163.38	-1.979E+00	&	2.042E+01	3.01E+02	5.08E+00 G
			185.72	1.130E+00		1.115E+00	3.88E+01	5.40E+01 GA
BI-214	N	5.5370E+00					5.84E+05	
			609.31	5.537E+00	(P	1.991E+00	1.91E+01	4.61E+01 G
			1120.29	-1.810E-01	% P	1.194E+01	1.27E+03	1.51E+01 G
			1764.49	2.902E+00	- P	8.355E+00	8.38E+01	1.54E+01 G
BI-210M	T	4.4072E-01					1.10E+09	
			265.83	4.407E-01	?(	2.091E+00	1.39E+02	5.00E+01 G
			304.90	0.000E+00	-	7.278E+00	1.00E+03	2.80E+01 G
AC-228	N	6.6531E+00					2.10E+03	
			911.07	6.057E+00	(	1.860E+00	2.04E+01	2.90E+01 G
			968.97	7.577E+00	&(	6.953E+00	3.34E+01	1.75E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			338.32	6.750E+00	(	3.100E+00	2.36E+01	1.20E+01 G
			93.35	1.921E+01	+	9.092E+00	2.15E+01	5.56E+00 XA
TH-227	N	2.7617E+00					7.95E+03	
			50.14	2.762E+00	&(	1.276E+01	1.59E+02	8.00E+00 G
			256.24	-1.573E+00	+	1.173E+01	2.78E+02	7.00E+00 G
TH-229	N	-5.0352E+00					2.68E+06	
			193.51	-5.035E+00	?(	1.776E+01	1.29E+02	4.40E+00 G
			210.85	-4.098E+00	+	2.947E+01	2.60E+02	2.99E+00 G
TH-234	N	9.4619E+00					1.63E+12	
			63.29	9.462E+00	*(P	2.434E+01	7.76E+01	3.81E+00 G
			92.59	-2.577E+00	- P	1.889E+01	2.11E+02	5.58E+00 G
PA-233	C	8.0233E-01					7.82E+08	
			312.01	8.023E-01	?(	5.552E+00	2.04E+02	3.60E+01 G
			300.18	0.000E+00	-	3.245E+01	1.00E+03	6.20E+00 G
PA-234	N	9.9611E-01					1.63E+12	
			131.29	8.984E-01	(P	4.255E+00	1.39E+02	1.80E+01 G
			946.02	1.127E+00	?(	1.136E+01	4.03E+02	1.34E+01 G
			569.47	2.069E-01	%	1.238E+01	1.59E+03	8.20E+00 G
			883.24	0.000E+00	-	1.837E+01	1.00E+03	9.60E+00 G
			880.53	-1.976E+00	+	2.832E+01	3.93E+02	6.00E+00 GA
PA-234M	N	4.0796E+01					1.63E+12	
			1001.00	4.630E+01	?(P	2.055E+02	1.26E+02	8.37E-01 G
			766.41	2.512E+01	?(	6.969E+02	7.77E+02	2.94E-01 G
AM-241	T	3.3267E-01					1.58E+05	
			59.54	3.327E-01	?(P	2.362E+00	2.40E+02	3.59E+01 G
Np-237	F	-1.9726E+00					2.14E+06	
			86.49	-1.973E+00	?(	1.081E+01	1.63E+02	1.31E+01 G
Ir-192	F	2.8497E-01					7.40E+01	
			316.49	2.850E-01	(	9.047E-01	9.31E+01	8.70E+01 G
			468.06	8.102E-02	-	2.287E+00	7.81E+02	5.18E+01 G
			308.44	0.000E+00	-	6.480E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.3039E-01					1.30E+01	
			818.50	3.477E-01	?(	8.547E-01	9.85E+01	1.00E+02 G
			1048.07	3.087E-01	?(	1.795E+00	1.60E+02	8.00E+01 G
			340.57	-8.899E-01	+	3.905E+00	1.30E+02	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -8.6629E-01                                      2.36E+00
                          103.70 0.000E+00 +   3.472E+00 1.00E+03 2.40E+01 X
                          106.13-8.663E-01 ?(  4.740E+00 1.62E+02 2.27E+01 G
                           99.50 1.084E+00 ?   4.345E+00 1.18E+02 1.50E+01 X

Nd-147      -3.2248E+00                                      1.11E+01
                          531.00-3.225E+00 ?(  9.806E+00 1.20E+02 1.30E+01 G
                           91.10 0.000E+00 +   4.539E+00 1.00E+03 2.83E+01 G

TL-210   N   7.7780E-02                                      5.84E+05
                          799.60 0.000E+00 ?(  1.785E+00 1.00E+03 9.90E+01 G
                          296.00 1.752E-01 ?(  2.488E+00 4.16E+02 7.90E+01 G
                         1313.00 3.317E+00 ?   3.492E+00 3.78E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	54.	8.	0.004	158.61	2.762E+00	
AM-241	59.54	60.	5.	0.003	239.94	3.327E-01	P
TH-234	63.29	83.	18.	0.010	77.60	9.462E+00	P
Sn-126	64.28	124.	-3.	-0.001	592.93	-5.540E-01	
BA-133	80.99	73.	7.	0.004	231.84	3.275E-01	
Np-237	86.49	332.	-16.	-0.009	163.09	-1.973E+00	
EU-155	86.54	316.	-16.	-0.009	159.20	-8.415E-01	
Sn-126	86.94	300.	-16.	-0.009	155.17	-2.853E+00	
TH-234	92.59	190.	-9.	-0.005	211.40	-2.577E+00	P
Gd-153	97.50	72.	11.	0.006	114.59	5.634E-01	
Np-239	99.50	72.	11.	0.006	117.88	1.084E+00	
Gd-153	103.20	117.	5.	0.003	289.67	3.763E-01	
EU-155	105.31	165.	11.	0.006	172.63	7.744E-01	P
Np-239	106.13	209.	-13.	-0.007	162.05	-8.663E-01	
EU-152	121.78	97.	-3.	-0.001	525.00	-1.446E-01	
EU-154	123.10	82.	4.	0.002	369.41	1.333E-01	
PA-234	131.29	96.	10.	0.006	139.33	8.984E-01	P
HF-181	133.02	106.	11.	0.006	139.12	3.951E-01	P
CE-144	133.54	117.	11.	0.006	143.06	1.573E+00	
HF-181	136.30	128.	11.	0.006	148.84	3.016E+00	
CO-57	136.47	174.	-13.	-0.007	142.95	-1.999E+00	
Tc-99m	140.51	122.	11.	0.006	142.96	2.101E-01	
CE-141	145.44	74.	-10.	-0.006	148.36	-3.506E-01	P
Ba-140	162.66	126.	-14.	-0.008	113.45	-4.128E+00	
U-235	163.38	140.	-6.	-0.003	301.47	-1.979E+00	
CE-139	165.85	100.	12.	0.007	119.41	2.707E-01	
Cf-251	176.60	70.	-15.	-0.008	105.24	-1.605E+00	
U-235	185.72	37.	31.	0.017	38.75	1.130E+00	
TH-229	193.51	60.	-11.	-0.006	128.89	-5.035E+00	
U-235	205.33	50.	-8.	-0.004	161.21	-3.378E+00	
TH-229	210.85	67.	-6.	-0.003	259.82	-4.098E+00	
Cf-251	227.00	27.	10.	0.005	101.94	3.469E+00	
EU-152	244.69	214.	-13.	-0.007	89.45	-4.054E+00	P
TH-227	256.24	40.	-4.	-0.002	278.36	-1.573E+00	
Cd-113m	263.70	64.	-12.	-0.007	97.98	-5.238E+03	
BI-210M	265.83	64.	8.	0.005	138.58	4.407E-01	
TL-208	277.28	25.	9.	0.005	88.51	3.720E+00	
Hg-203	279.20	54.	-4.	-0.002	288.37	-1.223E-01	
I-131	284.30	37.	-6.	-0.003	181.06	-2.817E+00	P
TL-210	296.00	200.	5.	0.003	416.46	1.752E-01	
PA-233	312.01	189.	10.	0.005	204.03	8.023E-01	
Ir-192	316.49	25.	8.	0.005	93.11	2.850E-01	
CR-51	320.08	64.	-11.	-0.006	180.76	-3.429E+00	P
La-140	328.76	37.	-3.	-0.001	429.21	-4.105E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	333.44	15.	6.	0.004	119.90	1.291E+00	
Cs-136	340.57	135.	-13.	-0.007	129.84	-8.899E-01	
EU-152	344.29	122.	-13.	-0.007	123.39	-1.594E+00	
HF-181	345.83	75.	8.	0.005	151.82	1.793E+00	P
BA-133	356.00	126.	-11.	-0.006	151.02	-5.774E-01	
I-131	364.48	30.	-4.	-0.002	277.08	-1.516E-01	P
BA-133	383.84	66.	-4.	-0.002	333.81	-1.391E+00	
SN-113	391.69	15.	8.	0.004	99.29	4.418E-01	
SB-125	427.88	12.	7.	0.004	109.76	8.751E-01	P
AG-108M	433.94	8.	13.	0.007	52.22	5.530E-01	P
pm-146	453.88	4.	4.	0.002	123.50	2.278E-01	P
SB-125	463.37	29.	1.	0.001	809.27	3.774E-01	P
Ir-192	468.06	30.	1.	0.001	781.02	8.102E-02	
BE-7	477.59	50.	-11.	-0.006	95.29	-4.489E+00	
La-140	487.02	44.	-14.	-0.008	96.64	-1.332E+00	
RU-103	497.05	8.	6.	0.003	100.81	2.913E-01	
RH-106	511.86	20.	48.	0.026	27.99	1.076E+01	
Nd-147	531.00	28.	-9.	-0.005	119.84	-3.225E+00	
CS-134	563.24	4.	10.	0.006	50.33	5.860E+00	
CS-134	569.32	8.	6.	0.004	74.72	2.030E+00	
TL-208	583.02	12.	8.	0.004	93.85	4.659E-01	
SB-125	600.50	125.	4.	0.002	434.94	1.060E+00	
RH-106	621.92	148.	-10.	-0.006	169.16	-5.542E+00	
SB-125	635.89	0.	11.	0.006	30.61	5.232E+00	P
I-131	636.97	27.	-8.	-0.005	41.24	-6.395E+00	P
AG-110M	657.76	32.	-12.	-0.006	74.94	-6.829E-01	
CS-137	661.66	37.	4.	0.002	232.97	2.479E-01	P
PM-144	696.54	26.	-12.	-0.007	92.28	-7.014E-01	
NB-94	702.63	48.	-16.	-0.009	90.76	-9.708E-01	
SB-124	722.79	43.	-12.	-0.007	82.06	-6.729E+00	
BI-212	727.17	42.	10.	0.005	97.74	7.926E+00	
pm-146	735.72	14.	2.	0.001	305.71	6.759E-01	P
pm-146	747.16	22.	-8.	-0.004	129.09	-1.397E+00	
ZR-95	756.73	13.	9.	0.005	91.73	9.952E-01	P
AG-110M	763.94	21.	-5.	-0.003	129.90	-1.511E+00	
NB-95	765.79	34.	-6.	-0.003	142.72	-3.804E-01	
PA-234M	766.41	40.	1.	0.001	776.96	2.512E+01	
EU-152	778.92	14.	2.	0.001	403.11	9.918E-01	
BI-212	785.42	19.	4.	0.002	216.89	2.188E+01	
CS-134	795.87	26.	-2.	-0.001	483.05	-1.146E-01	
CS-134	801.95	46.	-12.	-0.006	88.03	-8.718E+00	
CO-58	810.78	20.	-3.	-0.001	310.65	-1.714E-01	P
Cs-136	818.50	5.	5.	0.003	98.47	3.477E-01	
MN-54	834.85	14.	-3.	-0.002	270.80	-2.041E-01	
Co-56	846.77	14.	-2.	-0.001	403.11	-1.377E-01	
TL-208	860.56	9.	6.	0.003	122.29	3.174E+00	P
NB-94	871.10	12.	8.	0.004	74.35	5.331E-01	
EU-154	873.23	32.	-10.	-0.006	84.53	-5.884E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	880.53	21.	-2.	-0.001	393.45	-1.976E+00		
Sc-46	889.28	12.	5.	0.003	101.11	3.867E-01		
y-88	898.04	23.	-5.	-0.003	196.95	-4.116E-01		
AG-110M	937.49	23.	-12.	-0.007	87.74	-2.693E+00		
PA-234	946.02	14.	2.	0.001	403.11	1.127E+00		
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00		
PA-234M	1001.00	17.	5.	0.003	126.39	4.630E+01		P
EU-154	1004.77	33.	-6.	-0.003	148.03	-2.513E+00		
Co-56	1037.84	0.	8.	0.004	36.94	4.500E+00		P
Cs-136	1048.07	10.	3.	0.002	159.86	3.087E-01		
RH-106	1050.36	10.	6.	0.003	85.69	3.073E+01		
BI-207	1063.66	5.	6.	0.003	93.70	6.541E-01		
FE-59	1099.25	30.	-13.	-0.007	22.63	-2.021E+00		P
EU-152	1112.07	15.	15.	0.008	45.70	9.269E+00		
CO-60	1173.24	16.	-3.	-0.001	168.14	-2.282E-01		P
Ta-182	1189.05	25.	-12.	-0.007	96.04	-6.780E+00		
Co-56	1238.28	27.	-7.	-0.004	62.48	-9.870E-01		P
NA-22	1274.53	11.	3.	0.002	149.00	3.237E-01		
TL-210	1313.00	0.	7.	0.004	37.80	3.317E+00		
AG-110M	1384.30	5.	-1.	-0.001	403.11	-5.711E-01		
EU-152	1408.00	0.	5.	0.003	44.72	2.512E+00		
La-140	1596.21	0.	7.	0.004	38.89	8.456E-01		P
SB-124	1690.98	6.	-3.	-0.002	95.02	-7.558E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.4891E+00	-4.4892E+00	9.529E+01%	1.45E+01
NA-22	#A	3.2367E-01	3.2367E-01	1.490E+02%	1.74E+00
K-40		1.4478E+02	1.4478E+02	8.647E+00%	1.24E+01
Sc-46	#A	3.8674E-01	3.8674E-01	1.011E+02%	1.36E+00
CR-51	#A	-3.4292E+00	-3.4292E+00	1.808E+02%	1.23E+01
MN-54	#A	-2.0408E-01	-2.0408E-01	2.708E+02%	1.37E+00
FE-59	#A	-2.0211E+00	-2.0211E+00	2.263E+01%	4.30E+00
Co-56	#A	4.3673E-01	4.3673E-01	3.694E+01%	1.39E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.91E-01
CO-58	#A	-1.7137E-01	-1.7137E-01	3.107E+02%	1.56E+00
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.43E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.81E+00
NB-94	#A	-9.7081E-01	-9.7081E-01	9.076E+01%	2.10E+00
ZR-95	#A	9.9522E-01	9.9523E-01	9.173E+01%	2.25E+00
NB-95	#A	-3.8039E-01	-3.8039E-01	1.427E+02%	1.89E+00
RU-103	#A	2.9131E-01	2.9131E-01	1.008E+02%	7.71E-01
RH-106	#A	-6.1663E-01	-6.1663E-01	8.569E+01%	3.18E+01

AG-108M#A	5.5299E-01	5.5299E-01	5.222E+01%	7.02E-01
AG-110M#A	0.0000E+00	0.0000E+00	1.000E+03%	2.43E+00
SN-113 #A	4.4179E-01	4.4179E-01	9.929E+01%	1.17E+00
SB-124 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.93E+00
SB-125 #A	1.7697E+00	1.7697E+00	3.061E+01%	2.51E+00
I-131 #A	-1.5161E-01	-1.5162E-01	2.771E+02%	1.17E+00
Gd-153 #A	4.8470E-01	4.8470E-01	1.146E+02%	2.19E+00
Ga-68 #	4.1537E+01	4.2000E+01	2.673E+01%	2.21E+01
Tc-99m #A	2.0962E-01	2.1005E-01	1.430E+02%	1.02E+00
BA-133 #A	-5.7742E-01	-5.7742E-01	1.510E+02%	2.96E+00
CS-134 #A	6.6044E-01	6.6044E-01	5.033E+01%	2.96E+00
CS-137 #A	2.4792E-01	2.4792E-01	2.330E+02%	2.03E+00
CE-139 #A	2.7074E-01	2.7074E-01	1.194E+02%	1.09E+00
Ba-140 #A	-5.6335E-02	-5.6337E-02	2.652E+03%	4.15E+00
La-140 #A	8.4560E-01	8.4563E-01	3.889E+01%	9.06E-01
CE-141 #A	-3.5056E-01	-3.5057E-01	1.484E+02%	1.47E+00
CE-144 #A	1.5728E+00	1.5729E+00	1.431E+02%	7.64E+00
PM-144 #A	-7.0136E-01	-7.0136E-01	9.228E+01%	1.56E+00
EU-152 #A	1.8285E+00	1.8285E+00	4.570E+01%	6.65E+00
EU-154 #A	-5.8838E+00	-5.8838E+00	8.453E+01%	1.68E+01
EU-155 #A	7.7440E-01	7.7440E-01	1.726E+02%	4.53E+00
HF-181 #A	3.9941E-01	3.9942E-01	1.391E+02%	1.96E+00
Ta-182 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.12E+00
Hg-203 #A	-1.2234E-01	-1.2234E-01	2.884E+02%	1.23E+00
TL-208 #A	9.9065E-01	9.9065E-01	5.925E+01%	1.12E+00
pm-146 #A	-1.3974E+00	-1.3974E+00	1.291E+02%	4.45E+00
y-88 #A	-4.1155E-01	-4.1155E-01	1.969E+02%	1.95E+00
Cd-113m#A	-5.2384E+03	-5.2384E+03	9.798E+01%	1.73E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.43E+01
Cf-251 #A	-1.6046E+00	-1.6046E+00	1.052E+02%	4.58E+00
Cf-249 #A	2.6031E-01	2.6031E-01	1.199E+02%	2.12E+00
Sn-126 #A	-5.5404E-01	-5.5404E-01	5.929E+02%	1.13E+01
PB-210 #A	1.9957E+01	1.9957E+01	4.620E+01%	2.48E+01
PB-212 #	4.2898E+00	4.2898E+00	1.445E+01%	1.40E+00
PB-214	6.4941E+00	6.4941E+00	1.359E+01%	1.48E+00
BI-207 #A	2.8292E-01	2.8292E-01	9.370E+01%	1.05E+00
BI-212 #A	7.9262E+00	7.9262E+00	9.774E+01%	2.63E+01
U-235 #A	-1.5590E-01	-1.5590E-01	1.451E+03%	8.52E+00
BI-214	5.5370E+00	5.5370E+00	1.911E+01%	1.99E+00
BI-210M#A	4.4072E-01	4.4072E-01	1.386E+02%	2.09E+00
AC-228	6.6531E+00	6.6531E+00	1.523E+01%	1.86E+00
TH-227 #A	2.7617E+00	2.7617E+00	1.586E+02%	1.28E+01
TH-229 #A	-5.0352E+00	-5.0352E+00	1.289E+02%	1.78E+01
TH-234 #A	9.4619E+00	9.4619E+00	7.760E+01%	2.43E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	7.03E+01
PA-233 #A	8.0233E-01	8.0233E-01	2.040E+02%	5.55E+00
PA-234 #A	9.9611E-01	9.9611E-01	1.393E+02%	4.26E+00
PA-234M#A	4.0796E+01	4.0796E+01	1.264E+02%	2.05E+02
AM-241 #A	3.3267E-01	3.3267E-01	2.399E+02%	2.36E+00

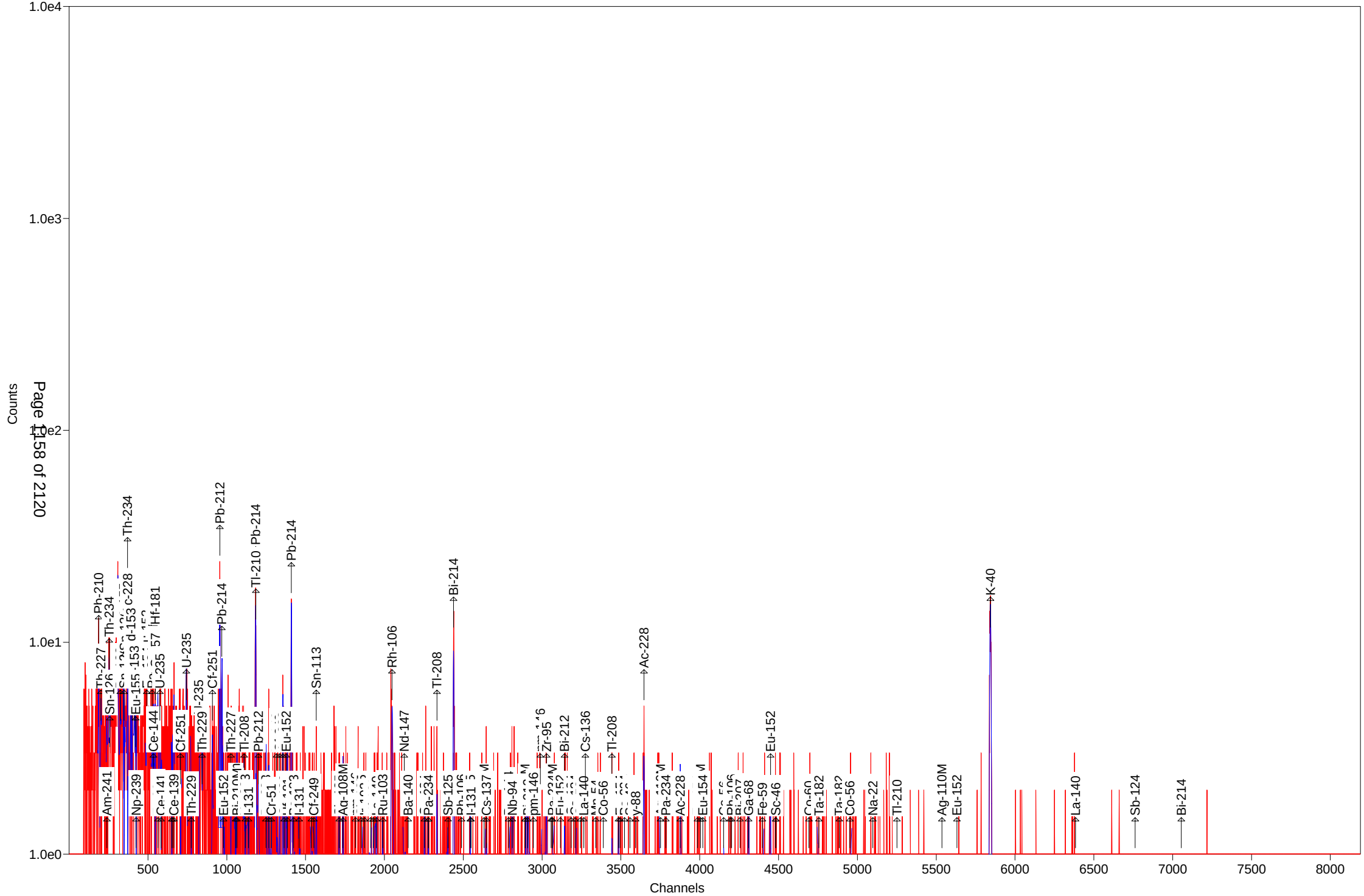
Np-237 #A	-1.9726E+00	-1.9726E+00	1.631E+02%	1.08E+01
Ir-192 #A	2.8497E-01	2.8497E-01	9.311E+01%	9.05E-01
Cs-136 #A	3.3038E-01	3.3039E-01	9.388E+01%	8.55E-01
Np-239 #A	-8.6610E-01	-8.6629E-01	1.620E+02%	4.74E+00
Nd-147 #A	-3.2247E+00	-3.2248E+00	1.198E+02%	9.81E+00
TL-210 #A	7.7780E-02	7.7780E-02	4.165E+02%	1.78E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 1.877E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.8770822E+02 Bq/Sample

379951_Gamma_160-29881-A-14-B. 5_Gamma_20182908.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181528

Sample Description: 379951_Gamma_160-29881-A-15-B
Detector: Detector #12
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-15-B

Decay to Time: 8/23/2018 07:09 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:09:56 Real Time: 1801 sec
Analysis Time: 8/23/2018 07:40 Dead Time: 0.07 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.081E+00	389.6	4.212E+00	4.213E+00	1.462E+01
NA-22	4.683E-02	724.6	3.393E-01	3.393E-01	1.292E+00
K-40	1.281E+02	7.6	9.685E+00	1.165E+01	5.395E+00
Sc-46	-5.112E-01	134.2	6.860E-01	6.864E-01	2.339E+00
CR-51	4.200E+00	203.5	8.545E+00	8.548E+00	2.864E+01
MN-54	1.200E-01	398.2	4.777E-01	4.777E-01	1.174E+00
FE-59	1.073E+00	62.2	6.678E-01	6.700E-01	1.993E+00
Co-56	0.000E+00	1.#INF	1.643E-01	1.643E-01	1.467E+00
CO-57	2.882E-01	163.8	4.720E-01	4.722E-01	1.290E+00
CO-58	-5.060E-01	111.4	5.635E-01	5.641E-01	1.917E+00
CO-60	-5.087E-01	143.2	7.285E-01	7.289E-01	1.593E+00
ZN-65	-9.740E-02	1681.4	1.638E+00	1.638E+00	5.724E+00
NB-94	-7.980E-01	91.5	7.303E-01	7.314E-01	1.673E+00
ZR-95	8.792E-02	1126.9	9.908E-01	9.908E-01	2.406E+00
NB-95	2.904E-01	209.5	6.083E-01	6.085E-01	2.097E+00
RU-103	1.160E-01	350.1	4.063E-01	4.063E-01	1.059E+00
RH-106	2.080E+00	75.6	1.573E+00	1.576E+00	4.248E+01
AG-108M	3.695E-01	96.1	3.551E-01	3.556E-01	8.956E-01
AG-110M	3.563E-01	85.1	3.030E-01	3.036E-01	2.949E+00
SN-113	-3.137E-01	237.7	7.457E-01	7.458E-01	2.549E+00
SB-124	4.622E-01	31.1	1.439E-01	1.459E-01	4.281E+00
SB-125	7.198E-01	79.0	5.684E-01	5.696E-01	3.253E+00
I-131	3.909E-01	100.7	3.937E-01	3.942E-01	9.881E-01
Gd-153	-1.047E+00	144.2	1.509E+00	1.511E+00	5.052E+00
Ga-68	1.982E+01	88.8	1.761E+01	1.764E+01	3.942E+01
Tc-99m	3.242E-01	166.4	5.394E-01	5.397E-01	1.808E+00
BA-133	-8.130E-01	178.0	1.447E+00	1.448E+00	4.847E+00
CS-134	5.865E-01	94.1	5.521E-01	5.529E-01	4.254E+00
CS-137	5.766E-01	82.8	4.773E-01	4.782E-01	1.606E+00
CE-139	-2.723E-01	163.7	4.458E-01	4.460E-01	1.504E+00
Ba-140	-2.355E+00	94.9	2.235E+00	2.239E+00	5.330E+00
La-140	7.105E-01	63.6	4.516E-01	4.531E-01	1.243E+00
CE-141	-6.639E-01	162.4	1.078E+00	1.079E+00	3.607E+00

CE-144	2.482E+00	159.6	3.962E+00	3.964E+00	1.328E+01
PM-144	-8.160E-01	91.7	7.483E-01	7.495E-01	1.712E+00
EU-152	-7.038E-01	247.3	1.740E+00	1.741E+00	5.939E+00
EU-154	-3.724E+00	110.1	4.101E+00	4.106E+00	1.402E+01
EU-155	1.336E+00	140.2	1.873E+00	1.874E+00	6.279E+00
HF-181	3.304E-01	114.3	3.776E-01	3.779E-01	1.960E+00
Ta-182	1.208E+00	22.4	2.702E-01	2.769E-01	8.152E+00
Hg-203	4.024E-01	114.0	4.587E-01	4.592E-01	1.546E+00
TL-208	2.663E+00	17.6	4.686E-01	4.878E-01	8.887E-01
pm-146	1.169E+00	83.6	9.767E-01	9.785E-01	2.365E+00
y-88	8.420E-01	28.9	2.431E-01	2.468E-01	1.362E+00
Cd-113m	-6.163E+03	93.9	5.789E+03	5.800E+03	1.941E+04
Cd-109	3.372E+00	398.0	1.342E+01	1.342E+01	4.516E+01
Cf-251	1.286E+00	160.7	2.067E+00	2.068E+00	5.340E+00
Cf-249	8.864E-01	78.3	6.943E-01	6.958E-01	2.241E+00
Sn-126	3.143E+00	179.9	5.652E+00	5.655E+00	1.897E+01
PB-210	4.023E+01	29.9	1.205E+01	1.231E+01	3.279E+01
PB-212	8.318E+00	9.5	7.922E-01	9.033E-01	1.728E+00
PB-214	2.814E+01	5.1	1.434E+00	2.023E+00	2.692E+00
BI-207	3.651E-01	98.6	3.600E-01	3.605E-01	1.247E+00
BI-212	0.000E+00	1.#INF	4.611E+00	4.611E+00	1.960E+01
U-235	3.669E-01	143.7	5.273E-01	5.276E-01	1.499E+01
BI-214	2.758E+01	6.4	1.776E+00	2.264E+00	1.868E+00
BI-210M	5.688E-01	115.9	6.593E-01	6.599E-01	2.228E+00
AC-228	1.149E+01	11.5	1.321E+00	1.444E+00	2.196E+00
TH-227	-6.094E+00	135.8	8.276E+00	8.284E+00	2.774E+01
TH-229	4.959E+00	156.3	7.751E+00	7.756E+00	2.007E+01
TH-234	1.190E+01	37.6	4.475E+00	4.525E+00	2.613E+01
PA-231	-1.442E+01	204.2	2.945E+01	2.946E+01	9.862E+01
PA-233	0.000E+00	1.#INF	1.678E-01	1.678E-01	7.958E+00
PA-234	1.156E-01	144.6	1.672E-01	1.673E-01	6.697E+00
PA-234M	6.102E+01	73.8	4.500E+01	4.511E+01	2.774E+02
AM-241	1.167E+00	129.8	1.514E+00	1.516E+00	5.068E+00
Np-237	2.637E+00	159.6	4.208E+00	4.211E+00	1.407E+01
Ir-192	5.802E-01	99.6	5.777E-01	5.787E-01	3.139E+00
Cs-136	5.639E-01	94.2	5.310E-01	5.320E-01	1.796E+00
Np-239	1.248E+00	137.9	1.721E+00	1.722E+00	5.769E+00
Nd-147	1.421E+00	212.9	3.025E+00	3.026E+00	7.523E+00
TL-210	-2.753E-01	240.2	6.614E-01	6.615E-01	2.281E+00
Total	3.836E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-15-B

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181528.An1

Acquisition information

Start time:	8/23/2018 7:09:56 AM
Live time:	1800
Real time:	1801
Dead time:	0.07 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:09:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1419

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.51	56.	29.95	1.04	1.803E-02	46.54	4.250	4.023E+01	PB210
59.54	21.	129.78	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
63.40	30.	62.65	0.57	2.982E-02	63.29	3.810	PBC<MDA	TH234
					64.28	9.700	5.625E+00	Sn126
74.53	156.	13.46	0.88	3.323E-02				
77.11	212.	10.16	0.88	3.383E-02				
87.21	72.	29.69	1.00	3.570E-02	86.49	13.100	8.619E+00	Np237
					86.54	30.700	3.677E+00	EU155
					86.94	9.040	1.247E+01	Sn126
					87.57	37.500	2.998E+00	Sn126
					88.04	3.790	2.960E+01	Cd109
92.35	40.	44.20	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
93.11	24.	142.43	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
103.70	19.	144.15	0.91	3.720E-02	103.70	24.000	PBC<MDA	Np239
105.31	19.	140.17	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	137.85	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
123.10	20.	95.93	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
133.16	10.	114.28	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.362E+00	CE144
133.54	18.	159.63	0.94	3.670E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	2.482E+00	CE144
136.44	18.	160.38	0.94	3.652E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.598E+00	CO57
136.47	18.	163.76	0.94	3.651E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.598E+00	CO57
140.51	18.	166.37	0.95	3.623E-02	140.51	89.300	PBC<MDA	Tc99m
176.42	13.	160.71	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
186.03	80.	22.71	0.58	3.212E-02	185.72	54.000	PBC<MDA	U235
193.51	12.	156.31	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	14.	143.73	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
226.31	6.	295.33	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.47	178.	9.50	1.05	2.744E-02	238.63	43.300	8.346E+00	PB212
241.67	103.	14.83	1.05	2.719E-02	242.00	7.430	2.714E+01	PB214
265.83	13.	115.90	1.07	2.539E-02	265.83	50.000	PBC<MDA	BI210M
279.20	14.	113.99	1.09	2.449E-02	279.20	81.460	PBC<MDA	Hg203
294.85	244.	8.10	0.99	2.351E-02	295.09	19.300	2.994E+01	PB214
316.49	17.	197.54	1.12	2.229E-02	316.49	87.040	PBC<MDA	Ir192
319.98	17.	203.47	1.13	2.210E-02	320.08	9.940	PBC<MDA	CR51
328.76	15.	91.62	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
333.44	13.	106.77	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
338.10	62.	17.26	0.84	2.118E-02	338.32	12.010	1.354E+01	AC228
351.69	372.	6.58	1.31	2.056E-02	351.93	37.600	2.678E+01	PB214
364.48	11.	100.72	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
383.84	13.	108.17	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	13.	114.64	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
433.94	11.	96.10	1.24	1.751E-02	433.94	90.480	PBC<MDA	AG108M
453.88	4.	164.04	1.26	1.692E-02	453.88	65.000	PBC<MDA	pm146
463.37	12.	78.96	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	12.	99.58	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	3.	389.61	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
487.02	10.	109.36	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
497.05	3.	350.13	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	90.	19.52	2.56	1.546E-02	511.86	20.000	1.611E+01	RH106
531.00	5.	212.92	1.33	1.504E-02	531.00	13.000	PBC<MDA	Nd147
563.24	4.	264.97	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
569.70	9.	98.59	1.37	1.427E-02	569.32	15.380	2.361E+00	CS134
					569.47	8.200	4.429E+00	PA234
					569.70	97.740	3.717E-01	BI207
583.32	57.	17.60	1.26	1.403E-02	583.02	84.500	2.663E+00	TL208
609.14	306.	6.71	1.36	1.359E-02	609.31	46.090	2.712E+01	BI214
					610.30	5.750	2.176E+02	RU103
635.89	4.	141.42	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	335.44	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
661.66	11.	82.77	1.45	1.279E-02	661.66	85.210	PBC<MDA	CS137
722.79	24.	31.15	1.51	1.199E-02	722.79	10.810	1.014E+01	SB124
					722.94	90.840	1.207E+00	AG108M
					723.36	20.220	5.424E+00	EU154
735.72	7.	130.32	1.52	1.184E-02	735.72	22.500	PBC<MDA	pm146
747.16	7.	104.64	1.53	1.171E-02	747.16	34.000	PBC<MDA	pm146
765.79	6.	209.50	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	9.862E+01	PA234M
766.41	14.	73.76	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.347E+02	PA234M
785.42	3.	378.59	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
801.95	14.	94.13	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
818.50	11.	94.16	1.60	1.096E-02	818.50	100.000	PBC<MDA	Cs136
834.85	2.	398.21	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
860.50	16.	50.13	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
871.10	8.	65.41	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
898.04	9.	114.22	1.67	1.025E-02	898.04	93.700	PBC<MDA	y88
911.00	56.	15.21	0.99	1.015E-02	911.07	29.000	1.064E+01	AC228
946.02	4.	218.66	1.72	9.873E-03	946.02	13.400	PBC<MDA	PA234
969.15	6.	232.22	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
1050.36	6.	75.61	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	4.	275.10	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	9.	88.84	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	9.	87.98	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1120.04	63.	12.60	1.73	8.722E-03	1120.29	15.100	2.657E+01	BI214
					1120.55	99.987	4.014E+00	Sc46
1189.05	2.	324.82	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	20.	22.36	1.96	8.175E-03	1221.41	27.000	5.034E+00	Ta182
1274.53	1.	724.57	2.00	7.914E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.330E-01	EU154
1291.60	7.	88.04	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1384.30	7.	85.05	2.10	7.423E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	7.	92.58	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1461.01	175.	7.56	1.68	7.112E-03	1460.83	10.670	1.281E+02	K40
1596.21	5.	126.49	2.27	6.616E-03	1596.21	95.400	PBC<MDA	La140
1764.22	57.	13.25	2.40	6.075E-03	1764.49	15.400	3.385E+01	BI214
1836.06	12.	28.87	2.46	5.866E-03	1836.06	99.200	1.146E+00	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.69	74.44	142.	156.	4.690E+03	13.46	0.880	- sD
307.98	77.02	125.	212.	6.262E+03	10.16	0.882	- D
743.41	186.03	72.	80.	2.506E+03	22.71	0.583	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.68	46.51	83.	56.	0.031	29.95	1.038s
TH-227	200.18	50.14	332.	-19.	-0.011	135.80	0.855s
AM-241	237.74	59.54	369.	21.	0.012	129.78	0.865
TH-234	252.74	63.29	118.	27.	0.015	60.82	0.868D
Sn-126	256.71	64.28	434.	17.	0.009	179.86	0.869s
BA-133	323.50	80.99	200.	-3.	-0.002	840.85	0.887s
Np-237	345.49	86.49	613.	22.	0.012	159.59	0.892A
EU-155	345.70	86.54	655.	-25.	-0.014	148.46	0.892s
Sn-126	347.29	86.94	591.	18.	0.010	99.59	0.892D
Sn-126	349.81	87.57	509.	58.	0.032	29.35	0.893D
Cd-109	351.68	88.04	533.	8.	0.005	397.98	0.894A
Nd-147	363.92	91.10	555.	0.	0.000	1000.00	0.897s
TH-234	369.87	92.59	138.	40.	0.022	44.20	0.898D
AC-228	372.91	93.35	552.	24.	0.013	142.43	0.899s
Gd-153	389.50	97.50	440.	-21.	-0.012	144.16	0.903s
Np-239	397.50	99.50	461.	-7.	-0.004	424.46	0.905s
Gd-153	412.29	103.20	468.	0.	0.000	1000.00	0.909s
Np-239	414.29	103.70	364.	19.	0.011	144.15	0.909s
EU-155	420.73	105.31	345.	19.	0.011	140.17	0.911s
Np-239	424.00	106.13	334.	19.	0.011	137.85	0.912s
EU-152	486.55	121.78	220.	-14.	-0.008	152.19	0.928
CO-57	487.69	122.06	234.	0.	0.000	1000.00	0.928
EU-154	491.84	123.10	172.	20.	0.011	95.93	0.929s
PA-234	524.60	131.29	275.	-13.	-0.007	189.35	0.938s
HF-181	531.51	133.02	60.	10.	0.006	114.28	0.939D
CE-144	533.57	133.54	412.	18.	0.010	159.63	0.940
HF-181	544.61	136.30	419.	18.	0.010	160.38	0.943s
CO-57	545.30	136.47	437.	18.	0.010	163.76	0.943s
Tc-99m	561.44	140.51	455.	18.	0.010	166.37	0.947s
U-235	574.53	143.79	495.	-12.	-0.007	254.68	0.950s
CE-141	581.15	145.44	552.	-21.	-0.011	162.37	0.952
Ba-140	649.99	162.66	222.	-20.	-0.011	108.03	0.969s
U-235	652.87	163.38	242.	-3.	-0.002	803.84	0.970
CE-139	662.76	165.85	232.	-13.	-0.007	163.75	0.973s
Cf-251	705.72	176.60	121.	13.	0.007	160.71	0.983s
U-235	742.18	185.72	239.	-38.	-0.021	49.84	0.992s
TH-229	773.32	193.51	103.	12.	0.007	156.31	1.000s
U-235	820.59	205.33	106.	14.	0.008	143.73	1.012s
TH-229	842.65	210.85	143.	-22.	-0.012	103.51	1.018
Cf-251	907.22	227.00	88.	6.	0.003	295.33	1.034s
PB-212	953.73	238.63	54.	178.	0.099	9.52	1.045D
PB-214	967.18	242.00	70.	93.	0.052	16.38	1.049D
EU-152	977.96	244.69	510.	-20.	-0.011	163.83	1.051s
TH-227	1024.13	256.24	84.	-16.	-0.009	108.06	1.063s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-113m	1053.96	263.70	119.	-17.	-0.009	93.93	1.070s
BI-210M	1062.48	265.83	107.	13.	0.007	115.90	1.072s
TL-208	1108.27	277.28	119.	-18.	-0.010	86.90	1.084s
Hg-203	1115.93	279.20	128.	14.	0.008	113.99	1.086s
I-131	1136.32	284.30	77.	-8.	-0.004	208.23	1.091s
PB-214	1178.51	294.85	32.	251.	0.140	7.79	0.992s
TL-210	1183.11	296.00	690.	-17.	-0.010	218.14	1.102s
PB-212	1199.22	300.03	662.	-17.	-0.010	213.04	1.106s
PA-231	1199.38	300.07	645.	-17.	-0.010	210.30	1.106s
PA-233	1199.82	300.18	628.	-17.	-0.010	207.47	1.107s
PA-231	1209.70	302.65	611.	-17.	-0.010	204.19	1.109
Ba-140	1218.49	304.85	593.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	593.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	593.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	593.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	526.	17.	0.009	197.54	1.123s
CR-51	1279.41	320.08	562.	17.	0.009	203.47	1.126s
La-140	1314.10	328.76	84.	15.	0.008	91.62	1.135s
Cf-249	1332.81	333.44	92.	13.	0.007	106.77	1.139
AC-228	1351.44	338.10	15.	62.	0.034	17.26	0.844s
Cs-136	1361.32	340.57	246.	-18.	-0.010	126.82	1.146s
EU-152	1376.18	344.29	147.	-7.	-0.004	247.27	1.150s
HF-181	1382.35	345.83	187.	-16.	-0.009	119.87	1.151s
PB-214	1405.78	351.69	56.	372.	0.207	6.58	1.311
BA-133	1423.02	356.00	533.	-18.	-0.010	178.02	1.162
I-131	1456.95	364.48	32.	11.	0.006	100.72	1.170s
BA-133	1534.35	383.84	93.	13.	0.007	108.17	1.189
Cf-249	1550.79	387.95	106.	13.	0.007	114.64	1.193s
SN-113	1565.74	391.69	129.	-7.	-0.004	237.72	1.196s
SB-125	1710.45	427.88	36.	-6.	-0.003	200.00	1.232
AG-108M	1734.69	433.94	24.	11.	0.006	96.10	1.238s
pm-146	1814.45	453.88	8.	4.	0.002	164.04	1.257s
SB-125	1852.39	463.37	37.	12.	0.006	78.96	1.266s
Ir-192	1871.16	468.06	62.	12.	0.006	99.58	1.271
BE-7	1909.29	477.60	83.	3.	0.002	389.61	1.280s
HF-181	1926.90	482.00	86.	0.	0.000	1000.00	1.284s
La-140	1946.98	487.02	55.	10.	0.006	109.36	1.289s
RU-103	1987.11	497.05	28.	3.	0.002	350.13	1.298s
RH-106	2046.35	511.86	33.	90.	0.050	19.52	2.563s
Nd-147	2122.88	531.00	26.	5.	0.003	212.92	1.331s
Ba-140	2147.92	537.26	48.	-15.	-0.009	94.91	1.337s
CS-134	2251.82	563.24	26.	4.	0.002	264.97	1.362s
CS-134	2276.15	569.32	45.	-5.	-0.003	194.94	1.367s
PA-234	2276.75	569.47	50.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	38.	9.	0.005	98.59	1.368s
TL-208	2332.16	583.32	12.	57.	0.032	17.60	1.256
SB-125	2400.87	600.50	484.	-15.	-0.008	215.12	1.397s
SB-124	2409.79	602.73	469.	-15.	-0.008	211.58	1.399

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	2417.71	604.71	455.	-4.	-0.002	788.24	1.401
BI-214	2435.44	609.14	16.	314.	0.175	6.44	1.365
AG-108M	2455.99	614.28	451.	0.	0.000	1000.00	1.410s
PM-144	2471.12	618.06	505.	-18.	-0.010	180.85	1.414s
RH-106	2486.54	621.92	450.	-3.	-0.002	872.67	1.417s
SB-125	2542.43	635.89	14.	4.	0.002	141.42	1.430s
I-131	2546.77	636.97	25.	-4.	-0.002	198.55	1.432s
AG-110M	2629.92	657.76	55.	3.	0.002	335.44	1.451s
CS-137	2645.51	661.66	38.	11.	0.006	82.77	1.455s
PM-144	2785.05	696.54	56.	-18.	-0.010	91.71	1.487s
NB-94	2809.41	702.63	51.	-17.	-0.010	91.51	1.493s
SB-124	2890.04	722.79	15.	24.	0.013	31.15	1.512s
AG-108M	2890.65	722.94	39.	0.	0.000	1000.00	1.512s
EU-154	2892.32	723.36	39.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	39.	0.	0.000	1000.00	1.513s
BI-212	2907.58	727.17	39.	0.	0.000	1000.00	1.516s
pm-146	2941.78	735.72	19.	7.	0.004	130.32	1.524s
pm-146	2987.55	747.16	9.	7.	0.004	104.64	1.535s
AG-110M	3054.69	763.94	70.	-10.	-0.006	122.47	1.550s
NB-95	3062.08	765.79	76.	6.	0.003	209.50	1.552s
PA-234M	3064.57	766.41	48.	14.	0.008	73.76	1.552s
EU-152	3114.61	778.92	47.	-17.	-0.010	87.66	1.564s
BI-212	3140.62	785.42	28.	3.	0.002	378.59	1.570s
CS-134	3182.42	795.87	68.	-16.	-0.009	79.25	1.579s
TL-210	3197.35	799.60	84.	-5.	-0.003	240.22	1.583s
CS-134	3206.76	801.95	74.	14.	0.008	94.13	1.585s
CO-58	3242.06	810.78	57.	-10.	-0.006	111.36	1.593s
La-140	3262.05	815.77	67.	0.	0.000	1000.00	1.598s
Cs-136	3272.97	818.50	49.	11.	0.006	94.16	1.600s
MN-54	3338.38	834.85	19.	2.	0.001	398.21	1.615s
Co-56	3386.08	846.77	30.	0.	0.000	1000.00	1.626s
TL-208	3441.27	860.56	10.	16.	0.009	50.13	1.638s
NB-94	3483.41	871.10	10.	8.	0.005	65.41	1.648s
EU-154	3491.95	873.23	41.	-9.	-0.005	110.14	1.650s
PA-234	3521.16	880.53	52.	-12.	-0.006	93.86	1.657s
PA-234	3532.00	883.24	64.	0.	0.000	1000.00	1.659s
AG-110M	3537.78	884.68	64.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	76.	-10.	-0.005	134.18	1.664s
y-88	3591.22	898.04	20.	9.	0.005	114.22	1.672
AC-228	3643.09	911.00	4.	56.	0.031	15.21	0.991s
AG-110M	3749.09	937.49	50.	-19.	-0.010	85.91	1.708s
PA-234	3783.21	946.02	15.	4.	0.002	218.66	1.716s
EU-152	3855.60	964.11	74.	-15.	-0.009	83.52	1.732s
AC-228	3875.05	968.97	89.	6.	0.003	232.22	1.736
EU-154	3984.54	996.33	51.	-12.	-0.007	90.03	1.761s
PA-234M	4003.22	1001.00	63.	0.	0.000	1000.00	1.765s
EU-154	4018.33	1004.77	75.	-10.	-0.006	124.35	1.768s
Co-56	4150.66	1037.84	27.	-4.	-0.002	324.36	1.798s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cs-136	4191.60	1048.07	25.	-1.	-0.001	540.83	1.807s
RH-106	4200.76	1050.36	8.	6.	0.003	75.61	1.809s
BI-207	4253.99	1063.66	27.	4.	0.002	275.10	1.820s
Ga-68	4308.98	1077.40	11.	9.	0.005	88.84	1.833
FE-59	4396.44	1099.25	11.	9.	0.005	87.98	1.852s
EU-152	4447.76	1112.07	96.	-11.	-0.006	127.01	1.863s
BI-214	4479.65	1120.04	0.	63.	0.035	12.60	1.732
Sc-46	4481.68	1120.55	83.	-11.	-0.006	118.30	1.870
Ta-182	4484.69	1121.30	81.	-9.	-0.005	145.97	1.871s
CO-60	4692.57	1173.24	27.	-4.	-0.002	324.36	1.916s
Ta-182	4755.86	1189.05	11.	2.	0.001	324.82	1.930
Ta-182	4885.39	1221.41	0.	20.	0.011	22.36	1.957
Co-56	4952.92	1238.28	51.	-4.	-0.002	421.68	1.972s
NA-22	5098.03	1274.53	11.	1.	0.000	724.57	2.003s
EU-154	5098.09	1274.54	12.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	7.	0.004	88.04	2.017s
TL-210	5252.04	1313.00	17.	-5.	-0.003	198.49	2.036s
CO-60	5330.11	1332.50	17.	-7.	-0.004	143.21	2.052s
AG-110M	5537.48	1384.30	6.	7.	0.004	85.05	2.096s
EU-152	5632.39	1408.00	6.	7.	0.004	92.58	2.115s
K-40	5844.63	1461.01	0.	175.	0.097	7.56	1.682
La-140	6386.02	1596.21	6.	5.	0.003	126.49	2.269s
SB-124	6765.58	1690.98	0.	0.	0.000	1000.00	2.345s
BI-214	7060.00	1764.49	0.	57.	0.032	13.25	2.403
Co-56	7087.48	1771.35	57.	0.	0.000	1000.00	2.408s
y-88	7346.69	1836.06	0.	12.	0.007	28.87	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.0811E+00				5.31E+01	
			477.60	1.081E+00	?(	1.462E+01 3.90E+02 1.05E+01	G
NA-22	C	4.6828E-02				9.50E+02	
			1274.53	4.683E-02	?(	1.292E+00 7.25E+02 9.99E+01	G
K-40	N	1.2811E+02				4.66E+11	
			1460.83	1.281E+02	(	5.395E+00 7.56E+00 1.07E+01	G
Sc-46	F	-5.1120E-01				8.38E+01	
			889.28	-5.112E-01	?(	2.339E+00 1.34E+02 1.00E+02	G
			1120.55	-7.180E-01	+	2.881E+00 1.18E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	4.1997E+00					2.77E+01	
			320.08	4.200E+00	?(	2.864E+01	2.03E+02	9.94E+00 G
MN-54	C	1.1996E-01					3.12E+02	
			834.85	1.200E-01	?(	1.174E+00	3.98E+02	1.00E+02 G
FE-59	F	1.0731E+00					4.45E+01	
			1099.25	1.012E+00	&(	1.993E+00	8.80E+01	5.65E+01 G
			1291.60	1.152E+00	?(	2.266E+00	8.80E+01	4.32E+01 G
CO-57	C	2.8821E-01					2.72E+02	
			122.06	0.000E+00	?(	1.290E+00	1.00E+03	8.56E+01 G
			136.47	2.598E+00	?(	1.426E+01	1.64E+02	1.07E+01 G
CO-58	C	-5.0601E-01					7.09E+01	
			810.78	-5.060E-01	?(	1.917E+00	1.11E+02	9.95E+01 G
CO-60	F	-5.0865E-01					1.93E+03	
			1332.50	-5.087E-01	?(	1.593E+00	1.43E+02	1.00E+02 G
			1173.24	-2.420E-01	+	1.767E+00	3.24E+02	9.99E+01 G
ZN-65	F	-9.7399E-02					2.44E+02	
			1115.55	-9.740E-02	%(	5.724E+00	1.68E+03	5.06E+01 G
NB-94	I	-7.9800E-01					7.41E+06	
			702.63	-7.980E-01	?(	1.673E+00	9.15E+01	9.79E+01 G
			871.10	4.301E-01	+	9.257E-01	6.54E+01	9.99E+01 G
ZR-95	I	8.7922E-02					6.40E+01	
			756.73	8.792E-02	%(	2.406E+00	1.13E+03	5.45E+01 G
			724.20	0.000E+00	-	3.342E+00	1.00E+03	4.42E+01 G
NB-95	I	2.9039E-01					6.40E+01	
			765.79	2.904E-01	?(	2.097E+00	2.09E+02	9.98E+01 G
RU-103	I	1.1604E-01					3.93E+01	
			497.05	1.160E-01	?(	1.059E+00	3.50E+02	9.09E+01 G
			610.30	-2.173E-05	%	7.241E+01	9.84E+07	5.75E+00 GA
RH-106	I	2.0801E+00					3.74E+02	
			621.92	-1.441E+00	?(	4.248E+01	8.73E+02	9.93E+00 G
			1050.36	2.449E+01	?(	6.240E+01	7.56E+01	1.56E+00 G
			511.86	1.611E+01	@	5.322E+00	1.95E+01	2.00E+01 GA
AG-108M	C	3.6951E-01					1.53E+05	
			433.94	3.695E-01	?(	8.956E-01	9.61E+01	9.05E+01 G
			722.94	0.000E+00	-	1.622E+00	1.00E+03	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	0.000E+00	-	4.656E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.5630E-01					2.50E+02	
			884.68	0.000E+00	?(	2.949E+00	1.00E+03	7.27E+01 G
			657.76	1.447E-01	?(	1.701E+00	3.35E+02	9.46E+01 G
			937.49	-3.056E+00	+	5.802E+00	8.59E+01	3.44E+01 G
			1384.30	2.247E+00	?(	4.253E+00	8.51E+01	2.43E+01 G
			763.94	-2.164E+00	+	9.023E+00	1.22E+02	2.23E+01 G
SN-113	F	-3.1368E-01					1.15E+02	
			391.69	-3.137E-01	?(	2.549E+00	2.38E+02	6.40E+01 G
SB-124	F	4.6216E-01					6.02E+01	
			602.73	-6.026E-01	?(	4.281E+00	2.12E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.359E+00	1.00E+03	4.78E+01 G
			722.79	1.014E+01	?(	8.980E+00	3.11E+01	1.08E+01 G
SB-125	I	7.1984E-01					1.01E+03	
			427.88	-6.363E-01	?(	3.253E+00	2.00E+02	2.96E+01 G
			600.50	-3.301E+00	+	2.384E+01	2.15E+02	1.79E+01 G
			635.89	1.492E+00	?(	7.517E+00	1.41E+02	1.13E+01 G
			463.37	3.719E+00	&(	9.851E+00	7.90E+01	1.05E+01 G
I-131	I	3.9087E-01					8.02E+00	
			364.48	3.909E-01	?(	9.881E-01	1.01E+02	8.17E+01 G
			284.30	-2.996E+00	+	1.633E+01	2.08E+02	6.14E+00 G
			636.97	-2.161E+00	&	1.524E+01	1.99E+02	7.17E+00 G
Gd-153	F	-1.0469E+00					2.42E+02	
			97.50	-1.047E+00	*(	5.052E+00	1.44E+02	3.00E+01 G
			103.20	0.000E+00	+	7.097E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.9818E+01					4.71E-02	
			1077.40	1.982E+01	?(	3.942E+01	8.88E+01	3.30E+00 G
Tc-99m	I	3.2422E-01					2.51E-01	
			140.51	3.242E-01	?(	1.808E+00	1.66E+02	8.93E+01 G
BA-133	F	-8.1302E-01					3.85E+03	
			356.00	-8.130E-01	&(	4.847E+00	1.78E+02	6.20E+01 G
			302.85	-7.128E-02	%	1.529E+01	6.36E+03	1.83E+01 G
			383.84	4.222E+00	&	1.542E+01	1.08E+02	8.94E+00 GA
			80.99	-1.412E-01	&	3.229E+00	8.41E+02	3.41E+01 GA
CS-134	I	5.8653E-01					7.54E+02	
			604.71	-1.598E-01	&(	4.254E+00	7.88E+02	9.76E+01 G
			795.87	-9.018E-01	+	2.388E+00	7.93E+01	8.55E+01 G
			569.32	-1.265E+00	&	8.593E+00	1.95E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	7.757E+00	?(	2.459E+01	9.41E+01	8.69E+00 G
			563.24	1.849E+00	?(	1.224E+01	2.65E+02	8.35E+00 G
CS-137	I	5.7660E-01					1.10E+04	
			661.66	5.766E-01	(	1.606E+00	8.28E+01	8.52E+01 G
CE-139	F	-2.7226E-01					1.38E+02	
			165.85	-2.723E-01	?(	1.504E+00	1.64E+02	7.99E+01 G
Ba-140	I	-2.3554E+00					1.28E+01	
			537.26	-2.355E+00	?(	5.330E+00	9.49E+01	2.44E+01 G
			162.66	-5.181E+00	+	1.875E+01	1.08E+02	6.22E+00 G
			304.85	0.000E+00	&	6.562E+01	1.00E+03	4.29E+00 G
La-140	I	7.1053E-01					1.28E+01	
			1596.21	4.401E-01	?(	1.243E+00	1.26E+02	9.54E+01 G
			487.02	7.624E-01	?(	2.836E+00	1.09E+02	4.55E+01 G
			328.76	1.865E+00	?(	5.741E+00	9.16E+01	2.03E+01 G
			815.77	0.000E+00	-	8.871E+00	1.00E+03	2.33E+01 G
CE-141	I	-6.6393E-01					3.25E+01	
			145.44	-6.639E-01	(	3.607E+00	1.62E+02	4.82E+01 G
CE-144	I	2.4821E+00					2.85E+02	
			133.54	2.482E+00	(	1.328E+01	1.60E+02	1.11E+01 G
PM-144	C	-8.1597E-01					3.63E+02	
			696.54	-8.160E-01	?(	1.712E+00	9.17E+01	9.90E+01 G
			618.06	-7.390E-01	+	4.479E+00	1.81E+02	9.91E+01 G
EU-152	F	-7.0383E-01					4.94E+03	
			344.29	-7.038E-01	?(	5.939E+00	2.47E+02	2.65E+01 G
			1112.07	-5.211E+00	+	2.246E+01	1.27E+02	1.36E+01 G
			121.78	-7.306E-01	+	3.748E+00	1.52E+02	2.86E+01 G
			778.92	-6.497E+00	+	1.305E+01	8.77E+01	1.29E+01 G
			964.11	-5.989E+00	+	1.675E+01	8.35E+01	1.46E+01 G
			244.69	-5.351E+00	&	2.935E+01	1.64E+02	7.58E+00 G
			1408.00	2.528E+00	?	5.101E+00	9.26E+01	2.10E+01 GA
EU-154	I	-3.7237E+00					3.14E+03	
			873.23	-3.724E+00	?(	1.402E+01	1.10E+02	1.23E+01 G
			123.10	7.286E-01	+	2.339E+00	9.59E+01	4.08E+01 G
			1274.54	0.000E+00	+	3.761E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	7.291E+00	1.00E+03	2.02E+01 G
			1004.77	-3.319E+00	+	1.404E+01	1.24E+02	1.80E+01 G
			996.33	-6.523E+00	+	1.981E+01	9.00E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.3361E+00					1.81E+03	
			105.31	1.336E+00	@(	6.279E+00	1.40E+02	2.12E+01 G
			86.54	-1.251E+00	+	6.199E+00	1.48E+02	3.07E+01 G
HF-181	F	3.3037E-01					4.24E+01	
			482.00	0.000E+00	?(	1.960E+00	1.00E+03	8.05E+01 G
			133.02	3.485E-01	(	1.356E+00	1.14E+02	4.33E+01 G
			345.83	-2.920E+00	+	1.177E+01	1.20E+02	1.51E+01 G
			136.30	4.742E+00	?(	2.550E+01	1.60E+02	5.85E+00 G
Ta-182	F	1.2085E+00					1.14E+02	
			1121.30	-1.635E+00	?(	8.152E+00	1.46E+02	3.49E+01 G
			1221.41	5.034E+00	(	1.855E+00	2.24E+01	2.70E+01 G
			1189.05	9.592E-01	(	7.371E+00	3.25E+02	1.62E+01 G
Hg-203	F	4.0242E-01					4.66E+01	
			279.20	4.024E-01	?(	1.546E+00	1.14E+02	8.15E+01 G
TL-208	N	2.6627E+00					6.98E+02	
			583.02	2.663E+00	(P	8.887E-01	1.76E+01	8.45E+01 G
			277.28	-6.599E+00	-	1.918E+01	8.69E+01	6.31E+00 G
			860.56	6.768E+00	+	7.380E+00	5.01E+01	1.24E+01 G
pm-146	C	1.1688E+00					2.02E+03	
			747.16	9.303E-01	?(	2.365E+00	1.05E+02	3.40E+01 G
			735.72	1.529E+00	?(	4.763E+00	1.30E+02	2.25E+01 G
			453.88	1.802E-01	-	8.026E-01	1.64E+02	6.50E+01 G
y-88	F	8.4195E-01					1.07E+02	
			898.04	5.205E-01	&(	1.362E+00	1.14E+02	9.37E+01 G
			1836.06	1.146E+00	?(	7.036E-01	2.89E+01	9.92E+01 G
Cd-113m		-6.1626E+03					5.33E+03	
			263.70	-6.163E+03	?(	1.941E+04	9.39E+01	6.00E-03 K
Cd-109	F	3.3719E+00					4.53E+02	
							Derived Ave Activity	
			88.04	3.372E+00	}(	4.516E+01	3.98E+02	3.79E+00 G
Cf-251	T	1.2864E+00					3.28E+05	
			176.60	1.286E+00	?(	5.340E+00	1.61E+02	1.70E+01 G
			227.00	1.864E+00	&	1.442E+01	2.95E+02	6.30E+00 GA
Cf-249	T	8.8642E-01					1.28E+05	
			387.95	5.786E-01	&(	2.241E+00	1.15E+02	6.60E+01 G
			333.44	2.196E+00	?(	7.918E+00	1.07E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		3.1426E+00					3.65E+07	
			87.57	2.412E+00	}	4.471E+00	2.94E+01	3.75E+01 GA
			64.28	3.143E+00	?(	1.897E+01	1.80E+02	9.70E+00 G
			86.94	3.143E+00	}	1.999E+01	9.96E+01	9.04E+00 GA
PB-210	N	4.0228E+01					8.14E+03	
			46.54	4.023E+01	(P	3.279E+01	2.99E+01	4.25E+00 G
PB-212	N	8.3183E+00					6.98E+02	
			238.63	8.318E+00	(P	1.728E+00	9.52E+00	4.33E+01 G
			300.03	-1.255E+01	-	8.951E+01	2.13E+02	3.28E+00 GA
PB-214	N	2.8136E+01					5.84E+05	
			351.93	2.678E+01	(P	2.692E+00	6.58E+00	3.76E+01 G
			295.09	3.079E+01	@(	3.544E+00	7.79E+00	1.93E+01 G
			242.00	2.568E+01	P	1.146E+01	1.64E+01	7.43E+00 GA
BI-207	C	3.6513E-01					1.18E+04	
			569.70	3.717E-01	&(	1.247E+00	9.86E+01	9.77E+01 G
			1063.66	3.565E-01	&(	2.203E+00	2.75E+02	7.45E+01 G
U-235	N	3.6686E-01					2.57E+11	
			143.79	-1.752E+00	&(	1.499E+01	2.55E+02	1.10E+01 G
			205.33	5.002E+00	(	1.858E+01	1.44E+02	5.01E+00 G
			163.38	-8.747E-01	+	2.397E+01	8.04E+02	5.08E+00 G
			185.72	-1.218E+00	+ P	2.394E+00	4.98E+01	5.40E+01 GA
BI-214	N	2.7579E+01					5.84E+05	
			609.31	2.791E+01	(	1.868E+00	6.44E+00	4.61E+01 G
			1120.29	2.657E+01	(	3.109E+00	1.26E+01	1.51E+01 G
			1764.49	3.385E+01	+	4.376E+00	1.32E+01	1.54E+01 G
BI-210M	T	5.6884E-01					1.10E+09	
			265.83	5.688E-01	?(	2.228E+00	1.16E+02	5.00E+01 G
			304.90	0.000E+00	-	1.005E+01	1.00E+03	2.80E+01 G
AC-228	N	1.1486E+01					2.10E+03	
			911.07	1.064E+01	(	2.196E+00	1.52E+01	2.90E+01 G
			968.97	1.913E+00	-	1.529E+01	2.32E+02	1.75E+01 G
			338.32	1.354E+01	*(	4.533E+00	1.73E+01	1.20E+01 G
			93.35	6.463E+00	-	3.076E+01	1.42E+02	5.56E+00 XA
TH-227	N	-6.0940E+00					7.95E+03	
			50.14	-6.094E+00	?(	2.774E+01	1.36E+02	8.00E+00 G
			256.24	-4.971E+00	&	1.385E+01	1.08E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	4.9588E+00					2.68E+06	
			193.51	4.959E+00	(	2.007E+01	1.56E+02	4.40E+00 G
			210.85	-1.377E+01	&	3.644E+01	1.04E+02	2.99E+00 G
TH-234	N	1.1903E+01					1.63E+12	
			63.29	1.314E+01	(P	2.613E+01	6.08E+01	3.81E+00 G
			92.59	1.106E+01	(P	1.571E+01	4.42E+01	5.58E+00 G
PA-231	N	-1.4422E+01					1.20E+07	
			302.65	-1.442E+01	?(	9.862E+01	2.04E+02	2.88E+00 G
			300.07	-1.673E+01	+	1.178E+02	2.10E+02	2.46E+00 G
PA-234	N	1.1558E-01					1.63E+12	
			131.29	-1.049E+00	?(	6.697E+00	1.89E+02	1.80E+01 G
			946.02	1.680E+00	?(	8.716E+00	2.19E+02	1.34E+01 G
			569.47	0.000E+00	&	1.692E+01	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	2.230E+01	1.00E+03	9.60E+00 G
			880.53	-1.024E+01	+	3.247E+01	9.39E+01	6.00E+00 GA
PA-234M	N	6.1017E+01					1.63E+12	
			1001.00	0.000E+00	&(	2.774E+02	1.00E+03	8.37E-01 G
			766.41	2.347E+02	?(	5.770E+02	7.38E+01	2.94E-01 G
AM-241	T	1.1668E+00					1.58E+05	
			59.54	1.167E+00	?(	5.068E+00	1.30E+02	3.59E+01 G
Np-237	F	2.6368E+00					2.14E+06	
							Derived Ave Activity	
			86.49	2.637E+00	}(	1.407E+01	1.60E+02	1.31E+01 G
Ir-192	F	5.8019E-01					7.40E+01	
			316.49	4.740E-01	?(	3.139E+00	1.98E+02	8.70E+01 G
			468.06	7.587E-01	?(	2.556E+00	9.96E+01	5.18E+01 G
			308.44	0.000E+00	-	8.945E+00	1.00E+03	3.18E+01 G
Cs-136	F	5.6393E-01					1.30E+01	
			818.50	5.639E-01	?(	1.796E+00	9.42E+01	1.00E+02 G
			1048.07	-1.011E-01	-	1.983E+00	5.41E+02	8.00E+01 G
			340.57	-1.001E+00	+	4.263E+00	1.27E+02	4.69E+01 G
Np-239	T	1.2482E+00					2.36E+00	
			103.70	1.180E+00	?	5.703E+00	1.44E+02	2.40E+01 X
			106.13	1.248E+00	@(	5.769E+00	1.38E+02	2.27E+01 G
			99.50	-7.195E-01	+	1.030E+01	4.24E+02	1.50E+01 X

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Nd-147       1.4209E+00                                      1.11E+01
                          531.00 1.421E+00 ?(  7.523E+00 2.13E+02 1.30E+01 G
                           91.10 0.000E+00 -   6.099E+00 1.00E+03 2.83E+01 G

TL-210   N  -2.7531E-01                                      5.84E+05
                          799.60-2.753E-01 ?(  2.281E+00 2.40E+02 9.90E+01 G
                          296.00-5.139E-01 +   3.752E+00 2.18E+02 7.90E+01 G
                         1313.00-1.710E+00 +   7.498E+00 1.98E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
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Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	332.	-19.	-0.011	135.80	-6.094E+00
AM-241	59.54	369.	21.	0.012	129.78	1.167E+00
BA-133	80.99	200.	-3.	-0.002	840.85	-1.412E-01
EU-155	86.54	655.	-25.	-0.014	148.46	-1.251E+00
Gd-153	97.50	440.	-21.	-0.012	144.16	-1.047E+00
Np-239	99.50	461.	-7.	-0.004	424.46	-7.195E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Np-239	103.70	364.	19.	0.011	144.15	1.180E+00		
EU-155	105.31	345.	19.	0.011	140.17	1.336E+00		
Np-239	106.13	334.	19.	0.011	137.85	1.248E+00		
EU-152	121.78	220.	-14.	-0.008	152.19	-7.306E-01		
EU-154	123.10	172.	20.	0.011	95.93	7.286E-01		
PA-234	131.29	275.	-13.	-0.007	189.35	-1.049E+00		
CE-144	133.54	412.	18.	0.010	159.63	2.482E+00		
CO-57	136.47	437.	18.	0.010	163.76	2.598E+00		
Tc-99m	140.51	455.	18.	0.010	166.37	3.242E-01		
U-235	143.79	495.	-12.	-0.007	254.68	-1.752E+00		
CE-141	145.44	552.	-21.	-0.011	162.37	-6.639E-01		
Ba-140	162.66	222.	-20.	-0.011	108.03	-5.181E+00		
U-235	163.38	242.	-3.	-0.002	803.84	-8.747E-01		
CE-139	165.85	232.	-13.	-0.007	163.75	-2.723E-01		
U-235	185.72	239.	-38.	-0.021	49.84	-1.218E+00		P
TH-229	193.51	103.	12.	0.007	156.31	4.959E+00		
U-235	205.33	106.	14.	0.008	143.73	5.002E+00		
TH-229	210.85	143.	-22.	-0.012	103.51	-1.377E+01		
EU-152	244.69	510.	-20.	-0.011	163.83	-5.351E+00		
TH-227	256.24	84.	-16.	-0.009	108.06	-4.971E+00		
Cd-113m	263.70	119.	-17.	-0.009	93.93	-6.163E+03		
BI-210M	265.83	107.	13.	0.007	115.90	5.688E-01		
I-131	284.30	77.	-8.	-0.004	208.23	-2.996E+00		
TL-210	296.00	690.	-17.	-0.010	218.14	-5.139E-01		
PA-231	300.07	645.	-17.	-0.010	210.30	-1.673E+01		
PA-233	300.18	628.	-17.	-0.010	207.47	-6.643E+00		
PA-231	302.65	611.	-17.	-0.010	204.19	-1.442E+01		
Ir-192	316.49	526.	17.	0.009	197.54	4.740E-01		
La-140	328.76	84.	15.	0.008	91.62	1.865E+00		
Cf-249	333.44	92.	13.	0.007	106.77	2.196E+00		
Cs-136	340.57	246.	-18.	-0.010	126.82	-1.001E+00		
EU-152	344.29	147.	-7.	-0.004	247.27	-7.038E-01		
BA-133	356.00	533.	-18.	-0.010	178.02	-8.130E-01		
I-131	364.48	32.	11.	0.006	100.72	3.909E-01		
BA-133	383.84	93.	13.	0.007	108.17	4.222E+00		
Cf-249	387.95	106.	13.	0.007	114.64	5.786E-01		
SN-113	391.69	129.	-7.	-0.004	237.72	-3.137E-01		
SB-125	427.88	36.	-6.	-0.003	200.00	-6.363E-01		
AG-108M	433.94	24.	11.	0.006	96.10	3.695E-01		
pm-146	453.88	8.	4.	0.002	164.04	1.802E-01		
SB-125	463.37	37.	12.	0.006	78.96	3.719E+00		
Ir-192	468.06	62.	12.	0.006	99.58	7.587E-01		
BE-7	477.60	83.	3.	0.002	389.61	1.081E+00		
La-140	487.02	55.	10.	0.006	109.36	7.624E-01		
RU-103	497.05	28.	3.	0.002	350.13	1.160E-01		
RH-106	511.86	33.	90.	0.050	19.52	1.611E+01		
Nd-147	531.00	26.	5.	0.003	212.92	1.421E+00		
Ba-140	537.26	48.	-15.	-0.009	94.91	-2.355E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	563.24	26.	4.	0.002	264.97	1.849E+00	
CS-134	569.32	45.	-5.	-0.003	194.94	-1.265E+00	
BI-207	569.70	38.	9.	0.005	98.59	3.717E-01	
SB-125	600.50	484.	-15.	-0.008	215.12	-3.301E+00	
SB-124	602.73	469.	-15.	-0.008	211.58	-6.026E-01	
CS-134	604.71	455.	-4.	-0.002	788.24	-1.598E-01	
PM-144	618.06	505.	-18.	-0.010	180.85	-7.390E-01	
RH-106	621.92	450.	-3.	-0.002	872.67	-1.441E+00	
SB-125	635.89	14.	4.	0.002	141.42	1.492E+00	
I-131	636.97	25.	-4.	-0.002	198.55	-2.161E+00	
AG-110M	657.76	55.	3.	0.002	335.44	1.447E-01	
CS-137	661.66	38.	11.	0.006	82.77	5.766E-01	
PM-144	696.54	56.	-18.	-0.010	91.71	-8.160E-01	
NB-94	702.63	51.	-17.	-0.010	91.51	-7.980E-01	
SB-124	722.79	15.	24.	0.013	31.15	1.014E+01	
pm-146	735.72	19.	7.	0.004	130.32	1.529E+00	
pm-146	747.16	9.	7.	0.004	104.64	9.303E-01	
AG-110M	763.94	70.	-10.	-0.006	122.47	-2.164E+00	
NB-95	765.79	76.	6.	0.003	209.50	2.904E-01	
PA-234M	766.41	48.	14.	0.008	73.76	2.347E+02	
EU-152	778.92	47.	-17.	-0.010	87.66	-6.497E+00	
BI-212	785.42	28.	3.	0.002	378.59	1.153E+01	
CS-134	795.87	68.	-16.	-0.009	79.25	-9.018E-01	
TL-210	799.60	84.	-5.	-0.003	240.22	-2.753E-01	
CS-134	801.95	74.	14.	0.008	94.13	7.757E+00	
CO-58	810.78	57.	-10.	-0.006	111.36	-5.060E-01	
Cs-136	818.50	49.	11.	0.006	94.16	5.639E-01	
MN-54	834.85	19.	2.	0.001	398.21	1.200E-01	
NB-94	871.10	10.	8.	0.005	65.41	4.301E-01	
EU-154	873.23	41.	-9.	-0.005	110.14	-3.724E+00	
PA-234	880.53	52.	-12.	-0.006	93.86	-1.024E+01	
Sc-46	889.28	76.	-10.	-0.005	134.18	-5.112E-01	
y-88	898.04	20.	9.	0.005	114.22	5.205E-01	
AG-110M	937.49	50.	-19.	-0.010	85.91	-3.056E+00	
PA-234	946.02	15.	4.	0.002	218.66	1.680E+00	
EU-152	964.11	74.	-15.	-0.009	83.52	-5.989E+00	
EU-154	996.33	51.	-12.	-0.007	90.03	-6.523E+00	
EU-154	1004.77	75.	-10.	-0.006	124.35	-3.319E+00	
Co-56	1037.84	27.	-4.	-0.002	324.36	-1.562E+00	
Cs-136	1048.07	25.	-1.	-0.001	540.83	-1.011E-01	
RH-106	1050.36	8.	6.	0.003	75.61	2.449E+01	
BI-207	1063.66	27.	4.	0.002	275.10	3.565E-01	
Ga-68	1077.40	11.	9.	0.005	88.84	1.982E+01	
FE-59	1099.25	11.	9.	0.005	87.98	1.012E+00	
EU-152	1112.07	96.	-11.	-0.006	127.01	-5.211E+00	
Sc-46	1120.55	83.	-11.	-0.006	118.30	-7.180E-01	
Ta-182	1121.30	81.	-9.	-0.005	145.97	-1.635E+00	
CO-60	1173.24	27.	-4.	-0.002	324.36	-2.420E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	1189.05	11.	2.	0.001	324.82	9.592E-01	
Ta-182	1221.41	0.	20.	0.011	22.36	5.034E+00	
Co-56	1238.28	51.	-4.	-0.002	421.68	-4.157E-01	
NA-22	1274.53	11.	1.	0.000	724.57	4.683E-02	
FE-59	1291.60	6.	7.	0.004	88.04	1.152E+00	
TL-210	1313.00	17.	-5.	-0.003	198.49	-1.710E+00	
CO-60	1332.50	17.	-7.	-0.004	143.21	-5.087E-01	
AG-110M	1384.30	6.	7.	0.004	85.05	2.247E+00	
EU-152	1408.00	6.	7.	0.004	92.58	2.528E+00	
La-140	1596.21	6.	5.	0.003	126.49	4.401E-01	
y-88	1836.06	0.	12.	0.007	28.87	1.146E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.0811E+00	1.0811E+00	3.896E+02%	1.46E+01
NA-22	#A	4.6828E-02	4.6828E-02	7.246E+02%	1.29E+00
K-40		1.2811E+02	1.2811E+02	7.559E+00%	5.40E+00
Sc-46	#A	-5.1120E-01	-5.1120E-01	1.342E+02%	2.34E+00
CR-51	#A	4.1997E+00	4.1997E+00	2.035E+02%	2.86E+01
MN-54	#A	1.1996E-01	1.1996E-01	3.982E+02%	1.17E+00
FE-59	#A	1.0731E+00	1.0731E+00	6.223E+01%	1.99E+00
Co-56	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.47E+00
CO-57	#A	2.8821E-01	2.8821E-01	1.638E+02%	1.29E+00
CO-58	#A	-5.0601E-01	-5.0601E-01	1.114E+02%	1.92E+00
CO-60	#A	-5.0865E-01	-5.0865E-01	1.432E+02%	1.59E+00
ZN-65	#A	-9.7399E-02	-9.7399E-02	1.681E+03%	5.72E+00
NB-94	#A	-7.9800E-01	-7.9800E-01	9.151E+01%	1.67E+00
ZR-95	#A	8.7922E-02	8.7922E-02	1.127E+03%	2.41E+00
NB-95	#A	2.9038E-01	2.9039E-01	2.095E+02%	2.10E+00
RU-103	#A	1.1604E-01	1.1604E-01	3.501E+02%	1.06E+00
RH-106	#A	2.0801E+00	2.0801E+00	7.561E+01%	4.25E+01
AG-108M	#A	3.6951E-01	3.6951E-01	9.610E+01%	8.96E-01
AG-110M	#A	3.5630E-01	3.5630E-01	8.505E+01%	2.95E+00
SN-113	#A	-3.1367E-01	-3.1368E-01	2.377E+02%	2.55E+00
SB-124	#A	4.6216E-01	4.6216E-01	3.115E+01%	4.28E+00
SB-125	#A	7.1984E-01	7.1984E-01	7.896E+01%	3.25E+00
I-131	#A	3.9085E-01	3.9087E-01	1.007E+02%	9.88E-01
Gd-153	#A	-1.0469E+00	-1.0469E+00	1.442E+02%	5.05E+00
Ga-68	#A	1.9629E+01	1.9818E+01	8.884E+01%	3.94E+01
Tc-99m	#A	3.2364E-01	3.2422E-01	1.664E+02%	1.81E+00
BA-133	#A	-8.1302E-01	-8.1302E-01	1.780E+02%	4.85E+00
CS-134	#A	5.8653E-01	5.8653E-01	9.413E+01%	4.25E+00
CS-137	#A	5.7660E-01	5.7660E-01	8.277E+01%	1.61E+00

CE-139 #A	-2.7225E-01	-2.7226E-01	1.637E+02%	1.50E+00
Ba-140 #A	-2.3553E+00	-2.3554E+00	9.491E+01%	5.33E+00
La-140 #A	7.1051E-01	7.1053E-01	6.356E+01%	1.24E+00
CE-141 #A	-6.6392E-01	-6.6393E-01	1.624E+02%	3.61E+00
CE-144 #A	2.4821E+00	2.4821E+00	1.596E+02%	1.33E+01
PM-144 #A	-8.1597E-01	-8.1597E-01	9.171E+01%	1.71E+00
EU-152 #A	-7.0383E-01	-7.0383E-01	2.473E+02%	5.94E+00
EU-154 #A	-3.7237E+00	-3.7237E+00	1.101E+02%	1.40E+01
EU-155 #A	1.3361E+00	1.3361E+00	1.402E+02%	6.28E+00
HF-181 A	3.3036E-01	3.3037E-01	1.143E+02%	1.96E+00
Ta-182 #A	1.2085E+00	1.2085E+00	2.236E+01%	8.15E+00
Hg-203 #A	4.0242E-01	4.0242E-01	1.140E+02%	1.55E+00
TL-208	2.6627E+00	2.6627E+00	1.760E+01%	8.89E-01
pm-146 #A	1.1688E+00	1.1688E+00	8.357E+01%	2.36E+00
y-88 #A	8.4195E-01	8.4195E-01	2.887E+01%	1.36E+00
Cd-113m#A	-6.1626E+03	-6.1626E+03	9.393E+01%	1.94E+04
Cd-109 #A	3.3719E+00	3.3719E+00	3.980E+02%	4.52E+01
Cf-251 #A	1.2864E+00	1.2864E+00	1.607E+02%	5.34E+00
Cf-249 #A	8.8642E-01	8.8642E-01	7.833E+01%	2.24E+00
Sn-126 #A	3.1426E+00	3.1426E+00	1.799E+02%	1.90E+01
PB-210	4.0228E+01	4.0228E+01	2.995E+01%	3.28E+01
PB-212	8.3183E+00	8.3183E+00	9.524E+00%	1.73E+00
PB-214	2.8136E+01	2.8136E+01	5.097E+00%	2.69E+00
BI-207 #A	3.6513E-01	3.6513E-01	9.859E+01%	1.25E+00
BI-212 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.96E+01
U-235 #A	3.6686E-01	3.6686E-01	1.437E+02%	1.50E+01
BI-214	2.7579E+01	2.7579E+01	6.439E+00%	1.87E+00
BI-210M#A	5.6884E-01	5.6884E-01	1.159E+02%	2.23E+00
AC-228	1.1486E+01	1.1486E+01	1.150E+01%	2.20E+00
TH-227 #A	-6.0940E+00	-6.0940E+00	1.358E+02%	2.77E+01
TH-229 #A	4.9588E+00	4.9588E+00	1.563E+02%	2.01E+01
TH-234 A	1.1903E+01	1.1903E+01	3.759E+01%	2.61E+01
PA-231 #A	-1.4422E+01	-1.4422E+01	2.042E+02%	9.86E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.96E+00
PA-234 #A	1.1558E-01	1.1558E-01	1.446E+02%	6.70E+00
PA-234M#A	6.1017E+01	6.1017E+01	7.376E+01%	2.77E+02
AM-241 #A	1.1668E+00	1.1668E+00	1.298E+02%	5.07E+00
Np-237 #A	2.6368E+00	2.6368E+00	1.596E+02%	1.41E+01
Ir-192 #A	5.8019E-01	5.8019E-01	9.958E+01%	3.14E+00
Cs-136 #A	5.6391E-01	5.6393E-01	9.416E+01%	1.80E+00
Np-239 #A	1.2480E+00	1.2482E+00	1.379E+02%	5.77E+00
Nd-147 #A	1.4208E+00	1.4209E+00	2.129E+02%	7.52E+00
TL-210 #A	-2.7531E-01	-2.7531E-01	2.402E+02%	2.28E+00

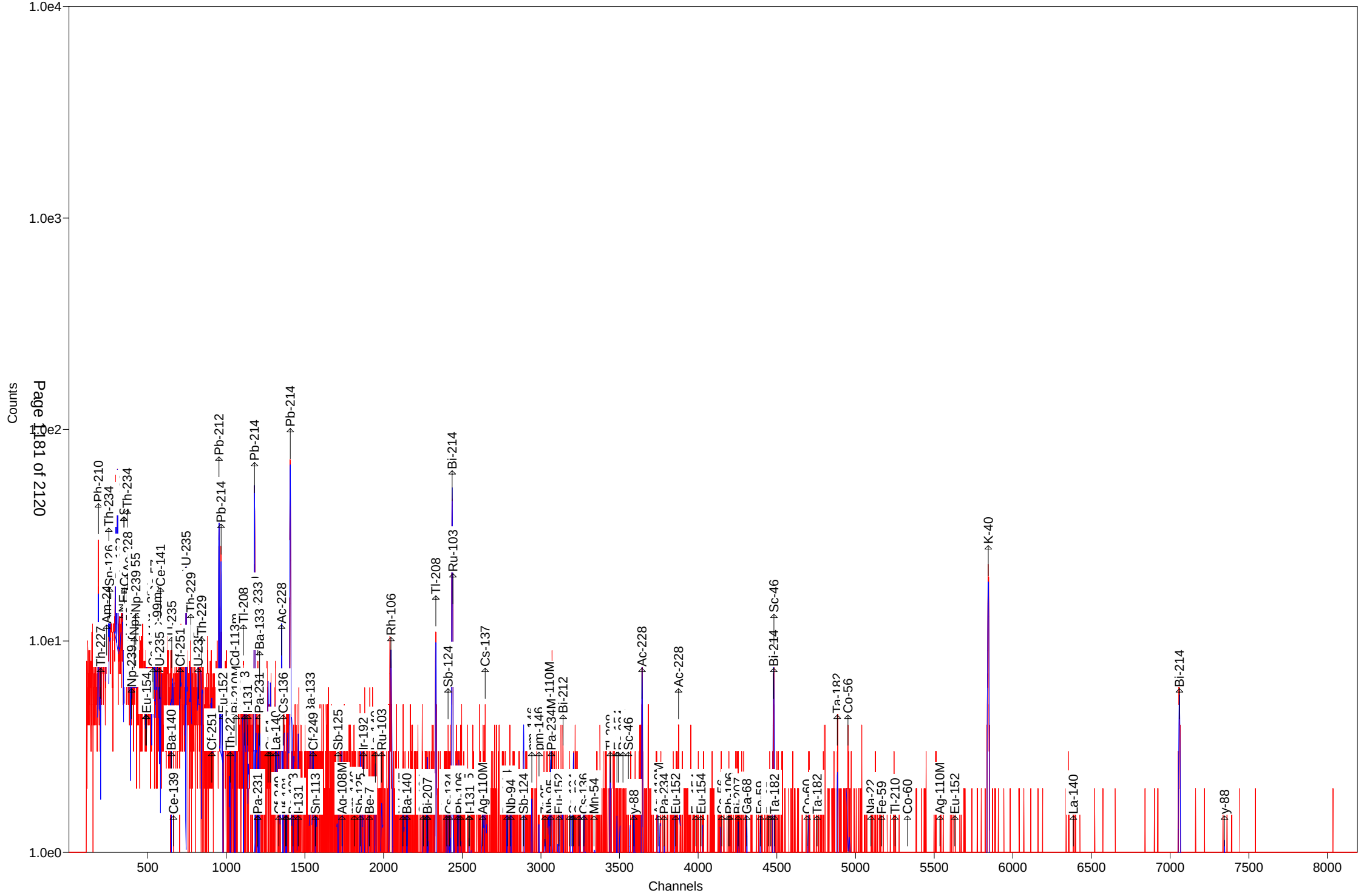
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 2.584E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.5842682E+02 Bq/Sample

379951_Gamma_160-29881-A-15-B. 12_Gamma_20181528.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20183188

Sample Description: 379951_Gamma_160-29881-A-16-B
Detector: Detector #14
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-16-B

Decay to Time: 8/23/2018 07:08 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:09:00 Real Time: 1803 sec
Analysis Time: 8/23/2018 07:39 Dead Time: 0.14 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.792E+00	101.5	1.819E+00	1.822E+00	6.309E+00
NA-22	3.610E-01	44.7	1.614E-01	1.624E-01	5.320E-01
K-40	9.785E+01	9.1	8.864E+00	1.018E+01	8.867E+00
Sc-46	-4.060E-01	117.8	4.783E-01	4.787E-01	1.645E+00
CR-51	2.395E-01	953.9	2.284E+00	2.284E+00	8.134E+00
MN-54	-5.296E-01	93.7	4.959E-01	4.967E-01	1.166E+00
FE-59	-1.339E-01	139.5	1.867E-01	1.868E-01	2.347E+00
Co-56	5.029E-01	33.1	1.664E-01	1.684E-01	3.808E-01
CO-57	-2.253E-01	115.3	2.597E-01	2.600E-01	8.744E-01
CO-58	-6.280E-01	89.8	5.637E-01	5.647E-01	1.899E+00
CO-60	1.010E-01	92.4	9.333E-02	9.347E-02	1.342E+00
ZN-65	7.619E-01	107.7	8.202E-01	8.211E-01	2.846E+00
NB-94	1.256E-01	274.0	3.441E-01	3.441E-01	8.917E-01
ZR-95	4.282E-01	97.2	4.161E-01	4.167E-01	1.075E+00
NB-95	-1.908E-01	165.8	3.164E-01	3.165E-01	1.123E+00
RU-103	-7.406E-02	484.8	3.590E-01	3.590E-01	9.457E-01
RH-106	0.000E+00	1.#INF	1.282E+00	1.282E+00	2.988E+00
AG-108M	2.179E-01	103.7	2.260E-01	2.262E-01	6.141E-01
AG-110M	3.082E-01	41.9	1.290E-01	1.300E-01	1.764E+00
SN-113	3.316E-01	121.7	4.035E-01	4.038E-01	1.387E+00
SB-124	-4.534E-02	84.4	3.829E-02	3.836E-02	2.471E+00
SB-125	3.350E-01	169.9	5.691E-01	5.694E-01	2.485E+00
I-131	-3.788E-01	100.8	3.817E-01	3.822E-01	9.975E-01
Gd-153	7.048E-01	70.9	4.998E-01	5.016E-01	2.083E+00
Ga-68	6.703E+00	173.7	1.165E+01	1.165E+01	2.934E+01
Tc-99m	1.853E-01	132.0	2.447E-01	2.449E-01	8.284E-01
BA-133	-6.253E-02	929.8	5.813E-01	5.814E-01	2.021E+00
CS-134	-2.825E-01	101.3	2.862E-01	2.866E-01	2.411E+00
CS-137	5.725E-02	555.1	3.178E-01	3.178E-01	1.165E+00
CE-139	1.720E-01	117.9	2.028E-01	2.035E-01	6.914E-01
Ba-140	8.594E-01	140.4	1.207E+00	1.208E+00	3.147E+00
La-140	1.845E-01	105.7	1.951E-01	1.953E-01	1.269E+00
CE-141	-4.046E-01	127.1	5.141E-01	5.146E-01	1.733E+00

CE-144	1.526E+00	139.2	2.124E+00	2.126E+00	7.178E+00
PM-144	-2.672E-01	178.2	4.762E-01	4.764E-01	1.179E+00
EU-152	9.564E-01	90.9	8.694E-01	8.708E-01	4.120E+00
EU-154	2.102E+00	108.4	2.278E+00	2.281E+00	8.956E+00
EU-155	5.922E-01	146.1	8.652E-01	8.658E-01	2.943E+00
HF-181	7.079E-02	259.7	1.838E-01	1.839E-01	1.216E+00
Ta-182	1.763E-01	684.4	1.207E+00	1.207E+00	4.967E+00
Hg-203	9.389E-03	2589.3	2.431E-01	2.431E-01	8.706E-01
TL-208	6.750E-01	91.8	6.195E-01	6.205E-01	1.250E+00
pm-146	-8.811E-01	114.9	1.013E+00	1.014E+00	3.041E+00
y-88	-7.707E-02	493.7	3.805E-01	3.805E-01	9.795E-01
Cd-113m	7.962E+02	352.5	2.807E+03	2.807E+03	1.001E+04
Cd-109	-6.225E+00	152.2	9.475E+00	9.481E+00	3.179E+01
Cf-251	9.405E-01	110.3	1.037E+00	1.041E+00	2.849E+00
Cf-249	4.987E-01	86.4	4.311E-01	4.319E-01	1.410E+00
Sn-126	3.436E-01	796.9	2.738E+00	2.738E+00	9.451E+00
PB-210	-3.294E+00	270.4	8.906E+00	8.908E+00	2.730E+01
PB-212	1.698E+00	30.1	5.105E-01	5.222E-01	1.535E+00
PB-214	4.635E+00	13.4	6.212E-01	6.663E-01	1.481E+00
BI-207	-1.472E-01	183.5	2.701E-01	2.702E-01	9.589E-01
BI-212	3.630E+00	122.5	4.447E+00	4.451E+00	1.544E+01
U-235	-1.858E+00	96.2	1.788E+00	1.791E+00	7.153E+00
BI-214	4.861E+00	16.8	8.165E-01	8.547E-01	1.525E+00
BI-210M	-3.790E-01	113.8	4.313E-01	4.318E-01	1.417E+00
AC-228	3.752E+00	22.4	8.420E-01	8.635E-01	1.393E+00
TH-227	-3.776E+00	111.7	4.220E+00	4.225E+00	1.273E+01
TH-229	1.901E-01	2269.5	4.313E+00	4.313E+00	1.226E+01
TH-234	9.828E+00	57.5	5.651E+00	5.675E+00	1.583E+01
PA-231	0.000E+00	1.#INF	3.711E+00	3.711E+00	4.730E+01
PA-233	-5.742E-01	117.4	6.743E-01	6.750E-01	3.982E+00
PA-234	1.016E+00	64.0	6.506E-01	6.527E-01	5.015E+00
PA-234M	2.088E+01	87.4	1.825E+01	1.828E+01	1.806E+02
AM-241	-2.126E-01	354.4	7.532E-01	7.533E-01	2.191E+00
Np-237	-1.630E+00	160.0	2.608E+00	2.610E+00	8.765E+00
Ir-192	2.867E-01	112.5	3.224E-01	3.229E-01	9.033E-01
Cs-136	1.487E-01	31.6	4.703E-02	4.780E-02	2.283E+00
Np-239	4.525E-01	174.5	7.893E-01	7.898E-01	2.699E+00
Nd-147	3.663E-01	153.5	5.623E-01	5.627E-01	5.827E+00
TL-210	0.000E+00	1.#INF	1.220E-01	1.220E-01	1.341E+00
Total	9.680E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-16-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183188.An1

Acquisition information
Start time: 8/23/2018 7:09:00 AM
Live time: 1800
Real time: 1803
Dead time: 0.14 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:08:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2819

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-5.	270.40	0.75	2.171E-02	46.54	4.250	PBC<MDA	PB210
63.02	22.	57.50	0.82	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.28	2.	796.87	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
77.28	53.	32.59	0.79	3.902E-02				
91.10	17.	153.51	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-9.	312.31	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
93.35	17.	154.99	0.80	4.291E-02	93.35	5.561	PBC<MDA	AC228
97.50	12.	119.01	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
103.20	17.	77.13	0.81	4.392E-02	103.20	21.800	PBC<MDA	Gd153
103.70	10.	136.48	0.81	4.395E-02	103.70	24.000	PBC<MDA	Np239
105.31	10.	146.09	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
106.13	8.	174.46	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
123.10	13.	120.66	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
133.54	13.	139.24	0.84	4.277E-02	133.54	11.090	PBC<MDA	CE144
136.30	7.	259.69	0.84	4.245E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	8.129E-01	CO57
140.51	12.	132.03	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m
165.85	10.	117.93	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	110.29	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
238.63	39.	30.07	0.94	2.931E-02	238.63	43.300	1.698E+00	PB212
242.00	13.	62.91	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
263.70	2.	352.54	0.97	2.714E-02	263.70	0.006	PBC<MDA	Cd113m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.28	7.	106.16	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
294.82	52.	19.84	1.51	2.487E-02	295.09	19.300	6.048E+00	PB214
308.44	9.	192.28	1.01	2.403E-02	308.44	31.750	PBC<MDA	Ir192
316.49	2.	512.17	1.02	2.355E-02	316.49	87.040	PBC<MDA	Ir192
320.08	1.	953.94	1.03	2.334E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	105.74	1.03	2.286E-02	328.76	20.300	PBC<MDA	La140
333.44	8.	115.24	1.04	2.261E-02	333.44	15.510	PBC<MDA	Cf249
339.32	7.	180.83	1.04	2.235E-02	338.32	12.010	PBC<MDA	AC228
351.62	57.	18.03	1.56	2.167E-02	351.93	37.600	3.910E+00	PB214
387.95	8.	128.88	1.09	2.008E-02	387.95	66.000	PBC<MDA	Cf249
391.69	8.	121.69	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
433.94	7.	103.69	1.13	1.838E-02	433.94	90.480	PBC<MDA	AG108M
463.37	5.	169.86	1.16	1.745E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	112.46	1.17	1.731E-02	468.06	51.750	PBC<MDA	Ir192
477.60	6.	101.53	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
511.86	45.	32.89	2.46	1.612E-02	511.86	20.000	7.779E+00	RH106
537.26	6.	140.44	1.23	1.551E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	123.97	1.25	1.494E-02	563.24	8.350	PBC<MDA	CS134
569.47	8.	80.55	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.431E+00	PA234
					569.70	97.740	2.879E-01	BI207
583.02	4.	235.81	1.27	1.453E-02	583.02	84.500	PBC<MDA	TL208
609.14	57.	16.80	1.08	1.403E-02	609.31	46.090	4.861E+00	BI214
657.76	6.	41.87	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
661.66	1.	555.10	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
702.63	3.	274.01	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
722.79	8.	84.43	1.40	1.223E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.206E-01	AG108M
					723.36	20.220	1.890E+00	EU154
727.17	6.	122.51	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
756.73	5.	97.19	1.43	1.179E-02	756.73	54.460	PBC<MDA	ZR95
763.94	3.	200.32	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
766.41	5.	87.40	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.076E+01	PA234M
785.42	4.	156.69	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212
795.87	2.	360.56	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
846.77	10.	33.10	1.50	1.076E-02	846.77	99.935	5.029E-01	Co56
860.56	7.	94.51	1.51	1.062E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	118.32	1.52	1.049E-02	873.23	12.270	PBC<MDA	EU154
880.53	5.	95.25	1.53	1.042E-02	880.53	6.000	PBC<MDA	PA234
883.24	5.	113.13	1.53	1.040E-02	883.24	9.600	PBC<MDA	PA234
884.68	4.	161.51	1.53	1.038E-02	884.68	72.680	PBC<MDA	AG110M
911.17	20.	22.44	1.55	1.014E-02	911.07	29.000	3.752E+00	AC228
968.97	28.	21.43	1.60	9.642E-03	968.97	17.460	9.240E+00	AC228
996.33	4.	181.59	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1048.07	10.	31.62	1.66	9.043E-03	1048.07	80.000	7.680E-01	Cs136
1077.40	3.	173.74	1.69	8.841E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	6.	90.91	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1115.55	6.	107.66	1.71	8.592E-03	1115.55	50.600	PBC<MDA	ZN65
1122.36	2.	352.34	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
1173.24	6.	92.42	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1221.41	1.	684.37	1.79	7.975E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	5.	44.72	1.83	7.700E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.025E+00	EU154
1291.60	3.	216.31	1.84	7.616E-03	1291.60	43.200	PBC<MDA	FE59
1461.17	129.	9.06	1.56	6.879E-03	1460.83	10.670	9.785E+01	K40
1764.93	13.	27.74	2.14	5.878E-03	1764.49	15.400	7.978E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.51	77.28	73.	53.	1.348E+03	32.59	0.789	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.58	46.54	84.	-5.	-0.003	270.40	0.750s
TH-227	199.98	50.14	81.	-13.	-0.007	111.74	0.751s
AM-241	237.55	59.54	76.	-4.	-0.002	354.36	0.761s
TH-234	251.48	63.02	50.	22.	0.012	57.50	0.820s
Sn-126	256.52	64.28	126.	2.	0.001	796.87	0.766s
BA-133	323.33	80.99	102.	-9.	-0.005	191.81	0.784s
Np-237	345.33	86.49	320.	-16.	-0.009	160.03	0.789
EU-155	345.54	86.54	304.	-15.	-0.008	169.86	0.790
Sn-126	347.13	86.94	335.	-18.	-0.010	147.33	0.790
Sn-126	349.65	87.57	341.	-18.	-0.010	148.57	0.791
Cd-109	351.53	88.04	359.	-18.	-0.010	152.20	0.791s
Nd-147	363.77	91.10	333.	17.	0.009	153.51	0.794s
TH-234	369.72	92.59	359.	-9.	-0.005	312.31	0.796s
AC-228	372.76	93.35	341.	17.	0.009	154.99	0.797s
Gd-153	389.36	97.50	98.	12.	0.007	119.01	0.801s
Np-239	397.36	99.50	138.	-15.	-0.008	113.44	0.803s
Gd-153	412.15	103.20	74.	17.	0.009	77.13	0.807s
Np-239	414.15	103.70	90.	10.	0.006	136.48	0.807s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	420.60	105.31	101.	10.	0.006	146.09	0.809s
Np-239	423.87	106.13	97.	8.	0.005	174.46	0.810
EU-152	486.43	121.78	131.	-15.	-0.008	109.47	0.826s
CO-57	487.58	122.06	146.	-15.	-0.008	115.25	0.826s
EU-154	491.73	123.10	126.	13.	0.007	120.66	0.828s
PA-234	524.50	131.29	208.	-16.	-0.009	132.72	0.836s
HF-181	531.42	133.02	223.	-16.	-0.009	137.20	0.838s
CE-144	533.47	133.54	158.	13.	0.007	139.24	0.838s
HF-181	544.52	136.30	145.	7.	0.004	259.69	0.841s
Tc-99m	561.35	140.51	122.	12.	0.007	132.03	0.845s
U-235	574.45	143.79	144.	-15.	-0.008	96.23	0.849s
CE-141	581.07	145.44	162.	-14.	-0.008	127.06	0.850s
Ba-140	649.93	162.66	96.	-4.	-0.002	350.00	0.868s
CE-139	662.70	165.85	59.	10.	0.005	117.93	0.871s
Cf-251	705.68	176.60	40.	11.	0.006	110.29	0.882s
PB-212	953.75	238.63	48.	39.	0.022	30.07	0.945D
PB-214	967.21	242.00	28.	13.	0.007	62.91	0.948D
EU-152	977.99	244.69	194.	-13.	-0.007	151.58	0.951s
Cd-113m	1054.01	263.70	33.	2.	0.001	352.54	0.970s
BI-210M	1062.53	265.83	46.	-9.	-0.005	113.80	0.972s
TL-208	1108.33	277.28	21.	7.	0.004	106.16	0.983s
I-131	1136.39	284.30	48.	-12.	-0.007	58.68	0.990s
PB-214	1178.48	294.82	14.	52.	0.029	19.84	1.507s
TL-210	1183.18	296.00	164.	-9.	-0.005	199.02	1.002s
PB-212	1199.30	300.03	153.	-3.	-0.001	669.65	1.006
PA-231	1199.46	300.07	150.	0.	0.000	1000.00	1.006s
PA-233	1199.90	300.18	150.	0.	0.000	1000.00	1.006s
PA-231	1209.78	302.65	150.	0.	0.000	1000.00	1.008
BA-133	1210.59	302.85	150.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	150.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	150.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	134.	9.	0.005	192.28	1.014s
PA-233	1247.22	312.01	159.	-9.	-0.005	117.43	1.018s
Ir-192	1265.13	316.49	43.	2.	0.001	512.17	1.022s
CR-51	1279.51	320.08	45.	1.	0.001	953.94	1.026s
La-140	1314.21	328.76	18.	8.	0.004	105.74	1.034s
Cf-249	1332.92	333.44	22.	8.	0.004	115.24	1.039
AC-228	1352.44	338.32	69.	7.	0.004	180.83	1.043s
Cs-136	1361.44	340.57	76.	0.	0.000	1000.00	1.045s
EU-152	1376.30	344.29	76.	0.	0.000	1000.00	1.049s
HF-181	1382.47	345.83	76.	0.	0.000	1000.00	1.050s
PB-214	1405.61	351.62	17.	57.	0.032	18.03	1.556s
BA-133	1423.15	356.00	96.	-2.	-0.001	929.76	1.060s
I-131	1457.08	364.48	37.	-12.	-0.007	100.76	1.069s
BA-133	1534.50	383.84	81.	-11.	-0.006	116.11	1.087s
Cf-249	1550.94	387.95	44.	8.	0.004	128.88	1.091s
SN-113	1565.90	391.69	39.	8.	0.004	121.69	1.095s
SB-125	1710.63	427.88	22.	-1.	-0.001	961.36	1.129s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-108M	1734.87	433.94	11.	7.	0.004	103.69	1.135s
pm-146	1814.64	453.88	24.	-6.	-0.003	164.99	1.154s
SB-125	1852.59	463.37	37.	5.	0.003	169.86	1.163s
Ir-192	1871.36	468.06	33.	8.	0.004	112.46	1.167s
BE-7	1909.50	477.60	14.	6.	0.003	101.53	1.176
La-140	1947.19	487.02	33.	-12.	-0.006	77.64	1.185s
RU-103	1987.33	497.05	24.	-2.	-0.001	484.77	1.194s
RH-106	2046.57	511.86	27.	45.	0.025	32.89	2.458s
Nd-147	2123.11	531.00	16.	-2.	-0.001	397.91	1.225s
Ba-140	2148.15	537.26	16.	6.	0.003	140.44	1.231s
CS-134	2252.06	563.24	4.	4.	0.002	123.97	1.255s
CS-134	2276.40	569.32	20.	-2.	-0.001	324.04	1.260s
PA-234	2276.99	569.47	14.	8.	0.004	80.55	1.261s
BI-207	2277.92	569.70	23.	-4.	-0.002	183.54	1.261s
TL-208	2331.20	583.02	29.	4.	0.002	235.81	1.273s
SB-125	2401.12	600.50	172.	-11.	-0.006	171.70	1.289s
SB-124	2410.04	602.73	161.	-11.	-0.006	166.05	1.291s
CS-134	2417.96	604.71	150.	-11.	-0.006	160.26	1.292s
BI-214	2435.67	609.14	10.	57.	0.031	16.80	1.085
RU-103	2440.31	610.30	139.	-11.	-0.006	153.90	1.297s
AG-108M	2456.25	614.28	128.	-5.	-0.003	324.21	1.301s
RH-106	2486.79	621.92	0.	0.	0.000	1000.00	1.308
SB-125	2542.69	635.89	15.	0.	0.000	1000.00	1.320s
I-131	2547.03	636.97	20.	-5.	-0.003	134.16	1.321s
AG-110M	2630.18	657.76	0.	6.	0.003	41.87	1.339s
CS-137	2645.77	661.66	20.	1.	0.001	555.10	1.343s
PM-144	2785.32	696.54	26.	-6.	-0.003	178.21	1.374s
NB-94	2809.67	702.63	13.	3.	0.002	274.01	1.379s
SB-124	2890.31	722.79	21.	8.	0.005	84.43	1.396s
EU-154	2892.59	723.36	30.	0.	0.000	1000.00	1.397s
BI-212	2907.84	727.17	24.	6.	0.003	122.51	1.400
pm-146	2942.05	735.72	13.	0.	0.000	1000.00	1.408s
pm-146	2987.81	747.16	17.	-6.	-0.004	114.93	1.417s
ZR-95	3026.09	756.73	4.	5.	0.003	97.19	1.426s
AG-110M	3054.96	763.94	11.	3.	0.001	200.32	1.432s
NB-95	3062.34	765.79	20.	-4.	-0.002	165.83	1.433s
PA-234M	3064.83	766.41	7.	5.	0.003	87.40	1.434s
EU-152	3114.87	778.92	17.	-5.	-0.003	165.12	1.444s
BI-212	3140.88	785.42	9.	4.	0.002	156.69	1.450
CS-134	3182.67	795.87	25.	2.	0.001	360.56	1.459
TL-210	3197.61	799.60	27.	0.	0.000	1000.00	1.462s
CO-58	3242.31	810.77	57.	-13.	-0.007	89.76	1.471s
La-140	3262.30	815.77	70.	-13.	-0.007	97.98	1.475s
Cs-136	3273.22	818.50	84.	-7.	-0.004	191.74	1.478s
MN-54	3338.63	834.85	19.	-10.	-0.006	93.65	1.492s
Co-56	3386.32	846.77	0.	10.	0.005	33.10	1.501
TL-208	3441.51	860.56	9.	7.	0.004	94.51	1.513s
NB-94	3483.65	871.10	17.	-3.	-0.002	202.76	1.522s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3492.19	873.23	15.	5.	0.003	118.32	1.523s
PA-234	3521.39	880.53	10.	5.	0.003	95.25	1.529s
PA-234	3532.24	883.24	15.	5.	0.003	113.13	1.531s
AG-110M	3538.01	884.68	21.	4.	0.002	161.51	1.533s
Sc-46	3556.40	889.28	36.	-8.	-0.004	117.81	1.536s
y-88	3591.45	898.04	9.	-1.	-0.001	493.71	1.543s
AC-228	3643.58	911.07	0.	20.	0.011	22.44	1.554s
AG-110M	3749.30	937.49	23.	-10.	-0.006	103.93	1.576s
PA-234	3783.42	946.02	10.	-2.	-0.001	218.77	1.582s
EU-152	3855.80	964.11	14.	-4.	-0.002	204.63	1.597
AC-228	3875.25	968.97	4.	28.	0.016	21.43	1.601
EU-154	3984.71	996.33	20.	4.	0.002	181.59	1.622s
EU-154	4018.51	1004.77	15.	-1.	-0.001	857.32	1.629s
Co-56	4150.81	1037.84	15.	-5.	-0.003	176.07	1.655s
Cs-136	4191.74	1048.07	0.	10.	0.006	31.62	1.663s
RH-106	4200.91	1050.36	10.	0.	0.000	1000.00	1.665s
BI-207	4254.12	1063.66	21.	-10.	-0.005	36.87	1.675s
Ga-68	4309.10	1077.40	5.	3.	0.002	173.74	1.685s
FE-59	4396.54	1099.25	15.	-5.	-0.003	176.07	1.702s
EU-152	4447.85	1112.07	12.	6.	0.003	90.91	1.712s
ZN-65	4461.74	1115.55	18.	6.	0.003	107.66	1.714s
BI-214	4480.72	1120.29	24.	2.	0.001	352.34	1.718s
CO-60	4692.60	1173.24	5.	6.	0.003	92.42	1.757s
Ta-182	4755.88	1189.05	35.	-16.	-0.009	83.66	1.769s
Ta-182	4885.38	1221.41	11.	1.	0.001	684.37	1.792
Co-56	4952.89	1238.28	16.	-3.	-0.002	243.65	1.805s
NA-22	5097.96	1274.53	0.	5.	0.003	44.72	1.831s
EU-154	5098.01	1274.54	5.	0.	0.000	1000.00	1.831s
FE-59	5166.25	1291.60	5.	3.	0.001	216.31	1.843s
TL-210	5251.92	1313.00	11.	-2.	-0.001	452.11	1.858s
CO-60	5329.96	1332.50	11.	-3.	-0.001	285.04	1.871s
AG-110M	5537.26	1384.30	0.	0.	0.000	1000.00	1.907s
EU-152	5632.13	1408.00	0.	0.	0.000	1000.00	1.923s
K-40	5844.92	1461.17	4.	129.	0.072	9.06	1.562
SB-124	6764.81	1690.98	6.	-2.	-0.001	343.80	2.102s
BI-214	7059.07	1764.49	0.	13.	0.007	27.74	2.145s
Co-56	7086.53	1771.35	24.	-7.	-0.004	99.02	2.149s
y-88	7345.59	1836.06	0.	0.	0.000	1000.00	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.7920E+00				5.31E+01	
			477.60	1.792E+00	?(	6.309E+00 1.02E+02 1.05E+01	G
NA-22	C	3.6095E-01				9.50E+02	
			1274.53	3.610E-01	?(	5.320E-01 4.47E+01 9.99E+01	G
K-40	N	9.7845E+01				4.66E+11	
			1460.83	9.785E+01	(P	8.867E+00 9.06E+00 1.07E+01	G
Sc-46	F	-4.0600E-01				8.38E+01	
			889.28	-4.060E-01	&(	1.645E+00 1.18E+02 1.00E+02	G
			1120.55	-6.190E-08	&	1.718E+00 7.56E+08 1.00E+02	G
CR-51	F	2.3945E-01				2.77E+01	
			320.08	2.395E-01	?(	8.134E+00 9.54E+02 9.94E+00	G
MN-54	C	-5.2956E-01				3.12E+02	
			834.85	-5.296E-01	?(	1.166E+00 9.37E+01 1.00E+02	G
FE-59	F	-1.3389E-01				4.45E+01	
			1099.25	-5.653E-01	?(	2.347E+00 1.76E+02 5.65E+01	G
			1291.60	4.304E-01	?(P	2.295E+00 2.16E+02 4.32E+01	G
Co-56	C	5.0291E-01				7.73E+01	
			846.77	5.029E-01	?(P	3.808E-01 3.31E+01 9.99E+01	G
			1238.28	-3.308E-01	& P	2.283E+00 2.44E+02 6.61E+01	G
			1037.84	-2.157E+00	-	8.953E+00 1.76E+02 1.41E+01	G
			1771.35	-4.579E+00	-	1.555E+01 9.90E+01 1.55E+01	A
CO-57	C	-2.2532E-01				2.72E+02	
			122.06	-2.253E-01	&(	8.744E-01 1.15E+02 8.56E+01	G
			136.47	-1.169E-07	%	7.051E+00 1.74E+09 1.07E+01	G
CO-58	C	-6.2802E-01				7.09E+01	
			810.78	-6.280E-01	?(	1.899E+00 8.98E+01 9.95E+01	G
CO-60	F	1.0099E-01				1.93E+03	
			1332.50	-1.996E-01	?(	1.342E+00 2.85E+02 1.00E+02	G
			1173.24	4.018E-01	&(P	8.888E-01 9.24E+01 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	7.6187E-01					2.44E+02	
			1115.55	7.619E-01	?(	2.846E+00	1.08E+02	5.06E+01 G
NB-94	I	1.2557E-01					7.41E+06	
			702.63	1.256E-01	?(P	8.917E-01	2.74E+02	9.79E+01 G
			871.10	-1.587E-01	+	1.160E+00	2.03E+02	9.99E+01 G
ZR-95	I	4.2819E-01					6.40E+01	
			756.73	4.282E-01	?(P	1.075E+00	9.72E+01	5.45E+01 G
			724.20	-5.994E-03	% P	2.868E+00	1.31E+04	4.42E+01 G
NB-95	I	-1.9078E-01					6.40E+01	
			765.79	-1.908E-01	?(	1.123E+00	1.66E+02	9.98E+01 G
RU-103	I	-7.4060E-02					3.93E+01	
			497.05	-7.406E-02	?(	9.457E-01	4.85E+02	9.09E+01 G
			610.30	-7.618E+00	+	3.976E+01	1.54E+02	5.75E+00 GA
AG-108M	C	2.1792E-01					1.53E+05	
			433.94	2.179E-01	?(P	6.141E-01	1.04E+02	9.05E+01 G
			722.94	2.956E-02	%	1.399E+00	1.30E+03	9.08E+01 G
			614.28	-2.210E-01	+	2.459E+00	3.24E+02	8.98E+01 G
AG-110M	F	3.0817E-01					2.50E+02	
			884.68	3.085E-01	?(	1.764E+00	1.62E+02	7.27E+01 G
			657.76	2.538E-01	?(	3.279E-01	4.19E+01	9.46E+01 G
			937.49	-1.687E+00	+	4.117E+00	1.04E+02	3.44E+01 G
			1384.30	0.000E+00	-	2.344E+00	1.00E+03	2.43E+01 G
			763.94	5.382E-01	?(P	3.943E+00	2.00E+02	2.23E+01 G
SN-113	F	3.3158E-01					1.15E+02	
			391.69	3.316E-01	?(	1.387E+00	1.22E+02	6.40E+01 G
SB-124	F	-4.5345E-02					6.02E+01	
			602.73	-4.391E-01	?(	2.471E+00	1.66E+02	9.83E+01 G
			1690.98	-3.181E-01	+	2.634E+00	3.44E+02	4.78E+01 G
			722.79	3.534E+00	?(	1.011E+01	8.44E+01	1.08E+01 G
SB-125	I	3.3504E-01					1.01E+03	
			427.88	-1.088E-01	?(P	2.485E+00	9.61E+02	2.96E+01 G
			600.50	-2.405E+00	+	1.399E+01	1.72E+02	1.79E+01 G
			635.89	0.000E+00	+	7.521E+00	1.00E+03	1.13E+01 G
			463.37	1.590E+00	&(P	9.417E+00	1.70E+02	1.05E+01 G
I-131	I	-3.7883E-01					8.02E+00	
			364.48	-3.788E-01	?(	9.975E-01	1.01E+02	8.17E+01 G
			284.30	-4.267E+00	+ P	1.238E+01	5.87E+01	6.14E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			636.97	-2.862E+00	+	1.348E+01	1.34E+02	7.17E+00 G
Gd-153	F	7.0482E-01					2.42E+02	
			97.50	5.171E-01	?(	2.083E+00	1.19E+02	3.00E+01 G
			103.20	9.631E-01	?(	2.478E+00	7.71E+01	2.18E+01 G
Ga-68	C	6.7029E+00					4.71E-02	
			1077.40	6.703E+00	?(	2.934E+01	1.74E+02	3.30E+00 G
Tc-99m	I	1.8534E-01					2.51E-01	
			140.51	1.853E-01	?(	8.284E-01	1.32E+02	8.93E+01 G
BA-133	F	-6.2527E-02					3.85E+03	
			356.00	-6.253E-02	?(	2.021E+00	9.30E+02	6.20E+01 G
			302.85	0.000E+00	+	7.435E+00	1.00E+03	1.83E+01 G
			383.84	-3.481E+00	&	1.370E+01	1.16E+02	8.94E+00 GA
			80.99	-3.652E-01	+	2.020E+00	1.92E+02	3.41E+01 GA
CS-134	I	-2.8255E-01					7.54E+02	
			604.71	-4.437E-01	?(	2.411E+00	1.60E+02	9.76E+01 G
			795.87	1.148E-01	+	1.493E+00	3.61E+02	8.55E+01 G
			569.32	-4.877E-01	+	5.743E+00	3.24E+02	1.54E+01 G
			801.95	-2.843E-01	%	1.543E+01	1.49E+03	8.69E+00 G
			563.24	1.602E+00	?(P	5.561E+00	1.24E+02	8.35E+00 G
CS-137	I	5.7251E-02					1.10E+04	
			661.66	5.725E-02	?(P	1.165E+00	5.55E+02	8.52E+01 G
CE-139	F	1.7199E-01					1.38E+02	
			165.85	1.720E-01	?(	6.914E-01	1.18E+02	7.99E+01 G
Ba-140	I	8.5945E-01					1.28E+01	
			537.26	8.594E-01	?(P	3.147E+00	1.40E+02	2.44E+01 G
			162.66	-9.273E-01	+	1.121E+01	3.50E+02	6.22E+00 G
			304.85	0.000E+00	-	3.193E+01	1.00E+03	4.29E+00 G
La-140	I	1.8452E-01					1.28E+01	
			1596.21	1.905E-02	%(P	1.269E+00	2.69E+03	9.54E+01 G
			487.02	-8.393E-01	+ P	2.132E+00	7.76E+01	4.55E+01 G
			328.76	9.621E-01	?(	2.713E+00	1.06E+02	2.03E+01 G
			815.77	-2.704E+00	+	8.945E+00	9.80E+01	2.33E+01 G
CE-141	I	-4.0464E-01					3.25E+01	
			145.44	-4.046E-01	?(	1.733E+00	1.27E+02	4.82E+01 G
CE-144	I	1.5258E+00					2.85E+02	
			133.54	1.526E+00	?(	7.178E+00	1.39E+02	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C -2.6721E-01				3.63E+02		
		696.54	-2.672E-01	?(	1.179E+00	1.78E+02	9.90E+01 G
		618.06	-7.709E-08	%	2.198E+00	8.22E+08	9.91E+01 G
EU-152	F 9.5638E-01				4.94E+03		
		344.29	0.000E+00	?(	4.120E+00	1.00E+03	2.65E+01 G
		1112.07	2.814E+00	?(	8.805E+00	9.09E+01	1.36E+01 G
		121.78	-6.741E-01	&	2.484E+00	1.09E+02	2.86E+01 G
		778.92	-1.989E+00	+	8.245E+00	1.65E+02	1.29E+01 G
		964.11	-1.572E+00	+	7.915E+00	2.05E+02	1.46E+01 G
		244.69	-3.371E+00	+	1.725E+01	1.52E+02	7.58E+00 G
		1408.00	0.000E+00	-	2.749E+00	1.00E+03	2.10E+01 GA
EU-154	I 2.1024E+00				3.14E+03		
		873.23	2.157E+00	?(	8.956E+00	1.18E+02	1.23E+01 G
		123.10	4.203E-01	-	1.712E+00	1.21E+02	4.08E+01 G
		1274.54	0.000E+00	-	2.692E+00	1.00E+03	3.52E+01 G
		723.36	0.000E+00	-	6.347E+00	1.00E+03	2.02E+01 G
		1004.77	-3.295E-01	-	6.841E+00	8.57E+02	1.80E+01 G
		996.33	2.039E+00	?(	1.319E+01	1.82E+02	1.06E+01 G
EU-155	I 5.9222E-01				1.81E+03		
		105.31	5.922E-01	(P	2.943E+00	1.46E+02	2.12E+01 G
		86.54	-6.381E-01	+	3.647E+00	1.70E+02	3.07E+01 G
HF-181	F 7.0792E-02				4.24E+01		
		482.00	-3.187E-02	%(	1.216E+00	1.06E+03	8.05E+01 G
		133.02	-4.697E-01	+	2.168E+00	1.37E+02	4.33E+01 G
		345.83	0.000E+00	+	7.271E+00	1.00E+03	1.51E+01 G
		136.30	1.483E+00	?(	1.316E+01	2.60E+02	5.85E+00 G
Ta-182	F 1.7634E-01				1.14E+02		
		1121.30	9.303E-02	&(	4.967E+00	1.46E+03	3.49E+01 G
		1221.41	2.840E-01	?(P	4.668E+00	6.84E+02	2.70E+01 G
		1189.05	-6.847E+00	+	1.274E+01	8.37E+01	1.62E+01 G
Hg-203	F 9.3892E-03				4.66E+01		
		279.20	9.389E-03	%(	8.706E-01	2.59E+03	8.15E+01 G
TL-208	N 6.7504E-01				6.98E+02		
		583.02	1.981E-01	(P	1.250E+00	2.36E+02	8.45E+01 G
		277.28	2.222E+00	?(P	8.127E+00	1.06E+02	6.31E+00 G
		860.56	3.134E+00	?(	7.138E+00	9.45E+01	1.24E+01 G
pm-146	C -8.8115E-01				2.02E+03		
		747.16	-8.811E-01	?(P	3.041E+00	1.15E+02	3.40E+01 G
		735.72	0.000E+00	+	3.996E+00	1.00E+03	2.25E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          453.88-2.891E-01 &   1.231E+00 1.65E+02 6.50E+01 G

y-88     F  -7.7066E-02                                     1.07E+02
                          898.04-7.707E-02 ?(  9.795E-01 4.94E+02 9.37E+01 G
                         1836.06 0.000E+00 +   7.259E-01 1.00E+03 9.92E+01 G

Cd-113m      7.9618E+02                                     5.33E+03
                          263.70 7.962E+02 &(  1.001E+04 3.53E+02 6.00E-03   K

Cd-109   F  -6.2254E+00                                     4.53E+02
                           88.04-6.225E+00 &(  3.179E+01 1.52E+02 3.79E+00 G

Cf-251   T   9.4050E-01                                     3.28E+05
                          176.60 9.405E-01 ?(  2.849E+00 1.10E+02 1.70E+01 G
                          227.00 9.649E-02 %   8.953E+00 3.24E+03 6.30E+00 GA

Cf-249   T   4.9872E-01                                     1.28E+05
                          387.95 3.181E-01 &(  1.410E+00 1.29E+02 6.60E+01 G
                          333.44 1.267E+00  (  3.892E+00 1.15E+02 1.55E+01 G

Sn-126       3.4355E-01                                     3.65E+07
                           87.57-6.302E-01 &   3.142E+00 1.49E+02 3.75E+01 GA
                           64.28 3.436E-01 ?(  9.451E+00 7.97E+02 9.70E+00 G
                           86.94-2.620E+00 +   1.295E+01 1.47E+02 9.04E+00 GA

PB-210   N  -3.2937E+00                                     8.14E+03
                           46.54-3.294E+00  (P 2.730E+01 2.70E+02 4.25E+00 G

PB-212   N   1.6975E+00                                     6.98E+02
                          238.63 1.698E+00  (P 1.535E+00 3.01E+01 4.33E+01 G
                          300.03-1.808E+00 &   4.159E+01 6.70E+02 3.28E+00 GA

PB-214   N   4.6349E+00                                     5.84E+05
                          351.93 3.910E+00 *(P 1.481E+00 1.80E+01 3.76E+01 G
                          295.09 6.048E+00 *(P 2.314E+00 1.98E+01 1.93E+01 G
                          242.00 3.415E+00   P 7.029E+00 6.29E+01 7.43E+00 GA

BI-207   C  -1.4717E-01                                     1.18E+04
                          569.70-1.472E-01 ?(  9.589E-01 1.84E+02 9.77E+01 G
                         1063.66-8.042E-01 + P 1.993E+00 3.69E+01 7.45E+01 G

BI-212   N   3.6296E+00                                     6.98E+02
                          727.17 3.630E+00  (P 1.544E+01 1.23E+02 7.55E+00 G
                          785.42 1.547E+01 ? P 6.312E+01 1.57E+02 1.28E+00 GA

U-235    N  -1.8585E+00                                     2.57E+11
                          143.79-1.858E+00  (P 7.153E+00 9.62E+01 1.10E+01 G
                          205.33-1.123E-01 %   9.981E+00 3.09E+03 5.01E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	-1.917E-01	% P	1.409E+01	2.18E+03	5.08E+00 G
			185.72	3.599E-02	% P	1.223E+00	1.18E+03	5.40E+01 GA
BI-214	N	4.8613E+00						5.84E+05
			609.31	4.861E+00	(P	1.525E+00	1.68E+01	4.61E+01 G
			1120.29	8.635E-01	& P	1.097E+01	3.52E+02	1.51E+01 G
			1764.49	7.978E+00	+	4.523E+00	2.77E+01	1.54E+01 G
BI-210M	T	-3.7895E-01						1.10E+09
			265.83	-3.790E-01	(P	1.417E+00	1.14E+02	5.00E+01 G
			304.90	0.000E+00	+	4.893E+00	1.00E+03	2.80E+01 G
AC-228	N	3.7524E+00						2.10E+03
			911.07	3.752E+00	?(	1.393E+00	2.24E+01	2.90E+01 G
			968.97	9.240E+00	+	3.970E+00	2.14E+01	1.75E+01 G
			338.32	1.380E+00	&	8.591E+00	1.81E+02	1.20E+01 G
			93.35	3.974E+00	?	2.068E+01	1.55E+02	5.56E+00 XA
TH-227	N	-3.7764E+00						7.95E+03
			50.14	-3.776E+00	?(P	1.273E+01	1.12E+02	8.00E+00 G
			256.24	1.944E-01	% P	8.584E+00	1.53E+03	7.00E+00 G
TH-229	N	1.9005E-01						2.68E+06
			193.51	1.901E-01	%(P	1.226E+01	2.27E+03	4.40E+00 G
			210.85	7.684E-01	%	2.178E+01	1.01E+03	2.99E+00 G
TH-234	N	9.8282E+00						1.63E+12
			63.29	9.828E+00	(P	1.583E+01	5.75E+01	3.81E+00 G
			92.59	-1.988E+00	- P	2.117E+01	3.12E+02	5.58E+00 G
PA-233	C	-5.7417E-01						7.82E+08
			312.01	-5.742E-01	&(P	3.982E+00	1.17E+02	3.60E+01 G
			300.18	0.000E+00	&	2.183E+01	1.00E+03	6.20E+00 G
PA-234	N	1.0161E+00						1.63E+12
			131.29	-1.123E+00	&(	5.015E+00	1.33E+02	1.80E+01 G
			946.02	-6.362E-01	+ P	7.202E+00	2.19E+02	1.34E+01 G
			569.47	3.431E+00	?(	9.357E+00	8.06E+01	8.20E+00 G
			883.24	2.964E+00	&(	1.171E+01	1.13E+02	9.60E+00 G
			880.53	4.723E+00	?	1.561E+01	9.52E+01	6.00E+00 GA
PA-234M	N	2.0884E+01						1.63E+12
			1001.00	-1.482E-01	%(P	1.806E+02	1.59E+04	8.37E-01 G
			766.41	8.076E+01	?(	2.436E+02	8.74E+01	2.94E-01 G
AM-241	T	-2.1255E-01						1.58E+05
			59.54	-2.126E-01	?(P	2.191E+00	3.54E+02	3.59E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-237	F -1.6298E+00					2.14E+06	
		86.49	-1.630E+00	(	8.765E+00	1.60E+02	1.31E+01 G
Ir-192	F 2.8671E-01					7.40E+01	
		316.49	4.969E-02	?(	9.033E-01	5.12E+02	8.70E+01 G
		468.06	4.754E-01	?(	1.837E+00	1.12E+02	5.18E+01 G
		308.44	6.288E-01	?(	4.119E+00	1.92E+02	3.18E+01 G
Cs-136	F 1.4873E-01					1.30E+01	
		818.50	-3.467E-01	?(	2.283E+00	1.92E+02	1.00E+02 G
		1048.07	7.680E-01	?(	5.660E-01	3.16E+01	8.00E+01 G
		340.57	0.000E+00	-	2.309E+00	1.00E+03	4.69E+01 G
Np-239	T 4.5245E-01					2.36E+00	
		103.70	5.330E-01	?	2.475E+00	1.36E+02	2.40E+01 X
		106.13	4.525E-01	&(	2.699E+00	1.74E+02	2.27E+01 G
		99.50	-1.275E+00	+	4.873E+00	1.13E+02	1.50E+01 X
Nd-147	3.6628E-01					1.11E+01	
		531.00	-5.458E-01	?(	5.827E+00	3.98E+02	1.30E+01 G
		91.10	7.853E-01	?(	4.047E+00	1.54E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line

M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	84.	-5.	-0.003	270.40	-3.294E+00	P
TH-227	50.14	81.	-13.	-0.007	111.74	-3.776E+00	P
AM-241	59.54	76.	-4.	-0.002	354.36	-2.126E-01	P
Sn-126	64.28	126.	2.	0.001	796.87	3.436E-01	
BA-133	80.99	102.	-9.	-0.005	191.81	-3.652E-01	
Np-237	86.49	320.	-16.	-0.009	160.03	-1.630E+00	
EU-155	86.54	304.	-15.	-0.008	169.86	-6.381E-01	
Sn-126	86.94	335.	-18.	-0.010	147.33	-2.620E+00	
Sn-126	87.57	341.	-18.	-0.010	148.57	-6.302E-01	
Cd-109	88.04	359.	-18.	-0.010	152.20	-6.225E+00	
Nd-147	91.10	333.	17.	0.009	153.51	7.853E-01	
Gd-153	97.50	98.	12.	0.007	119.01	5.171E-01	
Np-239	99.50	138.	-15.	-0.008	113.44	-1.275E+00	
Gd-153	103.20	74.	17.	0.009	77.13	9.631E-01	
Np-239	103.70	90.	10.	0.006	136.48	5.330E-01	
EU-155	105.31	101.	10.	0.006	146.09	5.922E-01	P
Np-239	106.13	97.	8.	0.005	174.46	4.525E-01	
EU-152	121.78	131.	-15.	-0.008	109.47	-6.741E-01	
CO-57	122.06	146.	-15.	-0.008	115.25	-2.253E-01	
EU-154	123.10	126.	13.	0.007	120.66	4.203E-01	
PA-234	131.29	208.	-16.	-0.009	132.72	-1.123E+00	
HF-181	133.02	223.	-16.	-0.009	137.20	-4.697E-01	
CE-144	133.54	158.	13.	0.007	139.24	1.526E+00	
HF-181	136.30	145.	7.	0.004	259.69	1.483E+00	
Tc-99m	140.51	122.	12.	0.007	132.03	1.853E-01	
U-235	143.79	144.	-15.	-0.008	96.23	-1.858E+00	P
CE-141	145.44	162.	-14.	-0.008	127.06	-4.046E-01	
Ba-140	162.66	96.	-4.	-0.002	350.00	-9.273E-01	
CE-139	165.85	59.	10.	0.005	117.93	1.720E-01	
Cf-251	176.60	40.	11.	0.006	110.29	9.405E-01	
EU-152	244.69	194.	-13.	-0.007	151.58	-3.371E+00	
Cd-113m	263.70	33.	2.	0.001	352.54	7.962E+02	
BI-210M	265.83	46.	-9.	-0.005	113.80	-3.790E-01	P
TL-208	277.28	21.	7.	0.004	106.16	2.222E+00	P
I-131	284.30	48.	-12.	-0.007	58.68	-4.267E+00	P
TL-210	296.00	164.	-9.	-0.005	199.02	-2.612E-01	
Ir-192	308.44	134.	9.	0.005	192.28	6.288E-01	
PA-233	312.01	159.	-9.	-0.005	117.43	-5.742E-01	P
Ir-192	316.49	43.	2.	0.001	512.17	4.969E-02	
CR-51	320.08	45.	1.	0.001	953.94	2.395E-01	
La-140	328.76	18.	8.	0.004	105.74	9.621E-01	
Cf-249	333.44	22.	8.	0.004	115.24	1.267E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	356.00	96.	-2.	-0.001	929.76	-6.253E-02	
I-131	364.48	37.	-12.	-0.007	100.76	-3.788E-01	
BA-133	383.84	81.	-11.	-0.006	116.11	-3.481E+00	
Cf-249	387.95	44.	8.	0.004	128.88	3.181E-01	
SN-113	391.69	39.	8.	0.004	121.69	3.316E-01	
SB-125	427.88	22.	-1.	-0.001	961.36	-1.088E-01	P
AG-108M	433.94	11.	7.	0.004	103.69	2.179E-01	P
pm-146	453.88	24.	-6.	-0.003	164.99	-2.891E-01	
SB-125	463.37	37.	5.	0.003	169.86	1.590E+00	P
Ir-192	468.06	33.	8.	0.004	112.46	4.754E-01	
BE-7	477.60	14.	6.	0.003	101.53	1.792E+00	
La-140	487.02	33.	-12.	-0.006	77.64	-8.393E-01	P
RU-103	497.05	24.	-2.	-0.001	484.77	-7.406E-02	
RH-106	511.86	27.	45.	0.025	32.89	7.779E+00	P
Nd-147	531.00	16.	-2.	-0.001	397.91	-5.458E-01	
Ba-140	537.26	16.	6.	0.003	140.44	8.594E-01	P
CS-134	563.24	4.	4.	0.002	123.97	1.602E+00	P
CS-134	569.32	20.	-2.	-0.001	324.04	-4.877E-01	
PA-234	569.47	14.	8.	0.004	80.55	3.431E+00	
BI-207	569.70	23.	-4.	-0.002	183.54	-1.472E-01	
TL-208	583.02	29.	4.	0.002	235.81	1.981E-01	P
SB-125	600.50	172.	-11.	-0.006	171.70	-2.405E+00	
SB-124	602.73	161.	-11.	-0.006	166.05	-4.391E-01	
CS-134	604.71	150.	-11.	-0.006	160.26	-4.437E-01	
RU-103	610.30	139.	-11.	-0.006	153.90	-7.618E+00	
AG-108M	614.28	128.	-5.	-0.003	324.21	-2.210E-01	
I-131	636.97	20.	-5.	-0.003	134.16	-2.862E+00	
AG-110M	657.76	0.	6.	0.003	41.87	2.538E-01	
CS-137	661.66	20.	1.	0.001	555.10	5.725E-02	P
PM-144	696.54	26.	-6.	-0.003	178.21	-2.672E-01	
NB-94	702.63	13.	3.	0.002	274.01	1.256E-01	P
SB-124	722.79	21.	8.	0.005	84.43	3.534E+00	
BI-212	727.17	24.	6.	0.003	122.51	3.630E+00	P
pm-146	747.16	17.	-6.	-0.004	114.93	-8.811E-01	P
ZR-95	756.73	4.	5.	0.003	97.19	4.282E-01	P
AG-110M	763.94	11.	3.	0.001	200.32	5.382E-01	P
NB-95	765.79	20.	-4.	-0.002	165.83	-1.908E-01	
PA-234M	766.41	7.	5.	0.003	87.40	8.076E+01	
EU-152	778.92	17.	-5.	-0.003	165.12	-1.989E+00	
BI-212	785.42	9.	4.	0.002	156.69	1.547E+01	P
CS-134	795.87	25.	2.	0.001	360.56	1.148E-01	
CO-58	810.77	57.	-13.	-0.007	89.76	-6.280E-01	
La-140	815.77	70.	-13.	-0.007	97.98	-2.704E+00	
Cs-136	818.50	84.	-7.	-0.004	191.74	-3.467E-01	
MN-54	834.85	19.	-10.	-0.006	93.65	-5.296E-01	
TL-208	860.56	9.	7.	0.004	94.51	3.134E+00	
NB-94	871.10	17.	-3.	-0.002	202.76	-1.587E-01	
EU-154	873.23	15.	5.	0.003	118.32	2.157E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	880.53	10.	5.	0.003	95.25	4.723E+00		
PA-234	883.24	15.	5.	0.003	113.13	2.964E+00		
AG-110M	884.68	21.	4.	0.002	161.51	3.085E-01		
Sc-46	889.28	36.	-8.	-0.004	117.81	-4.060E-01		
y-88	898.04	9.	-1.	-0.001	493.71	-7.707E-02		
AG-110M	937.49	23.	-10.	-0.006	103.93	-1.687E+00		
PA-234	946.02	10.	-2.	-0.001	218.77	-6.362E-01		P
EU-152	964.11	14.	-4.	-0.002	204.63	-1.572E+00		
EU-154	996.33	20.	4.	0.002	181.59	2.039E+00		
EU-154	1004.77	15.	-1.	-0.001	857.32	-3.295E-01		
Cs-136	1048.07	0.	10.	0.006	31.62	7.680E-01		
BI-207	1063.66	21.	-10.	-0.005	36.87	-8.042E-01		P
Ga-68	1077.40	5.	3.	0.002	173.74	6.703E+00		
FE-59	1099.25	15.	-5.	-0.003	176.07	-5.653E-01		
EU-152	1112.07	12.	6.	0.003	90.91	2.814E+00		
ZN-65	1115.55	18.	6.	0.003	107.66	7.619E-01		
CO-60	1173.24	5.	6.	0.003	92.42	4.018E-01		P
Ta-182	1189.05	35.	-16.	-0.009	83.66	-6.847E+00		
Ta-182	1221.41	11.	1.	0.001	684.37	2.840E-01		P
NA-22	1274.53	0.	5.	0.003	44.72	3.610E-01		
FE-59	1291.60	5.	3.	0.001	216.31	4.304E-01		P
TL-210	1313.00	11.	-2.	-0.001	452.11	-5.868E-01		
CO-60	1332.50	11.	-3.	-0.001	285.04	-1.996E-01		
SB-124	1690.98	6.	-2.	-0.001	343.80	-3.181E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.7919E+00	1.7920E+00	1.015E+02%	6.31E+00
NA-22	#A	3.6095E-01	3.6095E-01	4.472E+01%	5.32E-01
K-40		9.7845E+01	9.7845E+01	9.060E+00%	8.87E+00
Sc-46	#A	-4.0600E-01	-4.0600E-01	1.178E+02%	1.64E+00
CR-51	#A	2.3945E-01	2.3945E-01	9.539E+02%	8.13E+00
MN-54	#A	-5.2956E-01	-5.2956E-01	9.365E+01%	1.17E+00
FE-59	#A	-1.3388E-01	-1.3389E-01	1.395E+02%	2.35E+00
Co-56	#	5.0291E-01	5.0291E-01	3.310E+01%	3.81E-01
CO-57	#A	-2.2532E-01	-2.2532E-01	1.153E+02%	8.74E-01
CO-58	#A	-6.2802E-01	-6.2802E-01	8.976E+01%	1.90E+00
CO-60	#A	1.0099E-01	1.0099E-01	9.242E+01%	1.34E+00
ZN-65	#A	7.6187E-01	7.6187E-01	1.077E+02%	2.85E+00
NB-94	#A	1.2557E-01	1.2557E-01	2.740E+02%	8.92E-01
ZR-95	#A	4.2819E-01	4.2819E-01	9.719E+01%	1.08E+00
NB-95	#A	-1.9078E-01	-1.9078E-01	1.658E+02%	1.12E+00
RU-103	#A	-7.4059E-02	-7.4060E-02	4.848E+02%	9.46E-01

RH-106 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.99E+00
AG-108M#A	2.1792E-01	2.1792E-01	1.037E+02%	6.14E-01
AG-110M#A	3.0816E-01	3.0817E-01	4.187E+01%	1.76E+00
SN-113 #A	3.3158E-01	3.3158E-01	1.217E+02%	1.39E+00
SB-124 #A	-4.5344E-02	-4.5345E-02	8.443E+01%	2.47E+00
SB-125 #A	3.3504E-01	3.3504E-01	1.699E+02%	2.48E+00
I-131 #A	-3.7881E-01	-3.7883E-01	1.008E+02%	9.97E-01
Gd-153 #A	7.0482E-01	7.0482E-01	7.091E+01%	2.08E+00
Ga-68 #A	6.6348E+00	6.7029E+00	1.737E+02%	2.93E+01
Tc-99m #A	1.8498E-01	1.8534E-01	1.320E+02%	8.28E-01
BA-133 #A	-6.2527E-02	-6.2527E-02	9.298E+02%	2.02E+00
CS-134 #A	-2.8255E-01	-2.8255E-01	1.013E+02%	2.41E+00
CS-137 #A	5.7251E-02	5.7251E-02	5.551E+02%	1.17E+00
CE-139 #A	1.7199E-01	1.7199E-01	1.179E+02%	6.91E-01
Ba-140 #A	8.5941E-01	8.5945E-01	1.404E+02%	3.15E+00
La-140 #A	1.8451E-01	1.8452E-01	1.057E+02%	1.27E+00
CE-141 #A	-4.0463E-01	-4.0464E-01	1.271E+02%	1.73E+00
CE-144 #A	1.5258E+00	1.5258E+00	1.392E+02%	7.18E+00
PM-144 #A	-2.6721E-01	-2.6721E-01	1.782E+02%	1.18E+00
EU-152 #A	9.5638E-01	9.5638E-01	9.091E+01%	4.12E+00
EU-154 #A	2.1024E+00	2.1024E+00	1.084E+02%	8.96E+00
EU-155 #A	5.9222E-01	5.9222E-01	1.461E+02%	2.94E+00
HF-181 #A	7.0791E-02	7.0792E-02	2.597E+02%	1.22E+00
Ta-182 #A	1.7634E-01	1.7634E-01	6.844E+02%	4.97E+00
Hg-203 #A	9.3891E-03	9.3892E-03	2.589E+03%	8.71E-01
TL-208 #A	6.7504E-01	6.7504E-01	9.178E+01%	1.25E+00
pm-146 #A	-8.8115E-01	-8.8115E-01	1.149E+02%	3.04E+00
y-88 #A	-7.7066E-02	-7.7066E-02	4.937E+02%	9.80E-01
Cd-113m#A	7.9618E+02	7.9618E+02	3.525E+02%	1.00E+04
Cd-109 #A	-6.2254E+00	-6.2254E+00	1.522E+02%	3.18E+01
Cf-251 #A	9.4050E-01	9.4050E-01	1.103E+02%	2.85E+00
Cf-249 #A	4.9872E-01	4.9872E-01	8.645E+01%	1.41E+00
Sn-126 #A	3.4355E-01	3.4355E-01	7.969E+02%	9.45E+00
PB-210 #A	-3.2937E+00	-3.2937E+00	2.704E+02%	2.73E+01
PB-212 #	1.6975E+00	1.6975E+00	3.007E+01%	1.53E+00
PB-214	4.6349E+00	4.6349E+00	1.340E+01%	1.48E+00
BI-207 #A	-1.4717E-01	-1.4717E-01	1.835E+02%	9.59E-01
BI-212 #A	3.6296E+00	3.6296E+00	1.225E+02%	1.54E+01
U-235 #A	-1.8585E+00	-1.8585E+00	9.623E+01%	7.15E+00
BI-214	4.8613E+00	4.8613E+00	1.680E+01%	1.52E+00
BI-210M#A	-3.7895E-01	-3.7895E-01	1.138E+02%	1.42E+00
AC-228	3.7524E+00	3.7524E+00	2.244E+01%	1.39E+00
TH-227 #A	-3.7764E+00	-3.7764E+00	1.117E+02%	1.27E+01
TH-229 #A	1.9005E-01	1.9005E-01	2.270E+03%	1.23E+01
TH-234 #A	9.8282E+00	9.8282E+00	5.750E+01%	1.58E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	4.73E+01
PA-233 #A	-5.7417E-01	-5.7417E-01	1.174E+02%	3.98E+00
PA-234 #A	1.0161E+00	1.0161E+00	6.403E+01%	5.02E+00
PA-234M#A	2.0884E+01	2.0884E+01	8.740E+01%	1.81E+02

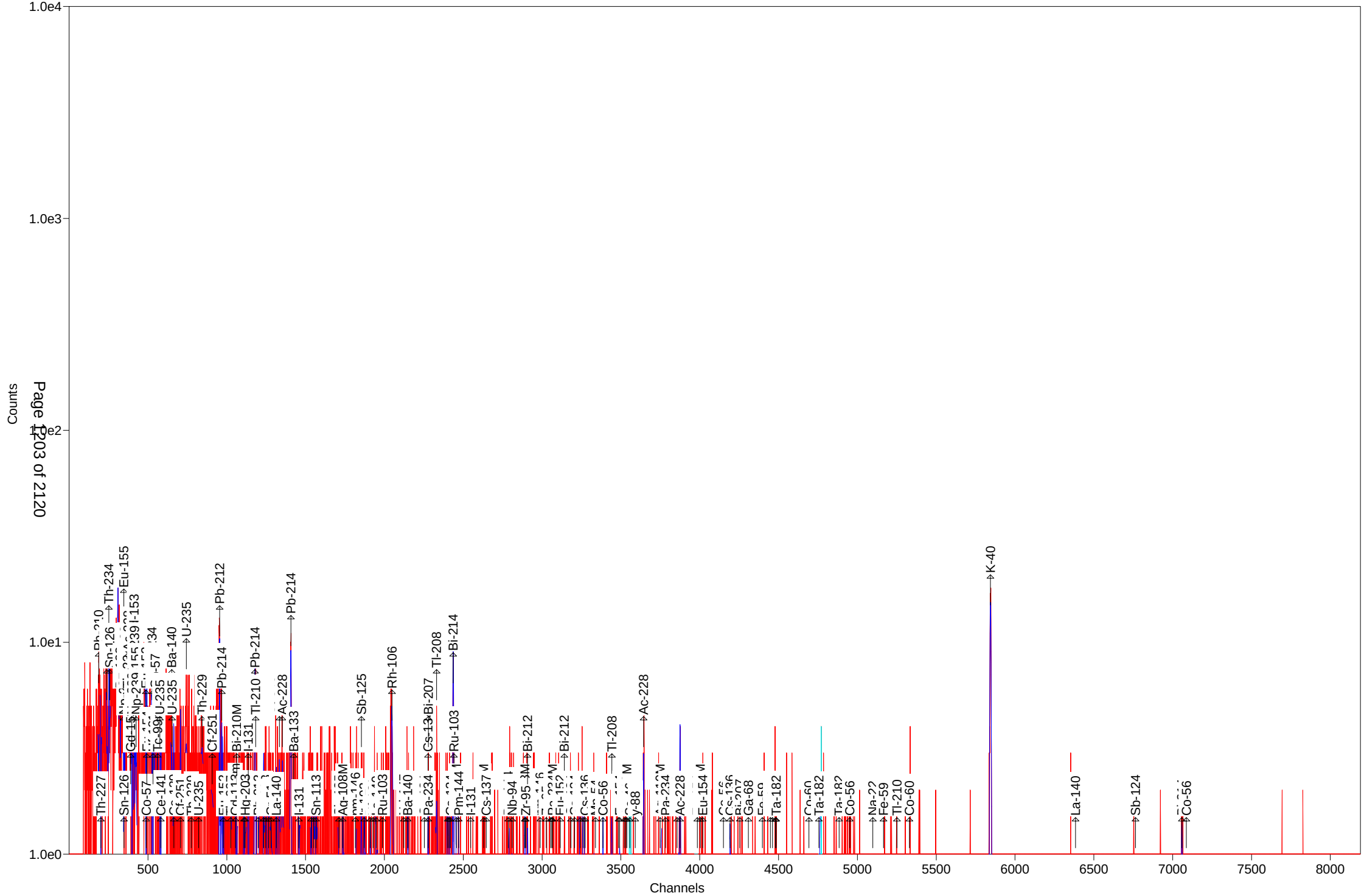
AM-241 #A	-2.1255E-01	-2.1255E-01	3.544E+02%		2.19E+00
Np-237 #A	-1.6298E+00	-1.6298E+00	1.600E+02%		8.76E+00
Ir-192 #A	2.8671E-01	2.8671E-01	1.125E+02%		9.03E-01
Cs-136 #A	1.4872E-01	1.4873E-01	3.162E+01%		2.28E+00
Np-239 #A	4.5236E-01	4.5245E-01	1.745E+02%		2.70E+00
Nd-147 #A	3.6627E-01	3.6628E-01	1.535E+02%		5.83E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.34E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.226E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.2261934E+02 Bq/Sample

379951_Gamma_160-29881-A-16-B. 14_Gamma_20183188.spc.



Test America St. Louis Spectrum ID: 15_Gamma_20182798

Sample Description: 379951_Gamma_160-29881-B-17-C
Detector: Detector #15
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-17-C

Decay to Time: 8/23/2018 07:09 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:10:14 Real Time: 1801 sec
Analysis Time: 8/23/2018 07:40 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.791E+00	106.4	2.970E+00	2.974E+00	1.018E+01
NA-22	3.943E-01	83.9	3.309E-01	3.315E-01	1.138E+00
K-40	1.663E+02	7.5	1.245E+01	1.508E+01	1.062E+01
Sc-46	6.526E-02	441.1	2.879E-01	2.879E-01	1.411E+00
CR-51	3.455E+00	181.7	6.278E+00	6.281E+00	2.117E+01
MN-54	3.122E-01	96.2	3.004E-01	3.008E-01	7.478E-01
FE-59	5.251E-01	232.7	1.222E+00	1.222E+00	2.802E+00
Co-56	-1.667E-02	124.9	2.082E-02	2.084E-02	1.354E+00
CO-57	-2.222E-01	106.2	2.359E-01	2.362E-01	7.966E-01
CO-58	-6.373E-01	62.3	3.969E-01	3.983E-01	1.820E+00
CO-60	1.871E-01	104.6	1.956E-01	1.959E-01	6.475E-01
ZN-65	6.804E-01	162.4	1.105E+00	1.106E+00	3.890E+00
NB-94	0.000E+00	1.#INF	5.168E-02	5.168E-02	1.041E+00
ZR-95	3.525E-01	190.0	6.696E-01	6.699E-01	1.683E+00
NB-95	2.725E-02	1319.1	3.595E-01	3.595E-01	1.325E+00
RU-103	-2.292E-01	112.0	2.567E-01	2.570E-01	1.117E+00
RH-106	1.894E+00	157.5	2.983E+00	2.985E+00	1.057E+01
AG-108M	6.219E-01	34.8	2.166E-01	2.189E-01	4.748E-01
AG-110M	3.089E-01	97.2	3.002E-01	3.006E-01	2.641E+00
SN-113	-4.584E-01	126.8	5.811E-01	5.816E-01	1.983E+00
SB-124	-1.041E-01	84.8	8.825E-02	8.842E-02	2.541E+00
SB-125	7.320E-01	129.4	9.469E-01	9.477E-01	2.470E+00
I-131	-2.752E-02	64.9	1.786E-02	1.792E-02	1.115E+00
Gd-153	0.000E+00	1.#INF	2.153E-01	2.153E-01	4.950E+00
Ga-68	1.039E+01	132.7	1.378E+01	1.380E+01	3.410E+01
Tc-99m	0.000E+00	1.#INF	1.580E-01	1.580E-01	1.242E+00
BA-133	4.462E-01	144.7	6.456E-01	6.460E-01	2.201E+00
CS-134	2.728E-01	64.7	1.765E-01	1.771E-01	2.443E+00
CS-137	-7.040E-01	53.4	3.760E-01	3.778E-01	1.869E+00
CE-139	1.535E-01	182.4	2.800E-01	2.803E-01	9.594E-01
Ba-140	2.400E-01	102.5	2.461E-01	2.464E-01	3.766E+00
La-140	-6.884E-01	219.2	1.509E+00	1.509E+00	1.993E+00
CE-141	-2.393E-01	57.2	1.370E-01	1.375E-01	2.301E+00

CE-144	1.716E+00	157.3	2.699E+00	2.700E+00	9.113E+00
PM-144	5.680E-02	88.0	4.998E-02	5.007E-02	1.176E+00
EU-152	1.096E+00	94.7	1.038E+00	1.040E+00	4.701E+00
EU-154	6.705E-01	93.7	6.284E-01	6.294E-01	8.766E+00
EU-155	-9.484E-01	134.4	1.275E+00	1.276E+00	6.922E+00
HF-181	2.636E-01	152.3	4.016E-01	4.018E-01	1.483E+00
Ta-182	1.455E+00	35.4	5.143E-01	5.194E-01	6.135E+00
Hg-203	3.019E-01	101.7	3.069E-01	3.074E-01	1.041E+00
TL-208	3.020E-01	90.0	2.718E-01	2.723E-01	1.415E+00
pm-146	-2.186E+00	36.8	8.055E-01	8.134E-01	4.347E+00
y-88	0.000E+00	1.#INF	1.329E-01	1.329E-01	1.160E+00
Cd-113m	1.541E+03	206.2	3.177E+03	3.179E+03	1.120E+04
Cd-109	0.000E+00	1.#INF	1.938E+00	1.938E+00	4.049E+01
Cf-251	5.043E-01	252.2	1.272E+00	1.272E+00	3.391E+00
Cf-249	3.342E-01	122.9	4.108E-01	4.112E-01	1.806E+00
Sn-126	3.474E+00	117.2	4.071E+00	4.075E+00	1.366E+01
PB-210	-2.486E+00	433.1	1.076E+01	1.077E+01	3.739E+01
PB-212	2.088E+00	22.2	4.631E-01	4.824E-01	1.212E+00
PB-214	3.356E+00	26.9	9.030E-01	9.197E-01	1.974E+00
BI-207	-3.052E-02	224.6	6.855E-02	6.856E-02	9.977E-01
BI-212	-8.261E-01	577.5	4.771E+00	4.771E+00	1.735E+01
U-235	-4.521E-01	76.9	3.476E-01	3.483E-01	1.137E+01
BI-214	3.918E+00	17.7	6.939E-01	7.231E-01	1.391E+00
BI-210M	-4.187E-01	118.1	4.945E-01	4.952E-01	1.689E+00
AC-228	2.302E+00	61.3	1.412E+00	1.417E+00	3.793E+00
TH-227	3.204E+00	160.6	5.147E+00	5.150E+00	1.749E+01
TH-229	3.512E+00	141.9	4.982E+00	4.990E+00	1.401E+01
TH-234	-1.139E+01	75.5	8.593E+00	8.613E+00	3.799E+01
PA-231	0.000E+00	1.#INF	4.721E+00	4.721E+00	7.526E+01
PA-233	0.000E+00	1.#INF	2.734E-01	2.734E-01	6.164E+00
PA-234	2.439E+00	69.7	1.701E+00	1.705E+00	5.125E+00
PA-234M	-1.756E+01	341.6	5.999E+01	6.000E+01	2.446E+02
AM-241	-1.065E+00	112.1	1.193E+00	1.195E+00	4.002E+00
Np-237	-2.084E+00	174.0	3.626E+00	3.628E+00	1.215E+01
Ir-192	0.000E+00	1.#INF	1.617E-01	1.617E-01	2.578E+00
Cs-136	2.290E-01	88.9	2.035E-01	2.039E-01	2.198E+00
Np-239	1.053E+00	174.6	1.839E+00	1.840E+00	6.170E+00
Nd-147	1.029E+00	188.4	1.939E+00	1.940E+00	5.073E+00
TL-210	-8.838E-01	88.4	7.812E-01	7.828E-01	2.620E+00
Total	1.765E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-17-C

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182798.An1

Acquisition information
Start time: 8/23/2018 7:10:14 AM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:09:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-08-11_1245.PBC 8/11/2018 12:45:21 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1865

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-4.	433.07	0.95	1.957E-02	46.54	4.250	PBC<MDA	PB210
50.14	10.	160.64	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
64.28	18.	117.21	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
86.94	16.	188.34	0.98	3.686E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.109E-01	EU155
					86.94	9.040	2.748E+00	Sn126
106.13	17.	174.60	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
121.78	3.	463.08	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.062E-02	CO57
123.10	15.	93.73	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
131.29	12.	150.38	1.02	3.775E-02	131.29	18.000	PBC<MDA	PA234
133.02	13.	152.33	1.03	3.759E-02	133.02	43.300	PBC<MDA	HF181
133.54	13.	157.28	1.03	3.754E-02	133.54	11.090	PBC<MDA	CE144
136.30	5.	402.50	1.03	3.725E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	7.171E-01	CO57
162.66	13.	102.52	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	12.	112.62	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	7.	182.36	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
176.60	5.	252.19	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
185.72	13.	100.02	1.07	3.123E-02	185.72	54.000	PBC<MDA	U235
193.51	9.	141.86	1.08	3.030E-02	193.51	4.400	PBC<MDA	TH229
210.85	5.	282.13	1.10	2.844E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.88	42.	22.18	1.12	2.592E-02	238.63	43.300	2.088E+00	PB212
244.69	8.	205.83	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152
263.70	4.	206.16	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	11.	90.00	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
279.20	10.	101.66	1.16	2.301E-02	279.20	81.460	PBC<MDA	Hg203
320.08	13.	181.72	1.19	2.070E-02	320.08	9.940	PBC<MDA	CR51
333.44	10.	122.95	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
351.71	44.	26.91	1.09	1.923E-02	351.93	37.600	3.356E+00	PB214
356.00	9.	144.69	1.22	1.906E-02	356.00	62.050	PBC<MDA	BA133
427.88	6.	129.36	1.28	1.647E-02	427.88	29.600	PBC<MDA	SB125
433.94	16.	34.83	1.29	1.629E-02	433.94	90.480	6.219E-01	AG108M
477.60	8.	106.43	1.32	1.508E-02	477.60	10.520	PBC<MDA	BE7
482.00	2.	446.21	1.33	1.497E-02	482.00	80.500	PBC<MDA	HF181
487.02	1.	921.95	1.33	1.485E-02	487.02	45.500	PBC<MDA	La140
511.86	41.	33.13	2.60	1.426E-02	511.86	20.000	7.987E+00	RH106
531.00	3.	188.41	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
569.32	5.	75.66	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.520E+00	PA234
					569.70	97.740	2.115E-01	BI207
569.47	5.	104.20	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.404E+00	PA234
					569.70	97.740	2.018E-01	BI207
609.51	42.	17.71	0.98	1.236E-02	609.31	46.090	4.081E+00	BI214
618.06	5.	87.99	1.44	1.222E-02	618.06	99.100	PBC<MDA	PM144
621.92	4.	157.49	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
636.97	7.	85.35	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
657.76	6.	97.19	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
722.79	7.	84.79	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.183E-01	AG108M
					723.36	20.220	1.880E+00	EU154
735.72	3.	151.99	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
756.73	4.	189.98	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
778.92	5.	94.72	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
785.42	12.	46.81	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
801.95	11.	108.68	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
834.85	5.	96.22	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
873.23	2.	309.87	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
880.53	8.	88.52	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
883.24	8.	101.48	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234
884.68	3.	342.85	1.64	9.036E-03	884.68	72.680	PBC<MDA	AG110M
911.07	8.	92.18	1.66	8.811E-03	911.07	29.000	PBC<MDA	AC228
937.49	3.	238.82	1.68	8.598E-03	937.49	34.360	PBC<MDA	AG110M
968.97	8.	80.89	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
996.33	1.	793.73	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1037.84	3.	189.20	1.75	7.875E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	88.85	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	1.	910.76	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	4.	132.68	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1099.25	4.	232.74	1.79	7.491E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	6.	106.83	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	5.	162.43	1.80	7.395E-03	1115.55	50.600	PBC<MDA	ZN65
1120.55	2.	441.13	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.305E-01	Sc46
					1121.30	34.900	3.741E-01	Ta182
1121.02	4.	192.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1173.24	6.	104.56	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	90.70	1.85	6.994E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	8.	35.36	1.87	6.830E-03	1221.41	27.000	2.410E+00	Ta182
1238.28	3.	333.92	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	5.	83.91	1.90	6.579E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.120E+00	EU154
1313.00	5.	121.64	1.93	6.408E-03	1313.00	21.000	PBC<MDA	TL210
1461.09	186.	7.49	2.19	5.828E-03	1460.83	10.670	1.663E+02	K40
1764.45	5.	65.74	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	131.	-4.	-0.002	433.07	0.946s
TH-227	200.23	50.14	127.	10.	0.006	160.64	0.950
AM-241	237.79	59.54	213.	-19.	-0.010	112.07	0.958s
TH-234	252.78	63.29	248.	-23.	-0.013	75.47	0.962
Sn-126	256.75	64.28	214.	18.	0.010	117.21	0.963s
Np-237	345.53	86.49	485.	-18.	-0.010	173.95	0.983s
EU-155	345.74	86.54	503.	-18.	-0.010	177.10	0.983s
Sn-126	347.33	86.94	474.	16.	0.009	188.34	0.984s
Sn-126	349.84	87.57	457.	0.	0.000	1000.00	0.984s
Cd-109	351.72	88.04	457.	0.	0.000	1000.00	0.985s
Nd-147	363.95	91.10	457.	0.	0.000	1000.00	0.987
TH-234	369.91	92.59	481.	-23.	-0.013	80.16	0.989s
AC-228	372.95	93.35	457.	0.	0.000	1000.00	0.990s
Gd-153	389.54	97.50	457.	0.	0.000	1000.00	0.993s
Np-239	397.53	99.50	457.	0.	0.000	1000.00	0.995s
Gd-153	412.32	103.20	457.	0.	0.000	1000.00	0.998
Np-239	414.32	103.70	457.	0.	0.000	1000.00	0.999s
EU-155	420.77	105.31	457.	-14.	-0.008	134.40	1.001
Np-239	424.03	106.13	416.	17.	0.009	174.60	1.001
EU-152	486.57	121.78	95.	3.	0.002	463.08	1.016s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	487.72	122.06	91.	-13.	-0.007	106.19	1.016s
EU-154	491.87	123.10	91.	15.	0.008	93.73	1.017s
PA-234	524.63	131.29	166.	12.	0.007	150.38	1.024s
HF-181	531.54	133.02	185.	13.	0.007	152.33	1.026s
CE-144	533.60	133.54	198.	13.	0.007	157.28	1.026s
HF-181	544.63	136.30	211.	5.	0.003	402.50	1.029s
CO-57	545.33	136.47	216.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	216.	0.	0.000	1000.00	1.032s
U-235	574.56	143.79	287.	-18.	-0.010	104.66	1.036s
CE-141	581.17	145.44	223.	-8.	-0.004	57.25	1.037s
Ba-140	650.01	162.66	78.	13.	0.007	102.52	1.053
U-235	652.88	163.38	91.	12.	0.007	112.62	1.053
CE-139	662.77	165.85	90.	7.	0.004	182.36	1.055s
Cf-251	705.73	176.60	44.	5.	0.003	252.19	1.065s
U-235	742.19	185.72	44.	13.	0.007	100.02	1.073s
TH-229	773.33	193.51	44.	9.	0.005	141.86	1.080s
TH-229	842.65	210.85	52.	5.	0.003	282.13	1.096s
PB-212	953.72	238.63	22.	42.	0.023	22.18	1.121D
PB-214	967.17	242.00	159.	-14.	-0.008	129.46	1.123s
EU-152	977.95	244.69	120.	8.	0.004	205.83	1.126s
TH-227	1024.12	256.24	77.	-18.	-0.010	93.77	1.136
Cd-113m	1053.94	263.70	32.	4.	0.002	206.16	1.142s
BI-210M	1062.46	265.83	52.	-9.	-0.005	118.11	1.144s
TL-208	1108.25	277.28	40.	11.	0.006	90.00	1.154s
Hg-203	1115.91	279.20	48.	10.	0.006	101.66	1.156s
I-131	1136.30	284.30	44.	-7.	-0.004	189.34	1.160s
PB-214	1179.44	295.09	257.	-20.	-0.011	53.65	1.170
TL-210	1183.08	296.00	263.	-14.	-0.008	164.81	1.170s
PB-212	1199.19	300.03	279.	-15.	-0.008	19.19	1.174s
PA-231	1199.35	300.07	292.	-14.	-0.008	173.15	1.174s
PA-231	1209.66	302.65	307.	0.	0.000	1000.00	1.176s
BA-133	1210.47	302.85	307.	0.	0.000	1000.00	1.176s
Ba-140	1218.46	304.85	307.	0.	0.000	1000.00	1.178s
BI-210M	1218.64	304.90	307.	0.	0.000	1000.00	1.178s
Ir-192	1232.81	308.44	307.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	307.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	307.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	264.	13.	0.007	181.72	1.191s
Cf-249	1332.77	333.44	68.	10.	0.005	122.95	1.203s
AC-228	1352.28	338.32	78.	0.	0.000	1000.00	1.207s
Cs-136	1361.28	340.57	78.	0.	0.000	1000.00	1.209s
EU-152	1376.13	344.29	78.	0.	0.000	1000.00	1.212s
HF-181	1382.30	345.83	96.	-11.	-0.006	127.86	1.213s
PB-214	1405.81	351.71	24.	44.	0.024	26.91	1.089
BA-133	1422.97	356.00	90.	9.	0.005	144.69	1.222s
I-131	1456.89	364.48	36.	-12.	-0.007	97.79	1.229s
BA-133	1534.29	383.84	58.	0.	0.000	1000.00	1.246s
Cf-249	1550.72	387.95	58.	0.	0.000	1000.00	1.249s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	1565.67	391.69	65.	-9.	-0.005	126.77	1.253s
SB-125	1710.36	427.88	17.	6.	0.004	129.36	1.283s
AG-108M	1734.60	433.94	5.	16.	0.009	34.83	1.288s
pm-146	1814.35	453.88	22.	-2.	-0.001	238.86	1.304
SB-125	1852.29	463.37	31.	-1.	-0.001	510.74	1.312s
BE-7	1909.18	477.60	32.	8.	0.004	106.43	1.324s
HF-181	1926.79	482.00	40.	2.	0.001	446.21	1.328s
La-140	1946.87	487.02	42.	1.	0.001	921.95	1.332s
RU-103	1987.00	497.05	26.	-5.	-0.003	112.02	1.340s
RH-106	2046.22	511.86	21.	41.	0.023	33.13	2.602s
Nd-147	2122.75	531.00	9.	3.	0.002	188.41	1.368s
Ba-140	2147.78	537.26	18.	-3.	-0.002	189.78	1.373s
CS-134	2251.67	563.24	13.	-3.	-0.002	252.03	1.394s
CS-134	2276.00	569.32	4.	5.	0.003	75.66	1.399s
PA-234	2276.59	569.47	9.	5.	0.003	104.20	1.399s
BI-207	2277.52	569.70	19.	-3.	-0.002	224.61	1.399s
SB-125	2400.69	600.50	142.	-11.	-0.006	95.90	1.424
SB-124	2409.62	602.73	131.	-11.	-0.006	149.21	1.425
CS-134	2417.53	604.71	118.	-11.	-0.006	141.93	1.427s
BI-214	2436.73	609.51	6.	42.	0.023	17.71	0.979s
RU-103	2439.88	610.30	107.	-9.	-0.005	161.46	1.431s
PM-144	2470.93	618.06	7.	5.	0.003	87.99	1.437s
RH-106	2486.35	621.92	19.	4.	0.002	157.49	1.440s
SB-125	2542.23	635.89	22.	-5.	-0.003	148.46	1.451s
I-131	2546.57	636.97	15.	7.	0.004	85.35	1.452s
AG-110M	2629.71	657.76	12.	6.	0.003	97.19	1.469s
CS-137	2645.30	661.66	43.	-12.	-0.007	53.41	1.472s
PM-144	2784.82	696.54	19.	-2.	-0.001	296.67	1.499s
NB-94	2809.17	702.63	14.	0.	0.000	1000.00	1.503s
SB-124	2889.79	722.79	16.	7.	0.004	84.79	1.519s
AG-108M	2890.40	722.94	23.	0.	0.000	1000.00	1.519s
EU-154	2892.07	723.36	23.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	23.	0.	0.000	1000.00	1.520s
BI-212	2907.33	727.17	23.	-1.	-0.001	577.47	1.522s
pm-146	2941.53	735.72	5.	3.	0.002	151.99	1.529s
pm-146	2987.29	747.16	29.	-14.	-0.008	36.84	1.537s
ZR-95	3025.56	756.73	9.	4.	0.002	189.98	1.544s
AG-110M	3054.42	763.94	14.	-4.	-0.002	162.88	1.550s
PA-234M	3064.30	766.41	35.	-11.	-0.006	60.54	1.552s
EU-152	3114.33	778.92	5.	5.	0.003	94.72	1.561s
BI-212	3140.33	785.42	5.	12.	0.007	46.81	1.566s
CS-134	3182.12	795.87	71.	-15.	-0.009	80.91	1.574s
TL-210	3197.05	799.60	86.	-16.	-0.009	88.39	1.577s
CS-134	3206.46	801.95	66.	11.	0.006	108.68	1.578s
CO-58	3241.75	810.78	39.	-11.	-0.006	62.28	1.585s
La-140	3261.74	815.77	50.	-8.	-0.004	135.31	1.589s
MN-54	3338.05	834.85	5.	5.	0.003	96.22	1.603s
Co-56	3385.75	846.77	19.	-8.	-0.004	124.88	1.612

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	3440.93	860.56	14.	-7.	-0.004	93.58	1.622s
EU-154	3491.60	873.23	10.	2.	0.001	309.87	1.631s
PA-234	3520.80	880.53	21.	8.	0.004	88.52	1.636s
PA-234	3531.64	883.24	29.	8.	0.004	101.48	1.638s
AG-110M	3537.42	884.68	37.	3.	0.001	342.85	1.639s
Sc-46	3555.81	889.28	19.	0.	0.000	1000.00	1.642s
y-88	3590.85	898.04	10.	0.	0.000	1000.00	1.649s
AC-228	3642.98	911.07	10.	8.	0.005	92.18	1.658s
AG-110M	3748.69	937.49	10.	3.	0.002	238.82	1.677s
PA-234	3782.81	946.02	20.	-8.	-0.004	127.88	1.683s
EU-152	3855.18	964.11	32.	-2.	-0.001	406.20	1.696s
AC-228	3874.63	968.97	19.	8.	0.005	80.89	1.699s
EU-154	3984.09	996.33	31.	1.	0.001	793.73	1.718s
PA-234M	4002.77	1001.00	34.	-2.	-0.001	341.59	1.722s
EU-154	4017.88	1004.77	33.	-1.	-0.001	818.54	1.724s
Co-56	4150.18	1037.84	5.	3.	0.002	189.20	1.747s
Cs-136	4191.11	1048.07	13.	6.	0.004	88.85	1.754s
BI-207	4253.49	1063.66	15.	1.	0.001	910.76	1.765s
Ga-68	4308.47	1077.40	5.	4.	0.002	132.68	1.774s
FE-59	4395.90	1099.25	16.	4.	0.002	232.74	1.789s
EU-152	4447.22	1112.07	19.	6.	0.003	106.83	1.797s
ZN-65	4461.11	1115.55	25.	5.	0.003	162.43	1.800s
BI-214	4480.08	1120.29	24.	4.	0.002	192.01	1.803s
Sc-46	4481.13	1120.55	28.	2.	0.001	441.13	1.803s
CO-60	4691.97	1173.24	6.	6.	0.003	104.56	1.838s
Ta-182	4755.25	1189.05	5.	6.	0.004	90.70	1.848s
Ta-182	4884.75	1221.41	0.	8.	0.004	35.36	1.869s
Co-56	4952.26	1238.28	16.	3.	0.002	333.92	1.879s
NA-22	5097.34	1274.53	5.	5.	0.003	83.91	1.902s
EU-154	5097.40	1274.54	10.	0.	0.000	1000.00	1.902s
FE-59	5165.64	1291.60	16.	-1.	-0.001	914.69	1.913s
TL-210	5251.31	1313.00	5.	5.	0.003	121.64	1.926
AG-110M	5536.68	1384.30	6.	-1.	0.000	846.32	1.970s
EU-152	5631.56	1408.00	0.	0.	0.000	1000.00	1.984s
K-40	5844.08	1461.09	4.	186.	0.103	7.49	2.186
La-140	6384.98	1596.21	11.	-6.	-0.004	219.20	2.092s
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	2.	5.	0.003	65.74	2.181s
Co-56	7086.23	1771.35	7.	0.	0.000	1000.00	2.184s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.7909E+00					5.31E+01	
			477.60	2.791E+00	?(	1.018E+01	1.06E+02 1.05E+01	G
NA-22	C	3.9431E-01					9.50E+02	
			1274.53	3.943E-01	?(	1.138E+00	8.39E+01 9.99E+01	G
K-40	N	1.6629E+02					4.66E+11	
			1460.83	1.663E+02	(P	1.062E+01	7.49E+00 1.07E+01	G
Sc-46	F	6.5261E-02					8.38E+01	
			889.28	0.000E+00	?(	1.411E+00	1.00E+03 1.00E+02	G
			1120.55	1.305E-01	?(	2.073E+00	4.41E+02 1.00E+02	G
CR-51	F	3.4549E+00					2.77E+01	
			320.08	3.455E+00	&(P	2.117E+01	1.82E+02 9.94E+00	G
MN-54	C	3.1216E-01					3.12E+02	
			834.85	3.122E-01	?(	7.478E-01	9.62E+01 1.00E+02	G
FE-59	F	5.2506E-01					4.45E+01	
			1099.25	5.251E-01	?(	2.802E+00	2.33E+02 5.65E+01	G
			1291.60	-1.978E-01	+	4.223E+00	9.15E+02 4.32E+01	G
Co-56	C	-1.6674E-02					7.73E+01	
			846.77	-4.544E-01	?(	1.354E+00	1.25E+02 9.99E+01	G
			1238.28	3.460E-01	&(P	2.676E+00	3.34E+02 6.61E+01	G
			1037.84	1.383E+00	?(P	6.674E+00	1.89E+02 1.41E+01	G
			1771.35	0.000E+00	+	1.102E+01	1.00E+03 1.55E+01	A
CO-57	C	-2.2218E-01					2.72E+02	
			122.06	-2.222E-01	?(	7.966E-01	1.06E+02 8.56E+01	G
			136.47	0.000E+00	&	9.947E+00	1.00E+03 1.07E+01	G
CO-58	C	-6.3727E-01					7.09E+01	
			810.78	-6.373E-01	?(P	1.820E+00	6.23E+01 9.95E+01	G
CO-60	F	1.8710E-01					1.93E+03	
			1332.50	-6.897E-02	%(P	6.475E-01	1.19E+03 1.00E+02	G
			1173.24	4.434E-01	?(P	1.116E+00	1.05E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	6.8039E-01					2.44E+02	
			1115.55	6.804E-01	?(	3.890E+00	1.62E+02	5.06E+01 G
ZR-95	I	3.5247E-01					6.40E+01	
			756.73	3.525E-01	?(P	1.683E+00	1.90E+02	5.45E+01 G
			724.20	0.000E+00	-	2.945E+00	1.00E+03	4.42E+01 G
NB-95	I	2.7253E-02					6.40E+01	
			765.79	2.725E-02	%(	1.325E+00	1.32E+03	9.98E+01 G
RU-103	I	-2.2917E-01					3.93E+01	
			497.05	-2.292E-01	?(P	1.117E+00	1.12E+02	9.09E+01 G
			610.30	-7.251E+00	+	3.989E+01	1.61E+02	5.75E+00 GA
RH-106	I	1.8943E+00					3.74E+02	
			621.92	1.894E+00	?(P	1.057E+01	1.57E+02	9.93E+00 G
			1050.36	-1.852E+00	% P	1.062E+02	1.30E+03	1.56E+00 G
			511.86	7.987E+00	?	4.688E+00	3.31E+01	2.00E+01 GA
AG-108M	C	6.2189E-01					1.53E+05	
			433.94	6.219E-01	&(P	4.748E-01	3.48E+01	9.05E+01 G
			722.94	0.000E+00	&	1.429E+00	1.00E+03	9.08E+01 G
			614.28	9.604E-08	%	2.459E+00	7.34E+08	8.98E+01 G
AG-110M	F	3.0890E-01					2.50E+02	
			884.68	2.171E-01	?(	2.641E+00	3.43E+02	7.27E+01 G
			657.76	2.867E-01	?(	9.651E-01	9.72E+01	9.46E+01 G
			937.49	5.642E-01	?(	3.281E+00	2.39E+02	3.44E+01 G
			1384.30	-2.494E-01	+	5.163E+00	8.46E+02	2.43E+01 G
			763.94	-8.527E-01	+	4.983E+00	1.63E+02	2.23E+01 G
SN-113	F	-4.5841E-01					1.15E+02	
			391.69	-4.584E-01	?(	1.983E+00	1.27E+02	6.40E+01 G
SB-124	F	-1.0408E-01					6.02E+01	
			602.73	-5.022E-01	?(	2.541E+00	1.49E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.677E+00	1.00E+03	4.78E+01 G
			722.79	3.515E+00	&(	1.014E+01	8.48E+01	1.08E+01 G
SB-125	I	7.3202E-01					1.01E+03	
			427.88	7.320E-01	?(P	2.470E+00	1.29E+02	2.96E+01 G
			600.50	-2.779E+00	+ P	1.449E+01	9.59E+01	1.79E+01 G
			635.89	-1.921E+00	+	1.004E+01	1.48E+02	1.13E+01 G
			463.37	-4.053E-01	- P	9.864E+00	5.11E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	-2.7523E-02					8.02E+00	
			364.48	-4.374E-01	?(P	1.115E+00	9.78E+01	8.17E+01 G
			284.30	-2.792E+00	+	1.341E+01	1.89E+02	6.14E+00 G
			636.97	4.643E+00	?(	1.350E+01	8.54E+01	7.17E+00 G
Ga-68	C	1.0388E+01					4.71E-02	
			1077.40	1.039E+01	?(	3.410E+01	1.33E+02	3.30E+00 G
BA-133	F	4.4621E-01					3.85E+03	
			356.00	4.462E-01	?(	2.201E+00	1.45E+02	6.20E+01 G
			302.85	0.000E+00	&	1.183E+01	1.00E+03	1.83E+01 G
			383.84	0.000E+00	-	1.322E+01	1.00E+03	8.94E+00 GA
			80.99	-4.752E-02	% P	2.174E+00	1.67E+03	3.41E+01 GA
CS-134	I	2.7277E-01					7.54E+02	
			604.71	-5.074E-01	?(	2.443E+00	1.42E+02	9.76E+01 G
			795.87	-1.017E+00	+	2.752E+00	8.09E+01	8.55E+01 G
			569.32	1.343E+00	?(	3.429E+00	7.57E+01	1.54E+01 G
			801.95	7.142E+00	?(	2.634E+01	1.09E+02	8.69E+00 G
			563.24	-1.513E+00	+	9.843E+00	2.52E+02	8.35E+00 G
CS-137	I	-7.0402E-01					1.10E+04	
			661.66	-7.040E-01	?(P	1.869E+00	5.34E+01	8.52E+01 G
CE-139	F	1.5352E-01					1.38E+02	
			165.85	1.535E-01	?(	9.594E-01	1.82E+02	7.99E+01 G
Ba-140	I	2.4003E-01					1.28E+01	
			537.26	-5.531E-01	?(P	3.766E+00	1.90E+02	2.44E+01 G
			162.66	3.350E+00	&(	1.160E+01	1.03E+02	6.22E+00 G
			304.85	0.000E+00	-	5.081E+01	1.00E+03	4.29E+00 G
La-140	I	-6.8836E-01					1.28E+01	
			1596.21	-6.884E-01	?(P	1.993E+00	2.19E+02	9.54E+01 G
			487.02	8.225E-02	+	2.707E+00	9.22E+02	4.55E+01 G
			328.76	1.575E-01	%	6.987E+00	1.28E+03	2.03E+01 G
			815.77	-1.885E+00	+	8.765E+00	1.35E+02	2.33E+01 G
CE-141	I	-2.3927E-01					3.25E+01	
			145.44	-2.393E-01	?(P	2.301E+00	5.72E+01	4.82E+01 G
CE-144	I	1.7157E+00					2.85E+02	
			133.54	1.716E+00	(	9.113E+00	1.57E+02	1.11E+01 G
PM-144	C	5.6799E-02					3.63E+02	
			696.54	-1.159E-01	?(P	1.176E+00	2.97E+02	9.90E+01 G
			618.06	2.293E-01	?(	6.968E-01	8.80E+01	9.91E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F 1.0962E+00					4.94E+03	
		344.29	0.000E+00	?(	4.701E+00	1.00E+03	2.65E+01 G
		1112.07	3.432E+00	?(	1.269E+01	1.07E+02	1.36E+01 G
		121.78	1.516E-01	&(	2.432E+00	4.63E+02	2.86E+01 G
		778.92	2.314E+00	?(	5.448E+00	9.47E+01	1.29E+01 G
		964.11	-9.064E-01	&	1.318E+01	4.06E+02	1.46E+01 G
		244.69	2.206E+00	?(	1.551E+01	2.06E+02	7.58E+00 G
		1408.00	0.000E+00	-	3.237E+00	1.00E+03	2.10E+01 GA
EU-154	I 6.7045E-01					3.14E+03	
		873.23	1.156E+00	?(	8.766E+00	3.10E+02	1.23E+01 G
		123.10	5.316E-01	&(	1.674E+00	9.37E+01	4.08E+01 G
		1274.54	0.000E+00	-	4.187E+00	1.00E+03	3.52E+01 G
		723.36	0.000E+00	-	6.425E+00	1.00E+03	2.02E+01 G
		1004.77	-3.809E-01	+	1.123E+01	8.19E+02	1.80E+01 G
		996.33	6.424E-01	?(	1.841E+01	7.94E+02	1.06E+01 G
EU-155	I -9.4844E-01					1.81E+03	
		105.31	-9.484E-01	(P	6.922E+00	1.34E+02	2.12E+01 G
		86.54	-8.891E-01	&	5.276E+00	1.77E+02	3.07E+01 G
HF-181	F 2.6362E-01					4.24E+01	
		482.00	9.353E-02	?(	1.483E+00	4.46E+02	8.05E+01 G
		133.02	4.386E-01	&(	2.257E+00	1.52E+02	4.33E+01 G
		345.83	-2.110E+00	+	9.155E+00	1.28E+02	1.51E+01 G
		136.30	1.309E+00	&(	1.794E+01	4.03E+02	5.85E+00 G
Ta-182	F 1.4546E+00					1.14E+02	
		1121.30	-7.207E-02	%(	6.135E+00	2.34E+03	3.49E+01 G
		1221.41	2.410E+00	?(	2.220E+00	3.54E+01	2.70E+01 G
		1189.05	3.152E+00	&(	6.606E+00	9.07E+01	1.62E+01 G
Hg-203	F 3.0188E-01					4.66E+01	
		279.20	3.019E-01	?(P	1.041E+00	1.02E+02	8.15E+01 G
TL-208	N 3.0204E-01					6.98E+02	
		583.02	2.457E-02	%(P	1.415E+00	2.23E+03	8.45E+01 G
		277.28	4.018E+00	?(P	1.221E+01	9.00E+01	6.31E+00 G
		860.56	-3.617E+00	+ P	9.884E+00	9.36E+01	1.24E+01 G
pm-146	C -2.1864E+00					2.02E+03	
		747.16	-2.186E+00	?(P	4.347E+00	3.68E+01	3.40E+01 G
		735.72	7.613E-01	+ P	3.005E+00	1.52E+02	2.25E+01 G
		453.88	-1.347E-01	& P	1.349E+00	2.39E+02	6.50E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cd-113m		1.5413E+03					5.33E+03	
			263.70	1.541E+03	&(	1.120E+04	2.06E+02	6.00E-03 K
Cf-251	T	5.0426E-01					3.28E+05	
			176.60	5.043E-01	&(	3.391E+00	2.52E+02	1.70E+01 G
			227.00	1.092E-01	%	1.013E+01	3.40E+03	6.30E+00 GA
Cf-249	T	3.3416E-01					1.28E+05	
			387.95	0.000E+00	?(	1.806E+00	1.00E+03	6.60E+01 G
			333.44	1.756E+00	&(	7.355E+00	1.23E+02	1.55E+01 G
Sn-126		3.4736E+00					3.65E+07	
			87.57	0.000E+00	-	4.101E+00	1.00E+03	3.75E+01 GA
			64.28	3.474E+00	?(	1.366E+01	1.17E+02	9.70E+00 G
			86.94	2.748E+00		1.736E+01	1.88E+02	9.04E+00 GA
PB-210	N	-2.4855E+00					8.14E+03	
			46.54	-2.486E+00	(P	3.739E+01	4.33E+02	4.25E+00 G
PB-212	N	2.0877E+00					6.98E+02	
			238.63	2.088E+00	(P	1.212E+00	2.22E+01	4.33E+01 G
			300.03	-1.173E+01	& P	6.269E+01	1.92E+01	3.28E+00 GA
PB-214	N	3.3557E+00					5.84E+05	
			351.93	3.356E+00	(P	1.974E+00	2.69E+01	3.76E+01 G
			295.09	-2.613E+00	- P	1.012E+01	5.36E+01	1.93E+01 G
			242.00	-4.103E+00	&	1.792E+01	1.29E+02	7.43E+00 GA
BI-207	C	-3.0518E-02					1.18E+04	
			569.70	-1.233E-01	?(	9.977E-01	2.25E+02	9.77E+01 G
			1063.66	9.115E-02	?(P	2.011E+00	9.11E+02	7.45E+01 G
BI-212	N	-8.2613E-01					6.98E+02	
			727.17	-8.261E-01	?(P	1.735E+01	5.77E+02	7.55E+00 G
			785.42	5.354E+01	?	5.546E+01	4.68E+01	1.28E+00 GA
U-235	N	-4.5214E-01					2.57E+11	
			143.79	-2.527E+00	(P	1.137E+01	1.05E+02	1.10E+01 G
			205.33	3.279E-01	& P	1.190E+01	1.33E+03	5.01E+00 G
			163.38	4.024E+00	?(P	1.532E+01	1.13E+02	5.08E+00 G
			185.72	4.255E-01		1.108E+00	1.00E+02	5.40E+01 GA
BI-214	N	3.9179E+00					5.84E+05	
			609.31	4.081E+00	(P	1.391E+00	1.77E+01	4.61E+01 G
			1120.29	1.895E+00	- P	1.286E+01	1.92E+02	1.51E+01 G
			1764.49	3.431E+00	?(P	7.203E+00	6.57E+01	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	-4.1870E-01						1.10E+09	
			265.83	-4.187E-01	?(	1.689E+00	1.18E+02	5.00E+01	G
			304.90	0.000E+00	+	7.785E+00	1.00E+03	2.80E+01	G
AC-228	N	2.3022E+00						2.10E+03	
			911.07	1.773E+00	&(	3.793E+00	9.22E+01	2.90E+01	G
			968.97	3.182E+00	?(	8.698E+00	8.09E+01	1.75E+01	G
			338.32	0.000E+00	-	1.023E+01	1.00E+03	1.20E+01	G
			93.35	0.000E+00	-	2.702E+01	1.00E+03	5.56E+00	XA
TH-227	N	3.2042E+00						7.95E+03	
			50.14	3.204E+00	(	1.749E+01	1.61E+02	8.00E+00	G
			256.24	-5.844E+00	+	1.409E+01	9.38E+01	7.00E+00	G
TH-229	N	3.5123E+00						2.68E+06	
			193.51	3.750E+00	?(	1.401E+01	1.42E+02	4.40E+00	G
			210.85	3.162E+00	?(P	2.376E+01	2.82E+02	2.99E+00	G
TH-234	N	-1.1386E+01						1.63E+12	
			63.29	-1.139E+01	(P	3.799E+01	7.55E+01	3.81E+00	G
			92.59	-6.169E+00	+ P	2.764E+01	8.02E+01	5.58E+00	G
PA-234	N	2.4389E+00						1.63E+12	
			131.29	1.008E+00	&(	5.125E+00	1.50E+02	1.80E+01	G
			946.02	-3.888E+00	+	1.145E+01	1.28E+02	1.34E+01	G
			569.47	2.404E+00	?(	8.796E+00	1.04E+02	8.20E+00	G
			883.24	5.152E+00	?(	1.789E+01	1.01E+02	9.60E+00	G
			880.53	8.211E+00	?	2.473E+01	8.85E+01	6.00E+00	GA
PA-234M	N	-1.7563E+01						1.63E+12	
			1001.00	-1.756E+01	?(P	2.446E+02	3.42E+02	8.37E-01	G
			766.41	-2.108E+02	+ P	5.634E+02	6.05E+01	2.94E-01	G
AM-241	T	-1.0649E+00						1.58E+05	
			59.54	-1.065E+00	?(	4.002E+00	1.12E+02	3.59E+01	G
Np-237	F	-2.0843E+00						2.14E+06	
			86.49	-2.084E+00	&(	1.215E+01	1.74E+02	1.31E+01	G
Cs-136	F	2.2904E-01						1.30E+01	
			818.50	-3.836E-02	%(	2.198E+00	1.62E+03	1.00E+02	G
			1048.07	5.633E-01	?(	1.716E+00	8.89E+01	8.00E+01	G
			340.57	0.000E+00	-	2.634E+00	1.00E+03	4.69E+01	G
Np-239	T	1.0531E+00						2.36E+00	
			103.70	0.000E+00	-	6.125E+00	1.00E+03	2.40E+01	X
			106.13	1.053E+00	&(	6.170E+00	1.75E+02	2.27E+01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                           99.50 0.000E+00 -   9.861E+00 1.00E+03 1.50E+01 X

Nd-147       1.0293E+00                                        1.11E+01
                          531.00 1.029E+00 ?(  5.073E+00 1.88E+02 1.30E+01 G
                           91.10 0.000E+00 &   5.352E+00 1.00E+03 2.83E+01 G

TL-210   N  -8.8382E-01                                        5.84E+05
                          799.60-8.838E-01 ?(  2.620E+00 8.84E+01 9.90E+01 G
                          296.00-4.505E-01 +   2.501E+00 1.65E+02 7.90E+01 G
                         1313.00 1.927E+00 ?   5.562E+00 1.22E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	131.	-4.	-0.002	433.07	-2.486E+00	P
TH-227	50.14	127.	10.	0.006	160.64	3.204E+00	
AM-241	59.54	213.	-19.	-0.010	112.07	-1.065E+00	
TH-234	63.29	248.	-23.	-0.013	75.47	-1.139E+01	P
Sn-126	64.28	214.	18.	0.010	117.21	3.474E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	86.49	485.	-18.	-0.010	173.95	-2.084E+00	
EU-155	86.54	503.	-18.	-0.010	177.10	-8.891E-01	
Sn-126	86.94	474.	16.	0.009	188.34	2.748E+00	
TH-234	92.59	481.	-23.	-0.013	80.16	-6.169E+00	P
EU-155	105.31	457.	-14.	-0.008	134.40	-9.484E-01	P
Np-239	106.13	416.	17.	0.009	174.60	1.053E+00	
EU-152	121.78	95.	3.	0.002	463.08	1.516E-01	
CO-57	122.06	91.	-13.	-0.007	106.19	-2.222E-01	
EU-154	123.10	91.	15.	0.008	93.73	5.316E-01	
PA-234	131.29	166.	12.	0.007	150.38	1.008E+00	
HF-181	133.02	185.	13.	0.007	152.33	4.386E-01	
CE-144	133.54	198.	13.	0.007	157.28	1.716E+00	
HF-181	136.30	211.	5.	0.003	402.50	1.309E+00	
U-235	143.79	287.	-18.	-0.010	104.66	-2.527E+00	P
CE-141	145.44	223.	-8.	-0.004	57.25	-2.393E-01	P
Ba-140	162.66	78.	13.	0.007	102.52	3.350E+00	
U-235	163.38	91.	12.	0.007	112.62	4.024E+00	P
CE-139	165.85	90.	7.	0.004	182.36	1.535E-01	
Cf-251	176.60	44.	5.	0.003	252.19	5.043E-01	
U-235	185.72	44.	13.	0.007	100.02	4.255E-01	
TH-229	193.51	44.	9.	0.005	141.86	3.750E+00	
TH-229	210.85	52.	5.	0.003	282.13	3.162E+00	P
EU-152	244.69	120.	8.	0.004	205.83	2.206E+00	
TH-227	256.24	77.	-18.	-0.010	93.77	-5.844E+00	
Cd-113m	263.70	32.	4.	0.002	206.16	1.541E+03	
BI-210M	265.83	52.	-9.	-0.005	118.11	-4.187E-01	
TL-208	277.28	40.	11.	0.006	90.00	4.018E+00	P
Hg-203	279.20	48.	10.	0.006	101.66	3.019E-01	P
I-131	284.30	44.	-7.	-0.004	189.34	-2.792E+00	
TL-210	296.00	263.	-14.	-0.008	164.81	-4.505E-01	
PA-231	300.07	292.	-14.	-0.008	173.15	-1.466E+01	
CR-51	320.08	264.	13.	0.007	181.72	3.455E+00	P
Cf-249	333.44	68.	10.	0.005	122.95	1.756E+00	
HF-181	345.83	96.	-11.	-0.006	127.86	-2.110E+00	
BA-133	356.00	90.	9.	0.005	144.69	4.462E-01	
I-131	364.48	36.	-12.	-0.007	97.79	-4.374E-01	P
SN-113	391.69	65.	-9.	-0.005	126.77	-4.584E-01	
SB-125	427.88	17.	6.	0.004	129.36	7.320E-01	P
pm-146	453.88	22.	-2.	-0.001	238.86	-1.347E-01	P
SB-125	463.37	31.	-1.	-0.001	510.74	-4.053E-01	P
BE-7	477.60	32.	8.	0.004	106.43	2.791E+00	
HF-181	482.00	40.	2.	0.001	446.21	9.353E-02	
La-140	487.02	42.	1.	0.001	921.95	8.225E-02	
RU-103	497.05	26.	-5.	-0.003	112.02	-2.292E-01	P
RH-106	511.86	21.	41.	0.023	33.13	7.987E+00	
Nd-147	531.00	9.	3.	0.002	188.41	1.029E+00	
Ba-140	537.26	18.	-3.	-0.002	189.78	-5.531E-01	P
CS-134	563.24	13.	-3.	-0.002	252.03	-1.513E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	569.32	4.	5.	0.003	75.66	1.343E+00	
PA-234	569.47	9.	5.	0.003	104.20	2.404E+00	
BI-207	569.70	19.	-3.	-0.002	224.61	-1.233E-01	
SB-125	600.50	142.	-11.	-0.006	95.90	-2.779E+00	P
SB-124	602.73	131.	-11.	-0.006	149.21	-5.022E-01	
CS-134	604.71	118.	-11.	-0.006	141.93	-5.074E-01	
RU-103	610.30	107.	-9.	-0.005	161.46	-7.251E+00	
PM-144	618.06	7.	5.	0.003	87.99	2.293E-01	
RH-106	621.92	19.	4.	0.002	157.49	1.894E+00	P
SB-125	635.89	22.	-5.	-0.003	148.46	-1.921E+00	
I-131	636.97	15.	7.	0.004	85.35	4.643E+00	
AG-110M	657.76	12.	6.	0.003	97.19	2.867E-01	
CS-137	661.66	43.	-12.	-0.007	53.41	-7.040E-01	P
PM-144	696.54	19.	-2.	-0.001	296.67	-1.159E-01	P
SB-124	722.79	16.	7.	0.004	84.79	3.515E+00	
BI-212	727.17	23.	-1.	-0.001	577.47	-8.261E-01	P
pm-146	735.72	5.	3.	0.002	151.99	7.613E-01	P
pm-146	747.16	29.	-14.	-0.008	36.84	-2.186E+00	P
ZR-95	756.73	9.	4.	0.002	189.98	3.525E-01	P
AG-110M	763.94	14.	-4.	-0.002	162.88	-8.527E-01	
PA-234M	766.41	35.	-11.	-0.006	60.54	-2.108E+02	P
EU-152	778.92	5.	5.	0.003	94.72	2.314E+00	
BI-212	785.42	5.	12.	0.007	46.81	5.354E+01	
CS-134	795.87	71.	-15.	-0.009	80.91	-1.017E+00	
TL-210	799.60	86.	-16.	-0.009	88.39	-8.838E-01	
CS-134	801.95	66.	11.	0.006	108.68	7.142E+00	
CO-58	810.78	39.	-11.	-0.006	62.28	-6.373E-01	P
La-140	815.77	50.	-8.	-0.004	135.31	-1.885E+00	
MN-54	834.85	5.	5.	0.003	96.22	3.122E-01	
Co-56	846.77	19.	-8.	-0.004	124.88	-4.544E-01	
TL-208	860.56	14.	-7.	-0.004	93.58	-3.617E+00	P
EU-154	873.23	10.	2.	0.001	309.87	1.156E+00	
PA-234	880.53	21.	8.	0.004	88.52	8.211E+00	
PA-234	883.24	29.	8.	0.004	101.48	5.152E+00	
AG-110M	884.68	37.	3.	0.001	342.85	2.171E-01	
AC-228	911.07	10.	8.	0.005	92.18	1.773E+00	
AG-110M	937.49	10.	3.	0.002	238.82	5.642E-01	
PA-234	946.02	20.	-8.	-0.004	127.88	-3.888E+00	
EU-152	964.11	32.	-2.	-0.001	406.20	-9.064E-01	
AC-228	968.97	19.	8.	0.005	80.89	3.182E+00	
EU-154	996.33	31.	1.	0.001	793.73	6.424E-01	
PA-234M	1001.00	34.	-2.	-0.001	341.59	-1.756E+01	P
EU-154	1004.77	33.	-1.	-0.001	818.54	-3.809E-01	
Co-56	1037.84	5.	3.	0.002	189.20	1.383E+00	P
Cs-136	1048.07	13.	6.	0.004	88.85	5.633E-01	
BI-207	1063.66	15.	1.	0.001	910.76	9.115E-02	P
Ga-68	1077.40	5.	4.	0.002	132.68	1.039E+01	
FE-59	1099.25	16.	4.	0.002	232.74	5.251E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	1112.07	19.	6.	0.003	106.83	3.432E+00		
ZN-65	1115.55	25.	5.	0.003	162.43	6.804E-01		
Sc-46	1120.55	28.	2.	0.001	441.13	1.305E-01		
CO-60	1173.24	6.	6.	0.003	104.56	4.434E-01		P
Ta-182	1189.05	5.	6.	0.004	90.70	3.152E+00		
Ta-182	1221.41	0.	8.	0.004	35.36	2.410E+00		
Co-56	1238.28	16.	3.	0.002	333.92	3.460E-01		P
NA-22	1274.53	5.	5.	0.003	83.91	3.943E-01		
FE-59	1291.60	16.	-1.	-0.001	914.69	-1.978E-01		
TL-210	1313.00	5.	5.	0.003	121.64	1.927E+00		
AG-110M	1384.30	6.	-1.	0.000	846.32	-2.494E-01		
La-140	1596.21	11.	-6.	-0.004	219.20	-6.884E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.7909E+00	2.7909E+00	1.064E+02%	1.02E+01
NA-22	#A	3.9431E-01	3.9431E-01	8.391E+01%	1.14E+00
K-40		1.6629E+02	1.6629E+02	7.490E+00%	1.06E+01
Sc-46	#A	6.5260E-02	6.5261E-02	4.411E+02%	1.41E+00
CR-51	#A	3.4548E+00	3.4549E+00	1.817E+02%	2.12E+01
MN-54	#A	3.1216E-01	3.1216E-01	9.622E+01%	7.48E-01
FE-59	#A	5.2505E-01	5.2506E-01	2.327E+02%	2.80E+00
Co-56	#A	-1.6673E-02	-1.6674E-02	1.249E+02%	1.35E+00
CO-57	#A	-2.2218E-01	-2.2218E-01	1.062E+02%	7.97E-01
CO-58	#A	-6.3726E-01	-6.3727E-01	6.228E+01%	1.82E+00
CO-60	#A	1.8710E-01	1.8710E-01	1.046E+02%	6.47E-01
ZN-65	#A	6.8039E-01	6.8039E-01	1.624E+02%	3.89E+00
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.04E+00
ZR-95	#A	3.5246E-01	3.5247E-01	1.900E+02%	1.68E+00
NB-95	#A	2.7252E-02	2.7253E-02	1.319E+03%	1.33E+00
RU-103	#A	-2.2917E-01	-2.2917E-01	1.120E+02%	1.12E+00
RH-106	#A	1.8943E+00	1.8943E+00	1.575E+02%	1.06E+01
AG-108M	#	6.2189E-01	6.2189E-01	3.483E+01%	4.75E-01
AG-110M	#A	3.0890E-01	3.0890E-01	9.719E+01%	2.64E+00
SN-113	#A	-4.5841E-01	-4.5841E-01	1.268E+02%	1.98E+00
SB-124	#A	-1.0408E-01	-1.0408E-01	8.479E+01%	2.54E+00
SB-125	#A	7.3202E-01	7.3202E-01	1.294E+02%	2.47E+00
I-131	#A	-2.7521E-02	-2.7523E-02	6.490E+01%	1.12E+00
Gd-153	#A	0.0000E+00	0.0000E+00	7.071E+02%	4.95E+00
Ga-68	#A	1.0258E+01	1.0388E+01	1.327E+02%	3.41E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.24E+00
BA-133	#A	4.4621E-01	4.4621E-01	1.447E+02%	2.20E+00
CS-134	#A	2.7277E-01	2.7277E-01	6.470E+01%	2.44E+00

CS-137 #A	-7.0402E-01	-7.0402E-01	5.341E+01%	1.87E+00
CE-139 #A	1.5352E-01	1.5352E-01	1.824E+02%	9.59E-01
Ba-140 #A	2.4002E-01	2.4003E-01	1.025E+02%	3.77E+00
La-140 #A	-6.8833E-01	-6.8836E-01	2.192E+02%	1.99E+00
CE-141 #A	-2.3927E-01	-2.3927E-01	5.725E+01%	2.30E+00
CE-144 #A	1.7157E+00	1.7157E+00	1.573E+02%	9.11E+00
PM-144 #A	5.6799E-02	5.6799E-02	8.799E+01%	1.18E+00
EU-152 #A	1.0962E+00	1.0962E+00	9.472E+01%	4.70E+00
EU-154 #A	6.7045E-01	6.7045E-01	9.373E+01%	8.77E+00
EU-155 #A	-9.4844E-01	-9.4844E-01	1.344E+02%	6.92E+00
HF-181 #A	2.6362E-01	2.6362E-01	1.523E+02%	1.48E+00
Ta-182 #A	1.4546E+00	1.4546E+00	3.536E+01%	6.14E+00
Hg-203 #A	3.0187E-01	3.0188E-01	1.017E+02%	1.04E+00
TL-208 #A	3.0204E-01	3.0204E-01	9.000E+01%	1.42E+00
pm-146 #A	-2.1864E+00	-2.1864E+00	3.684E+01%	4.35E+00
y-88 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.16E+00
Cd-113m#A	1.5413E+03	1.5413E+03	2.062E+02%	1.12E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	4.05E+01
Cf-251 #A	5.0426E-01	5.0426E-01	2.522E+02%	3.39E+00
Cf-249 #A	3.3416E-01	3.3416E-01	1.229E+02%	1.81E+00
Sn-126 #A	3.4736E+00	3.4736E+00	1.172E+02%	1.37E+01
PB-210 #A	-2.4855E+00	-2.4855E+00	4.331E+02%	3.74E+01
PB-212	2.0877E+00	2.0877E+00	2.218E+01%	1.21E+00
PB-214	3.3557E+00	3.3557E+00	2.691E+01%	1.97E+00
BI-207 #A	-3.0518E-02	-3.0518E-02	2.246E+02%	9.98E-01
BI-212 #A	-8.2613E-01	-8.2613E-01	5.775E+02%	1.73E+01
U-235 #A	-4.5214E-01	-4.5214E-01	7.687E+01%	1.14E+01
BI-214	3.9179E+00	3.9179E+00	1.771E+01%	1.39E+00
BI-210M#A	-4.1870E-01	-4.1870E-01	1.181E+02%	1.69E+00
AC-228 #A	2.3022E+00	2.3022E+00	6.132E+01%	3.79E+00
TH-227 #A	3.2042E+00	3.2042E+00	1.606E+02%	1.75E+01
TH-229 #A	3.5123E+00	3.5123E+00	1.419E+02%	1.40E+01
TH-234 #A	-1.1386E+01	-1.1386E+01	7.547E+01%	3.80E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.53E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.16E+00
PA-234 #A	2.4389E+00	2.4389E+00	6.974E+01%	5.13E+00
PA-234M#A	-1.7563E+01	-1.7563E+01	3.416E+02%	2.45E+02
AM-241 #A	-1.0649E+00	-1.0649E+00	1.121E+02%	4.00E+00
Np-237 #A	-2.0843E+00	-2.0843E+00	1.740E+02%	1.21E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.58E+00
Cs-136 #A	2.2903E-01	2.2904E-01	8.885E+01%	2.20E+00
Np-239 #A	1.0528E+00	1.0531E+00	1.746E+02%	6.17E+00
Nd-147 #A	1.0293E+00	1.0293E+00	1.884E+02%	5.07E+00
TL-210 #A	-8.8382E-01	-8.8382E-01	8.839E+01%	2.62E+00

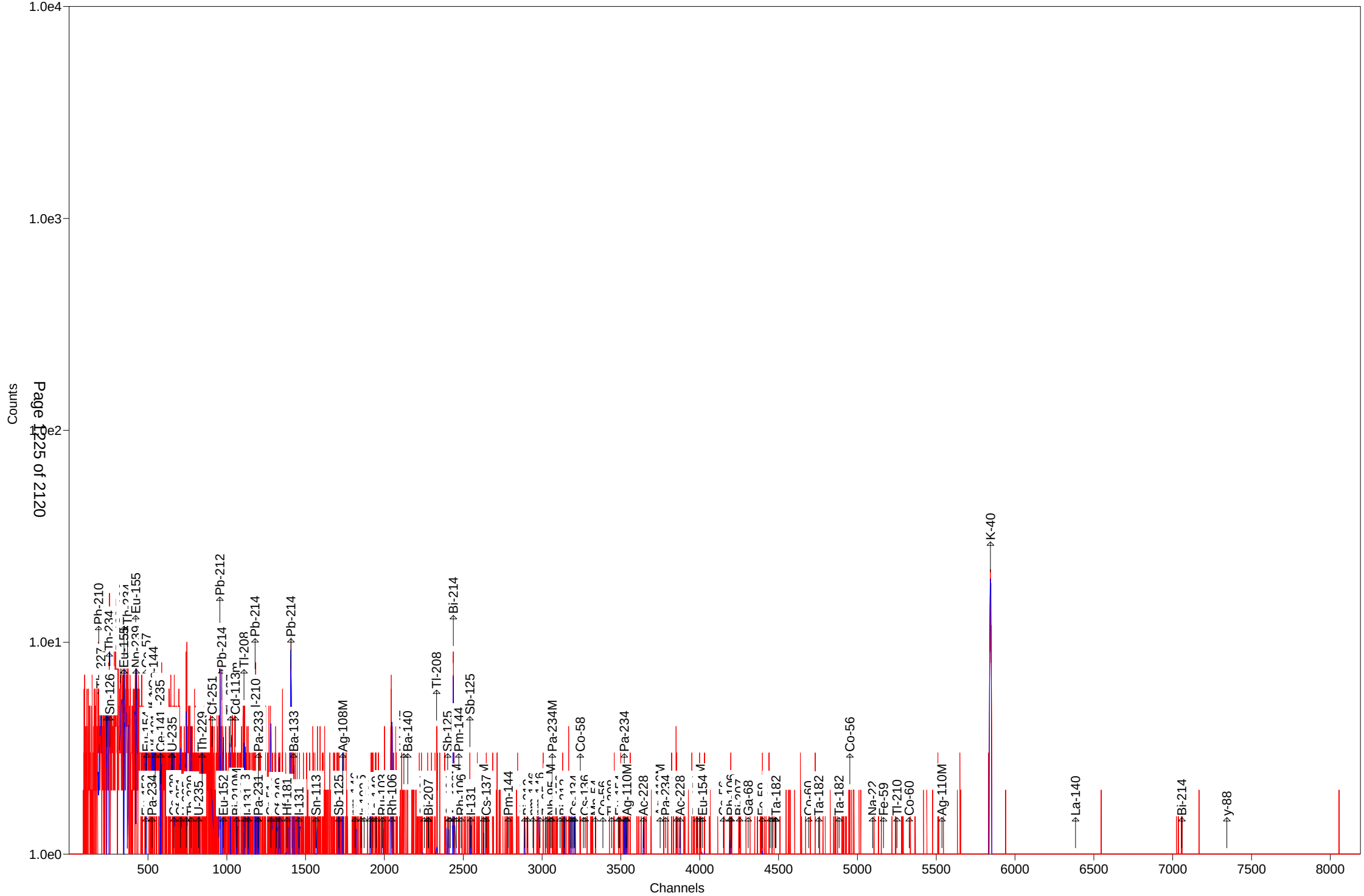
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.757E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.7565082E+02 Bq/Sample

379951_Gamma_160-29881-B-17-C. 15_Gamma_20182798.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20182903

Sample Description: 379951_Gamma_160-29881-A-27-C
Detector: Detector #17
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-27-C

Decay to Time: 8/23/2018 07:11 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:11:53 Real Time: 1833 sec
Analysis Time: 8/23/2018 07:42 Dead Time: 1.78 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev14.lib
Bkgd Correction File: 17_2018-08-11_1255.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.521E+00	96.3	3.389E+00	3.394E+00	1.145E+01
NA-22	2.744E-01	116.9	3.208E-01	3.211E-01	1.135E+00
K-40	1.483E+02	6.9	1.021E+01	1.272E+01	1.002E+01
Sc-46	2.403E-02	1805.5	4.338E-01	4.338E-01	1.555E+00
CR-51	1.913E+00	154.9	2.964E+00	2.966E+00	1.014E+01
MN-54	5.651E-01	46.8	2.645E-01	2.661E-01	5.854E-01
FE-59	6.807E-01	90.0	6.130E-01	6.139E-01	1.743E+00
Co-56	1.692E-01	152.0	2.573E-01	2.574E-01	1.181E+00
CO-57	-7.102E-03	3092.8	2.197E-01	2.197E-01	7.641E-01
CO-58	-5.118E-01	90.1	4.610E-01	4.617E-01	1.556E+00
CO-60	-2.738E-01	184.1	5.040E-01	5.042E-01	1.406E+00
ZN-65	0.000E+00	1.#INF	1.129E-01	1.129E-01	3.987E+00
NB-94	5.876E-01	40.4	2.373E-01	2.392E-01	5.275E-01
ZR-95	3.386E-01	146.8	4.969E-01	4.972E-01	1.284E+00
NB-95	-4.374E-01	96.6	4.226E-01	4.233E-01	1.434E+00
RU-103	-1.763E-01	194.2	3.423E-01	3.424E-01	9.420E-01
RH-106	3.345E+00	161.5	5.402E+00	5.405E+00	1.842E+01
AG-108M	2.685E-01	99.6	2.674E-01	2.677E-01	7.103E-01
AG-110M	3.345E-01	89.0	2.978E-01	2.983E-01	2.119E+00
SN-113	-5.827E-01	103.8	6.048E-01	6.055E-01	2.398E+00
SB-124	-4.652E-03	40.8	1.899E-03	1.914E-03	2.850E+00
SB-125	-2.811E-01	77.2	2.171E-01	2.176E-01	3.079E+00
I-131	-1.381E-01	78.8	1.088E-01	1.090E-01	9.984E-01
Gd-153	-7.542E-01	115.0	8.672E-01	8.684E-01	2.913E+00
Ga-68	-9.897E+00	201.7	1.996E+01	1.997E+01	4.661E+01
Tc-99m	-2.517E-01	128.6	3.237E-01	3.240E-01	1.089E+00
BA-133	2.923E-01	232.6	6.799E-01	6.801E-01	2.319E+00
CS-134	-2.200E-02	87.5	1.925E-02	1.928E-02	2.804E+00
CS-137	-3.557E-01	110.5	3.930E-01	3.934E-01	1.348E+00
CE-139	-1.636E-01	180.0	2.944E-01	2.948E-01	8.069E-01
Ba-140	-6.773E-01	180.7	1.224E+00	1.225E+00	3.190E+00
La-140	5.719E-01	40.8	2.335E-01	2.355E-01	5.828E-01
CE-141	4.108E-01	135.8	5.578E-01	5.582E-01	1.880E+00

CE-144	0.000E+00	1.#INF	1.183E+00	1.183E+00	8.100E+00
PM-144	-5.267E-01	92.3	4.861E-01	4.869E-01	1.224E+00
EU-152	1.410E+00	51.6	7.280E-01	7.317E-01	3.314E+00
EU-154	2.075E+00	38.1	7.911E-01	7.982E-01	8.595E+00
EU-155	-3.116E-02	2871.4	8.946E-01	8.946E-01	4.064E+00
HF-181	4.510E-02	334.8	1.510E-01	1.510E-01	1.563E+00
Ta-182	2.474E+00	46.9	1.160E+00	1.167E+00	4.625E+00
Hg-203	2.320E-01	110.1	2.555E-01	2.558E-01	8.718E-01
TL-208	1.427E+00	22.0	3.144E-01	3.230E-01	6.809E-01
pm-146	7.590E-01	95.6	7.253E-01	7.264E-01	2.040E+00
y-88	4.127E-01	35.7	1.474E-01	1.489E-01	3.807E-01
Cd-113m	1.881E+03	167.7	3.155E+03	3.157E+03	1.096E+04
Cd-109	0.000E+00	1.#INF	2.395E+00	2.395E+00	3.387E+01
Cf-251	-3.861E-01	377.9	1.459E+00	1.460E+00	4.032E+00
Cf-249	-1.535E-01	86.9	1.334E-01	1.336E-01	2.087E+00
Sn-126	-1.656E+00	185.0	3.063E+00	3.065E+00	1.042E+01
PB-210	1.276E+01	67.2	8.573E+00	8.606E+00	2.516E+01
PB-212	4.133E+00	13.7	5.654E-01	6.254E-01	1.345E+00
PB-214	7.339E+00	11.1	8.117E-01	8.968E-01	1.824E+00
BI-207	1.294E-01	181.6	2.349E-01	2.350E-01	8.371E-01
BI-212	-7.659E+00	96.4	7.381E+00	7.391E+00	2.485E+01
U-235	-2.754E+00	68.3	1.879E+00	1.885E+00	9.117E+00
BI-214	8.067E+00	12.6	1.016E+00	1.099E+00	1.671E+00
BI-210M	4.311E-01	102.7	4.426E-01	4.433E-01	1.501E+00
AC-228	5.681E+00	25.8	1.468E+00	1.496E+00	2.859E+00
TH-227	-2.063E+00	219.7	4.532E+00	4.533E+00	1.316E+01
TH-229	4.187E+00	106.6	4.465E+00	4.477E+00	1.222E+01
TH-234	4.409E+00	55.9	2.465E+00	2.476E+00	1.874E+01
PA-231	-2.903E-06	584998299.0	1.698E+01	1.698E+01	5.803E+01
PA-233	-8.672E-01	93.1	8.077E-01	8.090E-01	4.860E+00
PA-234	-3.937E-01	119.4	4.702E-01	4.706E-01	5.288E+00
PA-234M	8.187E+01	41.4	3.391E+01	3.416E+01	1.088E+02
AM-241	2.617E-01	337.9	8.843E-01	8.844E-01	2.568E+00
Np-237	0.000E+00	1.#INF	3.078E+00	3.078E+00	1.032E+01
Ir-192	-3.467E-01	102.2	3.544E-01	3.550E-01	1.196E+00
Cs-136	1.037E-01	118.5	1.229E-01	1.230E-01	1.803E+00
Np-239	8.578E-01	122.0	1.046E+00	1.048E+00	3.524E+00
Nd-147	7.560E-01	267.4	2.021E+00	2.022E+00	5.380E+00
TL-210	-7.053E-02	653.4	4.608E-01	4.609E-01	1.629E+00
Total	2.179E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-27-C

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20182903.An1

Acquisition information

Start time:	8/23/2018 7:11:53 AM
Live time:	1800
Real time:	1833
Dead time:	1.78 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration

Filename:	17_Soil_TunaCan.Clb

17_TunaCan_90099_032612

Energy Calibration

Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration

Created:	4/12/2012 9:28:42 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.91 %
Log(Eff):	-5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.12keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:11:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-08-11_1255.PBC 8/11/2018 12:55:25 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1789

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.57	21.	67.17	0.80	2.103E-02	46.54	4.250	PBC<MDA	PB210
59.54	5.	337.93	0.79	2.957E-02	59.54	35.900	PBC<MDA	AM241
63.51	4.	316.81	0.79	3.164E-02	63.29	3.810	PBC<MDA	TH234
77.35	52.	33.53	0.49	3.770E-02				
80.99	13.	116.11	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
87.02	45.	36.27	0.64	4.038E-02	86.49	13.100	4.705E+00	Np237
					86.54	30.700	2.007E+00	EU155
					86.94	9.040	6.801E+00	Sn126
					87.57	37.500	1.634E+00	Sn126
92.82	71.	20.94	0.63	4.148E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.707E+01	AC228
99.50	3.	588.79	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
106.13	15.	121.96	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
121.78	12.	107.75	0.85	4.277E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.893E-01	CO57
133.02	6.	334.77	0.86	4.197E-02	133.02	43.300	PBC<MDA	HF181
145.44	14.	135.80	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
185.74	34.	43.49	0.92	3.545E-02	185.72	54.000	PBC<MDA	U235
193.51	11.	106.62	0.91	3.448E-02	193.51	4.400	PBC<MDA	TH229
205.33	11.	110.49	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
227.00	7.	169.83	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.55	96.	14.02	0.95	2.989E-02	238.63	43.300	4.127E+00	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.63	45.	21.68	0.96	2.963E-02	242.00	7.430	1.146E+01	PB214
263.70	6.	167.72	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
265.28	11.	102.66	0.98	2.774E-02	265.83	50.000	PBC<MDA	BI210M
277.28	11.	98.23	0.99	2.694E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	110.13	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
284.30	10.	112.03	1.00	2.648E-02	284.30	6.140	PBC<MDA	I131
295.20	75.	17.23	1.24	2.579E-02	295.09	19.300	8.346E+00	PB214
					296.00	79.000	2.043E+00	TL210
320.08	8.	154.94	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
328.76	9.	123.98	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	121.75	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.32	5.	256.55	1.05	2.344E-02	338.32	12.010	PBC<MDA	AC228
344.29	8.	137.28	1.05	2.315E-02	344.29	26.500	PBC<MDA	EU152
351.90	105.	13.87	1.20	2.279E-02	351.93	37.600	6.822E+00	PB214
356.00	7.	232.58	1.06	2.261E-02	356.00	62.050	PBC<MDA	BA133
433.94	9.	99.58	1.13	1.963E-02	433.94	90.480	PBC<MDA	AG108M
463.37	9.	109.89	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
511.86	83.	20.93	2.45	1.742E-02	511.86	20.000	1.318E+01	RH106
531.00	3.	267.36	1.22	1.696E-02	531.00	13.000	PBC<MDA	Nd147
569.32	4.	165.83	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.682E+00	PA234
					569.70	97.740	1.411E-01	BI207
569.47	3.	200.50	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.401E+00	PA234
					569.70	97.740	1.176E-01	BI207
569.70	4.	181.59	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.542E+00	PA234
					569.70	97.740	1.294E-01	BI207
583.44	34.	22.04	1.64	1.584E-02	583.02	84.500	1.427E+00	TL208
609.36	95.	12.59	1.05	1.533E-02	609.31	46.090	7.480E+00	BI214
					610.30	5.750	6.003E+01	RU103
621.92	9.	161.53	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
635.89	3.	179.51	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125
657.76	7.	89.02	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
702.63	14.	40.38	1.37	1.380E-02	702.63	97.900	5.876E-01	NB94
735.72	3.	188.41	1.40	1.333E-02	735.72	22.500	PBC<MDA	pm146
747.16	7.	95.56	1.41	1.318E-02	747.16	34.000	PBC<MDA	pm146
756.73	4.	146.76	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
763.94	4.	218.53	1.42	1.296E-02	763.94	22.280	PBC<MDA	AG110M
766.41	4.	224.65	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
801.95	7.	114.37	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
834.85	12.	46.81	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
859.00	20.	32.66	1.50	1.185E-02	860.56	12.420	7.483E+00	TL208
871.10	5.	77.48	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
873.23	2.	254.41	1.51	1.172E-02	873.23	12.270	PBC<MDA	EU154
880.53	9.	93.62	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
898.04	8.	35.71	1.53	1.148E-02	898.04	93.700	4.127E-01	y88

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
909.18	34.	25.84	1.55	1.135E-02	911.07	29.000	5.681E+00	AC228
946.02	1.	800.00	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	12.	51.65	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
969.58	6.	122.88	1.59	1.083E-02	968.97	17.460	PBC<MDA	AC228
996.33	7.	38.12	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1001.00	14.	41.41	1.62	1.057E-02	1001.00	0.837	PBC<MDA	PA234M
1037.84	6.	152.05	1.65	1.028E-02	1037.84	14.130	PBC<MDA	Co56
1048.07	6.	118.53	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1099.25	8.	90.05	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1120.24	7.	134.23	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.26	8.	97.66	1.72	9.691E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.388E+00	Ta182
1189.25	13.	46.90	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	3.	388.20	1.81	8.977E-03	1238.28	66.070	PBC<MDA	Co56
1274.53	4.	116.91	1.84	8.779E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.793E-01	EU154
1291.60	3.	237.05	1.85	8.689E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	2.	324.35	1.87	8.579E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	5.	121.64	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	1.	796.87	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1461.04	225.	6.89	2.10	7.894E-03	1460.83	10.670	1.483E+02	K40
1596.21	6.	40.82	2.09	7.364E-03	1596.21	95.400	PBC<MDA	La140
1690.98	6.	40.82	2.16	7.037E-03	1690.98	47.790	PBC<MDA	SB124
1764.85	19.	27.45	2.21	6.804E-03	1764.49	15.400	9.822E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.81	77.35	84.	52.	1.379E+03	33.53	0.486	- s
742.19	185.74	40.	54.	1.523E+03	26.23	0.919	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.76	46.57	65.	21.	0.011	67.17	0.796
TH-227	200.03	50.14	81.	-7.	-0.004	219.69	0.778s
AM-241	237.59	59.54	99.	5.	0.003	337.93	0.787s
TH-234	252.59	63.29	66.	4.	0.002	316.81	0.791D
Sn-126	256.56	64.28	143.	-9.	-0.005	184.96	0.792s
BA-133	323.36	80.99	82.	13.	0.007	116.11	0.807s
Np-237	345.35	86.49	418.	0.	0.000	165.70	0.813A
EU-155	345.56	86.54	400.	-18.	-0.010	162.19	0.813s
Sn-126	347.15	86.94	350.	18.	0.010	73.55	0.813D
Sn-126	349.67	87.57	368.	14.	0.008	193.29	0.814s
Cd-109	351.55	88.04	382.	0.	0.000	1000.00	0.814s
Nd-147	363.79	91.10	378.	-18.	-0.010	151.25	0.817s
TH-234	369.74	92.59	91.	26.	0.014	55.91	0.818D
AC-228	372.78	93.35	357.	18.	0.010	152.20	0.819s
Gd-153	389.37	97.50	186.	-17.	-0.010	114.98	0.823s
Np-239	397.37	99.50	171.	3.	0.002	588.79	0.825s
Gd-153	412.16	103.20	170.	-16.	-0.009	119.64	0.828s
Np-239	423.88	106.13	160.	15.	0.008	121.96	0.831s
EU-152	486.43	121.78	84.	12.	0.007	107.75	0.846s
EU-154	491.73	123.10	125.	-13.	-0.007	127.79	0.847s
PA-234	524.49	131.29	222.	-17.	-0.009	129.84	0.855s
HF-181	531.41	133.02	201.	6.	0.003	334.77	0.856
CE-144	533.46	133.54	195.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	195.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	195.	0.	0.000	1000.00	0.859s
Tc-99m	561.34	140.51	208.	-16.	-0.009	128.64	0.863s
U-235	574.43	143.79	230.	-22.	-0.012	68.25	0.866s
CE-141	581.05	145.44	186.	14.	0.008	135.80	0.868s
CE-139	662.67	165.85	80.	-9.	-0.005	179.96	0.887s
Cf-251	705.64	176.60	83.	-4.	-0.002	377.94	0.897s
U-235	742.10	185.72	143.	-30.	-0.017	54.00	0.905
TH-229	773.25	193.51	43.	11.	0.006	106.62	0.913s
U-235	820.52	205.33	47.	11.	0.006	110.49	0.924s
TH-229	842.58	210.85	97.	-17.	-0.010	103.46	0.929s
Cf-251	907.16	227.00	47.	7.	0.004	169.83	0.944s
PB-212	953.67	238.63	38.	96.	0.053	13.68	0.954D
PB-214	967.13	242.00	21.	46.	0.026	20.42	0.957D
EU-152	977.91	244.69	328.	-16.	-0.009	158.61	0.960s
TH-227	1024.08	256.24	53.	-9.	-0.005	143.04	0.971s
Cd-113m	1053.91	263.70	42.	6.	0.003	167.72	0.978s
BI-210M	1062.44	265.83	56.	11.	0.006	102.66	0.979s
TL-208	1108.23	277.28	52.	11.	0.006	98.23	0.990
Hg-203	1115.89	279.20	46.	9.	0.005	110.13	0.992s
I-131	1136.28	284.30	33.	10.	0.006	112.03	0.996s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.86	295.20	27.	75.	0.042	17.23	1.244s
TL-210	1183.07	296.00	294.	-13.	-0.007	187.04	1.007s
PB-212	1199.19	300.03	281.	-14.	-0.008	95.19	1.011
PA-231	1199.35	300.07	267.	-13.	-0.007	178.04	1.011s
PA-233	1199.79	300.18	254.	-5.	-0.003	443.08	1.011s
BA-133	1210.47	302.85	249.	0.	0.000	1000.00	1.013s
Ba-140	1218.46	304.85	249.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	249.	0.	0.000	1000.00	1.019s
PA-233	1247.10	312.01	262.	-14.	-0.008	93.14	1.022
Ir-192	1265.01	316.49	86.	-13.	-0.007	102.23	1.026s
CR-51	1279.38	320.08	79.	8.	0.005	154.94	1.029
La-140	1314.07	328.76	33.	9.	0.005	123.98	1.037s
Cf-249	1332.79	333.44	29.	9.	0.005	121.75	1.041s
AC-228	1352.30	338.32	69.	5.	0.003	256.55	1.046
Cs-136	1361.30	340.57	74.	0.	0.000	1000.00	1.048s
EU-152	1376.16	344.29	53.	8.	0.004	137.28	1.051s
HF-181	1382.33	345.83	83.	-9.	-0.005	147.76	1.053s
PB-214	1406.62	351.90	30.	105.	0.058	13.87	1.198s
BA-133	1423.00	356.00	144.	7.	0.004	232.58	1.062s
I-131	1456.93	364.48	41.	-13.	-0.007	110.72	1.070s
BA-133	1534.34	383.84	103.	-13.	-0.007	117.80	1.087s
Cf-249	1550.77	387.95	115.	-13.	-0.007	123.96	1.091s
SN-113	1565.73	391.69	143.	-14.	-0.008	103.78	1.094s
SB-125	1710.44	427.88	41.	-14.	-0.008	108.58	1.127
AG-108M	1734.69	433.94	18.	9.	0.005	99.58	1.132
pm-146	1814.44	453.88	36.	-2.	-0.001	591.61	1.150s
SB-125	1852.38	463.37	45.	9.	0.005	109.89	1.158s
Ir-192	1871.15	468.06	60.	-6.	-0.003	186.23	1.163s
BE-7	1909.29	477.59	63.	-12.	-0.007	96.27	1.171s
La-140	1946.98	487.02	28.	-6.	-0.003	177.43	1.180s
RU-103	1987.11	497.05	28.	-5.	-0.003	194.18	1.188s
RH-106	2046.35	511.86	33.	83.	0.046	20.93	2.452s
Nd-147	2122.88	531.00	16.	3.	0.002	267.36	1.219s
Ba-140	2147.92	537.26	20.	-5.	-0.003	180.74	1.224s
CS-134	2251.82	563.24	32.	-13.	-0.007	78.80	1.247
CS-134	2276.15	569.32	20.	4.	0.002	165.83	1.252s
PA-234	2276.75	569.47	21.	3.	0.002	200.50	1.253s
BI-207	2277.67	569.70	20.	4.	0.002	181.59	1.253s
TL-208	2332.62	583.44	9.	34.	0.019	22.04	1.639s
SB-125	2400.86	600.50	274.	-13.	-0.007	177.46	1.280s
SB-124	2409.78	602.73	260.	-13.	-0.007	172.92	1.282
CS-134	2417.70	604.71	247.	-13.	-0.007	168.32	1.284
BI-214	2436.32	609.36	16.	95.	0.053	12.59	1.047
RU-103	2440.05	610.30	234.	-13.	-0.007	163.21	1.288s
AG-108M	2455.98	614.28	220.	-13.	-0.007	158.17	1.292s
PM-144	2471.11	618.06	207.	-9.	-0.005	232.92	1.295s
RH-106	2486.52	621.92	102.	9.	0.005	161.53	1.299s
SB-125	2542.41	635.89	13.	3.	0.002	179.51	1.311s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2546.75	636.97	34.	-11.	-0.006	79.66	1.312s
AG-110M	2629.90	657.76	14.	7.	0.004	89.02	1.330s
CS-137	2645.49	661.66	34.	-8.	-0.004	110.48	1.333s
PM-144	2785.03	696.54	35.	-13.	-0.007	92.29	1.363s
NB-94	2809.38	702.63	5.	14.	0.008	40.38	1.368s
SB-124	2890.01	722.79	49.	-13.	-0.007	82.55	1.386s
AG-108M	2890.61	722.94	62.	-5.	-0.003	216.03	1.386s
EU-154	2892.29	723.36	67.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	67.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	84.	-14.	-0.008	96.36	1.390s
pm-146	2941.74	735.72	9.	3.	0.002	188.41	1.397s
pm-146	2987.51	747.16	9.	7.	0.004	95.56	1.407s
ZR-95	3025.79	756.73	9.	4.	0.002	146.76	1.415s
AG-110M	3054.64	763.94	28.	4.	0.002	218.53	1.421s
NB-95	3062.03	765.79	43.	-10.	-0.006	96.62	1.423s
PA-234M	3064.52	766.41	43.	4.	0.002	224.65	1.423s
EU-152	3114.56	778.92	26.	-9.	-0.005	103.90	1.434s
BI-212	3140.56	785.42	35.	-14.	-0.008	88.96	1.440s
CS-134	3182.35	795.87	41.	-11.	-0.006	85.62	1.448
TL-210	3197.29	799.60	52.	-2.	-0.001	653.38	1.451s
CS-134	3206.69	801.95	30.	7.	0.004	114.37	1.454s
CO-58	3241.99	810.78	47.	-11.	-0.006	90.08	1.461
La-140	3261.97	815.77	58.	-3.	-0.002	330.25	1.465s
Cs-136	3272.90	818.50	64.	-2.	-0.001	456.36	1.467s
MN-54	3338.30	834.85	5.	12.	0.007	46.81	1.481s
Co-56	3385.99	846.77	24.	-4.	-0.002	245.65	1.491s
TL-208	3441.18	860.56	5.	20.	0.011	32.66	1.503s
NB-94	3483.32	871.10	6.	5.	0.003	77.48	1.512s
EU-154	3491.85	873.23	18.	2.	0.001	254.41	1.514s
PA-234	3521.06	880.53	31.	9.	0.005	93.62	1.520s
PA-234	3531.90	883.24	40.	0.	0.000	1000.00	1.522
AG-110M	3537.67	884.68	40.	0.	0.000	1000.00	1.523
y-88	3591.11	898.04	0.	8.	0.004	35.71	1.534s
AC-228	3643.24	911.07	9.	34.	0.019	25.84	1.545s
AG-110M	3748.95	937.49	23.	-5.	-0.003	196.95	1.567s
PA-234	3783.07	946.02	14.	1.	0.001	800.00	1.574s
EU-152	3855.45	964.11	14.	12.	0.007	51.65	1.589s
AC-228	3874.90	968.97	20.	6.	0.003	122.88	1.593s
EU-154	3984.36	996.33	0.	7.	0.004	38.12	1.616s
PA-234M	4003.04	1001.00	10.	14.	0.008	41.41	1.620s
EU-154	4018.15	1004.77	76.	-13.	-0.007	101.97	1.623s
Co-56	4150.45	1037.84	15.	6.	0.003	152.05	1.650s
Cs-136	4191.39	1048.07	18.	6.	0.003	118.53	1.658s
RH-106	4200.55	1050.36	6.	0.	0.000	1000.00	1.661s
BI-207	4253.77	1063.66	25.	-7.	-0.004	125.15	1.671s
Ga-68	4308.74	1077.40	20.	-5.	-0.003	201.66	1.683s
FE-59	4396.18	1099.25	10.	8.	0.005	90.05	1.700s
EU-152	4447.49	1112.07	55.	-6.	-0.003	178.98	1.711s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4461.38	1115.55	49.	0.	0.000	1000.00	1.713s
BI-214	4480.35	1120.29	39.	7.	0.004	134.23	1.717
Sc-46	4481.41	1120.55	61.	-12.	-0.007	97.81	1.717
Ta-182	4484.41	1121.30	30.	8.	0.005	97.66	1.718s
CO-60	4692.24	1173.24	35.	-16.	-0.009	56.88	1.760s
Ta-182	4755.52	1189.05	5.	13.	0.007	46.90	1.772s
Ta-182	4885.02	1221.41	21.	-3.	-0.002	319.69	1.798s
Co-56	4952.53	1238.28	22.	3.	0.002	388.20	1.812
NA-22	5097.60	1274.53	11.	4.	0.002	116.91	1.840s
EU-154	5097.66	1274.54	15.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	11.	3.	0.002	237.05	1.854s
TL-210	5251.56	1313.00	5.	2.	0.001	324.35	1.870s
CO-60	5329.61	1332.50	16.	-4.	-0.002	184.09	1.886s
AG-110M	5536.92	1384.30	5.	5.	0.003	121.64	1.926s
EU-152	5631.79	1408.00	5.	1.	0.000	796.87	1.944s
K-40	5844.07	1461.04	7.	225.	0.125	6.89	2.099
La-140	6385.15	1596.21	0.	6.	0.003	40.82	2.087s
SB-124	6764.55	1690.98	0.	6.	0.003	40.82	2.157s
BI-214	7058.84	1764.49	3.	19.	0.010	27.45	2.211s
Co-56	7086.31	1771.35	22.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	0.	0.	0.000	1000.00	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5210E+00				5.31E+01	
			477.60	-3.521E+00	?(	1.145E+01 9.63E+01 1.05E+01	G
NA-22	C	2.7440E-01				9.50E+02	
			1274.53	2.744E-01	?(	1.135E+00 1.17E+02 9.99E+01	G
K-40	N	1.4828E+02				4.66E+11	
			1460.83	1.483E+02	(P	1.002E+01 6.89E+00 1.07E+01	G
Sc-46	F	2.4026E-02				8.38E+01	
			889.28	2.403E-02	%(	1.555E+00 1.81E+03 1.00E+02	G
			1120.55	-6.768E-01	+	2.238E+00 9.78E+01 1.00E+02	G
CR-51	F	1.9131E+00				2.77E+01	
			320.08	1.913E+00	?(	1.014E+01 1.55E+02 9.94E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	C 5.6508E-01					3.12E+02	
		834.85	5.651E-01	&(	5.854E-01	4.68E+01	1.00E+02 G
FE-59	F 6.8070E-01					4.45E+01	
		1099.25	8.356E-01	?(	1.743E+00	9.00E+01	5.65E+01 G
		1291.60	4.781E-01	?(P	2.665E+00	2.37E+02	4.32E+01 G
Co-56	C 1.6920E-01					7.73E+01	
		846.77	-1.816E-01	?(P	1.181E+00	2.46E+02	9.99E+01 G
		1238.28	2.587E-01	?(P	2.312E+00	3.88E+02	6.61E+01 G
		1037.84	2.232E+00	?(P	7.975E+00	1.52E+02	1.41E+01 G
		1771.35	0.000E+00	-	1.300E+01	1.00E+03	1.55E+01 A
CO-57	C -7.1024E-03					2.72E+02	
		122.06	-7.102E-03	&(	7.641E-01	3.09E+03	8.56E+01 G
		136.47	0.000E+00	+	8.470E+00	1.00E+03	1.07E+01 G
CO-58	C -5.1175E-01					7.09E+01	
		810.78	-5.118E-01	?(	1.556E+00	9.01E+01	9.95E+01 G
CO-60	F -2.7378E-01					1.93E+03	
		1332.50	-2.738E-01	?(P	1.406E+00	1.84E+02	1.00E+02 G
		1173.24	-9.673E-01	+ P	1.801E+00	5.69E+01	9.99E+01 G
NB-94	I 5.8759E-01					7.41E+06	
		702.63	5.876E-01	?(P	5.275E-01	4.04E+01	9.79E+01 G
		871.10	2.489E-01	-	6.536E-01	7.75E+01	9.99E+01 G
ZR-95	I 3.3859E-01					6.40E+01	
		756.73	3.386E-01	?(	1.284E+00	1.47E+02	5.45E+01 G
		724.20	0.000E+00	-	3.811E+00	1.00E+03	4.42E+01 G
NB-95	I -4.3741E-01					6.40E+01	
		765.79	-4.374E-01	&(	1.434E+00	9.66E+01	9.98E+01 G
RU-103	I -1.7629E-01					3.93E+01	
		497.05	-1.763E-01	&(P	9.420E-01	1.94E+02	9.09E+01 G
		610.30	-8.477E+00	+	4.666E+01	1.63E+02	5.75E+00 GA
RH-106	I 3.3445E+00					3.74E+02	
		621.92	3.345E+00	&(	1.842E+01	1.62E+02	9.93E+00 G
		1050.36	0.000E+00	-	4.767E+01	1.00E+03	1.56E+00 G
		511.86	1.318E+01	*	4.723E+00	2.09E+01	2.00E+01 GA
AG-108M	C 2.6852E-01					1.53E+05	
		433.94	2.685E-01	&(P	7.103E-01	9.96E+01	9.05E+01 G
		722.94	-2.378E-01	-	1.781E+00	2.16E+02	9.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			614.28	-5.466E-01	+	2.916E+00	1.58E+02	8.98E+01 G
AG-110M	F	3.3454E-01					2.50E+02	
			884.68	0.000E+00	?(	2.119E+00	1.00E+03	7.27E+01 G
			657.76	2.648E-01	?(	8.077E-01	8.90E+01	9.46E+01 G
			937.49	-7.762E-01	+	3.670E+00	1.97E+02	3.44E+01 G
			1384.30	1.296E+00	?(	3.743E+00	1.22E+02	2.43E+01 G
			763.94	6.732E-01	&(	5.222E+00	2.19E+02	2.23E+01 G
SN-113	F	-5.8272E-01					1.15E+02	
			391.69	-5.827E-01	?(P	2.398E+00	1.04E+02	6.40E+01 G
SB-124	F	-4.6519E-03					6.02E+01	
			602.73	-4.890E-01	?(	2.850E+00	1.73E+02	9.83E+01 G
			1690.98	9.912E-01	?(	1.218E+00	4.08E+01	4.78E+01 G
			722.79	-4.849E+00	+	1.344E+01	8.26E+01	1.08E+01 G
SB-125	I	-2.8110E-01					1.01E+03	
			427.88	-1.287E+00	&(P	3.079E+00	1.09E+02	2.96E+01 G
			600.50	-2.679E+00	+	1.602E+01	1.77E+02	1.79E+01 G
			635.89	9.918E-01	+	6.451E+00	1.80E+02	1.13E+01 G
			463.37	2.564E+00	?(P	9.610E+00	1.10E+02	1.05E+01 G
I-131	I	-1.3810E-01					8.02E+00	
			364.48	-4.053E-01	?(P	9.984E-01	1.11E+02	8.17E+01 G
			284.30	3.418E+00	?(	1.007E+01	1.12E+02	6.14E+00 G
			636.97	-5.833E+00	&	1.560E+01	7.97E+01	7.17E+00 G
Gd-153	F	-7.5420E-01					2.42E+02	
			97.50	-7.542E-01	?(	2.913E+00	1.15E+02	3.00E+01 G
			103.20	-9.419E-01	&	3.792E+00	1.20E+02	2.18E+01 G
Ga-68	C	-9.8967E+00					4.71E-02	
			1077.40	-9.897E+00	?(	4.661E+01	2.02E+02	3.30E+00 G
Tc-99m	I	-2.5166E-01					2.51E-01	
			140.51	-2.517E-01	&(	1.089E+00	1.29E+02	8.93E+01 G
BA-133	F	2.9233E-01					3.85E+03	
			356.00	2.923E-01	&(	2.319E+00	2.33E+02	6.20E+01 G
			302.85	0.000E+00	-	9.122E+00	1.00E+03	1.83E+01 G
			383.84	-3.634E+00	+	1.448E+01	1.18E+02	8.94E+00 GA
			80.99	5.667E-01	* P	1.887E+00	1.16E+02	3.41E+01 GA
CS-134	I	-2.2000E-02					7.54E+02	
			604.71	-4.941E-01	?(	2.804E+00	1.68E+02	9.76E+01 G
			795.87	-5.817E-01	+	1.679E+00	8.56E+01	8.55E+01 G
			569.32	8.965E-01	?(	5.278E+00	1.66E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			801.95	3.655E+00	?(	1.440E+01	1.14E+02	8.69E+00 G
			563.24	-5.210E+00	+ P	1.198E+01	7.88E+01	8.35E+00 G
CS-137	I	-3.5569E-01					1.10E+04	
			661.66	-3.557E-01	?(	1.348E+00	1.10E+02	8.52E+01 G
CE-139	F	-1.6360E-01					1.38E+02	
			165.85	-1.636E-01	?(	8.069E-01	1.80E+02	7.99E+01 G
Ba-140	I	-6.7733E-01					1.28E+01	
			537.26	-6.773E-01	?(	3.190E+00	1.81E+02	2.44E+01 G
			162.66	-1.171E-01	%	1.237E+01	3.04E+03	6.22E+00 G
			304.85	0.000E+00	+	3.916E+01	1.00E+03	4.29E+00 G
La-140	I	5.7195E-01					1.28E+01	
			1596.21	4.745E-01	?(	5.828E-01	4.08E+01	9.54E+01 G
			487.02	-4.057E-01	-	1.850E+00	1.77E+02	4.55E+01 G
			328.76	1.030E+00	?(	3.374E+00	1.24E+02	2.03E+01 G
			815.77	-6.397E-01	-	7.389E+00	3.30E+02	2.33E+01 G
CE-141	I	4.1077E-01					3.25E+01	
			145.44	4.108E-01	?(	1.880E+00	1.36E+02	4.82E+01 G
PM-144	C	-5.2674E-01					3.63E+02	
			696.54	-5.267E-01	?(P	1.224E+00	9.23E+01	9.90E+01 G
			618.06	-3.260E-01	+	2.576E+00	2.33E+02	9.91E+01 G
EU-152	F	1.4095E+00					4.94E+03	
			344.29	7.034E-01	&(P	3.314E+00	1.37E+02	2.65E+01 G
			1112.07	-2.513E+00	+	1.556E+01	1.79E+02	1.36E+01 G
			121.78	5.667E-01	?(	2.064E+00	1.08E+02	2.86E+01 G
			778.92	-3.089E+00	& P	8.925E+00	1.04E+02	1.29E+01 G
			964.11	4.340E+00	?(	7.118E+00	5.16E+01	1.46E+01 G
			244.69	-4.078E+00	+	2.173E+01	1.59E+02	7.58E+00 G
			1408.00	2.170E-01	-	4.386E+00	7.97E+02	2.10E+01 GA
EU-154	I	2.0755E+00					3.14E+03	
			873.23	9.307E-01	?(	8.595E+00	2.54E+02	1.23E+01 G
			123.10	-4.040E-01	+	1.746E+00	1.28E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.733E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.313E+00	1.00E+03	2.02E+01 G
			1004.77	-3.694E+00	+	1.272E+01	1.02E+02	1.80E+01 G
			996.33	3.401E+00	?(	3.641E+00	3.81E+01	1.06E+01 G
EU-155	I	-3.1157E-02					1.81E+03	
			105.31	-3.116E-02	%(P	4.064E+00	2.87E+03	2.12E+01 G
			86.54	-7.926E-01	&	4.312E+00	1.62E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	4.5100E-02					4.24E+01	
			482.00	-2.987E-02	%(	1.563E+00	1.49E+03	8.05E+01 G
			133.02	1.845E-01	?(	2.103E+00	3.35E+02	4.33E+01 G
			345.83	-1.430E+00	+	7.214E+00	1.48E+02	1.51E+01 G
			136.30	0.000E+00	-	1.546E+01	1.00E+03	5.85E+00 G
Ta-182	F	2.4738E+00					1.14E+02	
			1121.30	1.388E+00	?(	4.625E+00	9.77E+01	3.49E+01 G
			1221.41	-7.560E-01	-	5.496E+00	3.20E+02	2.70E+01 G
			1189.05	4.813E+00	?(	4.861E+00	4.69E+01	1.62E+01 G
Hg-203	F	2.3197E-01					4.66E+01	
			279.20	2.320E-01	?(	8.718E-01	1.10E+02	8.15E+01 G
TL-208	N	1.4266E+00					6.98E+02	
			583.02	1.427E+00	(P	6.809E-01	2.20E+01	8.45E+01 G
			277.28	3.556E+00	+	1.183E+01	9.82E+01	6.31E+00 G
			860.56	7.483E+00	& P	5.021E+00	3.27E+01	1.24E+01 G
pm-146	C	7.5897E-01					2.02E+03	
			747.16	8.527E-01	?(P	2.040E+00	9.56E+01	3.40E+01 G
			735.72	6.173E-01	?(	3.042E+00	1.88E+02	2.25E+01 G
			453.88	-8.995E-02	-	1.379E+00	5.92E+02	6.50E+01 G
y-88	F	4.1272E-01					1.07E+02	
			898.04	4.127E-01	?(P	3.807E-01	3.57E+01	9.37E+01 G
			1836.06	0.000E+00	-	6.260E-01	1.00E+03	9.92E+01 G
Cd-113m		1.8808E+03					5.33E+03	
			263.70	1.881E+03	?(	1.096E+04	1.68E+02	6.00E-03 K
Cf-251	T	-3.8613E-01					3.28E+05	
			176.60	-3.861E-01	(	4.032E+00	3.78E+02	1.70E+01 G
			227.00	2.091E+00	?	9.848E+00	1.70E+02	6.30E+00 GA
Cf-249	T	-1.5351E-01					1.28E+05	
			387.95	-4.977E-01	?(	2.087E+00	1.24E+02	6.60E+01 G
			333.44	1.311E+00	?(	4.228E+00	1.22E+02	1.55E+01 G
Sn-126		-1.6563E+00					3.65E+07	
			87.57	5.183E-01	+	3.369E+00	1.93E+02	3.75E+01 GA
			64.28	-1.656E+00	&(	1.042E+01	1.85E+02	9.70E+00 G
			86.94	2.686E+00	}	1.369E+01	7.35E+01	9.04E+00 GA
PB-210	N	1.2764E+01					8.14E+03	
			46.54	1.276E+01	(P	2.516E+01	6.72E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	4.1326E+00					6.98E+02	
			238.63	4.133E+00	(P	1.345E+00	1.37E+01	4.33E+01 G
			300.03	-9.032E+00	- P	5.367E+01	9.52E+01	3.28E+00 GA
PB-214	N	7.3388E+00					5.84E+05	
			351.93	6.822E+00	@(P	1.824E+00	1.39E+01	3.76E+01 G
			295.09	8.346E+00	@(P	3.014E+00	1.72E+01	1.93E+01 G
			242.00	1.161E+01	+	6.085E+00	2.04E+01	7.43E+00 GA
BI-207	C	1.2938E-01					1.18E+04	
			569.70	1.294E-01	?(	8.371E-01	1.82E+02	9.77E+01 G
			1063.66	-5.256E-01	& P	1.926E+00	1.25E+02	7.45E+01 G
BI-212	N	-7.6593E+00					6.98E+02	
			727.17	-7.659E+00	?(	2.485E+01	9.64E+01	7.55E+00 G
			785.42	-4.839E+01	+	1.031E+02	8.90E+01	1.28E+00 GA
U-235	N	-2.7536E+00					2.57E+11	
			143.79	-2.754E+00	(P	9.117E+00	6.83E+01	1.10E+01 G
			205.33	3.841E+00	& P	1.163E+01	1.10E+02	5.01E+00 G
			163.38	-1.890E-01	% P	1.507E+01	2.29E+03	5.08E+00 G
			185.72	-8.825E-01	+ P	1.698E+00	5.40E+01	5.40E+01 GA
BI-214	N	8.0665E+00					5.84E+05	
			609.31	7.480E+00	(P	1.671E+00	1.26E+01	4.61E+01 G
			1120.29	2.611E+00	- P	1.205E+01	1.34E+02	1.51E+01 G
			1764.49	9.822E+00	?(P	6.043E+00	2.75E+01	1.54E+01 G
BI-210M	T	4.3111E-01					1.10E+09	
			265.83	4.311E-01	&(	1.501E+00	1.03E+02	5.00E+01 G
			304.90	3.935E-02	%	5.994E+00	4.46E+03	2.80E+01 G
AC-228	N	5.6806E+00					2.10E+03	
			911.07	5.681E+00	&(	2.859E+00	2.58E+01	2.90E+01 G
			968.97	1.627E+00	-	6.978E+00	1.23E+02	1.75E+01 G
			338.32	9.211E-01	-	8.194E+00	2.57E+02	1.20E+01 G
			93.35	4.273E+00	?	2.182E+01	1.52E+02	5.56E+00 XA
TH-227	N	-2.0627E+00					7.95E+03	
			50.14	-2.063E+00	?(	1.316E+01	2.20E+02	8.00E+00 G
			256.24	-2.603E+00	+	1.025E+01	1.43E+02	7.00E+00 G
TH-229	N	4.1873E+00					2.68E+06	
			193.51	4.187E+00	&(	1.222E+01	1.07E+02	4.40E+00 G
			210.85	-9.929E+00	+	2.772E+01	1.03E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	4.4085E+00					1.63E+12	
			63.29	1.713E+00	(P	1.874E+01	3.17E+02	3.81E+00 G
			92.59	6.248E+00	(P	1.131E+01	5.59E+01	5.58E+00 G
PA-231	N	-2.9034E-06					1.20E+07	
			302.65	-2.903E-06	%(	5.803E+01	5.85E+08	2.88E+00 G
			300.07	-1.164E+01	&	6.988E+01	1.78E+02	2.46E+00 G
PA-233	C	-8.6717E-01					7.82E+08	
			312.01	-8.672E-01	&(P	4.860E+00	9.31E+01	3.60E+01 G
			300.18	-1.798E+00	&	2.707E+01	4.43E+02	6.20E+00 G
PA-234	N	-3.9368E-01					1.63E+12	
			131.29	-1.211E+00	&(	5.288E+00	1.30E+02	1.80E+01 G
			946.02	3.757E-01	+	7.570E+00	8.00E+02	1.34E+01 G
			569.47	1.401E+00	?(	1.005E+01	2.00E+02	8.20E+00 G
			883.24	0.000E+00	+	1.602E+01	1.00E+03	9.60E+00 G
			880.53	7.153E+00	?	2.277E+01	9.36E+01	6.00E+00 GA
PA-234M	N	8.1873E+01					1.63E+12	
			1001.00	8.889E+01	?(P	1.088E+02	4.14E+01	8.37E-01 G
			766.41	6.190E+01	?(P	4.866E+02	2.25E+02	2.94E-01 G
AM-241	T	2.6167E-01					1.58E+05	
			59.54	2.617E-01	(	2.568E+00	3.38E+02	3.59E+01 G
Ir-192	F	-3.4668E-01					7.40E+01	
			316.49	-3.467E-01	?(	1.196E+00	1.02E+02	8.70E+01 G
			468.06	-3.483E-01	+	2.242E+00	1.86E+02	5.18E+01 G
			308.44	0.000E+00	&	5.334E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.0366E-01					1.30E+01	
			818.50	-1.128E-01	?(	1.803E+00	4.56E+02	1.00E+02 G
			1048.07	3.743E-01	?(	1.548E+00	1.19E+02	8.00E+01 G
			340.57	0.000E+00	&	2.173E+00	1.00E+03	4.69E+01 G
Np-239	T	8.5785E-01					2.36E+00	
			103.70	-1.275E-02	%	3.592E+00	8.20E+03	2.40E+01 X
			106.13	8.578E-01	&(	3.524E+00	1.22E+02	2.27E+01 G
			99.50	2.762E-01	?	5.571E+00	5.89E+02	1.50E+01 X
Nd-147		7.5598E-01					1.11E+01	
			531.00	7.560E-01	?(	5.380E+00	2.67E+02	1.30E+01 G
			91.10	-8.769E-01	+	4.447E+00	1.51E+02	2.83E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-210	N -7.0533E-02					5.84E+05	
		799.60	-7.053E-02	?(	1.629E+00	6.53E+02	9.90E+01 G
		296.00	-3.578E-01	+	2.255E+00	1.87E+02	7.90E+01 G
		1313.00	5.140E-01	?	4.154E+00	3.24E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	81.	-7.	-0.004	219.69	-2.063E+00	
AM-241	59.54	99.	5.	0.003	337.93	2.617E-01	
BA-133	80.99	82.	13.	0.007	116.11	5.667E-01	P
EU-155	86.54	400.	-18.	-0.010	162.19	-7.926E-01	
Nd-147	91.10	378.	-18.	-0.010	151.25	-8.769E-01	
Gd-153	97.50	186.	-17.	-0.010	114.98	-7.542E-01	
Np-239	99.50	171.	3.	0.002	588.79	2.762E-01	
Gd-153	103.20	170.	-16.	-0.009	119.64	-9.419E-01	
Np-239	106.13	160.	15.	0.008	121.96	8.578E-01	
EU-152	121.78	84.	12.	0.007	107.75	5.667E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	123.10	125.	-13.	-0.007	127.79	-4.040E-01	
PA-234	131.29	222.	-17.	-0.009	129.84	-1.211E+00	
HF-181	133.02	201.	6.	0.003	334.77	1.845E-01	
Tc-99m	140.51	208.	-16.	-0.009	128.64	-2.517E-01	
U-235	143.79	230.	-22.	-0.012	68.25	-2.754E+00	P
CE-141	145.44	186.	14.	0.008	135.80	4.108E-01	
CE-139	165.85	80.	-9.	-0.005	179.96	-1.636E-01	
Cf-251	176.60	83.	-4.	-0.002	377.94	-3.861E-01	
U-235	185.72	143.	-30.	-0.017	54.00	-8.825E-01	P
TH-229	193.51	43.	11.	0.006	106.62	4.187E+00	
U-235	205.33	47.	11.	0.006	110.49	3.841E+00	P
TH-229	210.85	97.	-17.	-0.010	103.46	-9.929E+00	
Cf-251	227.00	47.	7.	0.004	169.83	2.091E+00	
EU-152	244.69	328.	-16.	-0.009	158.61	-4.078E+00	
TH-227	256.24	53.	-9.	-0.005	143.04	-2.603E+00	
Cd-113m	263.70	42.	6.	0.003	167.72	1.881E+03	
Hg-203	279.20	46.	9.	0.005	110.13	2.320E-01	
I-131	284.30	33.	10.	0.006	112.03	3.418E+00	
TL-210	296.00	294.	-13.	-0.007	187.04	-3.578E-01	
PA-231	300.07	267.	-13.	-0.007	178.04	-1.164E+01	
PA-233	300.18	254.	-5.	-0.003	443.08	-1.798E+00	
PA-233	312.01	262.	-14.	-0.008	93.14	-8.672E-01	P
Ir-192	316.49	86.	-13.	-0.007	102.23	-3.467E-01	
CR-51	320.08	79.	8.	0.005	154.94	1.913E+00	
La-140	328.76	33.	9.	0.005	123.98	1.030E+00	
Cf-249	333.44	29.	9.	0.005	121.75	1.311E+00	
EU-152	344.29	53.	8.	0.004	137.28	7.034E-01	P
HF-181	345.83	83.	-9.	-0.005	147.76	-1.430E+00	
BA-133	356.00	144.	7.	0.004	232.58	2.923E-01	
I-131	364.48	41.	-13.	-0.007	110.72	-4.053E-01	P
BA-133	383.84	103.	-13.	-0.007	117.80	-3.634E+00	
Cf-249	387.95	115.	-13.	-0.007	123.96	-4.977E-01	
SN-113	391.69	143.	-14.	-0.008	103.78	-5.827E-01	P
SB-125	427.88	41.	-14.	-0.008	108.58	-1.287E+00	P
AG-108M	433.94	18.	9.	0.005	99.58	2.685E-01	P
pm-146	453.88	36.	-2.	-0.001	591.61	-8.995E-02	
SB-125	463.37	45.	9.	0.005	109.89	2.564E+00	P
Ir-192	468.06	60.	-6.	-0.003	186.23	-3.483E-01	
BE-7	477.59	63.	-12.	-0.007	96.27	-3.521E+00	
La-140	487.02	28.	-6.	-0.003	177.43	-4.057E-01	
RU-103	497.05	28.	-5.	-0.003	194.18	-1.763E-01	P
RH-106	511.86	33.	83.	0.046	20.93	1.318E+01	
Nd-147	531.00	16.	3.	0.002	267.36	7.560E-01	
Ba-140	537.26	20.	-5.	-0.003	180.74	-6.773E-01	
CS-134	563.24	32.	-13.	-0.007	78.80	-5.210E+00	P
CS-134	569.32	20.	4.	0.002	165.83	8.965E-01	
PA-234	569.47	21.	3.	0.002	200.50	1.401E+00	
BI-207	569.70	20.	4.	0.002	181.59	1.294E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	600.50	274.	-13.	-0.007	177.46	-2.679E+00	
SB-124	602.73	260.	-13.	-0.007	172.92	-4.890E-01	
CS-134	604.71	247.	-13.	-0.007	168.32	-4.941E-01	
RU-103	610.30	234.	-13.	-0.007	163.21	-8.477E+00	
AG-108M	614.28	220.	-13.	-0.007	158.17	-5.466E-01	
PM-144	618.06	207.	-9.	-0.005	232.92	-3.260E-01	
RH-106	621.92	102.	9.	0.005	161.53	3.345E+00	
SB-125	635.89	13.	3.	0.002	179.51	9.918E-01	
I-131	636.97	34.	-11.	-0.006	79.66	-5.833E+00	
AG-110M	657.76	14.	7.	0.004	89.02	2.648E-01	
CS-137	661.66	34.	-8.	-0.004	110.48	-3.557E-01	
PM-144	696.54	35.	-13.	-0.007	92.29	-5.267E-01	P
SB-124	722.79	49.	-13.	-0.007	82.55	-4.849E+00	
AG-108M	722.94	62.	-5.	-0.003	216.03	-2.378E-01	
BI-212	727.17	84.	-14.	-0.008	96.36	-7.659E+00	
pm-146	735.72	9.	3.	0.002	188.41	6.173E-01	
pm-146	747.16	9.	7.	0.004	95.56	8.527E-01	P
ZR-95	756.73	9.	4.	0.002	146.76	3.386E-01	
AG-110M	763.94	28.	4.	0.002	218.53	6.732E-01	
NB-95	765.79	43.	-10.	-0.006	96.62	-4.374E-01	
PA-234M	766.41	43.	4.	0.002	224.65	6.190E+01	P
EU-152	778.92	26.	-9.	-0.005	103.90	-3.089E+00	P
BI-212	785.42	35.	-14.	-0.008	88.96	-4.839E+01	
CS-134	795.87	41.	-11.	-0.006	85.62	-5.817E-01	
TL-210	799.60	52.	-2.	-0.001	653.38	-7.053E-02	
CS-134	801.95	30.	7.	0.004	114.37	3.655E+00	
CO-58	810.78	47.	-11.	-0.006	90.08	-5.118E-01	
La-140	815.77	58.	-3.	-0.002	330.25	-6.397E-01	
Cs-136	818.50	64.	-2.	-0.001	456.36	-1.128E-01	
MN-54	834.85	5.	12.	0.007	46.81	5.651E-01	
Co-56	846.77	24.	-4.	-0.002	245.65	-1.816E-01	P
EU-154	873.23	18.	2.	0.001	254.41	9.307E-01	
PA-234	880.53	31.	9.	0.005	93.62	7.153E+00	
AG-110M	937.49	23.	-5.	-0.003	196.95	-7.762E-01	
PA-234	946.02	14.	1.	0.001	800.00	3.757E-01	
EU-152	964.11	14.	12.	0.007	51.65	4.340E+00	
EU-154	996.33	0.	7.	0.004	38.12	3.401E+00	
PA-234M	1001.00	10.	14.	0.008	41.41	8.889E+01	P
EU-154	1004.77	76.	-13.	-0.007	101.97	-3.694E+00	
Co-56	1037.84	15.	6.	0.003	152.05	2.232E+00	P
Cs-136	1048.07	18.	6.	0.003	118.53	3.743E-01	
BI-207	1063.66	25.	-7.	-0.004	125.15	-5.256E-01	P
Ga-68	1077.40	20.	-5.	-0.003	201.66	-9.897E+00	
FE-59	1099.25	10.	8.	0.005	90.05	8.356E-01	
EU-152	1112.07	55.	-6.	-0.003	178.98	-2.513E+00	
Sc-46	1120.55	61.	-12.	-0.007	97.81	-6.768E-01	
CO-60	1173.24	35.	-16.	-0.009	56.88	-9.673E-01	P
Co-56	1238.28	22.	3.	0.002	388.20	2.587E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
NA-22	1274.53	11.	4.	0.002	116.91	2.744E-01		
FE-59	1291.60	11.	3.	0.002	237.05	4.781E-01		P
TL-210	1313.00	5.	2.	0.001	324.35	5.140E-01		
CO-60	1332.50	16.	-4.	-0.002	184.09	-2.738E-01		P
AG-110M	1384.30	5.	5.	0.003	121.64	1.296E+00		
EU-152	1408.00	5.	1.	0.000	796.87	2.170E-01		
La-140	1596.21	0.	6.	0.003	40.82	4.745E-01		
SB-124	1690.98	0.	6.	0.003	40.82	9.912E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

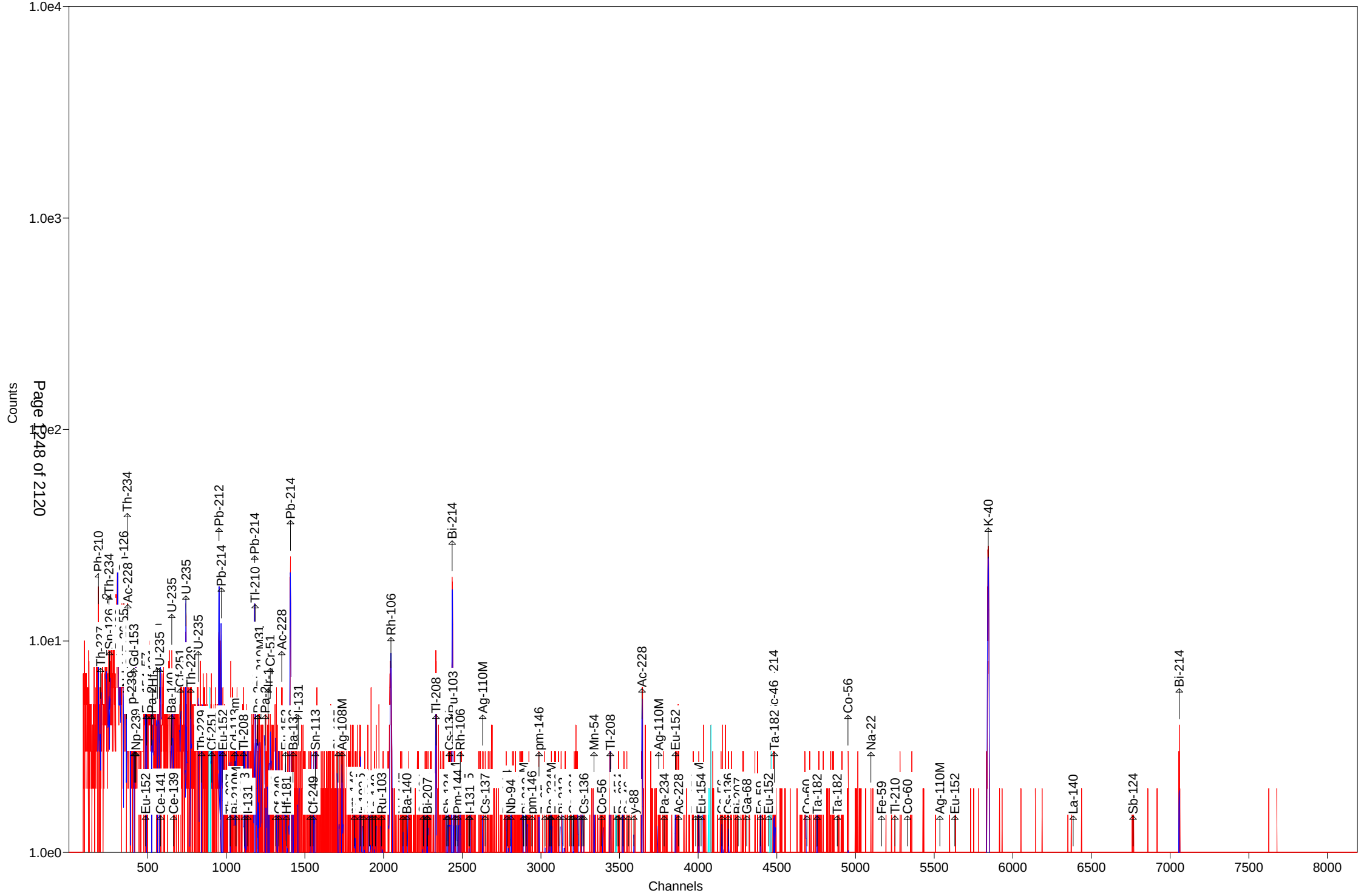
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.5209E+00	-3.5210E+00	9.627E+01%	1.14E+01
NA-22	#A	2.7440E-01	2.7440E-01	1.169E+02%	1.14E+00
K-40		1.4828E+02	1.4828E+02	6.889E+00%	1.00E+01
Sc-46	#A	2.4026E-02	2.4026E-02	1.806E+03%	1.56E+00
CR-51	#A	1.9131E+00	1.9131E+00	1.549E+02%	1.01E+01
MN-54	#A	5.6508E-01	5.6508E-01	4.681E+01%	5.85E-01
FE-59	#A	6.8070E-01	6.8070E-01	9.005E+01%	1.74E+00
Co-56	#A	1.6920E-01	1.6920E-01	1.520E+02%	1.18E+00
CO-57	#A	-7.1024E-03	-7.1024E-03	3.093E+03%	7.64E-01
CO-58	#A	-5.1175E-01	-5.1175E-01	9.008E+01%	1.56E+00
CO-60	#A	-2.7378E-01	-2.7378E-01	1.841E+02%	1.41E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.99E+00
NB-94	#	5.8759E-01	5.8759E-01	4.038E+01%	5.27E-01
ZR-95	#A	3.3859E-01	3.3859E-01	1.468E+02%	1.28E+00
NB-95	#A	-4.3741E-01	-4.3741E-01	9.662E+01%	1.43E+00
RU-103	#A	-1.7629E-01	-1.7629E-01	1.942E+02%	9.42E-01
RH-106	#A	3.3445E+00	3.3445E+00	1.615E+02%	1.84E+01
AG-108M	#A	2.6852E-01	2.6852E-01	9.958E+01%	7.10E-01
AG-110M	#A	3.3454E-01	3.3454E-01	8.902E+01%	2.12E+00
SN-113	#A	-5.8271E-01	-5.8272E-01	1.038E+02%	2.40E+00
SB-124	#A	-4.6518E-03	-4.6519E-03	4.082E+01%	2.85E+00
SB-125	#A	-2.8110E-01	-2.8110E-01	7.724E+01%	3.08E+00
I-131	#A	-1.3810E-01	-1.3810E-01	7.875E+01%	9.98E-01
Gd-153	#A	-7.5420E-01	-7.5420E-01	1.150E+02%	2.91E+00
Ga-68	#A	-9.8077E+00	-9.8967E+00	2.017E+02%	4.66E+01
Tc-99m	#A	-2.5123E-01	-2.5166E-01	1.286E+02%	1.09E+00
BA-133	#A	2.9233E-01	2.9233E-01	2.326E+02%	2.32E+00
CS-134	#A	-2.2000E-02	-2.2000E-02	8.750E+01%	2.80E+00
CS-137	#A	-3.5569E-01	-3.5569E-01	1.105E+02%	1.35E+00
CE-139	#A	-1.6360E-01	-1.6360E-01	1.800E+02%	8.07E-01
Ba-140	#A	-6.7731E-01	-6.7733E-01	1.807E+02%	3.19E+00
La-140	#A	5.7193E-01	5.7195E-01	4.082E+01%	5.83E-01

CE-141 #A	4.1076E-01	4.1077E-01	1.358E+02%	1.88E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	8.10E+00
PM-144 #A	-5.2674E-01	-5.2674E-01	9.229E+01%	1.22E+00
EU-152 #A	1.4095E+00	1.4095E+00	5.165E+01%	3.31E+00
EU-154 #A	2.0755E+00	2.0755E+00	3.812E+01%	8.59E+00
EU-155 #A	-3.1157E-02	-3.1157E-02	2.871E+03%	4.06E+00
HF-181 #A	4.5100E-02	4.5100E-02	3.348E+02%	1.56E+00
Ta-182 #A	2.4738E+00	2.4738E+00	4.690E+01%	4.63E+00
Hg-203 #A	2.3197E-01	2.3197E-01	1.101E+02%	8.72E-01
TL-208	1.4266E+00	1.4266E+00	2.204E+01%	6.81E-01
pm-146 #A	7.5897E-01	7.5897E-01	9.556E+01%	2.04E+00
y-88 #	4.1272E-01	4.1272E-01	3.571E+01%	3.81E-01
Cd-113m#A	1.8808E+03	1.8808E+03	1.677E+02%	1.10E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.39E+01
Cf-251 #A	-3.8613E-01	-3.8613E-01	3.779E+02%	4.03E+00
Cf-249 #A	-1.5351E-01	-1.5351E-01	8.687E+01%	2.09E+00
Sn-126 #A	-1.6563E+00	-1.6563E+00	1.850E+02%	1.04E+01
PB-210 A	1.2764E+01	1.2764E+01	6.717E+01%	2.52E+01
PB-212	4.1326E+00	4.1326E+00	1.368E+01%	1.35E+00
PB-214	7.3388E+00	7.3388E+00	1.106E+01%	1.82E+00
BI-207 #A	1.2938E-01	1.2938E-01	1.816E+02%	8.37E-01
BI-212 #A	-7.6593E+00	-7.6593E+00	9.636E+01%	2.48E+01
U-235 #A	-2.7536E+00	-2.7536E+00	6.825E+01%	9.12E+00
BI-214	8.0665E+00	8.0665E+00	1.259E+01%	1.67E+00
BI-210M#A	4.3111E-01	4.3111E-01	1.027E+02%	1.50E+00
AC-228	5.6806E+00	5.6806E+00	2.584E+01%	2.86E+00
TH-227 #A	-2.0627E+00	-2.0627E+00	2.197E+02%	1.32E+01
TH-229 #A	4.1873E+00	4.1873E+00	1.066E+02%	1.22E+01
TH-234 A	4.4085E+00	4.4085E+00	5.591E+01%	1.87E+01
PA-231 #A	-2.9034E-06	-2.9034E-06	5.850E+08%	5.80E+01
PA-233 #A	-8.6717E-01	-8.6717E-01	9.314E+01%	4.86E+00
PA-234 #A	-3.9368E-01	-3.9368E-01	1.194E+02%	5.29E+00
PA-234M#A	8.1873E+01	8.1873E+01	4.141E+01%	1.09E+02
AM-241 #A	2.6167E-01	2.6167E-01	3.379E+02%	2.57E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.03E+01
Ir-192 #A	-3.4667E-01	-3.4668E-01	1.022E+02%	1.20E+00
Cs-136 #A	1.0365E-01	1.0366E-01	1.185E+02%	1.80E+00
Np-239 #A	8.5769E-01	8.5785E-01	1.220E+02%	3.52E+00
Nd-147 #A	7.5595E-01	7.5598E-01	2.674E+02%	5.38E+00
TL-210 #A	-7.0533E-02	-7.0533E-02	6.534E+02%	1.63E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

```
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   25.1 to  1999.5 keV)     1.877E+02  Bq/Sample
Total Decayed Activity (   25.1 to  1999.5 keV) 1.8768802E+02  Bq/Sample
```

379951_Gamma_160-29881-A-27-C. 17_Gamma_20182903.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20181613

Sample Description: 379951_Gamma_160-29881-B-28-C
Detector: Detector #19
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-28-C

Decay to Time: 8/23/2018 07:09 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:09:26 Real Time: 1802 sec
Analysis Time: 8/23/2018 07:39 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.837E+00	107.7	4.132E+00	4.137E+00	1.405E+01
NA-22	4.428E-01	96.8	4.287E-01	4.293E-01	1.489E+00
K-40	1.572E+02	8.3	1.312E+01	1.534E+01	1.730E+01
Sc-46	2.358E-01	129.7	3.057E-01	3.060E-01	1.270E+00
CR-51	-4.902E+00	170.3	8.346E+00	8.350E+00	2.801E+01
MN-54	-7.044E-01	108.0	7.605E-01	7.613E-01	1.772E+00
FE-59	2.686E-01	121.6	3.268E-01	3.270E-01	2.350E+00
Co-56	-4.485E-01	108.1	4.848E-01	4.853E-01	1.569E+00
CO-57	1.934E-01	170.9	3.306E-01	3.307E-01	9.574E-01
CO-58	3.254E-01	93.9	3.056E-01	3.061E-01	1.058E+00
CO-60	2.696E-01	188.1	5.070E-01	5.071E-01	1.203E+00
ZN-65	8.536E-01	118.1	1.008E+00	1.009E+00	3.505E+00
NB-94	-2.419E-01	139.8	3.381E-01	3.383E-01	1.263E+00
ZR-95	4.739E-01	113.5	5.377E-01	5.383E-01	1.396E+00
NB-95	0.000E+00	1.#INF	8.026E-02	8.027E-02	1.928E+00
RU-103	1.612E-01	177.1	2.855E-01	2.856E-01	7.456E-01
RH-106	1.629E-01	2855.7	4.651E+00	4.651E+00	1.192E+01
AG-108M	1.687E-01	166.7	2.813E-01	2.814E-01	9.687E-01
AG-110M	5.062E-01	35.4	1.790E-01	1.808E-01	1.740E+00
SN-113	4.996E-01	119.9	5.991E-01	5.996E-01	2.042E+00
SB-124	2.564E-01	81.8	2.097E-01	2.101E-01	2.623E+00
SB-125	1.513E+00	95.7	1.448E+00	1.450E+00	2.628E+00
I-131	3.088E-01	177.4	5.479E-01	5.481E-01	1.074E+00
Gd-153	3.267E-01	390.9	1.277E+00	1.277E+00	4.332E+00
Ga-68	-2.063E+01	112.2	2.314E+01	2.317E+01	5.353E+01
Tc-99m	2.494E-01	174.8	4.361E-01	4.363E-01	1.471E+00
BA-133	-4.393E-01	159.0	6.987E-01	6.991E-01	2.387E+00
CS-134	3.984E-01	95.6	3.809E-01	3.814E-01	2.647E+00
CS-137	4.973E-02	874.4	4.348E-01	4.348E-01	1.583E+00
CE-139	1.404E-01	303.3	4.260E-01	4.260E-01	1.453E+00
Ba-140	-1.652E+00	70.2	1.160E+00	1.163E+00	5.123E+00
La-140	7.223E-01	47.4	3.426E-01	3.446E-01	7.696E-01
CE-141	-5.659E-01	169.7	9.602E-01	9.606E-01	3.226E+00

CE-144	1.907E+00	161.9	3.088E+00	3.089E+00	1.043E+01
PM-144	-1.778E-02	3079.0	5.473E-01	5.473E-01	1.345E+00
EU-152	9.410E-01	95.5	8.982E-01	8.994E-01	8.705E+00
EU-154	3.736E+00	20.9	7.791E-01	8.019E-01	1.680E+01
EU-155	3.746E-01	448.7	1.681E+00	1.681E+00	5.714E+00
HF-181	6.087E-01	85.7	5.216E-01	5.225E-01	1.815E+00
Ta-182	1.352E+00	142.0	1.920E+00	1.921E+00	6.654E+00
Hg-203	-2.776E-01	138.7	3.851E-01	3.853E-01	1.317E+00
TL-208	1.735E+00	22.7	3.936E-01	4.034E-01	8.351E-01
pm-146	-3.167E-01	339.6	1.075E+00	1.076E+00	4.173E+00
y-88	-5.537E-01	89.4	4.950E-01	4.958E-01	1.804E+00
Cd-113m	-1.379E+02	3245.0	4.475E+03	4.475E+03	1.585E+04
Cd-109	8.447E-01	1703.0	1.439E+01	1.439E+01	4.855E+01
Cf-251	1.255E+00	140.9	1.769E+00	1.771E+00	4.608E+00
Cf-249	2.267E-01	242.0	5.485E-01	5.487E-01	1.911E+00
Sn-126	3.378E+00	114.4	3.865E+00	3.870E+00	1.299E+01
PB-210	-2.213E+01	62.6	1.386E+01	1.393E+01	4.949E+01
PB-212	3.119E+00	21.8	6.790E-01	6.983E-01	1.596E+00
PB-214	3.553E+00	24.1	8.565E-01	8.752E-01	2.380E+00
BI-207	-3.949E-01	118.5	4.680E-01	4.685E-01	1.602E+00
BI-212	-7.031E-01	658.9	4.633E+00	4.633E+00	1.877E+01
U-235	1.995E+00	178.8	3.566E+00	3.568E+00	1.203E+01
BI-214	2.987E+00	25.9	7.739E-01	7.887E-01	1.847E+00
BI-210M	-3.331E-02	1624.8	5.411E-01	5.411E-01	1.479E+00
AC-228	2.233E+00	64.0	1.428E+00	1.433E+00	4.609E+00
TH-227	5.060E+00	111.3	5.630E+00	5.638E+00	1.896E+01
TH-229	-6.279E+00	158.6	9.959E+00	9.965E+00	1.885E+01
TH-234	-2.127E+01	48.2	1.025E+01	1.032E+01	4.064E+01
PA-231	0.000E+00	1.#INF	3.840E+00	3.840E+00	9.037E+01
PA-233	0.000E+00	1.#INF	3.690E-01	3.690E-01	7.406E+00
PA-234	3.591E+00	30.9	1.109E+00	1.124E+00	5.941E+00
PA-234M	1.411E+01	81.9	1.156E+01	1.158E+01	2.202E+02
AM-241	7.501E-01	170.7	1.280E+00	1.281E+00	4.321E+00
Np-237	0.000E+00	1.#INF	3.055E+00	3.055E+00	1.042E+01
Ir-192	5.021E-01	172.4	8.654E-01	8.659E-01	2.909E+00
Cs-136	2.835E-01	30.2	8.547E-02	8.697E-02	1.696E+00
Np-239	-1.386E+00	130.8	1.813E+00	1.815E+00	6.076E+00
Nd-147	6.300E-01	237.6	1.497E+00	1.497E+00	7.320E+00
TL-210	0.000E+00	1.#INF	8.356E-02	8.356E-02	1.742E+00
Total	2.248E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-28-C

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181613.An1

Acquisition information

Start time:	8/23/2018 7:09:26 AM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:09:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0810

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.67	-29.	62.61	0.93	1.709E-02	46.54	4.250	PBC<MDA	PB210
50.14	15.	111.27	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
59.54	13.	170.67	0.95	2.613E-02	59.54	35.900	PBC<MDA	AM241
64.28	17.	114.42	0.95	2.799E-02	64.28	9.700	PBC<MDA	Sn126
77.40	51.	31.76	0.92	3.151E-02				
87.43	18.	67.32	0.97	3.314E-02	87.57	37.500	PBC<MDA	Sn126
91.10	6.	527.86	0.97	3.352E-02	91.10	28.300	PBC<MDA	Nd147
97.50	6.	390.87	0.98	3.401E-02	97.50	30.000	PBC<MDA	Gd153
105.31	5.	448.72	0.99	3.429E-02	105.31	21.200	PBC<MDA	EU155
121.78	15.	95.45	1.00	3.401E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.863E-01	CO57
131.29	16.	116.25	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
133.02	13.	157.02	1.01	3.336E-02	133.02	43.300	PBC<MDA	HF181
133.54	13.	161.89	1.01	3.333E-02	133.54	11.090	PBC<MDA	CE144
136.30	13.	166.29	1.02	3.313E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.998E+00	CO57
136.47	13.	170.92	1.02	3.312E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.999E+00	CO57
140.51	13.	174.85	1.02	3.280E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	13.	178.76	1.02	3.254E-02	143.79	10.960	PBC<MDA	U235
165.85	6.	303.31	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	140.95	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
185.72	18.	100.18	1.06	2.864E-02	185.72	54.000	PBC<MDA	U235
210.85	3.	506.66	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229
238.64	59.	21.77	1.04	2.413E-02	238.63	43.300	3.119E+00	PB212
278.06	12.	92.58	1.14	2.153E-02	277.28	6.310	PBC<MDA	TL208
284.30	3.	373.67	1.15	2.111E-02	284.30	6.140	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
316.49	15.	172.36	1.17	1.940E-02	316.49	87.040	PBC<MDA	Ir192
351.89	43.	24.11	1.20	1.782E-02	351.93	37.600	3.553E+00	PB214
364.14	6.	177.43	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
383.84	8.	112.77	1.23	1.664E-02	383.84	8.940	PBC<MDA	BA133
387.95	4.	241.96	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	119.91	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
427.88	9.	95.72	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	5.	166.74	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
463.37	3.	324.89	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
477.60	10.	107.69	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
482.00	9.	117.37	1.31	1.391E-02	482.00	80.500	PBC<MDA	HF181
487.02	8.	131.97	1.32	1.380E-02	487.02	45.500	PBC<MDA	La140
497.05	4.	177.11	1.33	1.358E-02	497.05	90.900	PBC<MDA	RU103
511.86	39.	37.08	2.59	1.328E-02	511.86	20.000	8.228E+00	RH106
531.00	4.	237.58	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
583.04	32.	22.68	1.35	1.202E-02	583.02	84.500	1.735E+00	TL208
600.50	9.	164.83	1.41	1.176E-02	600.50	17.860	PBC<MDA	SB125
609.39	29.	25.91	1.18	1.163E-02	609.31	46.090	3.056E+00	BI214
657.76	5.	84.74	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
661.66	1.	874.43	1.46	1.093E-02	661.66	85.210	PBC<MDA	CS137
722.79	7.	81.79	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.428E-01	AG108M
					723.36	20.220	1.990E+00	EU154
722.94	2.	353.14	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.148E-01	AG108M
					723.36	20.220	5.162E-01	EU154
756.73	5.	113.48	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
766.41	7.	99.42	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	800.00	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
795.87	5.	145.46	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
801.95	8.	95.60	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
810.78	5.	93.93	1.58	9.404E-03	810.78	99.460	PBC<MDA	CO58
815.77	5.	110.94	1.58	9.362E-03	815.77	23.280	PBC<MDA	La140
858.48	8.	90.52	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
880.53	7.	37.97	1.63	8.849E-03	880.53	6.000	PBC<MDA	PA234
883.24	7.	65.70	1.63	8.829E-03	883.24	9.600	PBC<MDA	PA234
911.57	10.	91.28	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	12.	30.89	1.68	8.392E-03	946.02	13.400	5.685E+00	PA234
964.11	3.	266.85	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
969.57	6.	89.63	1.69	8.244E-03	968.97	17.460	PBC<MDA	AC228
996.33	23.	20.85	1.71	8.075E-03	996.33	10.600	1.493E+01	EU154
1001.00	-4.	130.17	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	11.	30.15	1.75	7.775E-03	1048.07	80.000	9.825E-01	Cs136
1063.66	3.	333.98	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	6.	99.40	1.80	7.435E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	118.08	1.80	7.418E-03	1115.55	50.600	PBC<MDA	ZN65
1120.55	6.	129.67	1.80	7.393E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1121.30	6.	141.98	1.80	7.389E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.717E-01	Sc46
					1121.30	34.900	1.352E+00	Ta182
1121.51	6.	132.43	1.80	7.394E-03	1121.30	34.900	PBC<MDA	Ta182
1274.53	5.	96.82	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.258E+00	EU154
1291.60	5.	121.64	1.92	6.626E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	16.	25.00	1.94	6.541E-03	1313.00	21.000	6.471E+00	TL210
1332.50	3.	188.06	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	8.	35.36	1.98	6.272E-03	1384.30	24.290	2.917E+00	AG110M
1408.00	11.	32.14	2.00	6.187E-03	1408.00	21.005	4.512E+00	EU152
1461.23	181.	8.35	2.03	6.004E-03	1460.83	10.670	1.572E+02	K40
1596.21	5.	47.43	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140
1764.26	3.	215.59	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.67	77.40	66.	51.	1.628E+03	31.76	0.921	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.30	46.54	177.	-29.	-0.016	62.61	0.934
TH-227	199.70	50.14	130.	15.	0.008	111.27	0.938s
AM-241	237.25	59.54	227.	13.	0.007	170.67	0.946s
TH-234	252.25	63.29	254.	-40.	-0.022	48.18	0.950
Sn-126	256.21	64.28	170.	17.	0.009	114.42	0.951
BA-133	323.00	80.99	232.	-13.	-0.007	163.97	0.966s
Np-237	344.99	86.49	283.	0.	0.000	1000.00	0.971A
EU-155	345.20	86.54	292.	-13.	-0.007	183.41	0.971s
Sn-126	349.31	87.57	510.	18.	0.010	67.32	0.972D
Nd-147	363.42	91.10	529.	6.	0.003	527.86	0.975s
TH-234	369.37	92.59	562.	-27.	-0.015	67.25	0.976s
Gd-153	389.00	97.50	272.	6.	0.003	390.87	0.981s
Np-239	396.99	99.50	278.	0.	0.000	1000.00	0.982s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	411.78	103.20	278.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	278.	0.	0.000	1000.00	0.986s
EU-155	420.23	105.31	239.	5.	0.003	448.72	0.988
Np-239	423.49	106.13	313.	-19.	-0.011	130.80	0.988s
EU-152	486.04	121.78	95.	15.	0.008	95.45	1.002s
CO-57	487.18	122.06	104.	-2.	-0.001	867.41	1.003s
EU-154	491.33	123.10	108.	-7.	-0.004	218.29	1.004s
PA-234	524.09	131.29	176.	16.	0.009	116.25	1.011s
HF-181	531.00	133.02	192.	13.	0.007	157.02	1.013s
CE-144	533.06	133.54	205.	13.	0.007	161.89	1.013s
HF-181	544.09	136.30	217.	13.	0.007	166.29	1.015s
CO-57	544.79	136.47	230.	13.	0.007	170.92	1.016s
Tc-99m	560.92	140.51	243.	13.	0.007	174.85	1.019s
U-235	574.02	143.79	256.	13.	0.007	178.76	1.022s
CE-141	580.63	145.44	356.	-16.	-0.009	169.66	1.024s
Ba-140	649.47	162.66	152.	-14.	-0.008	127.38	1.039s
U-235	652.34	163.38	158.	-12.	-0.007	150.92	1.040s
CE-139	662.23	165.85	172.	6.	0.003	303.31	1.042s
Cf-251	705.19	176.60	70.	11.	0.006	140.95	1.051s
U-235	741.65	185.72	84.	18.	0.010	100.18	1.060s
TH-229	772.79	193.51	70.	-14.	-0.008	158.62	1.066s
U-235	820.06	205.33	63.	-14.	-0.008	153.74	1.077s
TH-229	842.11	210.85	70.	3.	0.002	506.66	1.082
Cf-251	906.68	227.00	44.	0.	0.000	1000.00	1.096s
PB-212	953.21	238.64	34.	59.	0.033	21.77	1.037
EU-152	977.41	244.69	63.	-15.	-0.008	102.31	1.111s
TH-227	1023.58	256.24	59.	-15.	-0.008	84.71	1.122s
TL-208	1107.70	277.28	53.	12.	0.007	92.58	1.140s
Hg-203	1115.37	279.20	69.	-9.	-0.005	138.72	1.141s
I-131	1135.76	284.30	32.	3.	0.002	373.67	1.146
PB-214	1178.90	295.09	323.	-20.	-0.011	55.96	1.155
TL-210	1182.54	296.00	333.	-16.	-0.009	167.69	1.156s
PB-212	1198.65	300.03	349.	-16.	-0.009	18.60	1.159s
PA-231	1198.81	300.07	364.	-16.	-0.009	174.80	1.159s
PA-233	1199.25	300.18	380.	-5.	-0.003	533.28	1.159s
PA-231	1209.13	302.65	385.	0.	0.000	1000.00	1.162s
BA-133	1209.93	302.85	385.	0.	0.000	1000.00	1.162s
Ba-140	1217.92	304.85	385.	0.	0.000	1000.00	1.164s
BI-210M	1218.11	304.90	385.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	385.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	385.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	338.	15.	0.008	172.36	1.173s
CR-51	1278.83	320.08	404.	-17.	-0.009	170.26	1.177s
La-140	1313.52	328.76	200.	-16.	-0.009	22.61	1.184s
Cf-249	1332.23	333.44	195.	-14.	-0.008	140.68	1.188s
AC-228	1351.74	338.32	219.	-15.	-0.008	39.69	1.192s
Cs-136	1360.74	340.57	233.	-9.	-0.005	239.79	1.194s
PB-214	1406.17	351.93	31.	43.	0.024	24.11	1.204s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1422.43	356.00	91.	-9.	-0.005	159.05	1.207
I-131	1456.35	364.48	28.	6.	0.003	177.43	1.215s
BA-133	1533.76	383.84	40.	8.	0.005	112.77	1.231s
Cf-249	1550.19	387.95	56.	4.	0.002	241.96	1.235s
SN-113	1565.14	391.69	59.	9.	0.005	119.91	1.238s
SB-125	1709.84	427.88	16.	9.	0.005	95.72	1.268s
AG-108M	1734.08	433.94	21.	5.	0.003	166.74	1.273s
SB-125	1851.76	463.37	46.	3.	0.002	324.89	1.298s
Ir-192	1870.53	468.06	54.	-8.	-0.005	129.80	1.302s
BE-7	1908.66	477.60	55.	10.	0.006	107.69	1.310s
HF-181	1926.26	482.00	53.	9.	0.005	117.37	1.313s
La-140	1946.35	487.02	51.	8.	0.004	131.97	1.317s
RU-103	1986.48	497.05	9.	4.	0.002	177.11	1.326s
RH-106	2045.71	511.86	27.	39.	0.022	37.08	2.588s
Nd-147	2122.23	531.00	17.	4.	0.002	237.58	1.354s
Ba-140	2147.27	537.26	31.	-9.	-0.005	70.23	1.359s
CS-134	2275.49	569.32	26.	0.	0.000	1000.00	1.385s
PA-234	2276.09	569.47	32.	-4.	-0.002	182.57	1.385s
BI-207	2277.02	569.70	46.	-8.	-0.005	118.53	1.385s
TL-208	2330.38	583.04	7.	32.	0.018	22.68	1.346
SB-125	2400.20	600.50	114.	9.	0.005	164.83	1.410s
SB-124	2409.12	602.73	123.	0.	0.000	1000.00	1.412s
CS-134	2417.03	604.71	123.	0.	0.000	1000.00	1.414s
BI-214	2435.76	609.39	11.	29.	0.016	25.91	1.182
RU-103	2439.39	610.30	123.	0.	0.000	1000.00	1.418s
AG-108M	2455.31	614.28	123.	0.	0.000	1000.00	1.421s
I-131	2546.08	636.97	13.	-1.	-0.001	565.69	1.440
AG-110M	2629.23	657.76	7.	5.	0.003	84.74	1.456s
CS-137	2644.82	661.66	26.	1.	0.000	874.43	1.459s
NB-94	2808.70	702.63	19.	-4.	-0.002	139.76	1.492s
SB-124	2889.33	722.79	15.	7.	0.004	81.79	1.507s
AG-108M	2889.93	722.94	22.	2.	0.001	353.14	1.507s
EU-154	2891.61	723.36	24.	0.	0.000	1000.00	1.508s
BI-212	2906.86	727.17	25.	-1.	-0.001	658.89	1.511s
pm-146	2941.07	735.72	10.	-3.	-0.001	257.98	1.518s
pm-146	2986.83	747.16	24.	-2.	-0.001	339.62	1.526s
ZR-95	3025.11	756.73	5.	5.	0.003	113.48	1.534s
AG-110M	3053.97	763.94	38.	-9.	-0.005	61.28	1.539s
NB-95	3061.35	765.79	45.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	21.	7.	0.004	99.42	1.541s
EU-152	3113.88	778.92	14.	1.	0.001	800.00	1.551s
BI-212	3139.88	785.42	19.	-2.	-0.001	294.36	1.556s
CS-134	3181.68	795.87	28.	5.	0.003	145.46	1.564s
TL-210	3196.61	799.60	33.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	23.	8.	0.004	95.60	1.569s
CO-58	3241.32	810.78	10.	5.	0.003	93.93	1.575s
La-140	3261.30	815.77	16.	5.	0.003	110.94	1.579s
Cs-136	3272.22	818.50	31.	-5.	-0.003	175.12	1.581s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
MN-54	3337.63	834.85	33.	-12.	-0.006	107.97	1.594s
Co-56	3385.32	846.77	24.	-7.	-0.004	108.10	1.603s
TL-208	3440.51	860.56	9.	8.	0.004	90.52	1.614s
NB-94	3482.65	871.10	25.	-6.	-0.004	111.34	1.621s
EU-154	3491.19	873.23	42.	-12.	-0.006	84.13	1.623s
PA-234	3520.39	880.53	0.	7.	0.004	37.97	1.628s
PA-234	3531.23	883.24	7.	7.	0.004	65.70	1.630s
AG-110M	3537.01	884.68	14.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	14.	0.	0.000	1000.00	1.635s
y-88	3590.45	898.04	26.	-8.	-0.005	89.41	1.642s
AC-228	3642.58	911.07	15.	10.	0.006	91.28	1.651s
AG-110M	3748.30	937.49	20.	-3.	-0.002	217.48	1.671s
PA-234	3782.42	946.02	0.	12.	0.006	30.89	1.677s
EU-152	3854.81	964.11	27.	3.	0.002	266.85	1.691s
AC-228	3874.26	968.97	11.	6.	0.003	89.63	1.694s
EU-154	3983.73	996.33	0.	23.	0.013	20.85	1.714s
PA-234M	4002.41	1001.00	26.	-4.	-0.002	130.17	1.718s
EU-154	4017.53	1004.77	44.	-8.	-0.005	116.45	1.721s
Co-56	4149.84	1037.84	20.	-1.	-0.001	333.10	1.745s
Cs-136	4190.78	1048.07	0.	11.	0.006	30.15	1.752s
RH-106	4199.94	1050.36	18.	-6.	-0.004	76.47	1.754s
BI-207	4253.17	1063.66	15.	3.	0.001	333.98	1.763s
Ga-68	4308.15	1077.40	15.	-8.	-0.004	112.15	1.773s
FE-59	4395.60	1099.25	11.	-2.	-0.001	452.11	1.789s
EU-152	4446.92	1112.07	14.	6.	0.003	99.40	1.798s
ZN-65	4460.81	1115.55	20.	6.	0.003	118.08	1.800s
BI-214	4479.78	1120.29	24.	6.	0.003	132.43	1.803s
Sc-46	4480.84	1120.55	30.	6.	0.003	129.67	1.804s
Ta-182	4483.84	1121.30	37.	6.	0.003	141.98	1.804s
CO-60	4691.70	1173.24	21.	-7.	-0.004	147.85	1.841s
Ta-182	4754.99	1189.05	27.	-4.	-0.002	324.36	1.852
Ta-182	4884.51	1221.41	16.	-2.	-0.001	460.07	1.874s
NA-22	5097.14	1274.53	11.	5.	0.003	96.82	1.910s
EU-154	5097.19	1274.54	16.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	5.	5.	0.003	121.64	1.922s
TL-210	5251.13	1313.00	0.	16.	0.009	25.00	1.936s
CO-60	5329.19	1332.50	6.	3.	0.002	188.06	1.949s
AG-110M	5536.55	1384.30	0.	8.	0.004	35.36	1.984s
EU-152	5631.44	1408.00	0.	11.	0.006	32.14	1.999s
K-40	5842.95	1460.83	14.	181.	0.101	8.35	2.033
La-140	6385.01	1596.21	1.	5.	0.003	47.43	2.119s
SB-124	6764.54	1690.98	0.	0.	0.000	1000.00	2.176s
BI-214	7058.94	1764.49	13.	3.	0.001	215.59	2.219s
Co-56	7086.41	1771.35	6.	0.	0.000	1000.00	2.223s
y-88	7345.60	1836.06	12.	-9.	-0.005	98.76	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.8372E+00					5.31E+01	
			477.60	3.837E+00	?(	1.405E+01	1.08E+02 1.05E+01	G
NA-22	C	4.4280E-01					9.50E+02	
			1274.53	4.428E-01	?(	1.489E+00	9.68E+01 9.99E+01	G
K-40	N	1.5723E+02					4.66E+11	
			1460.83	1.572E+02	?(P	1.730E+01	8.35E+00 1.07E+01	G
Sc-46	F	2.3578E-01					8.38E+01	
			889.28	0.000E+00	?(	1.270E+00	1.00E+03 1.00E+02	G
			1120.55	4.716E-01	?(	2.121E+00	1.30E+02 1.00E+02	G
CR-51	F	-4.9020E+00					2.77E+01	
			320.08	-4.902E+00	&(	2.801E+01	1.70E+02 9.94E+00	G
MN-54	C	-7.0437E-01					3.12E+02	
			834.85	-7.044E-01	?(	1.772E+00	1.08E+02 1.00E+02	G
FE-59	F	2.6863E-01					4.45E+01	
			1099.25	-2.185E-01	?(	2.350E+00	4.52E+02 5.65E+01	G
			1291.60	9.057E-01	?(	2.615E+00	1.22E+02 4.32E+01	G
Co-56	C	-4.4846E-01					7.73E+01	
			846.77	-4.485E-01	?(P	1.569E+00	1.08E+02 9.99E+01	G
			1238.28	6.358E-02	% P	2.985E+00	2.04E+03 6.61E+01	G
			1037.84	-7.037E-01	+ P	1.193E+01	3.33E+02 1.41E+01	G
			1771.35	0.000E+00	+	9.950E+00	1.00E+03 1.55E+01	A
CO-57	C	1.9341E-01					2.72E+02	
			122.06	-3.182E-02	?(	9.574E-01	8.67E+02 8.56E+01	G
			136.47	1.999E+00	?(	1.153E+01	1.71E+02 1.07E+01	G
CO-58	C	3.2536E-01					7.09E+01	
			810.78	3.254E-01	?(	1.058E+00	9.39E+01 9.95E+01	G
CO-60	F	2.6957E-01					1.93E+03	
			1332.50	2.696E-01	?(P	1.203E+00	1.88E+02 1.00E+02	G
			1173.24	-5.713E-01	+	1.888E+00	1.48E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	8.5356E-01					2.44E+02	
			1115.55	8.536E-01	?(P	3.505E+00	1.18E+02	5.06E+01 G
NB-94	I	-2.4193E-01					7.41E+06	
			702.63	-2.419E-01	?(P	1.263E+00	1.40E+02	9.79E+01 G
			871.10	-3.978E-01	+ P	1.633E+00	1.11E+02	9.99E+01 G
ZR-95	I	4.7386E-01					6.40E+01	
			756.73	4.739E-01	?(P	1.396E+00	1.13E+02	5.45E+01 G
			724.20	-7.061E-02	% P	3.177E+00	1.11E+03	4.42E+01 G
RU-103	I	1.6120E-01					3.93E+01	
			497.05	1.612E-01	?(P	7.456E-01	1.77E+02	9.09E+01 G
			610.30	0.000E+00	-	4.525E+01	1.00E+03	5.75E+00 GA
RH-106	I	1.6285E-01					3.74E+02	
			621.92	1.629E-01	&(	1.192E+01	2.86E+03	9.93E+00 G
			1050.36	-2.926E+01	+ P	1.041E+02	7.65E+01	1.56E+00 G
			511.86	8.228E+00	?	5.601E+00	3.71E+01	2.00E+01 GA
AG-108M	C	1.6871E-01					1.53E+05	
			433.94	2.228E-01	?(P	9.687E-01	1.67E+02	9.05E+01 G
			722.94	1.148E-01	?(	1.470E+00	3.53E+02	9.08E+01 G
			614.28	0.000E+00	-	2.910E+00	1.00E+03	8.98E+01 G
AG-110M	F	5.0625E-01					2.50E+02	
			884.68	0.000E+00	?(	1.740E+00	1.00E+03	7.27E+01 G
			657.76	2.762E-01	?(	8.040E-01	8.47E+01	9.46E+01 G
			937.49	-6.470E-01	+ P	4.545E+00	2.17E+02	3.44E+01 G
			1384.30	2.917E+00	?(	2.688E+00	3.54E+01	2.43E+01 G
			763.94	-2.233E+00	+ P	7.958E+00	6.13E+01	2.23E+01 G
SN-113	F	4.9963E-01					1.15E+02	
			391.69	4.996E-01	?(P	2.042E+00	1.20E+02	6.40E+01 G
SB-124	F	2.5639E-01					6.02E+01	
			602.73	0.000E+00	&(	2.623E+00	1.00E+03	9.83E+01 G
			1690.98	0.000E+00	?(	1.614E+00	1.00E+03	4.78E+01 G
			722.79	3.720E+00	?(	1.032E+01	8.18E+01	1.08E+01 G
SB-125	I	1.5127E+00					1.01E+03	
			427.88	1.078E+00	?(P	2.628E+00	9.57E+01	2.96E+01 G
			600.50	2.469E+00	&(	1.386E+01	1.65E+02	1.79E+01 G
			635.89	4.251E-02	% P	7.246E+00	6.23E+03	1.13E+01 G
			463.37	1.110E+00	?(	1.270E+01	3.25E+02	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	3.0881E-01					8.02E+00	
			364.48	2.354E-01	?(	1.074E+00	1.77E+02	8.17E+01 G
			284.30	1.286E+00	(	1.246E+01	3.74E+02	6.14E+00 G
			636.97	-9.185E-01	+	1.359E+01	5.66E+02	7.17E+00 G
Gd-153	F	3.2670E-01					2.42E+02	
			97.50	3.267E-01	&(	4.332E+00	3.91E+02	3.00E+01 G
			103.20	0.000E+00	-	5.984E+00	1.00E+03	2.18E+01 G
Ga-68	C	-2.0630E+01					4.71E-02	
			1077.40	-2.063E+01	?(	5.353E+01	1.12E+02	3.30E+00 G
Tc-99m	I	2.4940E-01					2.51E-01	
			140.51	2.494E-01	?(	1.471E+00	1.75E+02	8.93E+01 G
BA-133	F	-4.3932E-01					3.85E+03	
			356.00	-4.393E-01	(	2.387E+00	1.59E+02	6.20E+01 G
			302.85	0.000E+00	+	1.421E+01	1.00E+03	1.83E+01 G
			383.84	3.101E+00	? P	1.196E+01	1.13E+02	8.94E+00 GA
			80.99	-6.758E-01	+	3.737E+00	1.64E+02	3.41E+01 GA
CS-134	I	3.9840E-01					7.54E+02	
			604.71	0.000E+00	?(	2.647E+00	1.00E+03	9.76E+01 G
			795.87	3.651E-01	?(P	1.854E+00	1.45E+02	8.55E+01 G
			569.32	0.000E+00	-	7.811E+00	1.00E+03	1.54E+01 G
			801.95	5.202E+00	?(	1.701E+01	9.56E+01	8.69E+00 G
			563.24	-5.715E-02	% P	1.430E+01	6.19E+03	8.35E+00 G
CS-137	I	4.9728E-02					1.10E+04	
			661.66	4.973E-02	?(	1.583E+00	8.74E+02	8.52E+01 G
CE-139	F	1.4045E-01					1.38E+02	
			165.85	1.404E-01	?(	1.453E+00	3.03E+02	7.99E+01 G
Ba-140	I	-1.6524E+00					1.28E+01	
			537.26	-1.652E+00	?(P	5.123E+00	7.02E+01	2.44E+01 G
			162.66	-4.056E+00	+	1.743E+01	1.27E+02	6.22E+00 G
			304.85	0.000E+00	&	6.102E+01	1.00E+03	4.29E+00 G
La-140	I	7.2228E-01					1.28E+01	
			1596.21	5.667E-01	?(P	7.696E-01	4.74E+01	9.54E+01 G
			487.02	7.018E-01	&(	3.179E+00	1.32E+02	4.55E+01 G
			328.76	-2.257E+00	& P	9.985E+00	2.26E+01	2.03E+01 G
			815.77	1.400E+00	?(	5.414E+00	1.11E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-5.6593E-01					3.25E+01	
			145.44	-5.659E-01	?(	3.226E+00	1.70E+02	4.82E+01 G
CE-144	I	1.9073E+00					2.85E+02	
			133.54	1.907E+00	&(	1.043E+01	1.62E+02	1.11E+01 G
PM-144	C	-1.7777E-02					3.63E+02	
			696.54	-1.778E-02	%(	1.345E+00	3.08E+03	9.90E+01 G
			618.06	-2.049E-02	% P	2.655E+00	1.84E+03	9.91E+01 G
EU-152	F	9.4096E-01					4.94E+03	
			344.29	-8.877E-02	%(P	8.705E+00	2.87E+03	2.65E+01 G
			1112.07	3.201E+00	?(P	1.100E+01	9.94E+01	1.36E+01 G
			121.78	8.573E-01	?(	2.751E+00	9.55E+01	2.86E+01 G
			778.92	4.432E-01	?(	8.929E+00	8.00E+02	1.29E+01 G
			964.11	1.303E+00	?(	1.241E+01	2.67E+02	1.46E+01 G
			244.69	-4.641E+00	+	1.228E+01	1.02E+02	7.58E+00 G
			1408.00	4.512E+00	? P	3.151E+00	3.21E+01	2.10E+01 GA
EU-154	I	3.7363E+00					3.14E+03	
			873.23	-5.933E+00	?(	1.680E+01	8.41E+01	1.23E+01 G
			123.10	-2.741E-01	+	2.050E+00	2.18E+02	4.08E+01 G
			1274.54	0.000E+00	+	5.034E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	6.858E+00	1.00E+03	2.02E+01 G
			1004.77	-3.253E+00	+	1.297E+01	1.16E+02	1.80E+01 G
			996.33	1.493E+01	?(	4.784E+00	2.09E+01	1.06E+01 G
EU-155	I	3.7457E-01					1.81E+03	
			105.31	3.746E-01	(P	5.714E+00	4.49E+02	2.12E+01 G
			86.54	-7.309E-01	+	4.516E+00	1.83E+02	3.07E+01 G
HF-181	F	6.0867E-01					4.24E+01	
			482.00	4.529E-01	?(	1.815E+00	1.17E+02	8.05E+01 G
			133.02	4.878E-01	?(	2.587E+00	1.57E+02	4.33E+01 G
			345.83	2.040E-01	%	5.929E+00	1.11E+03	1.51E+01 G
			136.30	3.646E+00	&(	2.047E+01	1.66E+02	5.85E+00 G
Ta-182	F	1.3521E+00					1.14E+02	
			1121.30	1.352E+00	?(	6.654E+00	1.42E+02	3.49E+01 G
			1221.41	-5.946E-01	-	6.348E+00	4.60E+02	2.70E+01 G
			1189.05	-1.780E+00	+	1.300E+01	3.24E+02	1.62E+01 G
Hg-203	F	-2.7760E-01					4.66E+01	
			279.20	-2.776E-01	?(	1.317E+00	1.39E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.7353E+00					6.98E+02	
			583.02	1.735E+00	(P	8.351E-01	2.27E+01	8.45E+01 G
			277.28	4.786E+00	& P	1.494E+01	9.26E+01	6.31E+00 G
			860.56	3.889E+00	& P	8.464E+00	9.05E+01	1.24E+01 G
pm-146	C	-3.1665E-01					2.02E+03	
			747.16	-3.167E-01	?(P	4.173E+00	3.40E+02	3.40E+01 G
			735.72	-6.121E-01	+ P	4.173E+00	2.58E+02	2.25E+01 G
			453.88	-3.020E-03	% P	1.254E+00	1.78E+04	6.50E+01 G
y-88	F	-5.5367E-01					1.07E+02	
			898.04	-5.537E-01	?(P	1.804E+00	8.94E+01	9.37E+01 G
			1836.06	-1.022E+00	+	2.140E+00	9.88E+01	9.92E+01 G
Cd-113m		-1.3791E+02					5.33E+03	
			263.70	-1.379E+02	%(	1.585E+04	3.25E+03	6.00E-03 K
Cd-109	F	8.4471E-01					4.53E+02	
							Derived Ave Activity	
			88.04	8.447E-01	}(	4.855E+01	1.70E+03	3.79E+00 G
Cf-251	T	1.2553E+00					3.28E+05	
			176.60	1.255E+00	&(	4.608E+00	1.41E+02	1.70E+01 G
			227.00	0.000E+00	-	1.184E+01	1.00E+03	6.30E+00 GA
Cf-249	T	2.2671E-01					1.28E+05	
			387.95	2.267E-01	?(	1.911E+00	2.42E+02	6.60E+01 G
			333.44	-2.753E+00	+	1.306E+01	1.41E+02	1.55E+01 G
Sn-126		3.3785E+00					3.65E+07	
			87.57	7.973E-01	}	4.827E+00	6.73E+01	3.75E+01 GA
			64.28	3.378E+00	(	1.299E+01	1.14E+02	9.70E+00 G
			86.94	0.000E+00	}	1.497E+01	1.26E+03	9.04E+00 GA
PB-210	N	-2.2131E+01					8.14E+03	
			46.54	-2.213E+01	(P	4.949E+01	6.26E+01	4.25E+00 G
PB-212	N	3.1191E+00					6.98E+02	
			238.63	3.119E+00	(P	1.596E+00	2.18E+01	4.33E+01 G
			300.03	-1.371E+01	- P	7.518E+01	1.86E+01	3.28E+00 GA
PB-214	N	3.5526E+00					5.84E+05	
			351.93	3.553E+00	?(P	2.380E+00	2.41E+01	3.76E+01 G
			295.09	-2.867E+00	- P	1.214E+01	5.60E+01	1.93E+01 G
			242.00	2.087E-01	%	2.076E+01	2.90E+03	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-3.9488E-01					1.18E+04	
			569.70	-3.949E-01	?(	1.602E+00	1.19E+02	9.77E+01 G
			1063.66	2.532E-01	+ P	2.036E+00	3.34E+02	7.45E+01 G
BI-212	N	-7.0312E-01					6.98E+02	
			727.17	-7.031E-01	?(P	1.877E+01	6.59E+02	7.55E+00 G
			785.42	-1.097E+01	& P	1.048E+02	2.94E+02	1.28E+00 GA
U-235	N	1.9949E+00					2.57E+11	
			143.79	1.995E+00	(	1.203E+01	1.79E+02	1.10E+01 G
			205.33	-5.932E+00	+ P	1.644E+01	1.54E+02	5.01E+00 G
			163.38	-4.266E+00	+	2.179E+01	1.51E+02	5.08E+00 G
			185.72	6.342E-01	*	1.635E+00	1.00E+02	5.40E+01 GA
BI-214	N	2.9866E+00					5.84E+05	
			609.31	3.056E+00	(P	1.847E+00	2.59E+01	4.61E+01 G
			1120.29	2.774E+00	&(P	1.280E+01	1.32E+02	1.51E+01 G
			1764.49	1.785E+00	- P	1.398E+01	2.16E+02	1.54E+01 G
BI-210M	T	-3.3305E-02					1.10E+09	
			265.83	-3.331E-02	%(	1.479E+00	1.62E+03	5.00E+01 G
			304.90	0.000E+00	&	9.350E+00	1.00E+03	2.80E+01 G
AC-228	N	2.2332E+00					2.10E+03	
			911.07	2.208E+00	?(	4.609E+00	9.13E+01	2.90E+01 G
			968.97	2.274E+00	?(	7.012E+00	8.96E+01	1.75E+01 G
			338.32	-3.707E+00	& P	1.802E+01	3.97E+01	1.20E+01 G
			93.35	5.925E-01	%	3.267E+01	1.63E+03	5.56E+00 XA
TH-227	N	5.0596E+00					7.95E+03	
			50.14	5.060E+00	?(	1.896E+01	1.11E+02	8.00E+00 G
			256.24	-5.256E+00	+ P	1.337E+01	8.47E+01	7.00E+00 G
TH-229	N	-6.2789E+00					2.68E+06	
			193.51	-6.279E+00	?(P	1.885E+01	1.59E+02	4.40E+00 G
			210.85	2.189E+00	& P	2.936E+01	5.07E+02	2.99E+00 G
TH-234	N	-2.1270E+01					1.63E+12	
			63.29	-2.127E+01	(P	4.064E+01	4.82E+01	3.81E+00 G
			92.59	-7.931E+00	+ P	3.345E+01	6.72E+01	5.58E+00 G
PA-234	N	3.5911E+00					1.63E+12	
			131.29	1.520E+00	?(	5.941E+00	1.16E+02	1.80E+01 G
			946.02	5.685E+00	?(P	3.641E+00	3.09E+01	1.34E+01 G
			569.47	-2.491E+00	+	1.598E+01	1.83E+02	8.20E+00 G
			883.24	4.552E+00	?(	9.820E+00	6.57E+01	9.60E+00 G
			880.53	7.257E+00	?	7.712E+00	3.80E+01	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   1.4110E+01                                      1.63E+12
                         1001.00-2.887E+01 ?(P 2.202E+02 1.30E+02 8.37E-01 G
                          766.41 1.365E+02 ?(P 4.655E+02 9.94E+01 2.94E-01 G

AM-241   T   7.5010E-01                                      1.58E+05
                           59.54 7.501E-01 &(  4.321E+00 1.71E+02 3.59E+01 G

Ir-192   F   5.0210E-01                                      7.40E+01
                          316.49 5.021E-01 ?(  2.909E+00 1.72E+02 8.70E+01 G
                          468.06-6.287E-01 +   2.796E+00 1.30E+02 5.18E+01 G
                          308.44 0.000E+00 -   8.321E+00 1.00E+03 3.18E+01 G

Cs-136   F   2.8347E-01                                      1.30E+01
                          818.50-2.758E-01 &(  1.696E+00 1.75E+02 1.00E+02 G
                         1048.07 9.825E-01 ?(  6.583E-01 3.02E+01 8.00E+01 G
                          340.57-5.884E-01 +   4.780E+00 2.40E+02 4.69E+01 G

Np-239   T  -1.3859E+00                                      2.36E+00
                          103.70 0.000E+00 +   5.434E+00 1.00E+03 2.40E+01 X
                          106.13-1.386E+00 &(  6.076E+00 1.31E+02 2.27E+01 G
                           99.50 0.000E+00 &   8.731E+00 1.00E+03 1.50E+01 X

Nd-147       6.3002E-01                                      1.11E+01
                          531.00 1.214E+00 ?(  7.320E+00 2.38E+02 1.30E+01 G
                           91.10 3.618E-01 ?(  6.434E+00 5.28E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	177.	-29.	-0.016	62.61	-2.213E+01	P
TH-227	50.14	130.	15.	0.008	111.27	5.060E+00	
AM-241	59.54	227.	13.	0.007	170.67	7.501E-01	
TH-234	63.29	254.	-40.	-0.022	48.18	-2.127E+01	P
BA-133	80.99	232.	-13.	-0.007	163.97	-6.758E-01	
EU-155	86.54	292.	-13.	-0.007	183.41	-7.309E-01	
Nd-147	91.10	529.	6.	0.003	527.86	3.618E-01	
TH-234	92.59	562.	-27.	-0.015	67.25	-7.931E+00	P
Gd-153	97.50	272.	6.	0.003	390.87	3.267E-01	
EU-155	105.31	239.	5.	0.003	448.72	3.746E-01	P
Np-239	106.13	313.	-19.	-0.011	130.80	-1.386E+00	
EU-152	121.78	95.	15.	0.008	95.45	8.573E-01	
CO-57	122.06	104.	-2.	-0.001	867.41	-3.182E-02	
EU-154	123.10	108.	-7.	-0.004	218.29	-2.741E-01	
PA-234	131.29	176.	16.	0.009	116.25	1.520E+00	
HF-181	133.02	192.	13.	0.007	157.02	4.878E-01	
CE-144	133.54	205.	13.	0.007	161.89	1.907E+00	
HF-181	136.30	217.	13.	0.007	166.29	3.646E+00	
CO-57	136.47	230.	13.	0.007	170.92	1.999E+00	
Tc-99m	140.51	243.	13.	0.007	174.85	2.494E-01	
U-235	143.79	256.	13.	0.007	178.76	1.995E+00	
CE-141	145.44	356.	-16.	-0.009	169.66	-5.659E-01	
Ba-140	162.66	152.	-14.	-0.008	127.38	-4.056E+00	
U-235	163.38	158.	-12.	-0.007	150.92	-4.266E+00	
CE-139	165.85	172.	6.	0.003	303.31	1.404E-01	
Cf-251	176.60	70.	11.	0.006	140.95	1.255E+00	
U-235	185.72	84.	18.	0.010	100.18	6.342E-01	
TH-229	193.51	70.	-14.	-0.008	158.62	-6.279E+00	P
U-235	205.33	63.	-14.	-0.008	153.74	-5.932E+00	P
TH-229	210.85	70.	3.	0.002	506.66	2.189E+00	P
EU-152	244.69	63.	-15.	-0.008	102.31	-4.641E+00	
TH-227	256.24	59.	-15.	-0.008	84.71	-5.256E+00	P
Hg-203	279.20	69.	-9.	-0.005	138.72	-2.776E-01	
TL-210	296.00	333.	-16.	-0.009	167.69	-5.350E-01	
PA-231	300.07	364.	-16.	-0.009	174.80	-1.742E+01	
PA-233	300.18	380.	-5.	-0.003	533.28	-2.297E+00	
Ir-192	316.49	338.	15.	0.008	172.36	5.021E-01	
CR-51	320.08	404.	-17.	-0.009	170.26	-4.902E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	328.76	200.	-16.	-0.009	22.61	-2.257E+00	P
Cf-249	333.44	195.	-14.	-0.008	140.68	-2.753E+00	
Cs-136	340.57	233.	-9.	-0.005	239.79	-5.884E-01	
BA-133	356.00	91.	-9.	-0.005	159.05	-4.393E-01	
BA-133	383.84	40.	8.	0.005	112.77	3.101E+00	P
Cf-249	387.95	56.	4.	0.002	241.96	2.267E-01	
SN-113	391.69	59.	9.	0.005	119.91	4.996E-01	P
SB-125	427.88	16.	9.	0.005	95.72	1.078E+00	P
AG-108M	433.94	21.	5.	0.003	166.74	2.228E-01	P
SB-125	463.37	46.	3.	0.002	324.89	1.110E+00	
Ir-192	468.06	54.	-8.	-0.005	129.80	-6.287E-01	
BE-7	477.60	55.	10.	0.006	107.69	3.837E+00	
HF-181	482.00	53.	9.	0.005	117.37	4.529E-01	
La-140	487.02	51.	8.	0.004	131.97	7.018E-01	
RU-103	497.05	9.	4.	0.002	177.11	1.612E-01	P
RH-106	511.86	27.	39.	0.022	37.08	8.228E+00	
Nd-147	531.00	17.	4.	0.002	237.58	1.214E+00	
Ba-140	537.26	31.	-9.	-0.005	70.23	-1.652E+00	P
PA-234	569.47	32.	-4.	-0.002	182.57	-2.491E+00	
BI-207	569.70	46.	-8.	-0.005	118.53	-3.949E-01	
SB-125	600.50	114.	9.	0.005	164.83	2.469E+00	
AG-110M	657.76	7.	5.	0.003	84.74	2.762E-01	
CS-137	661.66	26.	1.	0.000	874.43	4.973E-02	
NB-94	702.63	19.	-4.	-0.002	139.76	-2.419E-01	P
SB-124	722.79	15.	7.	0.004	81.79	3.720E+00	
AG-108M	722.94	22.	2.	0.001	353.14	1.148E-01	
BI-212	727.17	25.	-1.	-0.001	658.89	-7.031E-01	P
pm-146	735.72	10.	-3.	-0.001	257.98	-6.121E-01	P
pm-146	747.16	24.	-2.	-0.001	339.62	-3.167E-01	P
ZR-95	756.73	5.	5.	0.003	113.48	4.739E-01	P
AG-110M	763.94	38.	-9.	-0.005	61.28	-2.233E+00	P
PA-234M	766.41	21.	7.	0.004	99.42	1.365E+02	P
EU-152	778.92	14.	1.	0.001	800.00	4.432E-01	
BI-212	785.42	19.	-2.	-0.001	294.36	-1.097E+01	P
CS-134	795.87	28.	5.	0.003	145.46	3.651E-01	P
CS-134	801.95	23.	8.	0.004	95.60	5.202E+00	
CO-58	810.78	10.	5.	0.003	93.93	3.254E-01	
La-140	815.77	16.	5.	0.003	110.94	1.400E+00	
Cs-136	818.50	31.	-5.	-0.003	175.12	-2.758E-01	
MN-54	834.85	33.	-12.	-0.006	107.97	-7.044E-01	
Co-56	846.77	24.	-7.	-0.004	108.10	-4.485E-01	P
NB-94	871.10	25.	-6.	-0.004	111.34	-3.978E-01	P
EU-154	873.23	42.	-12.	-0.006	84.13	-5.933E+00	
PA-234	880.53	0.	7.	0.004	37.97	7.257E+00	
PA-234	883.24	7.	7.	0.004	65.70	4.552E+00	
y-88	898.04	26.	-8.	-0.005	89.41	-5.537E-01	P
AG-110M	937.49	20.	-3.	-0.002	217.48	-6.470E-01	P
PA-234	946.02	0.	12.	0.006	30.89	5.685E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	964.11	27.	3.	0.002	266.85	1.303E+00		
EU-154	996.33	0.	23.	0.013	20.85	1.493E+01		
PA-234M	1001.00	26.	-4.	-0.002	130.17	-2.887E+01		P
EU-154	1004.77	44.	-8.	-0.005	116.45	-3.253E+00		
Co-56	1037.84	20.	-1.	-0.001	333.10	-7.037E-01		P
Cs-136	1048.07	0.	11.	0.006	30.15	9.825E-01		
RH-106	1050.36	18.	-6.	-0.004	76.47	-2.926E+01		P
BI-207	1063.66	15.	3.	0.001	333.98	2.532E-01		P
Ga-68	1077.40	15.	-8.	-0.004	112.15	-2.063E+01		
FE-59	1099.25	11.	-2.	-0.001	452.11	-2.185E-01		
EU-152	1112.07	14.	6.	0.003	99.40	3.201E+00		P
ZN-65	1115.55	20.	6.	0.003	118.08	8.536E-01		P
Sc-46	1120.55	30.	6.	0.003	129.67	4.716E-01		
Ta-182	1121.30	37.	6.	0.003	141.98	1.352E+00		
CO-60	1173.24	21.	-7.	-0.004	147.85	-5.713E-01		
Ta-182	1189.05	27.	-4.	-0.002	324.36	-1.780E+00		
Ta-182	1221.41	16.	-2.	-0.001	460.07	-5.946E-01		
NA-22	1274.53	11.	5.	0.003	96.82	4.428E-01		
FE-59	1291.60	5.	5.	0.003	121.64	9.057E-01		
TL-210	1313.00	0.	16.	0.009	25.00	6.471E+00		
CO-60	1332.50	6.	3.	0.002	188.06	2.696E-01		P
AG-110M	1384.30	0.	8.	0.004	35.36	2.917E+00		
EU-152	1408.00	0.	11.	0.006	32.14	4.512E+00		P
La-140	1596.21	1.	5.	0.003	47.43	5.667E-01		P
y-88	1836.06	12.	-9.	-0.005	98.76	-1.022E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.8372E+00	3.8372E+00	1.077E+02%	1.40E+01
NA-22	#A	4.4280E-01	4.4280E-01	9.682E+01%	1.49E+00
K-40	#	1.5723E+02	1.5723E+02	8.347E+00%	1.73E+01
Sc-46	#A	2.3578E-01	2.3578E-01	1.297E+02%	1.27E+00
CR-51	#A	-4.9020E+00	-4.9020E+00	1.703E+02%	2.80E+01
MN-54	#A	-7.0437E-01	-7.0437E-01	1.080E+02%	1.77E+00
FE-59	#A	2.6863E-01	2.6863E-01	1.216E+02%	2.35E+00
Co-56	#A	-4.4846E-01	-4.4846E-01	1.081E+02%	1.57E+00
CO-57	#A	1.9341E-01	1.9341E-01	1.709E+02%	9.57E-01
CO-58	#A	3.2536E-01	3.2536E-01	9.393E+01%	1.06E+00
CO-60	#A	2.6957E-01	2.6957E-01	1.881E+02%	1.20E+00
ZN-65	#A	8.5356E-01	8.5356E-01	1.181E+02%	3.50E+00
NB-94	#A	-2.4193E-01	-2.4193E-01	1.398E+02%	1.26E+00
ZR-95	#A	4.7386E-01	4.7386E-01	1.135E+02%	1.40E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.93E+00

RU-103 #A	1.6120E-01	1.6120E-01	1.771E+02%	7.46E-01
RH-106 #A	1.6285E-01	1.6285E-01	2.856E+03%	1.19E+01
AG-108M#A	1.6871E-01	1.6871E-01	1.667E+02%	9.69E-01
AG-110M#A	5.0625E-01	5.0625E-01	3.536E+01%	1.74E+00
SN-113 #A	4.9963E-01	4.9963E-01	1.199E+02%	2.04E+00
SB-124 #A	2.5639E-01	2.5639E-01	8.179E+01%	2.62E+00
SB-125 #A	1.5127E+00	1.5127E+00	9.572E+01%	2.63E+00
I-131 A	3.0880E-01	3.0881E-01	1.774E+02%	1.07E+00
Gd-153 #A	3.2670E-01	3.2670E-01	3.909E+02%	4.33E+00
Ga-68 #A	-2.0539E+01	-2.0630E+01	1.122E+02%	5.35E+01
Tc-99m #A	2.4919E-01	2.4940E-01	1.748E+02%	1.47E+00
BA-133 #A	-4.3932E-01	-4.3932E-01	1.590E+02%	2.39E+00
CS-134 #A	3.9839E-01	3.9840E-01	9.560E+01%	2.65E+00
CS-137 #A	4.9728E-02	4.9728E-02	8.744E+02%	1.58E+00
CE-139 #A	1.4045E-01	1.4045E-01	3.033E+02%	1.45E+00
Ba-140 #A	-1.6523E+00	-1.6524E+00	7.023E+01%	5.12E+00
La-140 #A	7.2227E-01	7.2228E-01	4.743E+01%	7.70E-01
CE-141 #A	-5.6592E-01	-5.6593E-01	1.697E+02%	3.23E+00
CE-144 #A	1.9073E+00	1.9073E+00	1.619E+02%	1.04E+01
PM-144 #A	-1.7777E-02	-1.7777E-02	3.079E+03%	1.34E+00
EU-152 #A	9.4096E-01	9.4096E-01	9.545E+01%	8.70E+00
EU-154 #A	3.7363E+00	3.7363E+00	2.085E+01%	1.68E+01
EU-155 #A	3.7457E-01	3.7457E-01	4.487E+02%	5.71E+00
HF-181 #A	6.0867E-01	6.0867E-01	8.569E+01%	1.82E+00
Ta-182 #A	1.3521E+00	1.3521E+00	1.420E+02%	6.65E+00
Hg-203 #A	-2.7760E-01	-2.7760E-01	1.387E+02%	1.32E+00
TL-208	1.7353E+00	1.7353E+00	2.268E+01%	8.35E-01
pm-146 #A	-3.1665E-01	-3.1665E-01	3.396E+02%	4.17E+00
y-88 #A	-5.5366E-01	-5.5367E-01	8.941E+01%	1.80E+00
Cd-113m#B	-1.3791E+02	-1.3791E+02	3.245E+03%	1.58E+04
Cd-109 #A	8.4471E-01	8.4471E-01	1.703E+03%	4.86E+01
Cf-251 #A	1.2553E+00	1.2553E+00	1.409E+02%	4.61E+00
Cf-249 #A	2.2671E-01	2.2671E-01	2.420E+02%	1.91E+00
Sn-126 A	3.3785E+00	3.3785E+00	1.144E+02%	1.30E+01
PB-210 #A	-2.2131E+01	-2.2131E+01	6.261E+01%	4.95E+01
PB-212	3.1191E+00	3.1191E+00	2.177E+01%	1.60E+00
PB-214 #	3.5526E+00	3.5526E+00	2.411E+01%	2.38E+00
BI-207 #A	-3.9488E-01	-3.9488E-01	1.185E+02%	1.60E+00
BI-212 #A	-7.0312E-01	-7.0312E-01	6.589E+02%	1.88E+01
U-235 #A	1.9949E+00	1.9949E+00	1.788E+02%	1.20E+01
BI-214	2.9866E+00	2.9866E+00	2.591E+01%	1.85E+00
BI-210M#A	-3.3305E-02	-3.3305E-02	1.625E+03%	1.48E+00
AC-228 #A	2.2332E+00	2.2332E+00	6.397E+01%	4.61E+00
TH-227 #A	5.0596E+00	5.0596E+00	1.113E+02%	1.90E+01
TH-229 #A	-6.2789E+00	-6.2789E+00	1.586E+02%	1.88E+01
TH-234 #A	-2.1270E+01	-2.1270E+01	4.818E+01%	4.06E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%	9.04E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.41E+00
PA-234 #A	3.5911E+00	3.5911E+00	3.089E+01%	5.94E+00

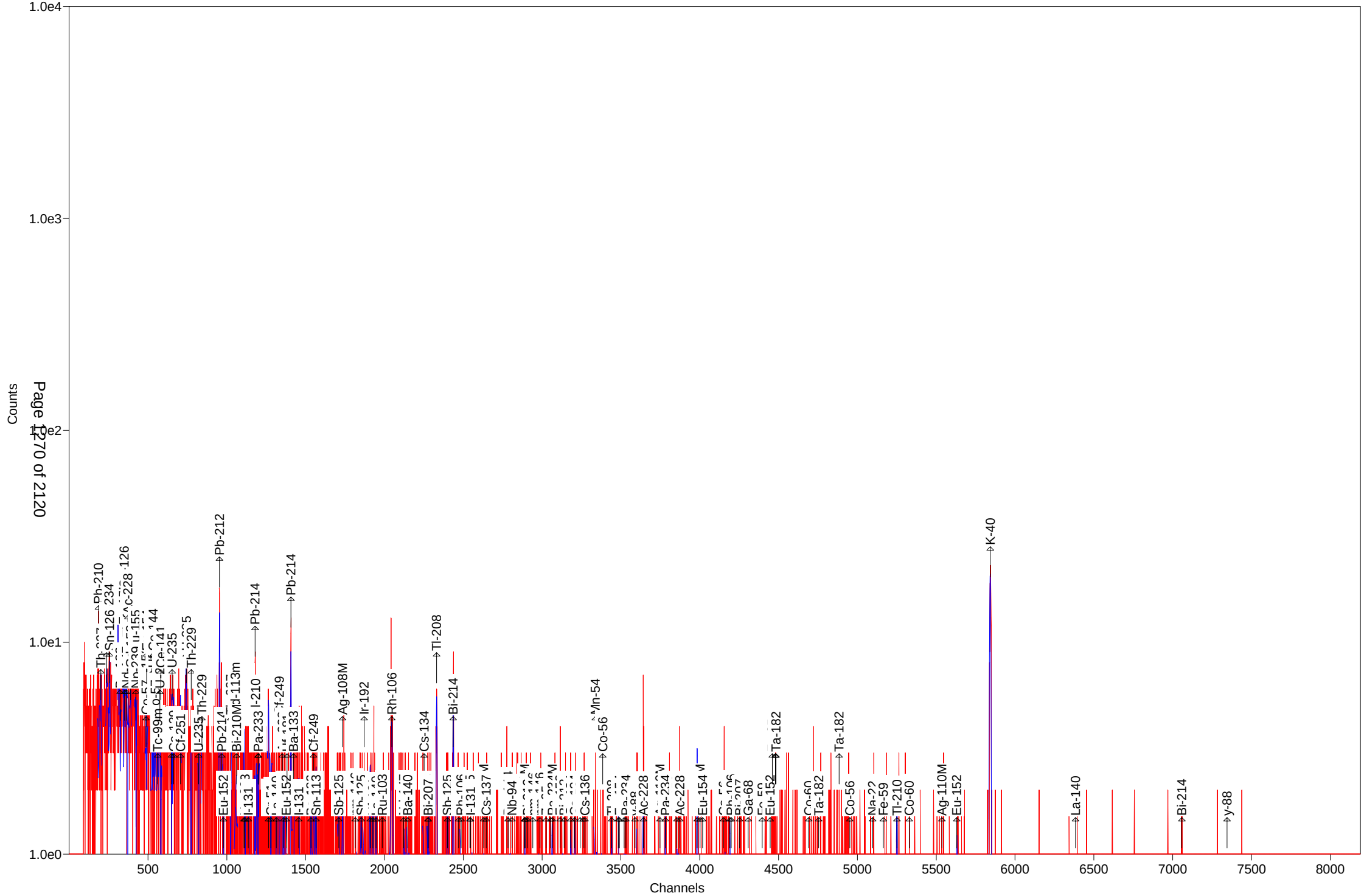
PA-234M#A	1.4110E+01	1.4110E+01	8.190E+01%	2.20E+02
AM-241 #A	7.5010E-01	7.5010E-01	1.707E+02%	4.32E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.04E+01
Ir-192 #A	5.0210E-01	5.0210E-01	1.724E+02%	2.91E+00
Cs-136 #A	2.8346E-01	2.8347E-01	3.015E+01%	1.70E+00
Np-239 #A	-1.3858E+00	-1.3859E+00	1.308E+02%	6.08E+00
Nd-147 #A	6.3001E-01	6.3002E-01	2.376E+02%	7.32E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.74E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.709E+02 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 1.7085234E+02 Bq/Sample

379951_Gamma_160-29881-B-28-C. 19_Gamma_20181613.spc.



Test America St. Louis Spectrum ID: 8_Gamma_20182987

Sample Description: 379951_Gamma_160-29881-B-29-B
Detector: Detector # 8
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-29-B

Decay to Time: 8/23/2018 07:10 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:10:48 Real Time: 1847 sec
Analysis Time: 8/23/2018 07:42 Dead Time: 2.54 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Long_Rev14.lib
Bkgd Correction File: 8_2018-08-11_1318.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.680E+00	107.3	2.875E+00	2.878E+00	9.851E+00
NA-22	2.670E-02	1396.4	3.729E-01	3.729E-01	1.436E+00
K-40	1.817E+02	6.9	1.261E+01	1.567E+01	9.986E+00
Sc-46	1.437E-01	428.5	6.156E-01	6.156E-01	2.165E+00
CR-51	-3.838E+00	36.7	1.409E+00	1.423E+00	2.027E+01
MN-54	-1.302E-01	444.0	5.783E-01	5.783E-01	1.408E+00
FE-59	7.301E-01	94.3	6.881E-01	6.891E-01	1.659E+00
Co-56	-8.980E-01	48.0	4.313E-01	4.338E-01	1.771E+00
CO-57	2.504E-01	102.4	2.564E-01	2.568E-01	6.386E-01
CO-58	-8.077E-01	51.1	4.130E-01	4.151E-01	2.272E+00
CO-60	9.931E-02	75.2	7.470E-02	7.487E-02	1.923E+00
ZN-65	0.000E+00	1.#INF	1.995E-01	1.995E-01	4.381E+00
NB-94	2.111E-01	79.7	1.682E-01	1.685E-01	6.304E-01
ZR-95	4.985E-01	97.0	4.838E-01	4.845E-01	1.206E+00
NB-95	0.000E+00	1.#INF	2.207E-01	2.207E-01	1.377E+00
RU-103	0.000E+00	1.#INF	3.995E-02	3.995E-02	7.795E-01
RH-106	3.093E+00	175.6	5.432E+00	5.435E+00	1.867E+01
AG-108M	1.073E-01	122.0	1.309E-01	1.310E-01	1.022E+00
AG-110M	4.206E-02	52.1	2.194E-02	2.204E-02	2.744E+00
SN-113	-5.539E-01	108.5	6.008E-01	6.015E-01	2.034E+00
SB-124	1.787E-01	106.4	1.901E-01	1.903E-01	2.063E+00
SB-125	2.659E+00	22.5	5.996E-01	6.148E-01	2.048E+00
I-131	2.935E-01	99.9	2.934E-01	2.938E-01	7.546E-01
Gd-153	-9.123E-01	173.1	1.580E+00	1.580E+00	5.283E+00
Ga-68	1.472E+01	92.0	1.355E+01	1.357E+01	3.240E+01
Tc-99m	0.000E+00	1.#INF	6.085E-02	6.086E-02	1.375E+00
BA-133	-6.123E-01	124.0	7.593E-01	7.599E-01	2.563E+00
CS-134	2.602E-01	87.8	2.284E-01	2.288E-01	2.082E+00
CS-137	1.780E-01	255.6	4.551E-01	4.552E-01	1.600E+00
CE-139	1.277E-01	251.0	3.206E-01	3.208E-01	1.096E+00
Ba-140	7.959E-01	129.1	1.027E+00	1.028E+00	2.646E+00
La-140	1.817E+00	14.1	2.569E-01	2.743E-01	1.409E+00
CE-141	4.505E-01	150.6	6.783E-01	6.787E-01	2.283E+00

CE-144	-1.506E+00	205.4	3.093E+00	3.094E+00	1.043E+01
PM-144	-3.552E-01	144.5	5.134E-01	5.137E-01	1.222E+00
EU-152	-1.596E+00	78.7	1.256E+00	1.259E+00	7.555E+00
EU-154	3.148E+00	71.4	2.247E+00	2.252E+00	8.112E+00
EU-155	1.172E+00	184.7	2.165E+00	2.166E+00	7.245E+00
HF-181	8.709E-02	463.1	4.033E-01	4.033E-01	1.432E+00
Ta-182	6.604E-01	180.9	1.194E+00	1.195E+00	6.341E+00
Hg-203	-2.598E-01	104.1	2.703E-01	2.708E-01	9.213E-01
TL-208	1.050E+00	35.6	3.734E-01	3.774E-01	1.080E+00
pm-146	-1.131E+00	76.0	8.587E-01	8.607E-01	3.788E+00
y-88	4.453E-02	1141.4	5.083E-01	5.083E-01	1.288E+00
Cd-113m	-6.079E+02	546.6	3.323E+03	3.323E+03	1.183E+04
Cd-109	0.000E+00	1.#INF	1.799E+00	1.799E+00	3.622E+01
Cf-251	4.093E-01	301.9	1.236E+00	1.236E+00	3.295E+00
Cf-249	-5.254E-01	102.6	5.391E-01	5.398E-01	1.825E+00
Sn-126	2.904E+00	124.8	3.625E+00	3.629E+00	1.220E+01
PB-210	-5.113E+00	191.3	9.780E+00	9.785E+00	3.389E+01
PB-212	2.722E+00	18.6	5.067E-01	5.365E-01	1.295E+00
PB-214	3.967E+00	16.6	6.590E-01	6.905E-01	1.361E+00
BI-207	2.697E-01	109.4	2.951E-01	2.955E-01	1.397E+00
BI-212	3.411E+00	109.2	3.725E+00	3.729E+00	1.300E+01
U-235	-8.946E-02	310.3	2.776E-01	2.776E-01	1.109E+01
BI-214	4.204E-01	265.1	1.115E+00	1.115E+00	3.858E+00
BI-210M	4.022E-01	89.0	3.580E-01	3.588E-01	1.213E+00
AC-228	3.798E+00	34.2	1.299E+00	1.314E+00	2.647E+00
TH-227	-5.720E+00	102.9	5.885E+00	5.894E+00	1.973E+01
TH-229	-7.017E+00	94.6	6.635E+00	6.659E+00	1.706E+01
TH-234	-5.048E+00	192.8	9.732E+00	9.735E+00	3.369E+01
PA-231	0.000E+00	1.#INF	2.934E+00	2.934E+00	5.375E+01
PA-233	0.000E+00	1.#INF	2.776E-01	2.776E-01	4.405E+00
PA-234	-1.274E+00	144.0	1.834E+00	1.835E+00	6.161E+00
PA-234M	-1.678E+01	186.1	3.122E+01	3.123E+01	3.145E+02
AM-241	1.485E+00	68.2	1.013E+00	1.016E+00	3.345E+00
Np-237	-1.863E+00	166.8	3.108E+00	3.110E+00	1.043E+01
Ir-192	0.000E+00	1.#INF	4.105E-02	4.105E-02	1.842E+00
Cs-136	9.328E-02	34.0	3.169E-02	3.214E-02	2.917E+00
Np-239	1.138E+00	179.1	2.039E+00	2.040E+00	6.823E+00
Nd-147	-2.752E+00	124.8	3.435E+00	3.439E+00	8.367E+00
TL-210	2.925E-01	108.4	3.171E-01	3.176E-01	1.106E+00
Total	2.386E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-29-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20182987.An1

Acquisition information

Start time:	8/23/2018 7:10:48 AM
Live time:	1800
Real time:	1847
Dead time:	2.54 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_Soil_TunaCan.Clb

8_Soil_TunaCan_90099_032712

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	3/28/2012 10:35:20 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.39 %
Log(Eff):	-1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.71 %
Log(Eff):	-2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.97keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2018-08-11_1318.PBC 8/11/2018 1:18:09 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1718

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
59.54	28.	68.20	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.29	-11.	192.78	1.03	3.093E-02	63.29	3.810	PBC<MDA	TH234
64.28	16.	124.84	1.03	3.146E-02	64.28	9.700	PBC<MDA	Sn126
80.99	15.	112.31	1.04	3.821E-02	80.99	34.060	PBC<MDA	BA133
105.31	19.	184.68	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	179.13	1.06	4.187E-02	106.13	22.700	PBC<MDA	Np239
121.20	12.	102.40	1.07	4.146E-02	122.06	85.600	PBC<MDA	CO57
121.78	12.	97.03	1.07	4.148E-02				
136.65	6.	419.88	1.08	3.999E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	7.805E-01	CO57
145.44	15.	150.57	1.09	3.874E-02	145.44	48.200	PBC<MDA	CE141
165.85	7.	251.00	1.10	3.629E-02	165.85	79.900	PBC<MDA	CE139
176.60	4.	301.92	1.11	3.460E-02	176.60	17.000	PBC<MDA	Cf251
185.72	7.	232.31	1.12	3.329E-02	185.72	54.000	PBC<MDA	U235
205.33	4.	310.26	1.13	3.083E-02	205.33	5.010	PBC<MDA	U235
210.85	8.	170.19	1.14	3.020E-02	210.85	2.990	PBC<MDA	TH229
227.00	4.	328.51	1.15	2.853E-02	227.00	6.300	PBC<MDA	Cf251
238.66	58.	18.61	1.16	2.744E-02	238.63	43.300	2.722E+00	PB212
242.03	24.	30.40	1.16	2.714E-02	242.00	7.430	6.649E+00	PB214
244.69	4.	480.71	1.16	2.691E-02	244.69	7.580	PBC<MDA	EU152
256.24	11.	105.65	1.17	2.596E-02	256.24	7.000	PBC<MDA	TH227
266.03	9.	89.00	1.18	2.523E-02	265.83	50.000	PBC<MDA	BI210M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.28	15.	38.30	1.19	2.440E-02	277.28	6.310	PBC<MDA	TL208
284.30	9.	99.95	1.19	2.393E-02	284.30	6.140	PBC<MDA	I131
295.05	27.	28.24	1.20	2.324E-02	295.09	19.300	3.382E+00	PB214
299.99	5.	110.32	1.20	2.294E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	87.	14.14	1.23	2.133E-02	328.76	20.300	1.115E+01	La140
351.61	58.	17.51	1.08	2.021E-02	351.93	37.600	4.266E+00	PB214
364.48	1.	663.69	1.25	1.965E-02	364.48	81.700	PBC<MDA	I131
383.84	10.	105.32	1.27	1.885E-02	383.84	8.940	PBC<MDA	BA133
427.88	8.	93.93	1.30	1.728E-02	427.88	29.600	PBC<MDA	SB125
463.37	31.	22.55	1.32	1.620E-02	463.37	10.470	1.002E+01	SB125
477.60	8.	107.27	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
482.00	2.	463.10	1.34	1.569E-02	482.00	80.500	PBC<MDA	HF181
511.86	22.	21.23	2.61	1.494E-02	511.86	20.000	4.127E+00	RH106
537.26	5.	129.05	1.37	1.436E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	237.58	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
569.70	9.	109.43	1.40	1.368E-02	569.32	15.380	2.375E+00	CS134
					569.47	8.200	4.455E+00	PA234
					569.70	97.740	3.739E-01	BI207
583.02	15.	59.93	1.40	1.342E-02	583.02	84.500	PBC<MDA	TL208
600.50	8.	178.14	1.42	1.310E-02	600.50	17.860	PBC<MDA	SB125
608.88	5.	265.10	1.42	1.294E-02	609.31	46.090	PBC<MDA	BI214
610.30	9.	145.62	1.42	1.293E-02	610.30	5.750	PBC<MDA	RU103
614.28	9.	153.14	1.43	1.286E-02	614.28	89.850	PBC<MDA	AG108M
618.06	2.	737.86	1.43	1.279E-02	618.06	99.100	PBC<MDA	PM144
621.92	7.	175.64	1.43	1.273E-02	621.92	9.930	PBC<MDA	RH106
635.89	5.	79.91	1.44	1.250E-02	635.89	11.310	PBC<MDA	SB125
636.97	1.	848.36	1.44	1.248E-02	636.97	7.170	PBC<MDA	I131
661.66	3.	255.63	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137
702.63	5.	99.12	1.48	1.150E-02	702.63	97.900	PBC<MDA	NB94
722.79	6.	106.37	1.50	1.123E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.086E-01	AG108M
					723.36	20.220	1.387E+00	EU154
727.17	5.	109.20	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
756.73	5.	97.05	1.52	1.081E-02	756.73	54.460	PBC<MDA	ZR95
763.94	1.	533.85	1.52	1.072E-02	763.94	22.280	PBC<MDA	AG110M
766.41	1.	866.90	1.53	1.070E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.87	5.	87.79	1.54	1.036E-02	795.87	85.530	PBC<MDA	CS134
799.60	5.	108.44	1.55	1.032E-02	799.60	98.960	PBC<MDA	TL210
801.95	1.	518.44	1.55	1.030E-02	801.95	8.690	PBC<MDA	CS134
871.10	3.	124.78	1.59	9.604E-03	871.10	99.890	PBC<MDA	NB94
873.23	5.	92.54	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
880.53	1.	806.23	1.60	9.517E-03	880.53	6.000	PBC<MDA	PA234
889.28	2.	428.49	1.60	9.438E-03	889.28	99.984	PBC<MDA	Sc46
910.75	18.	34.21	1.62	9.247E-03	911.07	29.000	3.798E+00	AC228
937.49	12.	52.15	1.63	9.026E-03	937.49	34.360	PBC<MDA	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
964.11	3.	238.82	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	92.82	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1001.00	-4.	186.08	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	10.	108.66	1.67	8.509E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	276.39	1.69	8.278E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	16.	33.98	1.70	8.209E-03	1048.07	80.000	1.325E+00	Cs136
1063.66	1.	358.25	1.71	8.106E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	6.	92.03	1.72	8.017E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	6.	94.26	1.73	7.881E-03	1099.25	56.500	PBC<MDA	FE59
1173.24	8.	75.22	1.77	7.453E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	4.	180.85	1.78	7.367E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	8.	96.54	1.81	7.114E-03	1238.28	66.070	PBC<MDA	Co56
1313.00	1.	563.47	1.85	6.763E-03	1313.00	21.000	PBC<MDA	TL210
1460.66	215.	6.94	1.36	6.166E-03	1460.83	10.670	1.817E+02	K40

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.54	112.	-8.	-0.004	191.26	1.012s
TH-227	200.37	50.14	175.	-19.	-0.010	102.89	1.015s
AM-241	237.95	59.54	163.	28.	0.015	68.20	1.022s
TH-234	252.96	63.29	218.	-11.	-0.006	192.78	1.025
Sn-126	256.93	64.28	190.	16.	0.009	124.84	1.026s
BA-133	323.77	80.99	73.	15.	0.008	112.31	1.039
Np-237	345.77	86.49	412.	-17.	-0.010	166.81	1.043s
EU-155	345.98	86.54	418.	-6.	-0.003	488.53	1.043s
Sn-126	347.57	86.94	424.	0.	0.000	1000.00	1.044s
Sn-126	350.09	87.57	424.	0.	0.000	1000.00	1.044s
Cd-109	351.97	88.04	424.	0.	0.000	1000.00	1.044s
Nd-147	364.21	91.10	544.	-20.	-0.011	164.34	1.047s
TH-234	370.17	92.59	616.	-72.	-0.040	32.36	1.048
AC-228	373.21	93.35	591.	-20.	-0.011	170.82	1.049
Gd-153	389.81	97.50	611.	-20.	-0.011	173.14	1.052s
Np-239	397.81	99.50	632.	-20.	-0.011	175.69	1.053s
Gd-153	412.62	103.20	652.	-20.	-0.011	177.98	1.056s
Np-239	414.62	103.70	672.	-6.	-0.003	653.77	1.057s
EU-155	421.07	105.31	588.	19.	0.010	184.68	1.058s
Np-239	424.34	106.13	599.	19.	0.011	179.13	1.058s
EU-152	486.92	121.78	59.	12.	0.007	97.03	1.071s
CO-57	488.06	122.06	67.	12.	0.007	102.40	1.071s
EU-154	492.22	123.10	100.	-15.	-0.009	95.56	1.072s
PA-234	525.00	131.29	283.	-17.	-0.009	143.96	1.078s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	531.92	133.02	287.	-17.	-0.009	144.95	1.079s
CE-144	533.98	133.54	304.	-12.	-0.007	205.41	1.080s
CO-57	545.72	136.47	314.	6.	0.003	419.88	1.082s
Tc-99m	561.86	140.51	308.	0.	0.000	1000.00	1.085s
U-235	574.97	143.79	314.	-6.	-0.003	592.76	1.087s
CE-141	581.59	145.44	252.	15.	0.008	150.57	1.089s
Ba-140	650.47	162.66	127.	-17.	-0.009	98.42	1.102s
U-235	653.35	163.38	144.	-16.	-0.009	217.95	1.102s
CE-139	663.24	165.85	137.	7.	0.004	251.00	1.104s
Cf-251	706.23	176.60	48.	4.	0.002	301.92	1.112s
U-235	742.71	185.72	77.	7.	0.004	232.31	1.119
TH-229	773.87	193.51	77.	-18.	-0.010	94.56	1.125s
U-235	821.17	205.33	41.	4.	0.002	310.26	1.134s
TH-229	843.24	210.85	44.	8.	0.004	170.19	1.138s
Cf-251	907.84	227.00	44.	4.	0.002	328.51	1.151s
PB-212	954.37	238.63	29.	58.	0.032	18.61	1.159D
PB-214	967.84	242.00	15.	24.	0.013	30.40	1.162D
EU-152	978.62	244.69	161.	4.	0.002	480.71	1.164s
TH-227	1024.81	256.24	32.	11.	0.006	105.65	1.172s
Cd-113m	1054.65	263.70	41.	-2.	-0.001	546.63	1.178s
BI-210M	1063.18	265.83	28.	9.	0.005	89.00	1.179s
TL-208	1108.99	277.28	9.	15.	0.008	38.30	1.188
Hg-203	1116.66	279.20	42.	-9.	-0.005	104.06	1.189
I-131	1137.05	284.30	20.	9.	0.005	99.95	1.193s
PB-214	1180.22	295.09	16.	27.	0.015	28.24	1.201D
TL-210	1183.86	296.00	185.	-11.	-0.006	176.65	1.202s
PB-212	1199.98	300.03	12.	5.	0.003	110.32	1.205D
PA-231	1200.14	300.07	174.	-4.	-0.002	461.42	1.205s
PA-233	1200.58	300.18	170.	0.	0.000	1000.00	1.205s
PA-231	1210.46	302.65	170.	0.	0.000	1000.00	1.207s
BA-133	1211.27	302.85	170.	0.	0.000	1000.00	1.207s
Ba-140	1219.26	304.85	170.	0.	0.000	1000.00	1.208s
Ir-192	1233.62	308.44	170.	0.	0.000	1000.00	1.211s
PA-233	1247.91	312.01	170.	0.	0.000	1000.00	1.214
Ir-192	1265.82	316.49	170.	0.	0.000	1000.00	1.217s
CR-51	1280.20	320.08	268.	-15.	-0.008	36.70	1.219s
La-140	1314.91	328.76	32.	87.	0.048	14.14	1.226s
Cf-249	1333.63	333.44	144.	-12.	-0.007	143.48	1.229
AC-228	1353.15	338.32	266.	-15.	-0.009	151.31	1.233
Cs-136	1362.15	340.57	250.	-15.	-0.009	146.78	1.234s
EU-152	1377.01	344.29	235.	-16.	-0.009	78.71	1.237s
HF-181	1383.19	345.83	151.	-12.	-0.007	145.66	1.238
PB-214	1406.30	351.61	12.	58.	0.032	17.51	1.081
BA-133	1423.87	356.00	137.	-14.	-0.008	124.01	1.245s
I-131	1457.81	364.48	17.	1.	0.001	663.69	1.252s
BA-133	1535.24	383.84	48.	10.	0.005	105.32	1.266s
Cf-249	1551.68	387.95	66.	-12.	-0.006	102.60	1.269s
SN-113	1566.64	391.69	76.	-12.	-0.007	108.47	1.271s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1711.39	427.88	12.	8.	0.004	93.93	1.297s
AG-108M	1735.64	433.94	30.	-5.	-0.003	189.91	1.301s
pm-146	1815.41	453.88	26.	-10.	-0.006	100.14	1.315s
SB-125	1853.36	463.37	8.	31.	0.017	22.55	1.322s
Ir-192	1872.14	468.06	68.	-10.	-0.006	117.80	1.325s
BE-7	1910.28	477.60	33.	8.	0.004	107.27	1.332s
HF-181	1927.89	482.00	41.	2.	0.001	463.10	1.335s
La-140	1947.98	487.02	74.	-11.	-0.006	110.75	1.339s
RU-103	1988.12	497.05	13.	0.	0.000	1000.00	1.346s
RH-106	2047.36	511.86	0.	22.	0.012	21.23	2.606s
Nd-147	2123.91	531.00	30.	-9.	-0.005	124.82	1.369s
Ba-140	2148.95	537.26	9.	5.	0.003	129.05	1.373s
CS-134	2252.86	563.24	17.	4.	0.002	237.58	1.391s
CS-134	2277.20	569.32	26.	-8.	-0.004	96.82	1.395s
PA-234	2277.80	569.47	44.	-8.	-0.004	122.47	1.395s
BI-207	2278.73	569.70	44.	9.	0.005	109.43	1.396s
TL-208	2332.01	583.02	17.	15.	0.008	59.93	1.405s
SB-125	2401.92	600.50	86.	8.	0.004	178.14	1.416s
SB-124	2410.85	602.73	93.	0.	0.000	1000.00	1.418s
CS-134	2418.76	604.71	93.	0.	0.000	1000.00	1.419s
BI-214	2437.17	609.31	69.	5.	0.003	265.10	1.422
RU-103	2441.12	610.30	74.	9.	0.005	145.62	1.423s
AG-108M	2457.05	614.28	82.	9.	0.005	153.14	1.426s
PM-144	2472.18	618.06	91.	2.	0.001	737.86	1.428s
RH-106	2487.60	621.92	73.	7.	0.004	175.64	1.431s
SB-125	2543.49	635.89	6.	5.	0.003	79.91	1.440s
I-131	2547.83	636.97	15.	1.	0.000	848.36	1.441s
AG-110M	2630.98	657.76	40.	-7.	-0.004	133.25	1.455s
CS-137	2646.58	661.66	33.	3.	0.002	255.63	1.457s
PM-144	2786.11	696.54	23.	-7.	-0.004	144.53	1.480s
NB-94	2810.46	702.63	5.	5.	0.003	99.12	1.484s
SB-124	2891.09	722.79	15.	6.	0.003	106.37	1.497s
AG-108M	2891.70	722.94	21.	0.	0.000	1000.00	1.498s
EU-154	2893.37	723.36	21.	0.	0.000	1000.00	1.498
ZR-95	2896.74	724.20	21.	0.	0.000	1000.00	1.498s
BI-212	2908.63	727.17	13.	5.	0.003	109.20	1.500s
pm-146	2942.83	735.72	19.	-4.	-0.002	151.94	1.506s
pm-146	2988.59	747.16	24.	-8.	-0.004	75.95	1.513s
ZR-95	3026.87	756.73	5.	5.	0.003	97.05	1.519s
AG-110M	3055.73	763.94	25.	1.	0.001	533.85	1.524s
NB-95	3063.11	765.79	26.	0.	0.000	1000.00	1.525s
PA-234M	3065.60	766.41	27.	1.	0.000	866.90	1.526s
CS-134	3183.43	795.87	9.	5.	0.003	87.79	1.544s
TL-210	3198.36	799.60	14.	5.	0.003	108.44	1.547s
CS-134	3207.77	801.95	29.	1.	0.001	518.44	1.548s
CO-58	3243.06	810.78	69.	-15.	-0.008	51.13	1.554s
La-140	3263.04	815.77	83.	-14.	-0.008	52.49	1.557s
Cs-136	3273.97	818.50	117.	-16.	-0.009	97.35	1.559s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
MN-54	3339.36	834.85	23.	-2.	-0.001	444.01	1.569s
Co-56	3387.05	846.77	38.	-16.	-0.009	48.03	1.577s
TL-208	3442.23	860.56	19.	-4.	-0.002	192.08	1.585s
NB-94	3484.36	871.10	5.	3.	0.002	124.78	1.592s
EU-154	3492.89	873.23	10.	5.	0.003	92.54	1.593s
PA-234	3522.10	880.53	32.	1.	0.001	806.23	1.598s
PA-234	3532.94	883.24	33.	0.	0.000	1000.00	1.599s
AG-110M	3538.71	884.68	45.	-12.	-0.007	81.49	1.600s
Sc-46	3557.10	889.28	53.	2.	0.001	428.49	1.603s
AC-228	3644.26	911.07	5.	18.	0.010	34.21	1.616s
AG-110M	3749.96	937.49	5.	12.	0.006	52.15	1.633s
PA-234	3784.07	946.02	25.	-6.	-0.003	187.70	1.638s
EU-152	3856.43	964.11	10.	3.	0.002	238.82	1.649s
AC-228	3875.88	968.97	11.	6.	0.003	92.82	1.652
EU-154	3985.31	996.33	52.	-10.	-0.005	112.64	1.668s
PA-234M	4003.99	1001.00	66.	-4.	-0.002	186.08	1.671s
EU-154	4019.10	1004.77	52.	10.	0.005	108.66	1.673s
Co-56	4151.36	1037.84	5.	2.	0.001	276.39	1.693s
Cs-136	4192.29	1048.07	6.	16.	0.009	33.98	1.698s
RH-106	4201.45	1050.36	29.	-6.	-0.003	140.07	1.700s
BI-207	4254.65	1063.66	6.	1.	0.001	358.25	1.708s
Ga-68	4309.61	1077.40	5.	6.	0.003	92.03	1.716s
FE-59	4397.02	1099.25	5.	6.	0.003	94.26	1.728s
EU-152	4448.32	1112.07	34.	-4.	-0.002	243.28	1.736s
ZN-65	4462.20	1115.55	37.	0.	0.000	1000.00	1.738s
CO-60	4692.97	1173.24	9.	8.	0.005	75.22	1.770s
Ta-182	4756.23	1189.05	10.	4.	0.002	180.85	1.779s
Ta-182	4885.67	1221.41	21.	-8.	-0.005	130.66	1.797s
Co-56	4953.16	1238.28	11.	8.	0.005	96.54	1.806s
EU-154	5098.22	1274.54	11.	0.	0.000	1000.00	1.826s
FE-59	5166.43	1291.60	27.	-13.	-0.007	63.18	1.835s
TL-210	5252.05	1313.00	11.	1.	0.001	563.47	1.847s
CO-60	5330.06	1332.50	19.	-5.	-0.003	164.00	1.857s
AG-110M	5537.25	1384.30	11.	-2.	-0.001	491.66	1.884s
EU-152	5632.07	1408.00	5.	-1.	-0.001	610.19	1.896s
K-40	5842.72	1460.66	4.	215.	0.120	6.94	1.359s
La-140	6384.93	1596.21	6.	-2.	-0.001	343.80	1.990s
SB-124	6764.03	1690.98	0.	0.	0.000	1000.00	2.034s
Co-56	7085.51	1771.35	0.	0.	0.000	1000.00	2.070s
y-88	7344.36	1836.06	0.	0.	0.000	1000.00	2.098s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   2.6802E+00                                      5.31E+01
                           477.60 2.680E+00 ?(  9.851E+00 1.07E+02 1.05E+01 G

NA-22    C   2.6702E-02                                      9.50E+02
                          1274.53 2.670E-02 %(  1.436E+00 1.40E+03 9.99E+01 G

K-40     N   1.8172E+02                                      4.66E+11
                          1460.83 1.817E+02  (P 9.986E+00 6.94E+00 1.07E+01 G

Sc-46    F   1.4365E-01                                      8.38E+01
                           889.28 1.437E-01 ?(  2.165E+00 4.28E+02 1.00E+02 G
                          1120.55-2.774E-02 % P 2.236E+00 2.27E+03 1.00E+02 G

CR-51    F  -3.8384E+00                                      2.77E+01
                           320.08-3.838E+00 ?(P 2.027E+01 3.67E+01 9.94E+00 G

MN-54    C  -1.3025E-01                                      3.12E+02
                           834.85-1.302E-01 ?(  1.408E+00 4.44E+02 1.00E+02 G

FE-59    F   7.3005E-01                                      4.45E+01
                          1099.25 7.301E-01 ?(P 1.659E+00 9.43E+01 5.65E+01 G
                          1291.60-2.391E+00 + P 5.027E+00 6.32E+01 4.32E+01 G

Co-56    C  -8.9802E-01                                      7.73E+01
                           846.77-8.980E-01 ?(P 1.771E+00 4.80E+01 9.99E+01 G
                          1238.28 9.842E-01 & P 2.165E+00 9.65E+01 6.61E+01 G
                          1037.84 8.827E-01 + P 6.306E+00 2.76E+02 1.41E+01 G
                          1771.35 0.000E+00 +   5.079E+00 1.00E+03 1.55E+01  A

CO-57    C   2.5043E-01                                      2.72E+02
                           122.06 1.843E-01 &(  6.386E-01 1.02E+02 8.56E+01 G
                           136.47 7.805E-01 ?(  1.110E+01 4.20E+02 1.07E+01 G

CO-58    C  -8.0773E-01                                      7.09E+01
                           810.78-8.077E-01 ?(P 2.272E+00 5.11E+01 9.95E+01 G

CO-60    F   9.9308E-02                                      1.93E+03
                          1332.50-4.299E-01 ?(P 1.923E+00 1.64E+02 1.00E+02 G
                          1173.24 6.290E-01 ?(P 1.220E+00 7.52E+01 9.99E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	2.1109E-01					7.41E+06	
			702.63	2.546E-01	?(	6.304E-01	9.91E+01	9.79E+01 G
			871.10	1.684E-01	?(P	7.658E-01	1.25E+02	9.99E+01 G
ZR-95	I	4.9850E-01					6.40E+01	
			756.73	4.985E-01	?(	1.206E+00	9.70E+01	5.45E+01 G
			724.20	0.000E+00	-	2.700E+00	1.00E+03	4.42E+01 G
RH-106	I	3.0928E+00					3.74E+02	
			621.92	3.093E+00	?(	1.867E+01	1.76E+02	9.93E+00 G
			1050.36	-2.463E+01	+	1.202E+02	1.40E+02	1.56E+00 G
			511.86	4.127E+00	&	1.371E+00	2.12E+01	2.00E+01 GA
AG-108M	C	1.0731E-01					1.53E+05	
			433.94	-1.961E-01	?(P	1.022E+00	1.90E+02	9.05E+01 G
			722.94	0.000E+00	+	1.310E+00	1.00E+03	9.08E+01 G
			614.28	4.129E-01	?(	2.161E+00	1.53E+02	8.98E+01 G
AG-110M	F	4.2062E-02					2.50E+02	
			884.68	-1.003E+00	&(	2.744E+00	8.15E+01	7.27E+01 G
			657.76	-3.382E-01	+	1.555E+00	1.33E+02	9.46E+01 G
			937.49	2.079E+00	?(P	2.424E+00	5.21E+01	3.44E+01 G
			1384.30	-6.111E-01	+ P	6.363E+00	4.92E+02	2.43E+01 G
			763.94	3.100E-01	?(	6.011E+00	5.34E+02	2.23E+01 G
SN-113	F	-5.5388E-01					1.15E+02	
			391.69	-5.539E-01	?(	2.034E+00	1.08E+02	6.40E+01 G
SB-124	F	1.7867E-01					6.02E+01	
			602.73	0.000E+00	?(	2.063E+00	1.00E+03	9.83E+01 G
			1690.98	0.000E+00	?(	1.579E+00	1.00E+03	4.78E+01 G
			722.79	2.593E+00	?(	9.588E+00	1.06E+02	1.08E+01 G
SB-125	I	2.6589E+00					1.01E+03	
			427.88	8.485E-01	?(	2.048E+00	9.39E+01	2.96E+01 G
			600.50	1.781E+00	?(	1.087E+01	1.78E+02	1.79E+01 G
			635.89	1.968E+00	?(	5.362E+00	7.99E+01	1.13E+01 G
			463.37	1.002E+01	?(P	5.316E+00	2.25E+01	1.05E+01 G
I-131	I	2.9354E-01					8.02E+00	
			364.48	4.182E-02	&(P	7.546E-01	6.64E+02	8.17E+01 G
			284.30	3.507E+00	?(	8.905E+00	9.99E+01	6.14E+00 G
			636.97	4.098E-01	?(	1.302E+01	8.48E+02	7.17E+00 G
Gd-153	F	-9.1230E-01					2.42E+02	
			97.50	-9.123E-01	&(	5.283E+00	1.73E+02	3.00E+01 G
			103.20	-1.248E+00	&	7.427E+00	1.78E+02	2.18E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	1.4719E+01					4.71E-02	
			1077.40	1.472E+01	?(	3.240E+01	9.20E+01	3.30E+00 G
BA-133	F	-6.1226E-01					3.85E+03	
			356.00	-6.123E-01	?(	2.563E+00	1.24E+02	6.20E+01 G
			302.85	0.000E+00	+	8.449E+00	1.00E+03	1.83E+01 G
			383.84	3.234E+00	? P	1.157E+01	1.05E+02	8.94E+00 GA
			80.99	6.262E-01	?	1.819E+00	1.12E+02	3.41E+01 GA
CS-134	I	2.6020E-01					7.54E+02	
			604.71	0.000E+00	?(	2.082E+00	1.00E+03	9.76E+01 G
			795.87	3.435E-01	?(	1.038E+00	8.78E+01	8.55E+01 G
			569.32	-2.111E+00	+	6.985E+00	9.68E+01	1.54E+01 G
			801.95	9.162E-01	?(	1.713E+01	5.18E+02	8.69E+00 G
			563.24	1.767E+00	&(	1.065E+01	2.38E+02	8.35E+00 G
CS-137	I	1.7802E-01					1.10E+04	
			661.66	1.780E-01	?(P	1.600E+00	2.56E+02	8.52E+01 G
CE-139	F	1.2773E-01					1.38E+02	
			165.85	1.277E-01	?(	1.096E+00	2.51E+02	7.99E+01 G
Ba-140	I	7.9590E-01					1.28E+01	
			537.26	7.959E-01	?(P	2.646E+00	1.29E+02	2.44E+01 G
			162.66	-4.151E+00	+	1.371E+01	9.84E+01	6.22E+00 G
			304.85	0.000E+00	-	3.629E+01	1.00E+03	4.29E+00 G
La-140	I	1.8169E+00					1.28E+01	
			1596.21	-1.701E-01	?(	1.409E+00	3.44E+02	9.54E+01 G
			487.02	-8.949E-01	+	3.360E+00	1.11E+02	4.55E+01 G
			328.76	1.115E+01	?(P	3.732E+00	1.41E+01	2.03E+01 G
			815.77	-3.389E+00	+ P	1.063E+01	5.25E+01	2.33E+01 G
CE-141	I	4.5048E-01					3.25E+01	
			145.44	4.505E-01	?(	2.283E+00	1.51E+02	4.82E+01 G
CE-144	I	-1.5056E+00					2.85E+02	
			133.54	-1.506E+00	(	1.043E+01	2.05E+02	1.11E+01 G
PM-144	C	-3.5523E-01					3.63E+02	
			696.54	-3.552E-01	?(	1.222E+00	1.45E+02	9.90E+01 G
			618.06	8.063E-02	+ P	2.069E+00	7.38E+02	9.91E+01 G
EU-152	F	-1.5956E+00					4.94E+03	
			344.29	-1.596E+00	?(P	7.555E+00	7.87E+01	2.65E+01 G
			1112.07	-1.826E+00	+	1.570E+01	2.43E+02	1.36E+01 G
			121.78	5.516E-01	&	1.809E+00	9.70E+01	2.86E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			778.92	-7.229E-02	% P	8.242E+00	4.20E+03	1.29E+01 G
			964.11	1.295E+00	+	7.530E+00	2.39E+02	1.46E+01 G
			244.69	1.023E+00	&	1.685E+01	4.81E+02	7.58E+00 G
			1408.00	-5.788E-01	+ P	5.622E+00	6.10E+02	2.10E+01 GA
EU-154	I	3.1482E+00					3.14E+03	
			873.23	2.537E+00	?(P	8.112E+00	9.25E+01	1.23E+01 G
			123.10	-5.056E-01	-	1.623E+00	9.56E+01	4.08E+01 G
			1274.54	0.000E+00	-	4.133E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	5.890E+00	1.00E+03	2.02E+01 G
			1004.77	3.565E+00	?(	1.318E+01	1.09E+02	1.80E+01 G
			996.33	-5.809E+00	+	2.230E+01	1.13E+02	1.06E+01 G
EU-155	I	1.1721E+00					1.81E+03	
			105.31	1.172E+00	?(P	7.245E+00	1.85E+02	2.12E+01 G
			86.54	-2.713E-01	-	4.476E+00	4.89E+02	3.07E+01 G
HF-181	F	8.7085E-02					4.24E+01	
			482.00	8.709E-02	&(	1.432E+00	4.63E+02	8.05E+01 G
			133.02	-5.328E-01	+	2.594E+00	1.45E+02	4.33E+01 G
			345.83	-2.190E+00	+	1.079E+01	1.46E+02	1.51E+01 G
			136.30	-4.747E-01	%	2.000E+01	1.24E+03	5.85E+00 G
Ta-182	F	6.6044E-01					1.14E+02	
			1121.30	1.027E-01	%(	6.341E+00	1.71E+03	3.49E+01 G
			1221.41	-2.382E+00	+	6.926E+00	1.31E+02	2.70E+01 G
			1189.05	1.862E+00	?(	8.121E+00	1.81E+02	1.62E+01 G
Hg-203	F	-2.5980E-01					4.66E+01	
			279.20	-2.598E-01	?(	9.213E-01	1.04E+02	8.15E+01 G
TL-208	N	1.0502E+00					6.98E+02	
			583.02	7.245E-01	(P	1.080E+00	5.99E+01	8.45E+01 G
			277.28	5.411E+00	?(	6.021E+00	3.83E+01	6.31E+00 G
			860.56	-1.845E+00	- P	1.061E+01	1.92E+02	1.24E+01 G
pm-146	C	-1.1306E+00					2.02E+03	
			747.16	-1.131E+00	?(P	3.788E+00	7.60E+01	3.40E+01 G
			735.72	-8.348E-01	+ P	5.105E+00	1.52E+02	2.25E+01 G
			453.88	-5.397E-01	& P	1.383E+00	1.00E+02	6.50E+01 G
y-88	F	4.4534E-02					1.07E+02	
			898.04	4.453E-02	%(P	1.288E+00	1.14E+03	9.37E+01 G
			1836.06	0.000E+00	-	8.180E-01	1.00E+03	9.92E+01 G
Cd-113m		-6.0792E+02					5.33E+03	
			263.70	-6.079E+02	?(	1.183E+04	5.47E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	4.0930E-01					3.28E+05	
			176.60	4.093E-01	&(	3.295E+00	3.02E+02	1.70E+01 G
			227.00	1.236E+00	&	1.039E+01	3.29E+02	6.30E+00 GA
Cf-249	T	-5.2544E-01					1.28E+05	
			387.95	-5.254E-01	&(	1.825E+00	1.03E+02	6.60E+01 G
			333.44	-2.052E+00	+	9.966E+00	1.43E+02	1.55E+01 G
Sn-126		2.9039E+00					3.65E+07	
			87.57	0.000E+00	&	3.669E+00	1.00E+03	3.75E+01 GA
			64.28	2.904E+00	?(	1.220E+01	1.25E+02	9.70E+00 G
			86.94	0.000E+00	-	1.527E+01	1.00E+03	9.04E+00 GA
PB-210	N	-5.1134E+00					8.14E+03	
			46.54	-5.113E+00	(P	3.389E+01	1.91E+02	4.25E+00 G
PB-212	N	2.7224E+00					6.98E+02	
			238.63	2.722E+00	(P	1.295E+00	1.86E+01	4.33E+01 G
			300.03	3.621E+00	P	1.397E+01	1.10E+02	3.28E+00 GA
PB-214	N	3.9666E+00					5.84E+05	
			351.93	4.266E+00	(P	1.361E+00	1.75E+01	3.76E+01 G
			295.09	3.382E+00	(P	2.622E+00	2.82E+01	1.93E+01 G
			242.00	6.649E+00	+	5.695E+00	3.04E+01	7.43E+00 GA
BI-207	C	2.6970E-01					1.18E+04	
			569.70	3.739E-01	?(	1.397E+00	1.09E+02	9.77E+01 G
			1063.66	1.330E-01	?(P	1.260E+00	3.58E+02	7.45E+01 G
BI-212	N	3.4112E+00					6.98E+02	
			727.17	3.411E+00	?(P	1.300E+01	1.09E+02	7.55E+00 G
			785.42	-1.381E+00	%	7.019E+01	1.95E+03	1.28E+00 GA
U-235	N	-8.9464E-02					2.57E+11	
			143.79	-7.628E-01	*(P	1.109E+01	5.93E+02	1.10E+01 G
			205.33	1.383E+00	?(P	1.173E+01	3.10E+02	5.01E+00 G
			163.38	-4.879E+00	& P	1.793E+01	2.18E+02	5.08E+00 G
			185.72	2.164E-01	P	1.347E+00	2.32E+02	5.40E+01 GA
BI-214	N	4.2045E-01					5.84E+05	
			609.31	4.204E-01	?(P	3.858E+00	2.65E+02	4.61E+01 G
			1120.29	5.361E-02	% P	1.490E+01	7.72E+03	1.51E+01 G
			1764.49	-8.687E-01	% P	5.480E+00	1.19E+03	1.54E+01 G
BI-210M	T	4.0223E-01					1.10E+09	
			265.83	4.022E-01	?(P	1.213E+00	8.90E+01	5.00E+01 G
			304.90	1.597E-01	%	5.532E+00	1.01E+03	2.80E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	N	3.7982E+00					2.10E+03	
			911.07	3.798E+00	?(	2.647E+00	3.42E+01	2.90E+01 G
			968.97	2.082E+00	-	6.670E+00	9.28E+01	1.75E+01 G
			338.32	-3.427E+00	-	1.745E+01	1.51E+02	1.20E+01 G
			93.35	-4.967E+00	&	2.838E+01	1.71E+02	5.56E+00 XA
TH-227	N	-5.7198E+00					7.95E+03	
			50.14	-5.720E+00	&(	1.973E+01	1.03E+02	8.00E+00 G
			256.24	3.348E+00	+ P	8.893E+00	1.06E+02	7.00E+00 G
TH-229	N	-7.0165E+00					2.68E+06	
			193.51	-7.017E+00	(	1.706E+01	9.46E+01	4.40E+00 G
			210.85	4.810E+00	+ P	2.072E+01	1.70E+02	2.99E+00 G
TH-234	N	-5.0480E+00					1.63E+12	
			63.29	-5.048E+00	(P	3.369E+01	1.93E+02	3.81E+00 G
			92.59	-1.750E+01	+ P	2.892E+01	3.24E+01	5.58E+00 G
PA-234	N	-1.2738E+00					1.63E+12	
			131.29	-1.274E+00	?(	6.161E+00	1.44E+02	1.80E+01 G
			946.02	-2.777E+00	+	1.204E+01	1.88E+02	1.34E+01 G
			569.47	-3.960E+00	+	1.664E+01	1.22E+02	8.20E+00 G
			883.24	0.000E+00	+	1.797E+01	1.00E+03	9.60E+00 G
			880.53	9.729E-01	?	2.828E+01	8.06E+02	6.00E+00 GA
PA-234M	N	-1.6776E+01					1.63E+12	
			1001.00	-2.799E+01	?(P	3.145E+02	1.86E+02	8.37E-01 G
			766.41	1.515E+01	&(P	4.768E+02	8.67E+02	2.94E-01 G
AM-241	T	1.4850E+00					1.58E+05	
			59.54	1.485E+00	&(P	3.345E+00	6.82E+01	3.59E+01 G
Np-237	F	-1.8632E+00					2.14E+06	
			86.49	-1.863E+00	(	1.043E+01	1.67E+02	1.31E+01 G
Cs-136	F	9.3283E-02					1.30E+01	
			818.50	-8.924E-01	?(	2.917E+00	9.73E+01	1.00E+02 G
			1048.07	1.325E+00	?(	1.221E+00	3.40E+01	8.00E+01 G
			340.57	-8.835E-01	+	4.363E+00	1.47E+02	4.69E+01 G
Np-239	T	1.1383E+00					2.36E+00	
			103.70	-3.115E-01	-	6.846E+00	6.54E+02	2.40E+01 X
			106.13	1.138E+00	&(	6.823E+00	1.79E+02	2.27E+01 G
			99.50	-1.820E+00	&	1.069E+01	1.76E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	-2.7520E+00					1.11E+01	
		531.00	-2.752E+00	?(	8.367E+00	1.25E+02	1.30E+01 G
		91.10	-9.827E-01	+	5.404E+00	1.64E+02	2.83E+01 G
TL-210 N	2.9247E-01					5.84E+05	
		799.60	2.925E-01	&(	1.106E+00	1.08E+02	9.90E+01 G
		296.00	-3.353E-01	&	2.006E+00	1.77E+02	7.90E+01 G
		1313.00	5.215E-01	?	7.013E+00	5.63E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	112.	-8.	-0.004	191.26	-5.113E+00	P
TH-227	50.14	175.	-19.	-0.010	102.89	-5.720E+00	
AM-241	59.54	163.	28.	0.015	68.20	1.485E+00	P
TH-234	63.29	218.	-11.	-0.006	192.78	-5.048E+00	P
Sn-126	64.28	190.	16.	0.009	124.84	2.904E+00	
BA-133	80.99	73.	15.	0.008	112.31	6.262E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	86.49	412.	-17.	-0.010	166.81	-1.863E+00	
EU-155	86.54	418.	-6.	-0.003	488.53	-2.713E-01	
Nd-147	91.10	544.	-20.	-0.011	164.34	-9.827E-01	
TH-234	92.59	616.	-72.	-0.040	32.36	-1.750E+01	P
Gd-153	97.50	611.	-20.	-0.011	173.14	-9.123E-01	
Np-239	99.50	632.	-20.	-0.011	175.69	-1.820E+00	
Gd-153	103.20	652.	-20.	-0.011	177.98	-1.248E+00	
Np-239	103.70	672.	-6.	-0.003	653.77	-3.115E-01	
EU-155	105.31	588.	19.	0.010	184.68	1.172E+00	P
Np-239	106.13	599.	19.	0.011	179.13	1.138E+00	
EU-152	121.78	59.	12.	0.007	97.03	5.516E-01	
EU-154	123.10	100.	-15.	-0.009	95.56	-5.056E-01	
PA-234	131.29	283.	-17.	-0.009	143.96	-1.274E+00	
HF-181	133.02	287.	-17.	-0.009	144.95	-5.328E-01	
CE-144	133.54	304.	-12.	-0.007	205.41	-1.506E+00	
U-235	143.79	314.	-6.	-0.003	592.76	-7.628E-01	P
CE-141	145.44	252.	15.	0.008	150.57	4.505E-01	
Ba-140	162.66	127.	-17.	-0.009	98.42	-4.151E+00	
U-235	163.38	144.	-16.	-0.009	217.95	-4.879E+00	P
CE-139	165.85	137.	7.	0.004	251.00	1.277E-01	
Cf-251	176.60	48.	4.	0.002	301.92	4.093E-01	
U-235	185.72	77.	7.	0.004	232.31	2.164E-01	P
TH-229	193.51	77.	-18.	-0.010	94.56	-7.017E+00	
U-235	205.33	41.	4.	0.002	310.26	1.383E+00	P
TH-229	210.85	44.	8.	0.004	170.19	4.810E+00	P
Cf-251	227.00	44.	4.	0.002	328.51	1.236E+00	
EU-152	244.69	161.	4.	0.002	480.71	1.023E+00	
TH-227	256.24	32.	11.	0.006	105.65	3.348E+00	P
Cd-113m	263.70	41.	-2.	-0.001	546.63	-6.079E+02	
TL-208	277.28	9.	15.	0.008	38.30	5.411E+00	
Hg-203	279.20	42.	-9.	-0.005	104.06	-2.598E-01	
I-131	284.30	20.	9.	0.005	99.95	3.507E+00	
TL-210	296.00	185.	-11.	-0.006	176.65	-3.353E-01	
PA-231	300.07	174.	-4.	-0.002	461.42	-4.005E+00	
CR-51	320.08	268.	-15.	-0.008	36.70	-3.838E+00	P
Cf-249	333.44	144.	-12.	-0.007	143.48	-2.052E+00	
Cs-136	340.57	250.	-15.	-0.009	146.78	-8.835E-01	
EU-152	344.29	235.	-16.	-0.009	78.71	-1.596E+00	P
HF-181	345.83	151.	-12.	-0.007	145.66	-2.190E+00	
BA-133	356.00	137.	-14.	-0.008	124.01	-6.123E-01	
I-131	364.48	17.	1.	0.001	663.69	4.182E-02	P
BA-133	383.84	48.	10.	0.005	105.32	3.234E+00	P
Cf-249	387.95	66.	-12.	-0.006	102.60	-5.254E-01	
SN-113	391.69	76.	-12.	-0.007	108.47	-5.539E-01	
AG-108M	433.94	30.	-5.	-0.003	189.91	-1.961E-01	P
pm-146	453.88	26.	-10.	-0.006	100.14	-5.397E-01	P
Ir-192	468.06	68.	-10.	-0.006	117.80	-6.885E-01	
BE-7	477.60	33.	8.	0.004	107.27	2.680E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	482.00	41.	2.	0.001	463.10	8.709E-02	
RH-106	511.86	0.	22.	0.012	21.23	4.127E+00	
Nd-147	531.00	30.	-9.	-0.005	124.82	-2.752E+00	
Ba-140	537.26	9.	5.	0.003	129.05	7.959E-01	P
CS-134	563.24	17.	4.	0.002	237.58	1.767E+00	
CS-134	569.32	26.	-8.	-0.004	96.82	-2.111E+00	
PA-234	569.47	44.	-8.	-0.004	122.47	-3.960E+00	
BI-207	569.70	44.	9.	0.005	109.43	3.739E-01	
TL-208	583.02	17.	15.	0.008	59.93	7.245E-01	P
RU-103	610.30	74.	9.	0.005	145.62	6.405E+00	
AG-108M	614.28	82.	9.	0.005	153.14	4.129E-01	
PM-144	618.06	91.	2.	0.001	737.86	8.063E-02	P
RH-106	621.92	73.	7.	0.004	175.64	3.093E+00	
I-131	636.97	15.	1.	0.000	848.36	4.098E-01	
AG-110M	657.76	40.	-7.	-0.004	133.25	-3.382E-01	
CS-137	661.66	33.	3.	0.002	255.63	1.780E-01	P
PM-144	696.54	23.	-7.	-0.004	144.53	-3.552E-01	
NB-94	702.63	5.	5.	0.003	99.12	2.546E-01	
SB-124	722.79	15.	6.	0.003	106.37	2.593E+00	
BI-212	727.17	13.	5.	0.003	109.20	3.411E+00	P
pm-146	735.72	19.	-4.	-0.002	151.94	-8.348E-01	P
pm-146	747.16	24.	-8.	-0.004	75.95	-1.131E+00	P
ZR-95	756.73	5.	5.	0.003	97.05	4.985E-01	
AG-110M	763.94	25.	1.	0.001	533.85	3.100E-01	
PA-234M	766.41	27.	1.	0.000	866.90	1.515E+01	P
CS-134	795.87	9.	5.	0.003	87.79	3.435E-01	
TL-210	799.60	14.	5.	0.003	108.44	2.925E-01	
CS-134	801.95	29.	1.	0.001	518.44	9.162E-01	
CO-58	810.78	69.	-15.	-0.008	51.13	-8.077E-01	P
Cs-136	818.50	117.	-16.	-0.009	97.35	-8.924E-01	
MN-54	834.85	23.	-2.	-0.001	444.01	-1.302E-01	
Co-56	846.77	38.	-16.	-0.009	48.03	-8.980E-01	P
TL-208	860.56	19.	-4.	-0.002	192.08	-1.845E+00	P
NB-94	871.10	5.	3.	0.002	124.78	1.684E-01	P
EU-154	873.23	10.	5.	0.003	92.54	2.537E+00	P
PA-234	880.53	32.	1.	0.001	806.23	9.729E-01	
AG-110M	884.68	45.	-12.	-0.007	81.49	-1.003E+00	
Sc-46	889.28	53.	2.	0.001	428.49	1.437E-01	
AG-110M	937.49	5.	12.	0.006	52.15	2.079E+00	P
PA-234	946.02	25.	-6.	-0.003	187.70	-2.777E+00	
EU-152	964.11	10.	3.	0.002	238.82	1.295E+00	
EU-154	996.33	52.	-10.	-0.005	112.64	-5.809E+00	
PA-234M	1001.00	66.	-4.	-0.002	186.08	-2.799E+01	P
EU-154	1004.77	52.	10.	0.005	108.66	3.565E+00	
Co-56	1037.84	5.	2.	0.001	276.39	8.827E-01	P
Cs-136	1048.07	6.	16.	0.009	33.98	1.325E+00	
RH-106	1050.36	29.	-6.	-0.003	140.07	-2.463E+01	
BI-207	1063.66	6.	1.	0.001	358.25	1.330E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ga-68	1077.40	5.	6.	0.003	92.03	1.472E+01		
FE-59	1099.25	5.	6.	0.003	94.26	7.301E-01		P
EU-152	1112.07	34.	-4.	-0.002	243.28	-1.826E+00		
CO-60	1173.24	9.	8.	0.005	75.22	6.290E-01		P
Ta-182	1189.05	10.	4.	0.002	180.85	1.862E+00		
Ta-182	1221.41	21.	-8.	-0.005	130.66	-2.382E+00		
Co-56	1238.28	11.	8.	0.005	96.54	9.842E-01		P
FE-59	1291.60	27.	-13.	-0.007	63.18	-2.391E+00		P
TL-210	1313.00	11.	1.	0.001	563.47	5.215E-01		
CO-60	1332.50	19.	-5.	-0.003	164.00	-4.299E-01		P
AG-110M	1384.30	11.	-2.	-0.001	491.66	-6.111E-01		P
EU-152	1408.00	5.	-1.	-0.001	610.19	-5.788E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.6802E+00	2.6802E+00	1.073E+02%	9.85E+00
NA-22	#A	2.6702E-02	2.6702E-02	1.396E+03%	1.44E+00
K-40		1.8172E+02	1.8172E+02	6.941E+00%	9.99E+00
Sc-46	#A	1.4365E-01	1.4365E-01	4.285E+02%	2.17E+00
CR-51	#A	-3.8383E+00	-3.8384E+00	3.670E+01%	2.03E+01
MN-54	#A	-1.3025E-01	-1.3025E-01	4.440E+02%	1.41E+00
FE-59	#A	7.3005E-01	7.3005E-01	9.426E+01%	1.66E+00
Co-56	#A	-8.9802E-01	-8.9802E-01	4.803E+01%	1.77E+00
CO-57	#A	2.5043E-01	2.5043E-01	1.024E+02%	6.39E-01
CO-58	#A	-8.0772E-01	-8.0773E-01	5.113E+01%	2.27E+00
CO-60	#A	9.9308E-02	9.9308E-02	7.522E+01%	1.92E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.38E+00
NB-94	#A	2.1109E-01	2.1109E-01	7.968E+01%	6.30E-01
ZR-95	#A	4.9849E-01	4.9850E-01	9.705E+01%	1.21E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.38E+00
RU-103	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.80E-01
RH-106	#A	3.0928E+00	3.0928E+00	1.756E+02%	1.87E+01
AG-108M	#A	1.0731E-01	1.0731E-01	1.220E+02%	1.02E+00
AG-110M	#A	4.2062E-02	4.2062E-02	5.215E+01%	2.74E+00
SN-113	#A	-5.5388E-01	-5.5388E-01	1.085E+02%	2.03E+00
SB-124	#A	1.7867E-01	1.7867E-01	1.064E+02%	2.06E+00
SB-125	#C	2.6589E+00	2.6589E+00	2.255E+01%	2.05E+00
I-131	#A	2.9352E-01	2.9354E-01	9.995E+01%	7.55E-01
Gd-153	#A	-9.1230E-01	-9.1230E-01	1.731E+02%	5.28E+00
Ga-68	#A	1.4599E+01	1.4719E+01	9.203E+01%	3.24E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.37E+00
BA-133	#A	-6.1226E-01	-6.1226E-01	1.240E+02%	2.56E+00
CS-134	#A	2.6020E-01	2.6020E-01	8.779E+01%	2.08E+00

CS-137 #A	1.7802E-01	1.7802E-01	2.556E+02%		1.60E+00
CE-139 #A	1.2773E-01	1.2773E-01	2.510E+02%		1.10E+00
Ba-140 #A	7.9588E-01	7.9590E-01	1.291E+02%		2.65E+00
La-140 #C	1.8169E+00	1.8169E+00	1.414E+01%		1.41E+00
CE-141 #A	4.5048E-01	4.5048E-01	1.506E+02%		2.28E+00
CE-144 #A	-1.5056E+00	-1.5056E+00	2.054E+02%		1.04E+01
PM-144 #A	-3.5523E-01	-3.5523E-01	1.445E+02%		1.22E+00
EU-152 #A	-1.5956E+00	-1.5956E+00	7.871E+01%		7.56E+00
EU-154 #A	3.1482E+00	3.1482E+00	7.136E+01%		8.11E+00
EU-155 #A	1.1721E+00	1.1721E+00	1.847E+02%		7.25E+00
HF-181 #A	8.7084E-02	8.7085E-02	4.631E+02%		1.43E+00
Ta-182 #A	6.6043E-01	6.6044E-01	1.809E+02%		6.34E+00
Hg-203 #A	-2.5980E-01	-2.5980E-01	1.041E+02%		9.21E-01
TL-208 #A	1.0502E+00	1.0502E+00	3.556E+01%		1.08E+00
pm-146 #A	-1.1306E+00	-1.1306E+00	7.595E+01%		3.79E+00
y-88 #A	4.4534E-02	4.4534E-02	1.141E+03%		1.29E+00
Cd-113m#A	-6.0792E+02	-6.0792E+02	5.466E+02%		1.18E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.62E+01
Cf-251 #A	4.0930E-01	4.0930E-01	3.019E+02%		3.29E+00
Cf-249 #A	-5.2544E-01	-5.2544E-01	1.026E+02%		1.82E+00
Sn-126 #A	2.9039E+00	2.9039E+00	1.248E+02%		1.22E+01
PB-210 #A	-5.1134E+00	-5.1134E+00	1.913E+02%		3.39E+01
PB-212	2.7224E+00	2.7224E+00	1.861E+01%		1.30E+00
PB-214	3.9666E+00	3.9666E+00	1.661E+01%		1.36E+00
BI-207 #A	2.6970E-01	2.6970E-01	1.094E+02%		1.40E+00
BI-212 #A	3.4112E+00	3.4112E+00	1.092E+02%		1.30E+01
U-235 #A	-8.9464E-02	-8.9464E-02	3.103E+02%		1.11E+01
BI-214 #A	4.2045E-01	4.2045E-01	2.651E+02%		3.86E+00
BI-210M#A	4.0223E-01	4.0223E-01	8.900E+01%		1.21E+00
AC-228	3.7982E+00	3.7982E+00	3.421E+01%		2.65E+00
TH-227 #A	-5.7198E+00	-5.7198E+00	1.029E+02%		1.97E+01
TH-229 #A	-7.0165E+00	-7.0165E+00	9.456E+01%		1.71E+01
TH-234 #A	-5.0480E+00	-5.0480E+00	1.928E+02%		3.37E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.37E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%		4.40E+00
PA-234 #A	-1.2738E+00	-1.2738E+00	1.440E+02%		6.16E+00
PA-234M#A	-1.6776E+01	-1.6776E+01	1.861E+02%		3.15E+02
AM-241 #A	1.4850E+00	1.4850E+00	6.820E+01%		3.35E+00
Np-237 #A	-1.8632E+00	-1.8632E+00	1.668E+02%		1.04E+01
Ir-192 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.84E+00
Cs-136 #A	9.3280E-02	9.3283E-02	3.398E+01%		2.92E+00
Np-239 #A	1.1381E+00	1.1383E+00	1.791E+02%		6.82E+00
Nd-147 #A	-2.7519E+00	-2.7520E+00	1.248E+02%		8.37E+00
TL-210 #A	2.9247E-01	2.9247E-01	1.084E+02%		1.11E+00

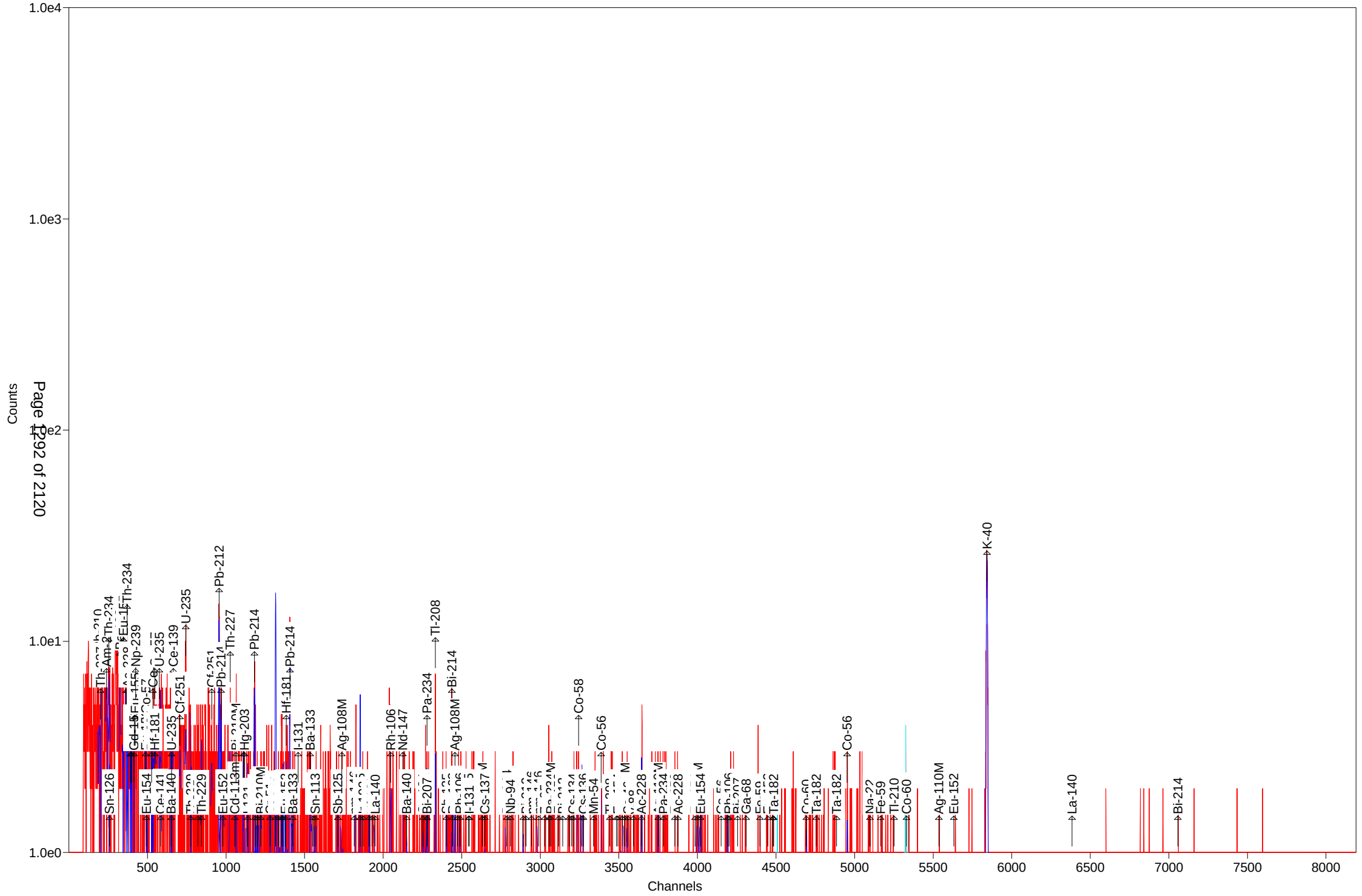
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.922E+02 Bq/Sample
Total Decayed Activity (37.5 to 2000.0 keV) 1.9221104E+02 Bq/Sample

379951_Gamma_160-29881-B-29-B. 8_Gamma_20182987.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20183083

Sample Description: 379951_Gamma_160-29881-B-30-C
Detector: Detector # 7
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-30-C

Decay to Time: 8/23/2018 07:11 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:12:14 Real Time: 1827 sec
Analysis Time: 8/23/2018 07:43 Dead Time: 1.50 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev14.lib
Bkgd Correction File: 7_2018-08-11_1303.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.349E+00	105.8	3.545E+00	3.549E+00	1.198E+01
NA-22	1.566E-01	158.4	2.482E-01	2.483E-01	9.266E-01
K-40	1.767E+02	6.4	1.136E+01	1.452E+01	7.673E+00
Sc-46	3.929E-01	99.2	3.899E-01	3.904E-01	1.332E+00
CR-51	0.000E+00	1.#INF	1.161E+00	1.161E+00	1.485E+01
MN-54	6.105E-02	692.8	4.230E-01	4.230E-01	1.046E+00
FE-59	3.777E-01	189.7	7.167E-01	7.170E-01	1.861E+00
Co-56	-1.701E-01	255.4	4.344E-01	4.345E-01	1.060E+00
CO-57	-3.510E-02	524.6	1.841E-01	1.842E-01	6.345E-01
CO-58	-6.554E-01	83.8	5.491E-01	5.502E-01	1.840E+00
CO-60	-1.845E-01	311.3	5.745E-01	5.746E-01	1.301E+00
ZN-65	3.047E-01	388.3	1.183E+00	1.183E+00	4.166E+00
NB-94	1.900E-01	123.7	2.351E-01	2.353E-01	9.161E-01
ZR-95	6.931E-01	94.3	6.534E-01	6.544E-01	1.551E+00
NB-95	-5.002E-01	78.4	3.924E-01	3.932E-01	1.315E+00
RU-103	-4.320E-01	97.8	4.226E-01	4.232E-01	1.013E+00
RH-106	3.476E+00	82.4	2.865E+00	2.870E+00	9.151E+00
AG-108M	1.934E-01	97.3	1.882E-01	1.885E-01	7.260E-01
AG-110M	6.119E-01	69.0	4.225E-01	4.237E-01	1.620E+00
SN-113	4.023E-01	124.1	4.992E-01	4.996E-01	1.694E+00
SB-124	-6.810E-02	82.4	5.608E-02	5.620E-02	2.136E+00
SB-125	1.246E+00	76.6	9.541E-01	9.562E-01	2.349E+00
I-131	1.297E-01	73.1	9.486E-02	9.510E-02	8.715E-01
Gd-153	4.505E-01	160.0	7.207E-01	7.212E-01	2.431E+00
Ga-68	1.295E+01	92.4	1.197E+01	1.199E+01	2.771E+01
Tc-99m	1.618E-01	121.9	1.971E-01	1.974E-01	6.657E-01
BA-133	-4.233E-01	151.0	6.393E-01	6.397E-01	2.163E+00
CS-134	-3.841E-01	160.0	6.145E-01	6.148E-01	2.084E+00
CS-137	-7.527E-02	615.0	4.629E-01	4.629E-01	1.632E+00
CE-139	-2.379E-01	92.6	2.204E-01	2.216E-01	8.074E-01
Ba-140	1.130E+00	103.8	1.173E+00	1.174E+00	2.809E+00
La-140	1.113E-01	101.9	1.135E-01	1.136E-01	1.630E+00
CE-141	2.795E-01	120.6	3.369E-01	3.372E-01	1.139E+00

CE-144	8.653E-01	169.9	1.470E+00	1.471E+00	5.003E+00
PM-144	-2.745E-02	139.7	3.834E-02	3.837E-02	1.077E+00
EU-152	2.605E+00	59.3	1.545E+00	1.551E+00	3.635E+00
EU-154	4.395E-01	105.5	4.637E-01	4.642E-01	9.734E+00
EU-155	9.206E-01	47.1	4.338E-01	4.367E-01	1.213E+00
HF-181	4.133E-01	75.2	3.110E-01	3.117E-01	1.333E+00
Ta-182	1.553E+00	104.0	1.615E+00	1.617E+00	5.507E+00
Hg-203	1.779E-01	168.4	2.997E-01	2.998E-01	1.025E+00
TL-208	1.357E+00	33.1	4.488E-01	4.543E-01	9.179E-01
pm-146	1.601E+00	44.8	7.176E-01	7.224E-01	1.585E+00
y-88	-9.698E-03	4346.0	4.215E-01	4.215E-01	9.171E-01
Cd-113m	2.321E+03	95.9	2.225E+03	2.230E+03	7.593E+03
Cd-109	0.000E+00	1.#INF	4.486E+00	4.487E+00	2.540E+01
Cf-251	8.293E-01	109.5	9.081E-01	9.110E-01	2.371E+00
Cf-249	-1.323E-01	86.3	1.142E-01	1.144E-01	1.576E+00
Sn-126	-6.083E-01	404.3	2.459E+00	2.460E+00	8.427E+00
PB-210	1.466E+01	52.6	7.707E+00	7.755E+00	2.498E+01
PB-212	3.214E+00	15.2	4.898E-01	5.321E-01	1.256E+00
PB-214	5.700E+00	12.4	7.088E-01	7.682E-01	1.156E+00
BI-207	2.267E-01	88.3	2.003E-01	2.006E-01	6.793E-01
BI-212	-5.647E+00	96.1	5.429E+00	5.437E+00	1.840E+01
U-235	-2.694E-01	504.2	1.358E+00	1.358E+00	4.892E+00
BI-214	5.707E+00	11.5	6.547E-01	7.187E-01	5.535E-01
BI-210M	-3.974E-01	97.6	3.878E-01	3.885E-01	1.311E+00
AC-228	4.268E+00	28.0	1.197E+00	1.217E+00	2.242E+00
TH-227	9.958E-01	183.2	1.825E+00	1.825E+00	1.427E+01
TH-229	2.557E+00	115.5	2.954E+00	2.961E+00	9.499E+00
TH-234	5.085E+00	57.4	2.916E+00	2.929E+00	1.566E+01
PA-231	4.104E+00	223.8	9.183E+00	9.186E+00	4.865E+01
PA-233	4.177E-01	228.5	9.543E-01	9.546E-01	4.013E+00
PA-234	1.597E+00	63.0	1.007E+00	1.010E+00	2.639E+00
PA-234M	-9.098E+01	91.1	8.292E+01	8.305E+01	2.788E+02
AM-241	3.066E-01	253.3	7.767E-01	7.769E-01	2.126E+00
Np-237	-1.593E+00	144.8	2.306E+00	2.308E+00	7.725E+00
Ir-192	0.000E+00	1.#INF	1.056E-01	1.056E-01	1.680E+00
Cs-136	4.172E-01	80.0	3.338E-01	3.346E-01	1.978E+00
Np-239	-7.443E-01	145.6	1.084E+00	1.085E+00	3.640E+00
Nd-147	2.359E-01	742.7	1.752E+00	1.753E+00	4.604E+00
TL-210	0.000E+00	1.#INF	6.295E-02	6.295E-02	1.294E+00
Total	2.581E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-30-C

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20183083.An1

Acquisition information
Start time: 8/23/2018 7:12:14 AM
Live time: 1800
Real time: 1827
Dead time: 1.50 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:11:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-08-11_1303.PBC 8/11/2018 1:03:03 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1362

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	28.	52.57	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	726.89	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
59.54	7.	253.32	0.85	3.701E-02	59.54	35.900	PBC<MDA	AM241
63.58	17.	87.65	0.71	4.005E-02	63.29	3.810	PBC<MDA	TH234
92.89	23.	74.00	2.06	5.452E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.35	19.	134.82	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
97.50	14.	159.99	0.89	5.550E-02	97.50	30.000	PBC<MDA	Gd153
105.34	20.	47.12	0.48	5.638E-02	105.31	21.200	PBC<MDA	EU155
123.10	13.	105.51	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
131.29	16.	89.87	0.93	5.493E-02	131.29	18.000	PBC<MDA	PA234
133.02	12.	126.73	0.93	5.467E-02	133.02	43.300	PBC<MDA	HF181
133.54	9.	169.88	0.93	5.459E-02	133.54	11.090	PBC<MDA	CE144
140.51	13.	121.86	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	13.	120.56	0.94	5.237E-02	145.44	48.200	PBC<MDA	CE141
162.66	7.	227.42	0.96	4.843E-02	162.66	6.220	PBC<MDA	Ba140
175.50	12.	109.50	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
185.72	42.	36.46	0.99	4.443E-02	185.72	54.000	9.724E-01	U235
193.51	11.	115.52	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
210.85	4.	406.20	1.01	3.997E-02	210.85	2.990	PBC<MDA	TH229
226.95	3.	391.34	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.96	90.	15.24	1.04	3.602E-02	238.63	43.300	3.214E+00	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
242.33	14.	152.62	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214
244.69	13.	166.19	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
256.24	6.	183.23	1.06	3.392E-02	256.24	7.000	PBC<MDA	TH227
263.70	8.	95.89	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
280.46	8.	168.41	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
295.63	89.	11.73	2.33	3.009E-02	295.09	19.300	8.515E+00	PB214
					296.00	79.000	2.086E+00	TL210
300.07	9.	223.77	1.10	2.966E-02				
300.18	9.	228.47	1.10	2.965E-02				
301.01	9.	223.67	1.10	2.966E-02	300.03	3.280	PBC<MDA	PB212
302.65	2.	956.64	1.11	2.945E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.343E-01	BA133
328.76	10.	101.95	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	7.	120.90	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
338.32	11.	112.01	1.14	2.677E-02	338.32	12.010	PBC<MDA	AC228
340.57	11.	119.97	1.15	2.662E-02	340.57	46.900	PBC<MDA	Cs136
344.29	11.	127.22	1.15	2.637E-02	344.29	26.500	PBC<MDA	EU152
345.83	8.	149.53	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.01	100.	12.44	1.77	2.588E-02	351.93	37.600	5.700E+00	PB214
391.83	11.	124.09	1.20	2.360E-02	391.69	64.000	PBC<MDA	SN113
427.88	10.	108.32	1.23	2.186E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	484.77	1.24	2.160E-02	433.94	90.480	PBC<MDA	AG108M
453.88	3.	282.89	1.26	2.077E-02	453.88	65.000	PBC<MDA	pm146
463.37	9.	108.30	1.27	2.040E-02	463.37	10.470	PBC<MDA	SB125
482.00	10.	111.92	1.29	1.971E-02	482.00	80.500	PBC<MDA	HF181
511.86	25.	76.46	2.56	1.870E-02	511.86	20.000	PBC<MDA	RH106
531.00	1.	742.74	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.26	9.	103.77	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
569.47	8.	88.39	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.182E+00	PA234
					569.70	97.740	2.670E-01	BI207
569.70	7.	88.33	1.37	1.703E-02	569.32	15.380	1.428E+00	CS134
					569.47	8.200	2.679E+00	PA234
					569.70	97.740	2.248E-01	BI207
583.02	31.	33.07	1.38	1.669E-02	583.02	84.500	1.240E+00	TL208
609.52	76.	11.47	0.67	1.605E-02	609.31	46.090	5.707E+00	BI214
618.06	4.	186.31	1.42	1.585E-02	618.06	99.100	PBC<MDA	PM144
621.92	1.	479.33	1.42	1.576E-02	621.92	9.930	PBC<MDA	RH106
636.97	10.	88.44	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
702.63	5.	177.22	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	82.35	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.293E-01	AG108M
					723.36	20.220	1.480E+00	EU154
722.94	7.	97.34	1.51	1.380E-02	722.79	10.810	2.767E+00	SB124
					722.94	90.840	3.293E-01	AG108M
					723.36	20.220	1.480E+00	EU154
723.36	1.	683.05	1.51	1.379E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	5.063E-02	AG108M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					723.36	20.220	2.276E-01	EU154
747.16	13.	44.81	1.53	1.340E-02	747.16	34.000	1.601E+00	pm146
756.73	9.	94.28	1.54	1.325E-02	756.73	54.460	PBC<MDA	ZR95
763.94	8.	69.05	1.55	1.314E-02	763.94	22.280	PBC<MDA	AG110M
766.41	7.	123.24	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	9.378E+01	PA234M
818.50	12.	104.88	1.60	1.235E-02	818.50	100.000	PBC<MDA	Cs136
834.85	1.	692.82	1.61	1.213E-02	834.85	99.980	PBC<MDA	MN54
860.56	6.	96.27	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
871.10	4.	172.61	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
873.23	3.	233.33	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
884.68	5.	130.03	1.65	1.152E-02	884.68	72.680	PBC<MDA	AG110M
889.28	8.	99.25	1.66	1.147E-02	889.28	99.984	PBC<MDA	Sc46
911.07	25.	28.05	1.68	1.122E-02	911.07	29.000	4.268E+00	AC228
964.11	10.	73.14	1.72	1.066E-02	964.11	14.605	PBC<MDA	EU152
968.97	8.	93.30	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
1048.07	3.	179.51	1.79	9.890E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	82.42	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	3.	308.52	1.80	9.759E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	6.	92.39	1.81	9.646E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	3.	229.35	1.83	9.472E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	11.	84.59	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	3.	388.28	1.84	9.347E-03	1115.55	50.600	PBC<MDA	ZN65
1119.09	3.	301.00	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
1121.30	9.	103.98	1.85	9.303E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.553E+00	Ta182
1221.41	2.	634.67	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	2.	158.44	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	4.449E-01	EU154
1291.60	3.	302.33	1.98	8.180E-03	1291.60	43.200	PBC<MDA	FE59
1461.34	248.	6.43	2.47	7.309E-03	1460.83	10.670	1.767E+02	K40
1764.78	13.	27.74	2.29	6.141E-03	1764.49	15.400	7.637E+00	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	92.	28.	0.015	52.57	0.836s
TH-227	200.12	50.14	143.	2.	0.001	726.89	0.840s
AM-241	237.70	59.54	107.	7.	0.004	253.32	0.850s
TH-234	253.87	63.58	75.	17.	0.010	87.65	0.709s
Sn-126	256.68	64.28	151.	-4.	-0.002	404.34	0.856s
BA-133	323.52	80.99	131.	-20.	-0.011	76.26	0.874

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	345.53	86.49	402.	-20.	-0.011	144.82	0.880s
EU-155	345.74	86.54	379.	-9.	-0.005	313.09	0.880s
Sn-126	347.33	86.94	370.	0.	0.000	1000.00	0.880s
Sn-126	349.85	87.57	370.	0.	0.000	1000.00	0.881s
Cd-109	351.73	88.04	370.	0.	0.000	1000.00	0.881s
Nd-147	363.97	91.10	370.	0.	0.000	1000.00	0.885s
TH-234	371.15	92.89	87.	23.	0.013	74.00	2.061s
AC-228	372.97	93.35	302.	19.	0.010	134.82	0.887s
Gd-153	389.57	97.50	226.	14.	0.007	159.99	0.892s
Np-239	397.57	99.50	240.	0.	0.000	1000.00	0.894s
Gd-153	412.38	103.20	240.	0.	0.000	1000.00	0.898s
Np-239	414.38	103.70	240.	0.	0.000	1000.00	0.898s
EU-155	420.93	105.34	25.	20.	0.011	47.12	0.482s
Np-239	424.10	106.13	304.	-17.	-0.010	145.62	0.901s
EU-152	486.69	121.78	110.	-15.	-0.008	102.41	0.918s
CO-57	487.83	122.06	125.	-3.	-0.002	524.57	0.918s
EU-154	491.98	123.10	93.	13.	0.007	105.51	0.919s
PA-234	524.77	131.29	90.	16.	0.009	89.87	0.928
HF-181	531.68	133.02	111.	12.	0.007	126.73	0.930s
CE-144	533.74	133.54	124.	9.	0.005	169.88	0.930
Tc-99m	561.63	140.51	128.	13.	0.007	121.86	0.938s
U-235	574.73	143.79	107.	-3.	-0.002	504.16	0.941s
CE-141	581.35	145.44	111.	13.	0.007	120.56	0.943s
Ba-140	650.24	162.66	114.	7.	0.004	227.42	0.961
CE-139	663.01	165.85	134.	-17.	-0.009	92.62	0.965s
Cf-251	706.00	176.60	44.	12.	0.007	109.50	0.976s
U-235	742.49	185.72	55.	42.	0.023	36.46	0.986s
TH-229	773.64	193.51	40.	11.	0.006	115.52	0.994
U-235	820.94	205.33	77.	-15.	-0.008	112.45	1.007
TH-229	843.01	210.85	62.	4.	0.002	406.20	1.012
Cf-251	907.62	227.00	48.	3.	0.002	391.34	1.029s
PB-212	954.15	238.63	49.	90.	0.050	15.24	1.042D
PB-214	967.61	242.00	224.	14.	0.008	152.62	1.045s
EU-152	978.39	244.69	227.	13.	0.007	166.19	1.048s
TH-227	1024.59	256.24	37.	6.	0.004	183.23	1.060
Cd-113m	1054.43	263.70	28.	8.	0.005	95.89	1.067s
BI-210M	1062.96	265.83	60.	-12.	-0.007	97.59	1.070s
TL-208	1108.77	277.28	107.	-15.	-0.008	103.90	1.081s
Hg-203	1116.44	279.20	92.	8.	0.005	168.41	1.083s
I-131	1136.83	284.30	40.	-1.	-0.001	895.30	1.089s
PB-214	1182.18	295.63	4.	89.	0.049	11.73	2.334s
TL-210	1183.64	296.00	244.	-6.	-0.003	403.50	1.101s
PB-212	1199.76	300.03	208.	9.	0.005	223.67	1.105
PA-231	1199.92	300.07	217.	9.	0.005	223.77	1.105
PA-233	1200.36	300.18	226.	9.	0.005	228.47	1.105
PA-231	1210.24	302.65	236.	2.	0.001	956.64	1.107s
BA-133	1211.05	302.85	238.	0.	0.000	1000.00	1.108s
Ba-140	1219.04	304.85	238.	0.	0.000	1000.00	1.110s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1219.23	304.90	238.	0.	0.000	1000.00	1.110s
Ir-192	1233.41	308.44	238.	0.	0.000	1000.00	1.113s
PA-233	1247.69	312.01	238.	0.	0.000	1000.00	1.117s
Ir-192	1265.61	316.49	238.	0.	0.000	1000.00	1.122
CR-51	1279.99	320.08	238.	0.	0.000	1000.00	1.125
La-140	1314.69	328.76	51.	10.	0.006	101.95	1.134s
Cf-249	1333.41	333.44	31.	7.	0.004	120.90	1.139s
AC-228	1352.93	338.32	64.	11.	0.006	112.01	1.144s
Cs-136	1361.93	340.57	75.	11.	0.006	119.97	1.146s
EU-152	1376.80	344.29	85.	11.	0.006	127.22	1.150s
HF-181	1382.97	345.83	68.	8.	0.004	149.53	1.151s
PB-214	1407.71	352.01	14.	100.	0.055	12.44	1.772s
BA-133	1423.66	356.00	161.	-12.	-0.007	151.03	1.162s
I-131	1457.59	364.48	40.	-11.	-0.006	116.54	1.170s
BA-133	1535.03	383.84	104.	-12.	-0.006	126.64	1.189s
Cf-249	1551.47	387.95	81.	-11.	-0.006	123.26	1.193s
SN-113	1566.43	391.69	87.	11.	0.006	124.09	1.197s
SB-125	1711.18	427.88	28.	10.	0.006	108.32	1.233s
AG-108M	1735.43	433.94	24.	2.	0.001	484.77	1.239
pm-146	1815.20	453.88	16.	3.	0.002	282.89	1.258s
SB-125	1853.15	463.37	43.	9.	0.005	108.30	1.268s
BE-7	1910.07	477.60	83.	-13.	-0.007	105.84	1.282s
HF-181	1927.68	482.00	58.	10.	0.006	111.92	1.286s
La-140	1947.77	487.02	85.	-13.	-0.007	106.64	1.291s
RU-103	1987.91	497.05	39.	-14.	-0.008	97.82	1.301s
RH-106	2047.15	511.86	53.	25.	0.014	76.46	2.565s
Nd-147	2123.70	531.00	13.	1.	0.001	742.74	1.333s
Ba-140	2148.74	537.26	17.	9.	0.005	103.77	1.339s
CS-134	2252.65	563.24	17.	-1.	-0.001	643.23	1.364s
CS-134	2276.99	569.32	26.	-3.	-0.002	247.21	1.369s
PA-234	2277.59	569.47	21.	8.	0.004	88.39	1.370s
BI-207	2278.51	569.70	14.	7.	0.004	88.33	1.370s
TL-208	2331.79	583.02	20.	31.	0.017	33.07	1.382
SB-125	2401.71	600.50	168.	-11.	-0.006	171.51	1.399s
SB-124	2410.64	602.73	158.	-11.	-0.006	165.82	1.401s
CS-134	2418.55	604.71	147.	-11.	-0.006	159.98	1.403s
BI-214	2437.78	609.52	0.	76.	0.042	11.47	0.665s
RU-103	2440.91	610.30	136.	-2.	-0.001	904.34	1.408s
PM-144	2471.96	618.06	26.	4.	0.002	186.31	1.415s
RH-106	2487.38	621.92	25.	1.	0.001	479.33	1.419s
SB-125	2543.28	635.89	36.	-13.	-0.007	70.23	1.432s
I-131	2547.62	636.97	34.	10.	0.006	88.44	1.433s
AG-110M	2630.77	657.76	57.	-14.	-0.008	79.54	1.452
CS-137	2646.36	661.66	55.	-2.	-0.001	615.02	1.455s
PM-144	2785.90	696.54	28.	-5.	-0.003	208.11	1.487s
NB-94	2810.25	702.63	19.	5.	0.003	177.22	1.493s
SB-124	2890.87	722.79	15.	7.	0.004	82.35	1.511s
AG-108M	2891.48	722.94	22.	7.	0.004	97.34	1.511s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	2893.15	723.36	30.	1.	0.001	683.05	1.511s
ZR-95	2896.52	724.20	31.	0.	0.000	1000.00	1.512s
BI-212	2908.41	727.17	46.	-11.	-0.006	96.14	1.515
pm-146	2942.61	735.72	19.	-7.	-0.004	152.07	1.523s
pm-146	2988.37	747.16	5.	13.	0.007	44.81	1.533s
ZR-95	3026.65	756.73	14.	9.	0.005	94.28	1.541s
AG-110M	3055.51	763.94	10.	8.	0.004	69.05	1.548s
NB-95	3062.89	765.79	37.	-12.	-0.007	78.44	1.549s
PA-234M	3065.38	766.41	29.	7.	0.004	123.24	1.550s
EU-152	3115.41	778.92	23.	-10.	-0.006	103.93	1.561s
BI-212	3141.41	785.42	23.	-6.	-0.004	166.60	1.567s
CS-134	3183.20	795.87	26.	-6.	-0.004	116.66	1.576s
TL-210	3198.14	799.60	32.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	68.	-15.	-0.008	84.54	1.581s
CO-58	3242.84	810.78	68.	-15.	-0.008	83.78	1.589s
La-140	3262.82	815.77	82.	-15.	-0.008	91.34	1.593s
Cs-136	3273.74	818.50	78.	12.	0.007	104.88	1.596s
MN-54	3339.13	834.85	19.	1.	0.001	692.82	1.610s
Co-56	3386.82	846.77	19.	-4.	-0.002	255.36	1.620s
TL-208	3442.00	860.56	5.	6.	0.003	96.27	1.632s
NB-94	3484.13	871.10	16.	4.	0.002	172.61	1.641s
EU-154	3492.66	873.23	23.	3.	0.002	233.33	1.643s
PA-234	3521.86	880.53	41.	-11.	-0.006	84.61	1.649s
AG-110M	3538.47	884.68	22.	5.	0.003	130.03	1.653s
Sc-46	3556.86	889.28	28.	8.	0.005	99.25	1.657
AC-228	3644.02	911.07	5.	25.	0.014	28.05	1.675s
AG-110M	3749.71	937.49	16.	-5.	-0.003	180.26	1.697s
PA-234	3783.82	946.02	25.	0.	0.000	1000.00	1.704s
EU-152	3856.18	964.11	24.	10.	0.006	73.14	1.719s
AC-228	3875.62	968.97	27.	8.	0.005	93.30	1.724s
EU-154	3985.06	996.33	61.	-15.	-0.008	78.68	1.746s
PA-234M	4003.73	1001.00	76.	-14.	-0.008	91.14	1.750s
EU-154	4018.84	1004.77	104.	-12.	-0.006	126.85	1.753s
Co-56	4151.10	1037.84	15.	-3.	-0.002	263.69	1.780s
Cs-136	4192.02	1048.07	13.	3.	0.002	179.51	1.788s
RH-106	4201.18	1050.36	10.	6.	0.003	82.42	1.790s
BI-207	4254.38	1063.66	16.	3.	0.002	308.52	1.801s
Ga-68	4309.34	1077.40	5.	6.	0.003	92.39	1.812s
FE-59	4396.74	1099.25	11.	3.	0.002	229.35	1.829s
EU-152	4448.04	1112.07	38.	11.	0.006	84.59	1.839
ZN-65	4461.92	1115.55	49.	3.	0.001	388.28	1.842s
BI-214	4480.88	1120.29	49.	3.	0.002	301.00	1.845s
Sc-46	4481.94	1120.55	52.	0.	0.000	1000.00	1.846s
Ta-182	4484.94	1121.30	40.	9.	0.005	103.98	1.846s
CO-60	4692.68	1173.24	16.	-1.	-0.001	914.69	1.886s
Ta-182	4755.93	1189.05	27.	-10.	-0.005	125.61	1.899s
Ta-182	4885.37	1221.41	21.	2.	0.001	634.67	1.923s
Co-56	4952.84	1238.28	37.	-4.	-0.002	324.08	1.936s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NA-22	5097.84	1274.53	6.	2.	0.001	158.44	1.963s
EU-154	5097.89	1274.54	8.	0.	0.000	1000.00	1.963s
FE-59	5166.10	1291.60	11.	3.	0.001	302.33	1.975s
TL-210	5251.71	1313.00	11.	-4.	-0.002	188.42	1.991s
CO-60	5329.71	1332.50	12.	-3.	-0.001	311.32	2.005s
EU-152	5631.70	1408.00	0.	0.	0.000	1000.00	2.059s
K-40	5845.06	1461.34	3.	248.	0.138	6.43	2.469
La-140	6384.49	1596.21	12.	-1.	-0.001	842.61	2.185s
SB-124	6763.55	1690.98	0.	0.	0.000	1000.00	2.245s
BI-214	7057.56	1764.49	0.	13.	0.007	27.74	2.290s
Co-56	7084.99	1771.35	13.	0.	0.000	1000.00	2.294s
y-88	7343.81	1836.06	0.	0.	0.000	1000.00	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	-3.3495E+00					5.31E+01	
			477.60	-3.349E+00	?(	1.198E+01	1.06E+02	1.05E+01 G
NA-22	C	1.5665E-01					9.50E+02	
			1274.53	1.566E-01	?(	9.266E-01	1.58E+02	9.99E+01 G
K-40	N	1.7668E+02					4.66E+11	
			1460.83	1.767E+02	(P	7.673E+00	6.43E+00	1.07E+01 G
Sc-46	F	3.9288E-01					8.38E+01	
			889.28	3.929E-01	&(P	1.332E+00	9.92E+01	1.00E+02 G
			1120.55	0.000E+00	&	2.167E+00	1.00E+03	1.00E+02 G
MN-54	C	6.1055E-02					3.12E+02	
			834.85	6.105E-02	?(	1.046E+00	6.93E+02	1.00E+02 G
FE-59	F	3.7774E-01					4.45E+01	
			1099.25	3.460E-01	?(	1.861E+00	2.29E+02	5.65E+01 G
			1291.60	4.192E-01	?(	2.892E+00	3.02E+02	4.32E+01 G
Co-56	C	-1.7012E-01					7.73E+01	
			846.77	-1.701E-01	?(	1.060E+00	2.55E+02	9.99E+01 G
			1238.28	-4.286E-01	+	3.084E+00	3.24E+02	6.61E+01 G
			1037.84	-1.222E+00	+ P	8.204E+00	2.64E+02	1.41E+01 G
			1771.35	0.000E+00	+	1.144E+01	1.00E+03	1.55E+01 A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C -3.5104E-02					2.72E+02	
		122.06	-3.510E-02	&(	6.345E-01	5.25E+02	8.56E+01 G
		136.47	1.282E-01	%	5.383E+00	1.22E+03	1.07E+01 G
CO-58	C -6.5541E-01					7.09E+01	
		810.78	-6.554E-01	?(	1.840E+00	8.38E+01	9.95E+01 G
CO-60	F -1.8455E-01					1.93E+03	
		1332.50	-1.845E-01	&(P	1.301E+00	3.11E+02	1.00E+02 G
		1173.24	-6.228E-02	+	1.330E+00	9.15E+02	9.99E+01 G
ZN-65	F 3.0465E-01					2.44E+02	
		1115.55	3.047E-01	?(	4.166E+00	3.88E+02	5.06E+01 G
NB-94	I 1.9002E-01					7.41E+06	
		702.63	2.139E-01	&(	9.161E-01	1.77E+02	9.79E+01 G
		871.10	1.666E-01	?(	1.030E+00	1.73E+02	9.99E+01 G
ZR-95	I 6.9307E-01					6.40E+01	
		756.73	6.931E-01	?(	1.551E+00	9.43E+01	5.45E+01 G
		724.20	0.000E+00	-	2.618E+00	1.00E+03	4.42E+01 G
NB-95	I -5.0022E-01					6.40E+01	
		765.79	-5.002E-01	?(	1.315E+00	7.84E+01	9.98E+01 G
RU-103	I -4.3200E-01					3.93E+01	
		497.05	-4.320E-01	?(	1.013E+00	9.78E+01	9.09E+01 G
		610.30	-1.102E+00	+	3.437E+01	9.04E+02	5.75E+00 GA
RH-106	I 3.4756E+00					3.74E+02	
		621.92	5.263E-01	?(	9.151E+00	4.79E+02	9.93E+00 G
		1050.36	2.225E+01	&(	6.250E+01	8.24E+01	1.56E+00 G
		511.86	3.745E+00	?	5.456E+00	7.65E+01	2.00E+01 GA
AG-108M	C 1.9336E-01					1.53E+05	
		433.94	5.686E-02	?(	7.260E-01	4.85E+02	9.05E+01 G
		722.94	3.293E-01	?(	1.098E+00	9.73E+01	9.08E+01 G
		614.28	1.480E-07	%	2.198E+00	4.29E+08	8.98E+01 G
AG-110M	F 6.1190E-01					2.50E+02	
		884.68	3.566E-01	?(P	1.620E+00	1.30E+02	7.27E+01 G
		657.76	-5.587E-01	+	1.487E+00	7.95E+01	9.46E+01 G
		937.49	-6.690E-01	+ P	3.115E+00	1.80E+02	3.44E+01 G
		1384.30	-8.783E-02	% P	2.195E+00	2.80E+03	2.43E+01 G
		763.94	1.445E+00	?(	3.312E+00	6.90E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	4.0227E-01					1.15E+02	
			391.69	4.023E-01	?(P	1.694E+00	1.24E+02	6.40E+01 G
SB-124	F	-6.8103E-02					6.02E+01	
			602.73	-3.800E-01	?(	2.136E+00	1.66E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.341E+00	1.00E+03	4.78E+01 G
			722.79	2.767E+00	?(	7.731E+00	8.24E+01	1.08E+01 G
SB-125	I	1.2458E+00					1.01E+03	
			427.88	8.584E-01	&(	2.349E+00	1.08E+02	2.96E+01 G
			600.50	-2.081E+00	+	1.209E+01	1.72E+02	1.79E+01 G
			635.89	-4.184E+00	+	9.767E+00	7.02E+01	1.13E+01 G
			463.37	2.341E+00	?(	8.653E+00	1.08E+02	1.05E+01 G
I-131	I	1.2969E-01					8.02E+00	
			364.48	-2.979E-01	(	8.715E-01	1.17E+02	8.17E+01 G
			284.30	-3.885E-01	+	9.413E+00	8.95E+02	6.14E+00 G
			636.97	5.002E+00	?(	1.497E+01	8.84E+01	7.17E+00 G
Gd-153	F	4.5047E-01					2.42E+02	
			97.50	4.505E-01	?(	2.431E+00	1.60E+02	3.00E+01 G
			103.20	0.000E+00	&	3.396E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.2953E+01					4.71E-02	
			1077.40	1.295E+01	?(	2.771E+01	9.24E+01	3.30E+00 G
Tc-99m	I	1.6178E-01					2.51E-01	
			140.51	1.618E-01	*(	6.657E-01	1.22E+02	8.93E+01 G
BA-133	F	-4.2330E-01					3.85E+03	
			356.00	-4.233E-01	?(	2.163E+00	1.51E+02	6.20E+01 G
			302.85	0.000E+00	+	7.683E+00	1.00E+03	1.83E+01 G
			383.84	-3.026E+00	+	1.299E+01	1.27E+02	8.94E+00 GA
			80.99	-6.389E-01	& P	1.803E+00	7.63E+01	3.41E+01 GA
CS-134	I	-3.8409E-01					7.54E+02	
			604.71	-3.841E-01	?(	2.084E+00	1.60E+02	9.76E+01 G
			795.87	-3.334E-01	+	1.346E+00	1.17E+02	8.55E+01 G
			569.32	-6.360E-01	+	5.612E+00	2.47E+02	1.54E+01 G
			801.95	-7.393E+00	+	2.096E+01	8.45E+01	8.69E+00 G
			563.24	-5.157E-01	+	8.553E+00	6.43E+02	8.35E+00 G
CS-137	I	-7.5269E-02					1.10E+04	
			661.66	-7.527E-02	?(	1.632E+00	6.15E+02	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	-2.3795E-01					1.38E+02	
			165.85	-2.379E-01	?(P	8.074E-01	9.26E+01	7.99E+01 G
Ba-140	I	1.1302E+00					1.28E+01	
			537.26	1.101E+00	(	2.809E+00	1.04E+02	2.44E+01 G
			162.66	1.244E+00	?(P	9.686E+00	2.27E+02	6.22E+00 G
			304.85	0.000E+00	-	3.301E+01	1.00E+03	4.29E+00 G
La-140	I	1.1129E-01					1.28E+01	
			1596.21	-8.645E-02	?(	1.630E+00	8.43E+02	9.54E+01 G
			487.02	-7.934E-01	&	2.859E+00	1.07E+02	4.55E+01 G
			328.76	1.041E+00	*(	3.601E+00	1.02E+02	2.03E+01 G
			815.77	-2.823E+00	&	8.665E+00	9.13E+01	2.33E+01 G
CE-141	I	2.7947E-01					3.25E+01	
			145.44	2.795E-01	&(	1.139E+00	1.21E+02	4.82E+01 G
CE-144	I	8.6530E-01					2.85E+02	
			133.54	8.653E-01	&(	5.003E+00	1.70E+02	1.11E+01 G
PM-144	C	-2.7454E-02					3.63E+02	
			696.54	-1.972E-01	?(P	1.077E+00	2.08E+02	9.90E+01 G
			618.06	1.421E-01	?(	9.363E-01	1.86E+02	9.91E+01 G
EU-152	F	2.6048E+00					4.94E+03	
			344.29	8.407E-01	(	3.635E+00	1.27E+02	2.65E+01 G
			1112.07	4.810E+00	?(	1.371E+01	8.46E+01	1.36E+01 G
			121.78	-5.188E-01	&	1.788E+00	1.02E+02	2.86E+01 G
			778.92	-3.436E+00	+	8.387E+00	1.04E+02	1.29E+01 G
			964.11	3.693E+00	?(	9.025E+00	7.31E+01	1.46E+01 G
			244.69	2.705E+00	?(P	1.517E+01	1.66E+02	7.58E+00 G
			1408.00	0.000E+00	-	2.578E+00	1.00E+03	2.10E+01 GA
EU-154	I	4.3946E-01					3.14E+03	
			873.23	1.165E+00	?(	9.734E+00	2.33E+02	1.23E+01 G
			123.10	3.261E-01	?(P	1.161E+00	1.06E+02	4.08E+01 G
			1274.54	0.000E+00	-	3.030E+00	1.00E+03	3.52E+01 G
			723.36	2.276E-01	?(	5.614E+00	6.83E+02	2.02E+01 G
			1004.77	-3.503E+00	+	1.506E+01	1.27E+02	1.80E+01 G
			996.33	-7.527E+00	+	1.980E+01	7.87E+01	1.06E+01 G
EU-155	I	9.2058E-01					1.81E+03	
			105.31	9.206E-01	(P	1.213E+00	4.71E+01	2.12E+01 G
			86.54	-3.030E-01	-	3.201E+00	3.13E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	4.1332E-01					4.24E+01	
			482.00	3.500E-01	(	1.333E+00	1.12E+02	8.05E+01 G
			133.02	2.839E-01	?(	1.218E+00	1.27E+02	4.33E+01 G
			345.83	1.123E+00	?(	5.758E+00	1.50E+02	1.51E+01 G
			136.30	-6.693E-07	%	9.905E+00	4.28E+08	5.85E+00 G
Ta-182	F	1.5531E+00					1.14E+02	
			1121.30	1.553E+00	?(	5.507E+00	1.04E+02	3.49E+01 G
			1221.41	3.984E-01	-	5.793E+00	6.35E+02	2.70E+01 G
			1189.05	-3.758E+00	+	1.041E+01	1.26E+02	1.62E+01 G
Hg-203	F	1.7794E-01					4.66E+01	
			279.20	1.779E-01	&(	1.025E+00	1.68E+02	8.15E+01 G
TL-208	N	1.3569E+00					6.98E+02	
			583.02	1.240E+00	(P	9.179E-01	3.31E+01	8.45E+01 G
			277.28	-4.041E+00	-	1.414E+01	1.04E+02	6.31E+00 G
			860.56	2.149E+00	&(	4.973E+00	9.63E+01	1.24E+01 G
pm-146	C	1.6014E+00					2.02E+03	
			747.16	1.601E+00	?(P	1.585E+00	4.48E+01	3.40E+01 G
			735.72	-1.250E+00	- P	4.173E+00	1.52E+02	2.25E+01 G
			453.88	1.170E-01	- P	8.823E-01	2.83E+02	6.50E+01 G
y-88	F	-9.6983E-03					1.07E+02	
			898.04	-9.698E-03	%(P	9.171E-01	4.35E+03	9.37E+01 G
			1836.06	0.000E+00	+	6.973E-01	1.00E+03	9.92E+01 G
Cd-113m		2.3207E+03					5.33E+03	
			263.70	2.321E+03	?(	7.593E+03	9.59E+01	6.00E-03 K
Cf-251	T	8.2928E-01					3.28E+05	
			176.60	8.293E-01	&(	2.371E+00	1.09E+02	1.70E+01 G
			227.00	7.825E-01	?	8.189E+00	3.91E+02	6.30E+00 GA
Cf-249	T	-1.3227E-01					1.28E+05	
			387.95	-3.763E-01	?(	1.576E+00	1.23E+02	6.60E+01 G
			333.44	9.061E-01	&(	3.783E+00	1.21E+02	1.55E+01 G
Sn-126		-6.0825E-01					3.65E+07	
			87.57	0.000E+00	+	2.574E+00	1.00E+03	3.75E+01 GA
			64.28	-6.083E-01	?(	8.427E+00	4.04E+02	9.70E+00 G
			86.94	0.000E+00	+	1.072E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.4661E+01					8.14E+03	
			46.54	1.466E+01	@(P	2.498E+01	5.26E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	3.2139E+00					6.98E+02	
			238.63	3.214E+00	(P	1.256E+00	1.52E+01	4.33E+01 G
			300.03	5.261E+00	& P	3.989E+01	2.24E+02	3.28E+00 GA
PB-214	N	5.6999E+00					5.84E+05	
			351.93	5.700E+00	(	1.156E+00	1.24E+01	3.76E+01 G
			295.09	8.515E+00	+	1.151E+00	1.17E+01	1.93E+01 G
			242.00	2.956E+00	-	1.521E+01	1.53E+02	7.43E+00 GA
BI-207	C	2.2674E-01					1.18E+04	
			569.70	2.248E-01	?(	6.793E-01	8.83E+01	9.77E+01 G
			1063.66	2.292E-01	?(	1.631E+00	3.09E+02	7.45E+01 G
BI-212	N	-5.6468E+00					6.98E+02	
			727.17	-5.647E+00	?(	1.840E+01	9.61E+01	7.55E+00 G
			785.42	-2.145E+01	+	8.542E+01	1.67E+02	1.28E+00 GA
U-235	N	-2.6939E-01					2.57E+11	
			143.79	-2.694E-01	?(P	4.892E+00	5.04E+02	1.10E+01 G
			205.33	-4.070E+00	+	1.183E+01	1.12E+02	5.01E+00 G
			163.38	-2.107E-01	% P	1.227E+01	1.66E+03	5.08E+00 G
			185.72	9.724E-01	&	8.629E-01	3.65E+01	5.40E+01 GA
BI-214	N	5.7074E+00					5.84E+05	
			609.31	5.707E+00	*(	5.535E-01	1.15E+01	4.61E+01 G
			1120.29	1.317E+00	&	1.392E+01	3.01E+02	1.51E+01 G
			1764.49	7.637E+00	+	4.329E+00	2.77E+01	1.54E+01 G
BI-210M	T	-3.9740E-01					1.10E+09	
			265.83	-3.974E-01	?(	1.311E+00	9.76E+01	5.00E+01 G
			304.90	0.000E+00	+	5.059E+00	1.00E+03	2.80E+01 G
AC-228	N	4.2683E+00					2.10E+03	
			911.07	4.268E+00	&(	2.242E+00	2.80E+01	2.90E+01 G
			968.97	2.540E+00	-	8.073E+00	9.33E+01	1.75E+01 G
			338.32	1.818E+00	-	6.918E+00	1.12E+02	1.20E+01 G
			93.35	3.380E+00	*	1.529E+01	1.35E+02	5.56E+00 XA
TH-227	N	9.9581E-01					7.95E+03	
			50.14	5.704E-01	?(	1.427E+01	7.27E+02	8.00E+00 G
			256.24	1.482E+00	?(	7.237E+00	1.83E+02	7.00E+00 G
TH-229	N	2.5572E+00					2.68E+06	
			193.51	3.137E+00	?(	9.499E+00	1.16E+02	4.40E+00 G
			210.85	1.705E+00	(	1.836E+01	4.06E+02	2.99E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N 5.0847E+00					1.63E+12	
		63.29	6.258E+00	@(P	1.566E+01	8.77E+01	3.81E+00 G
		92.59	4.284E+00	*(P	8.405E+00	7.40E+01	5.58E+00 G
PA-231	N 4.1038E+00					1.20E+07	
		302.65	1.490E+00	?(	4.865E+01	9.57E+02	2.88E+00 G
		300.07	7.163E+00	(	5.432E+01	2.24E+02	2.46E+00 G
PA-233	C 4.1770E-01					7.82E+08	
		312.01	0.000E+00	?(	4.013E+00	1.00E+03	3.60E+01 G
		300.18	2.843E+00	(	2.200E+01	2.28E+02	6.20E+00 G
PA-234	N 1.5974E+00					1.63E+12	
		131.29	8.757E-01	(P	2.639E+00	8.99E+01	1.80E+01 G
		946.02	0.000E+00	-	9.941E+00	1.00E+03	1.34E+01 G
		569.47	3.182E+00	?(	9.571E+00	8.84E+01	8.20E+00 G
		883.24	-4.345E-01	%	1.834E+01	1.19E+03	9.60E+00 G
		880.53	-9.177E+00	+	2.615E+01	8.46E+01	6.00E+00 GA
PA-234M	N -9.0984E+01					1.63E+12	
		1001.00	-9.098E+01	?(	2.788E+02	9.11E+01	8.37E-01 G
		766.41	9.378E+01	&	4.001E+02	1.23E+02	2.94E-01 G
AM-241	T 3.0661E-01					1.58E+05	
		59.54	3.066E-01	*(	2.126E+00	2.53E+02	3.59E+01 G
Np-237	F -1.5925E+00					2.14E+06	
		86.49	-1.593E+00	?(	7.725E+00	1.45E+02	1.31E+01 G
Cs-136	F 4.1716E-01					1.30E+01	
		818.50	5.580E-01	?(	1.978E+00	1.05E+02	1.00E+02 G
		1048.07	2.107E-01	?(	1.370E+00	1.80E+02	8.00E+01 G
		340.57	4.691E-01	?(	1.913E+00	1.20E+02	4.69E+01 G
Np-239	T -7.4428E-01					2.36E+00	
		103.70	0.000E+00	+	3.083E+00	1.00E+03	2.40E+01 X
		106.13	-7.443E-01	?(	3.640E+00	1.46E+02	2.27E+01 G
		99.50	0.000E+00	+	4.973E+00	1.00E+03	1.50E+01 X
Nd-147	2.3594E-01					1.11E+01	
		531.00	2.359E-01	?(	4.604E+00	7.43E+02	1.30E+01 G
		91.10	0.000E+00	-	3.348E+00	1.00E+03	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went

negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	92.	28.	0.015	52.57	1.466E+01	P
TH-227	50.14	143.	2.	0.001	726.89	5.704E-01	
AM-241	59.54	107.	7.	0.004	253.32	3.066E-01	
Sn-126	64.28	151.	-4.	-0.002	404.34	-6.083E-01	
BA-133	80.99	131.	-20.	-0.011	76.26	-6.389E-01	P
Np-237	86.49	402.	-20.	-0.011	144.82	-1.593E+00	
Gd-153	97.50	226.	14.	0.007	159.99	4.505E-01	
Np-239	106.13	304.	-17.	-0.010	145.62	-7.443E-01	
EU-152	121.78	110.	-15.	-0.008	102.41	-5.188E-01	
CO-57	122.06	125.	-3.	-0.002	524.57	-3.510E-02	
EU-154	123.10	93.	13.	0.007	105.51	3.261E-01	P
PA-234	131.29	90.	16.	0.009	89.87	8.757E-01	P
HF-181	133.02	111.	12.	0.007	126.73	2.839E-01	
CE-144	133.54	124.	9.	0.005	169.88	8.653E-01	
Tc-99m	140.51	128.	13.	0.007	121.86	1.618E-01	
U-235	143.79	107.	-3.	-0.002	504.16	-2.694E-01	P
CE-141	145.44	111.	13.	0.007	120.56	2.795E-01	
Ba-140	162.66	114.	7.	0.004	227.42	1.244E+00	P
CE-139	165.85	134.	-17.	-0.009	92.62	-2.379E-01	P
U-235	185.72	55.	42.	0.023	36.46	9.724E-01	
TH-229	193.51	40.	11.	0.006	115.52	3.137E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	205.33	77.	-15.	-0.008	112.45	-4.070E+00		
TH-229	210.85	62.	4.	0.002	406.20	1.705E+00		
EU-152	244.69	227.	13.	0.007	166.19	2.705E+00		P
TH-227	256.24	37.	6.	0.004	183.23	1.482E+00		
Cd-113m	263.70	28.	8.	0.005	95.89	2.321E+03		
BI-210M	265.83	60.	-12.	-0.007	97.59	-3.974E-01		
I-131	284.30	40.	-1.	-0.001	895.30	-3.885E-01		
TL-210	296.00	244.	-6.	-0.003	403.50	-1.289E-01		
PA-231	300.07	217.	9.	0.005	223.77	7.163E+00		
PA-233	300.18	226.	9.	0.005	228.47	2.843E+00		
PA-231	302.65	236.	2.	0.001	956.64	1.490E+00		
La-140	328.76	51.	10.	0.006	101.95	1.041E+00		
Cf-249	333.44	31.	7.	0.004	120.90	9.061E-01		
Cs-136	340.57	75.	11.	0.006	119.97	4.691E-01		
EU-152	344.29	85.	11.	0.006	127.22	8.407E-01		
HF-181	345.83	68.	8.	0.004	149.53	1.123E+00		
BA-133	356.00	161.	-12.	-0.007	151.03	-4.233E-01		
I-131	364.48	40.	-11.	-0.006	116.54	-2.979E-01		
BA-133	383.84	104.	-12.	-0.006	126.64	-3.026E+00		
Cf-249	387.95	81.	-11.	-0.006	123.26	-3.763E-01		
SB-125	427.88	28.	10.	0.006	108.32	8.584E-01		
AG-108M	433.94	24.	2.	0.001	484.77	5.686E-02		
SB-125	463.37	43.	9.	0.005	108.30	2.341E+00		
BE-7	477.60	83.	-13.	-0.007	105.84	-3.349E+00		
HF-181	482.00	58.	10.	0.006	111.92	3.500E-01		
La-140	487.02	85.	-13.	-0.007	106.64	-7.934E-01		
RU-103	497.05	39.	-14.	-0.008	97.82	-4.320E-01		
RH-106	511.86	53.	25.	0.014	76.46	3.745E+00		
Nd-147	531.00	13.	1.	0.001	742.74	2.359E-01		
Ba-140	537.26	17.	9.	0.005	103.77	1.101E+00		
CS-134	563.24	17.	-1.	-0.001	643.23	-5.157E-01		
CS-134	569.32	26.	-3.	-0.002	247.21	-6.360E-01		
PA-234	569.47	21.	8.	0.004	88.39	3.182E+00		
BI-207	569.70	14.	7.	0.004	88.33	2.248E-01		
SB-125	600.50	168.	-11.	-0.006	171.51	-2.081E+00		
SB-124	602.73	158.	-11.	-0.006	165.82	-3.800E-01		
CS-134	604.71	147.	-11.	-0.006	159.98	-3.841E-01		
RU-103	610.30	136.	-2.	-0.001	904.34	-1.102E+00		
PM-144	618.06	26.	4.	0.002	186.31	1.421E-01		
RH-106	621.92	25.	1.	0.001	479.33	5.263E-01		
SB-125	635.89	36.	-13.	-0.007	70.23	-4.184E+00		
I-131	636.97	34.	10.	0.006	88.44	5.002E+00		
AG-110M	657.76	57.	-14.	-0.008	79.54	-5.587E-01		
CS-137	661.66	55.	-2.	-0.001	615.02	-7.527E-02		
PM-144	696.54	28.	-5.	-0.003	208.11	-1.972E-01		P
NB-94	702.63	19.	5.	0.003	177.22	2.139E-01		
SB-124	722.79	15.	7.	0.004	82.35	2.767E+00		
AG-108M	722.94	22.	7.	0.004	97.34	3.293E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	723.36	30.	1.	0.001	683.05	2.276E-01		
BI-212	727.17	46.	-11.	-0.006	96.14	-5.647E+00		
ZR-95	756.73	14.	9.	0.005	94.28	6.931E-01		
AG-110M	763.94	10.	8.	0.004	69.05	1.445E+00		
NB-95	765.79	37.	-12.	-0.007	78.44	-5.002E-01		
PA-234M	766.41	29.	7.	0.004	123.24	9.378E+01		
EU-152	778.92	23.	-10.	-0.006	103.93	-3.436E+00		
BI-212	785.42	23.	-6.	-0.004	166.60	-2.145E+01		
CS-134	795.87	26.	-6.	-0.004	116.66	-3.334E-01		
CS-134	801.95	68.	-15.	-0.008	84.54	-7.393E+00		
CO-58	810.78	68.	-15.	-0.008	83.78	-6.554E-01		
La-140	815.77	82.	-15.	-0.008	91.34	-2.823E+00		
Cs-136	818.50	78.	12.	0.007	104.88	5.580E-01		
MN-54	834.85	19.	1.	0.001	692.82	6.105E-02		
Co-56	846.77	19.	-4.	-0.002	255.36	-1.701E-01		
NB-94	871.10	16.	4.	0.002	172.61	1.666E-01		
EU-154	873.23	23.	3.	0.002	233.33	1.165E+00		
PA-234	880.53	41.	-11.	-0.006	84.61	-9.177E+00		
AG-110M	884.68	22.	5.	0.003	130.03	3.566E-01		P
Sc-46	889.28	28.	8.	0.005	99.25	3.929E-01		P
AG-110M	937.49	16.	-5.	-0.003	180.26	-6.690E-01		P
EU-152	964.11	24.	10.	0.006	73.14	3.693E+00		
EU-154	996.33	61.	-15.	-0.008	78.68	-7.527E+00		
PA-234M	1001.00	76.	-14.	-0.008	91.14	-9.098E+01		
EU-154	1004.77	104.	-12.	-0.006	126.85	-3.503E+00		
Co-56	1037.84	15.	-3.	-0.002	263.69	-1.222E+00		P
Cs-136	1048.07	13.	3.	0.002	179.51	2.107E-01		
RH-106	1050.36	10.	6.	0.003	82.42	2.225E+01		
BI-207	1063.66	16.	3.	0.002	308.52	2.292E-01		
Ga-68	1077.40	5.	6.	0.003	92.39	1.295E+01		
FE-59	1099.25	11.	3.	0.002	229.35	3.460E-01		
EU-152	1112.07	38.	11.	0.006	84.59	4.810E+00		
ZN-65	1115.55	49.	3.	0.001	388.28	3.047E-01		
Ta-182	1121.30	40.	9.	0.005	103.98	1.553E+00		
CO-60	1173.24	16.	-1.	-0.001	914.69	-6.228E-02		
Ta-182	1189.05	27.	-10.	-0.005	125.61	-3.758E+00		
Ta-182	1221.41	21.	2.	0.001	634.67	3.984E-01		
Co-56	1238.28	37.	-4.	-0.002	324.08	-4.286E-01		
NA-22	1274.53	6.	2.	0.001	158.44	1.566E-01		
FE-59	1291.60	11.	3.	0.001	302.33	4.192E-01		
TL-210	1313.00	11.	-4.	-0.002	188.42	-1.423E+00		
CO-60	1332.50	12.	-3.	-0.001	311.32	-1.845E-01		P
La-140	1596.21	12.	-1.	-0.001	842.61	-8.645E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.3494E+00	-3.3495E+00	1.058E+02%	1.20E+01
NA-22	#A	1.5664E-01	1.5665E-01	1.584E+02%	9.27E-01
K-40		1.7668E+02	1.7668E+02	6.430E+00%	7.67E+00
Sc-46	#A	3.9288E-01	3.9288E-01	9.925E+01%	1.33E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.49E+01
MN-54	#A	6.1055E-02	6.1055E-02	6.928E+02%	1.05E+00
FE-59	#A	3.7773E-01	3.7774E-01	1.897E+02%	1.86E+00
Co-56	#A	-1.7012E-01	-1.7012E-01	2.554E+02%	1.06E+00
CO-57	#A	-3.5104E-02	-3.5104E-02	5.246E+02%	6.35E-01
CO-58	#A	-6.5540E-01	-6.5541E-01	8.378E+01%	1.84E+00
CO-60	#A	-1.8455E-01	-1.8455E-01	3.113E+02%	1.30E+00
ZN-65	#A	3.0465E-01	3.0465E-01	3.883E+02%	4.17E+00
NB-94	#A	1.9002E-01	1.9002E-01	1.237E+02%	9.16E-01
ZR-95	#A	6.9307E-01	6.9307E-01	9.428E+01%	1.55E+00
NB-95	#A	-5.0021E-01	-5.0022E-01	7.844E+01%	1.32E+00
RU-103	#A	-4.3199E-01	-4.3200E-01	9.782E+01%	1.01E+00
RH-106	#A	3.4756E+00	3.4756E+00	8.242E+01%	9.15E+00
AG-108M	#A	1.9336E-01	1.9336E-01	9.734E+01%	7.26E-01
AG-110M	#A	6.1190E-01	6.1190E-01	6.905E+01%	1.62E+00
SN-113	#A	4.0226E-01	4.0227E-01	1.241E+02%	1.69E+00
SB-124	#A	-6.8103E-02	-6.8103E-02	8.235E+01%	2.14E+00
SB-125	#A	1.2458E+00	1.2458E+00	7.659E+01%	2.35E+00
I-131	#A	1.2968E-01	1.2969E-01	7.315E+01%	8.72E-01
Gd-153	#A	4.5047E-01	4.5047E-01	1.600E+02%	2.43E+00
Ga-68	#A	1.2791E+01	1.2953E+01	9.239E+01%	2.77E+01
Tc-99m	#A	1.6140E-01	1.6178E-01	1.219E+02%	6.66E-01
BA-133	#A	-4.2330E-01	-4.2330E-01	1.510E+02%	2.16E+00
CS-134	#A	-3.8409E-01	-3.8409E-01	1.600E+02%	2.08E+00
CS-137	#A	-7.5269E-02	-7.5269E-02	6.150E+02%	1.63E+00
CE-139	#A	-2.3795E-01	-2.3795E-01	9.262E+01%	8.07E-01
Ba-140	#A	1.1302E+00	1.1302E+00	1.038E+02%	2.81E+00
La-140	#A	1.1129E-01	1.1129E-01	1.019E+02%	1.63E+00
CE-141	#A	2.7946E-01	2.7947E-01	1.206E+02%	1.14E+00
CE-144	#A	8.6529E-01	8.6530E-01	1.699E+02%	5.00E+00
PM-144	#A	-2.7454E-02	-2.7454E-02	1.397E+02%	1.08E+00
EU-152	#A	2.6048E+00	2.6048E+00	5.933E+01%	3.64E+00
EU-154	#A	4.3946E-01	4.3946E-01	1.055E+02%	9.73E+00
EU-155	A	9.2058E-01	9.2058E-01	4.712E+01%	1.21E+00
HF-181	#A	4.1332E-01	4.1332E-01	7.524E+01%	1.33E+00
Ta-182	#A	1.5531E+00	1.5531E+00	1.040E+02%	5.51E+00
Hg-203	#A	1.7793E-01	1.7794E-01	1.684E+02%	1.02E+00
TL-208	#	1.3569E+00	1.3569E+00	3.307E+01%	9.18E-01
pm-146	#	1.6014E+00	1.6014E+00	4.481E+01%	1.58E+00

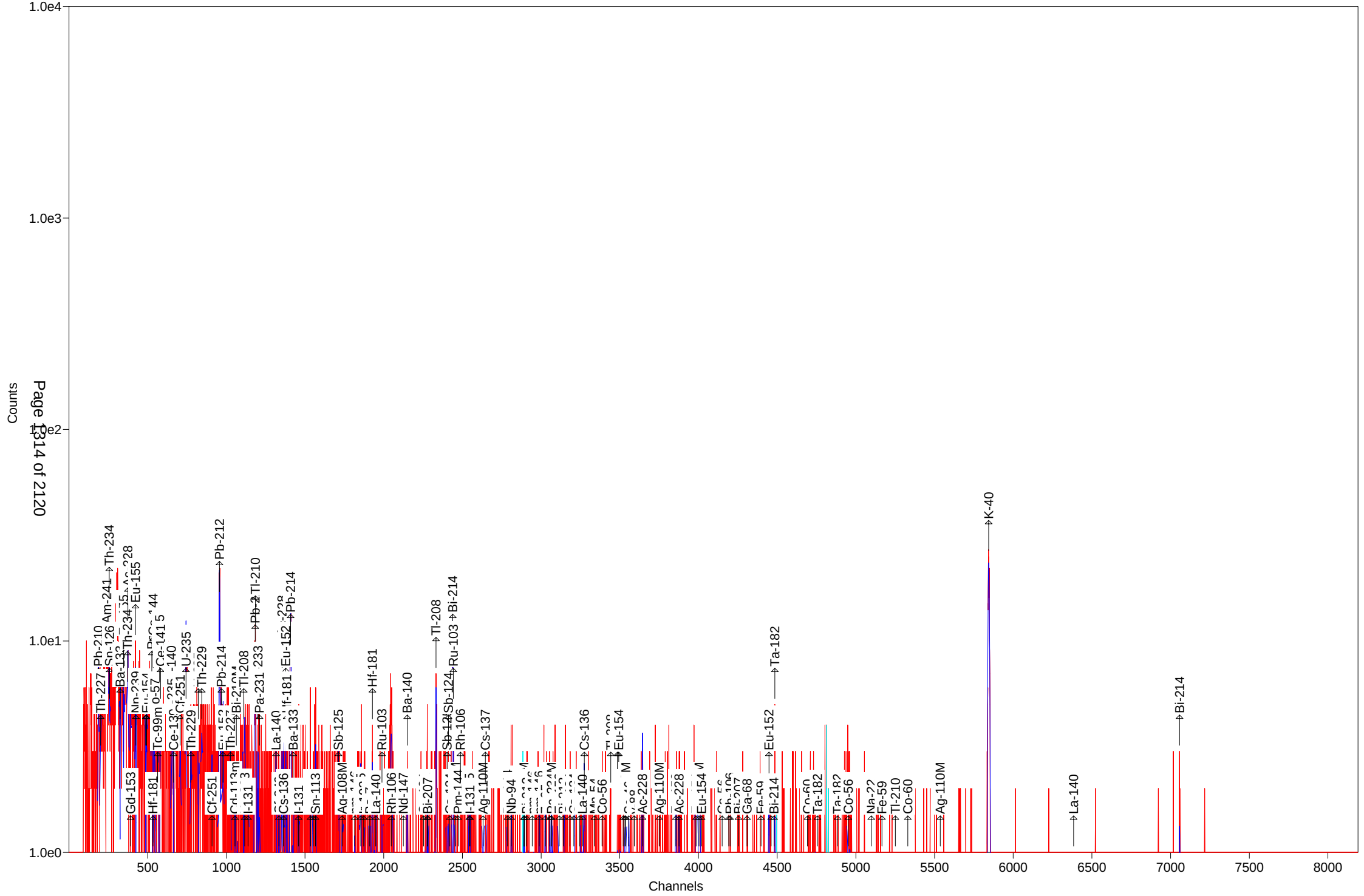
y-88	#A	-9.6983E-03	-9.6983E-03	4.346E+03%	9.17E-01
Cd-113m	#A	2.3207E+03	2.3207E+03	9.589E+01%	7.59E+03
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.54E+01
Cf-251	#A	8.2928E-01	8.2928E-01	1.095E+02%	2.37E+00
Cf-249	#A	-1.3227E-01	-1.3227E-01	8.633E+01%	1.58E+00
Sn-126	#A	-6.0825E-01	-6.0825E-01	4.043E+02%	8.43E+00
PB-210	#A	1.4661E+01	1.4661E+01	5.257E+01%	2.50E+01
PB-212		3.2139E+00	3.2139E+00	1.524E+01%	1.26E+00
PB-214	#	5.6999E+00	5.6999E+00	1.244E+01%	1.16E+00
BI-207	#A	2.2674E-01	2.2674E-01	8.833E+01%	6.79E-01
BI-212	#A	-5.6468E+00	-5.6468E+00	9.614E+01%	1.84E+01
U-235	#A	-2.6939E-01	-2.6939E-01	5.042E+02%	4.89E+00
BI-214	#	5.7074E+00	5.7074E+00	1.147E+01%	5.53E-01
BI-210M	#A	-3.9740E-01	-3.9740E-01	9.759E+01%	1.31E+00
AC-228	#	4.2683E+00	4.2683E+00	2.805E+01%	2.24E+00
TH-227	#A	9.9581E-01	9.9581E-01	1.832E+02%	1.43E+01
TH-229	#A	2.5572E+00	2.5572E+00	1.155E+02%	9.50E+00
TH-234	#A	5.0847E+00	5.0847E+00	5.736E+01%	1.57E+01
PA-231	#A	4.1038E+00	4.1038E+00	2.238E+02%	4.86E+01
PA-233	#A	4.1770E-01	4.1770E-01	2.285E+02%	4.01E+00
PA-234	#A	1.5974E+00	1.5974E+00	6.303E+01%	2.64E+00
PA-234M	#A	-9.0984E+01	-9.0984E+01	9.114E+01%	2.79E+02
AM-241	#A	3.0661E-01	3.0661E-01	2.533E+02%	2.13E+00
Np-237	#A	-1.5925E+00	-1.5925E+00	1.448E+02%	7.73E+00
Ir-192	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.68E+00
Cs-136	#A	4.1714E-01	4.1716E-01	8.001E+01%	1.98E+00
Np-239	#A	-7.4409E-01	-7.4428E-01	1.456E+02%	3.64E+00
Nd-147	#A	2.3593E-01	2.3594E-01	7.427E+02%	4.60E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.29E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.922E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.9222263E+02 Bq/Sample

379951_Gamma_160-29881-B-30-C. 7_Gamma_20183083.spc.



Test America St. Louis Spectrum ID: 5_Gamma_20182909

Sample Description: 379951_Gamma_160-29881-A-31-B
Detector: Detector # 5
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-31-B

Decay to Time: 8/23/2018 07:14 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:14:55 Real Time: 1810 sec
Analysis Time: 8/23/2018 07:45 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.432E+00	159.9	3.887E+00	3.889E+00	1.348E+01
NA-22	1.295E-01	357.1	4.623E-01	4.623E-01	1.741E+00
K-40	1.509E+02	8.5	1.277E+01	1.492E+01	1.239E+01
Sc-46	2.488E-01	105.7	2.629E-01	2.632E-01	1.820E+00
CR-51	-4.416E+00	80.2	3.540E+00	3.548E+00	1.561E+01
MN-54	6.803E-02	800.0	5.442E-01	5.442E-01	1.370E+00
FE-59	1.021E-01	1277.4	1.304E+00	1.304E+00	3.178E+00
Co-56	8.236E-01	51.2	4.218E-01	4.239E-01	1.167E+00
CO-57	0.000E+00	1.#INF	1.757E-01	1.757E-01	9.387E-01
CO-58	-7.065E-01	54.9	3.880E-01	3.898E-01	2.120E+00
CO-60	8.061E-01	35.4	2.850E-01	2.879E-01	7.427E-01
ZN-65	6.276E-02	2144.7	1.346E+00	1.346E+00	4.887E+00
NB-94	5.070E-01	93.8	4.757E-01	4.765E-01	1.173E+00
ZR-95	4.055E-02	430.5	1.746E-01	1.746E-01	1.894E+00
NB-95	-3.170E-01	165.3	5.241E-01	5.243E-01	1.834E+00
RU-103	9.699E-02	346.4	3.360E-01	3.360E-01	9.142E-01
RH-106	4.615E+00	100.0	4.615E+00	4.621E+00	2.824E+01
AG-108M	-3.171E-01	149.7	4.746E-01	4.748E-01	1.117E+00
AG-110M	2.622E-01	87.1	2.283E-01	2.287E-01	2.478E+00
SN-113	-3.483E-01	180.9	6.302E-01	6.304E-01	2.177E+00
SB-124	-1.210E-01	103.4	1.251E-01	1.253E-01	2.952E+00
SB-125	2.971E-01	41.3	1.228E-01	1.237E-01	4.047E+00
I-131	-9.606E-02	470.0	4.514E-01	4.515E-01	1.030E+00
Gd-153	-1.380E-01	533.0	7.357E-01	7.358E-01	2.549E+00
Ga-68	-1.497E+01	176.1	2.637E+01	2.638E+01	6.217E+01
Tc-99m	2.076E-01	127.3	2.642E-01	2.645E-01	8.968E-01
BA-133	-6.125E-01	148.8	9.115E-01	9.121E-01	3.089E+00
CS-134	2.072E-01	88.5	1.833E-01	1.836E-01	2.879E+00
CS-137	-3.711E-01	99.7	3.701E-01	3.706E-01	1.900E+00
CE-139	-2.683E-01	124.4	3.338E-01	3.348E-01	1.130E+00
Ba-140	5.892E-01	114.4	6.743E-01	6.750E-01	4.150E+00
La-140	-5.107E-01	133.3	6.807E-01	6.813E-01	2.273E+00
CE-141	-4.463E-01	115.1	5.136E-01	5.141E-01	2.010E+00

CE-144	1.149E+00	246.4	2.832E+00	2.833E+00	9.625E+00
PM-144	4.959E-01	94.1	4.669E-01	4.676E-01	1.152E+00
EU-152	1.368E+00	30.2	4.123E-01	4.185E-01	6.446E+00
EU-154	2.521E+00	70.5	1.777E+00	1.782E+00	1.519E+01
EU-155	-1.154E+00	88.3	1.020E+00	1.022E+00	5.675E+00
HF-181	2.669E-01	186.5	4.978E-01	4.980E-01	1.737E+00
Ta-182	-4.302E-01	128.3	5.521E-01	5.525E-01	6.337E+00
Hg-203	3.136E-01	103.2	3.236E-01	3.241E-01	1.102E+00
TL-208	1.189E+00	49.2	5.850E-01	5.883E-01	1.124E+00
pm-146	-1.580E+00	114.8	1.813E+00	1.815E+00	4.448E+00
y-88	-7.717E-02	800.0	6.173E-01	6.173E-01	1.555E+00
Cd-113m	-1.735E+03	255.0	4.423E+03	4.424E+03	1.547E+04
Cd-109	6.326E+00	152.5	9.646E+00	9.652E+00	3.247E+01
Cf-251	2.563E-01	577.8	1.481E+00	1.481E+00	4.151E+00
Cf-249	3.927E-01	137.5	5.399E-01	5.403E-01	1.860E+00
Sn-126	-1.350E+00	241.1	3.255E+00	3.256E+00	1.115E+01
PB-210	-1.592E+00	647.1	1.030E+01	1.030E+01	3.136E+01
PB-212	5.000E+00	12.6	6.324E-01	7.103E-01	1.292E+00
PB-214	7.406E+00	12.2	9.009E-01	9.797E-01	1.586E+00
BI-207	1.452E-01	238.8	3.467E-01	3.468E-01	3.725E-01
BI-212	-1.337E-01	3722.9	4.979E+00	4.979E+00	1.854E+01
U-235	2.248E+00	94.0	2.113E+00	2.116E+00	7.595E+00
BI-214	6.897E+00	13.3	9.159E-01	9.835E-01	1.246E+00
BI-210M	-4.715E-01	131.9	6.221E-01	6.227E-01	2.125E+00
AC-228	6.561E+00	19.6	1.287E+00	1.330E+00	1.860E+00
TH-227	-3.452E-01	1339.8	4.625E+00	4.625E+00	1.370E+01
TH-229	1.678E+00	323.7	5.433E+00	5.435E+00	1.528E+01
TH-234	1.032E+01	25.5	2.633E+00	2.688E+00	1.951E+01
PA-231	0.000E+00	1.#INF	4.530E+00	4.530E+00	6.356E+01
PA-233	-1.006E+00	171.8	1.728E+00	1.729E+00	5.840E+00
PA-234	3.387E-02	87.4	2.958E-02	2.964E-02	5.697E+00
PA-234M	6.974E+01	92.4	6.445E+01	6.455E+01	2.055E+02
AM-241	-1.297E+00	68.5	8.893E-01	8.919E-01	3.034E+00
Np-237	-1.941E+00	165.8	3.217E+00	3.219E+00	1.081E+01
Ir-192	-4.768E-01	102.0	4.866E-01	4.874E-01	1.640E+00
Cs-136	1.775E-01	203.6	3.612E-01	3.614E-01	1.151E+00
Np-239	-1.089E+00	154.3	1.680E+00	1.681E+00	5.646E+00
Nd-147	3.583E+00	50.3	1.803E+00	1.815E+00	4.310E+00
TL-210	3.141E-01	154.0	4.838E-01	4.841E-01	1.701E+00
Total	2.883E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-31-B

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182909.An1

Acquisition information

Start time:	8/23/2018 7:14:55 AM
Live time:	1800
Real time:	1810
Dead time:	0.57 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_Soil_TunaCan.Clb

5_Soil_TunaCan_90099_032612

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	3/27/2012 5:20:37 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.43 %
Log(Eff):	-2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:14:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2049

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-2.	647.06	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
63.49	5.	223.36	1.12	2.712E-02	63.29	3.810	PBC<MDA	TH234
74.78	42.	28.62	0.81	3.148E-02				
77.06	84.	16.47	0.81	3.216E-02				
88.04	15.	152.49	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
91.10	6.	383.39	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.55	55.	25.51	0.88	3.527E-02	92.59	5.584	1.549E+01	TH234
93.35	8.	276.17	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
99.50	11.	110.81	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
133.97	8.	246.43	0.87	3.487E-02	133.54	11.090	PBC<MDA	CE144
140.51	11.	127.28	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	10.	147.96	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
162.66	11.	114.43	0.90	3.113E-02	162.66	6.220	PBC<MDA	Ba140
163.38	11.	122.14	0.90	3.102E-02	163.38	5.080	PBC<MDA	U235
176.60	2.	577.82	0.92	2.975E-02	176.60	17.000	PBC<MDA	Cf251
181.99	16.	36.57	0.59	2.902E-02				
185.72	10.	119.70	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
193.51	4.	323.72	0.93	2.758E-02	193.51	4.400	PBC<MDA	TH229
205.33	5.	206.63	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
238.73	82.	15.71	0.87	2.318E-02	238.63	43.300	4.546E+00	PB212
242.14	27.	33.21	0.98	2.293E-02	242.00	7.430	8.741E+00	PB214
244.69	3.	764.19	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
277.28	7.	133.25	1.02	2.048E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	103.19	1.02	2.036E-02	279.20	81.460	PBC<MDA	Hg203
295.44	57.	20.03	0.93	1.945E-02	295.09	19.300	8.439E+00	PB214
328.76	5.	182.91	1.07	1.778E-02	328.76	20.300	PBC<MDA	La140
352.17	82.	12.81	0.86	1.679E-02	351.93	37.600	6.875E+00	PB214
383.84	8.	117.76	1.12	1.563E-02	383.84	8.940	PBC<MDA	BA133
387.95	7.	137.50	1.12	1.549E-02	387.95	66.000	PBC<MDA	Cf249
482.00	5.	186.55	1.21	1.293E-02	482.00	80.500	PBC<MDA	HF181
497.05	2.	346.41	1.22	1.260E-02	497.05	90.900	PBC<MDA	RU103
511.86	59.	23.30	2.48	1.230E-02	511.86	20.000	1.333E+01	RH106
531.00	10.	50.33	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
563.24	2.	397.91	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
583.02	16.	49.21	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
609.69	63.	13.28	1.06	1.063E-02	609.31	46.090	7.124E+00	BI214
635.89	11.	41.33	1.34	1.026E-02	635.89	11.310	PBC<MDA	SB125
657.76	7.	87.08	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
696.54	8.	94.15	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
702.63	8.	93.83	1.40	9.438E-03	702.63	97.900	PBC<MDA	NB94
722.79	6.	103.40	1.42	9.217E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.761E-01	AG108M
					723.36	20.220	1.690E+00	EU154
723.36	5.	111.62	1.42	9.211E-03	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.271E-01	AG108M
					723.36	20.220	1.470E+00	EU154
724.20	1.	430.54	1.42	9.202E-03	724.20	44.150	PBC<MDA	ZR95
766.41	7.	119.81	1.45	8.776E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.507E+02	PA234M
778.92	11.	30.15	1.46	8.657E-03	778.92	12.940	5.455E+00	EU152
785.42	4.	184.30	1.47	8.597E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	88.46	1.48	8.503E-03	795.87	85.530	PBC<MDA	CS134
799.60	5.	154.01	1.48	8.469E-03	799.60	98.960	PBC<MDA	TL210
801.95	1.	584.17	1.48	8.448E-03	801.95	8.690	PBC<MDA	CS134
818.50	2.	292.83	1.50	8.305E-03	818.50	100.000	PBC<MDA	Cs136
834.85	1.	800.00	1.51	8.168E-03	834.85	99.980	PBC<MDA	MN54
860.56	3.	281.80	1.53	7.963E-03	860.56	12.420	PBC<MDA	TL208
873.23	5.	155.52	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
911.07	26.	19.61	1.57	7.591E-03	911.07	29.000	6.561E+00	AC228
937.49	2.	403.11	1.59	7.411E-03	937.49	34.360	PBC<MDA	AG110M
946.02	3.	147.99	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
968.97	6.	98.72	1.61	7.209E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	4.	140.74	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	12.	51.21	1.66	6.805E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	2.	282.84	1.67	6.749E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	100.00	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	3.	238.82	1.68	6.666E-03	1063.66	74.500	PBC<MDA	BI207
1112.07	6.	124.62	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1120.30	6.	94.06	1.72	6.381E-03	1120.29	15.100	PBC<MDA	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	105.66	1.72	6.380E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.215E-01	Sc46
					1121.30	34.900	1.495E+00	Ta182
1173.24	3.	209.01	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	3.	238.82	1.77	6.069E-03	1189.05	16.200	PBC<MDA	Ta182
1274.53	1.	357.07	1.83	5.725E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.677E-01	EU154
1313.00	6.	101.72	1.85	5.583E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	8.	35.36	1.87	5.514E-03	1332.50	99.980	8.061E-01	CO60
1384.30	1.	796.87	1.90	5.340E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	6.	40.82	1.91	5.264E-03	1408.00	21.005	PBC<MDA	EU152
1461.18	148.	8.46	1.66	5.102E-03	1460.83	10.670	1.509E+02	K40
1764.73	8.	47.33	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.74	74.71	51.	42.	1.335E+03	28.62	0.813	- D
307.88	77.00	53.	84.	2.605E+03	16.47	0.815	- sD
727.91	181.99	8.	16.	5.456E+02	36.57	0.592	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	74.	-2.	-0.001	647.06	0.783s
AM-241	237.72	59.54	102.	-21.	-0.012	68.55	0.797s
TH-234	253.54	63.49	52.	5.	0.003	223.36	1.122s
Sn-126	256.71	64.28	120.	-6.	-0.004	241.05	0.802s
BA-133	323.61	80.99	117.	-17.	-0.009	116.57	0.819
Np-237	345.63	86.49	332.	-16.	-0.009	165.79	0.825s
EU-155	345.84	86.54	316.	-16.	-0.009	161.91	0.825s
Sn-126	347.43	86.94	300.	-9.	-0.005	267.49	0.825s
Sn-126	349.95	87.57	291.	0.	0.000	1000.00	0.826
Cd-109	351.83	88.04	252.	15.	0.008	152.49	0.826s
Nd-147	364.08	91.10	267.	6.	0.003	383.39	0.829s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-234	369.87	92.55	52.	55.	0.031	25.51	0.882s
AC-228	373.09	93.35	261.	8.	0.005	276.17	0.832s
Gd-153	389.70	97.50	100.	-3.	-0.001	532.98	0.836s
Np-239	397.71	99.50	73.	11.	0.006	110.81	0.838s
Gd-153	412.52	103.20	154.	-16.	-0.009	116.03	0.842s
Np-239	414.52	103.70	170.	-8.	-0.005	219.34	0.842s
EU-155	420.98	105.31	264.	-16.	-0.009	88.33	0.844s
Np-239	424.25	106.13	301.	-16.	-0.009	154.34	0.845s
EU-152	486.88	121.78	102.	-10.	-0.005	153.45	0.861s
CO-57	488.03	122.06	111.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	105.	-4.	-0.002	338.37	0.862s
PA-234	524.99	131.29	177.	-15.	-0.008	92.87	0.871s
HF-181	531.91	133.02	175.	-7.	-0.004	193.37	0.872s
CE-144	533.97	133.54	190.	8.	0.004	246.43	0.873s
CO-57	545.72	136.47	212.	-16.	-0.009	127.84	0.876s
Tc-99m	561.88	140.51	93.	11.	0.006	127.28	0.880s
U-235	574.99	143.79	105.	10.	0.006	147.96	0.883s
CE-141	581.61	145.44	143.	-13.	-0.007	115.08	0.885s
Ba-140	650.54	162.66	72.	11.	0.006	114.43	0.902s
U-235	653.42	163.38	83.	11.	0.006	122.14	0.903s
CE-139	663.32	165.85	107.	-12.	-0.007	124.42	0.905s
Cf-251	706.34	176.60	57.	2.	0.001	577.82	0.916s
U-235	742.85	185.72	69.	10.	0.006	119.70	0.925s
TH-229	774.03	193.51	43.	4.	0.002	323.72	0.933s
U-235	821.35	205.33	37.	5.	0.003	206.63	0.945s
TH-229	843.44	210.85	60.	-4.	-0.002	348.21	0.950
PB-212	954.64	238.63	20.	90.	0.050	12.65	0.978D
PB-214	968.10	242.00	26.	27.	0.015	33.21	0.981D
EU-152	978.89	244.69	196.	3.	0.001	764.19	0.984s
Cd-113m	1054.97	263.70	50.	-4.	-0.002	254.95	1.002s
BI-210M	1063.50	265.83	66.	-9.	-0.005	131.94	1.005s
TL-208	1109.33	277.28	40.	7.	0.004	133.25	1.016
Hg-203	1117.00	279.20	42.	9.	0.005	103.19	1.017s
I-131	1137.41	284.30	48.	-13.	-0.007	148.71	1.022s
PB-214	1181.98	295.44	17.	57.	0.032	20.03	0.934s
TL-210	1184.24	296.00	182.	-10.	-0.006	190.21	1.034
PB-212	1200.37	300.03	172.	-6.	-0.004	178.90	1.038
PA-231	1200.53	300.07	166.	0.	0.000	1000.00	1.038s
PA-233	1200.97	300.18	166.	0.	0.000	1000.00	1.038s
PA-231	1210.86	302.65	166.	0.	0.000	1000.00	1.040s
BA-133	1211.66	302.85	166.	0.	0.000	1000.00	1.040s
Ba-140	1219.66	304.85	166.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	166.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	166.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	210.	-12.	-0.007	171.83	1.049s
Ir-192	1266.25	316.49	91.	-14.	-0.008	102.04	1.053s
CR-51	1280.63	320.08	106.	-14.	-0.008	80.17	1.057s
La-140	1315.35	328.76	26.	5.	0.003	182.91	1.065s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1334.08	333.44	37.	-6.	-0.003	204.28	1.070s
Cs-136	1362.62	340.57	101.	-14.	-0.008	104.74	1.077s
EU-152	1377.49	344.29	115.	-14.	-0.008	111.02	1.080s
HF-181	1383.66	345.83	130.	-13.	-0.007	90.69	1.082s
PB-214	1409.03	352.17	11.	78.	0.043	13.81	0.857
BA-133	1424.36	356.00	138.	-11.	-0.006	148.83	1.091s
I-131	1458.32	364.48	22.	-2.	-0.001	469.96	1.099s
BA-133	1535.78	383.84	38.	8.	0.004	117.76	1.117s
Cf-249	1552.22	387.95	46.	7.	0.004	137.50	1.121s
SN-113	1567.19	391.69	59.	-6.	-0.003	180.94	1.125s
SB-125	1711.99	427.88	36.	-12.	-0.007	88.26	1.158s
AG-108M	1736.25	433.94	24.	-7.	-0.004	149.67	1.164s
pm-146	1816.05	453.88	36.	-13.	-0.007	85.50	1.182s
SB-125	1854.01	463.37	43.	-11.	-0.006	104.55	1.191s
Ir-192	1872.79	468.06	53.	-3.	-0.002	365.85	1.195s
BE-7	1910.94	477.59	43.	-6.	-0.003	159.86	1.204s
HF-181	1928.56	482.00	41.	5.	0.003	186.55	1.208s
La-140	1948.65	487.02	36.	-10.	-0.006	121.66	1.212s
RU-103	1988.80	497.05	12.	2.	0.001	346.41	1.221s
RH-106	2048.06	511.86	20.	59.	0.033	23.30	2.485
Nd-147	2124.62	531.00	4.	10.	0.006	50.33	1.252s
CS-134	2253.60	563.24	16.	2.	0.001	397.91	1.280s
PA-234	2278.54	569.47	0.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	0.	0.	0.000	1000.00	1.286s
TL-208	2332.76	583.02	12.	16.	0.009	49.21	1.298s
SB-125	2402.69	600.50	140.	-9.	-0.005	186.20	1.313s
SB-124	2411.61	602.73	131.	-9.	-0.005	179.96	1.315s
CS-134	2419.53	604.71	122.	-5.	-0.003	333.58	1.317s
BI-214	2439.44	609.69	3.	63.	0.035	13.28	1.062
RU-103	2441.89	610.30	117.	0.	0.000	1000.00	1.322s
AG-108M	2457.82	614.28	117.	0.	0.000	1000.00	1.325s
PM-144	2472.94	618.06	112.	-2.	-0.001	900.00	1.328s
SB-125	2544.26	635.89	5.	11.	0.006	41.33	1.344s
I-131	2548.61	636.97	22.	-5.	-0.003	96.55	1.345s
AG-110M	2631.76	657.76	14.	7.	0.004	87.08	1.362s
CS-137	2647.36	661.66	32.	-6.	-0.003	99.71	1.366s
PM-144	2786.90	696.54	13.	8.	0.005	94.15	1.395s
NB-94	2811.25	702.63	13.	8.	0.005	93.83	1.400s
SB-124	2891.88	722.79	14.	6.	0.003	103.40	1.417s
AG-108M	2892.48	722.94	20.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	13.	5.	0.003	111.62	1.418s
ZR-95	2897.53	724.20	18.	1.	0.001	430.54	1.418s
pm-146	2989.37	747.16	22.	-9.	-0.005	114.77	1.437s
ZR-95	3027.65	756.73	9.	-1.	0.000	804.42	1.445s
AG-110M	3056.50	763.94	21.	-3.	-0.002	203.47	1.451s
NB-95	3063.89	765.79	32.	-5.	-0.003	165.33	1.453s
PA-234M	3066.38	766.41	32.	7.	0.004	119.81	1.453s
EU-152	3116.41	778.92	0.	11.	0.006	30.15	1.463s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3142.41	785.42	9.	4.	0.002	184.30	1.468s
CS-134	3184.19	795.87	17.	7.	0.004	88.46	1.477s
TL-210	3199.12	799.60	24.	5.	0.003	154.01	1.480s
CS-134	3208.53	801.95	30.	1.	0.001	584.17	1.482s
CO-58	3243.82	810.78	39.	-11.	-0.006	54.93	1.489s
Cs-136	3274.72	818.50	10.	2.	0.001	292.83	1.495s
MN-54	3340.10	834.85	14.	1.	0.001	800.00	1.508s
TL-208	3442.95	860.56	19.	3.	0.002	281.80	1.529s
NB-94	3485.08	871.10	23.	-7.	-0.004	100.21	1.537s
EU-154	3493.61	873.23	26.	5.	0.003	155.52	1.539s
PA-234	3522.80	880.53	21.	-3.	-0.001	248.75	1.544s
PA-234	3533.64	883.24	23.	0.	0.000	1000.00	1.547s
AG-110M	3539.41	884.68	23.	0.	0.000	1000.00	1.547s
y-88	3592.83	898.04	14.	-1.	-0.001	800.00	1.558s
AC-228	3644.94	911.07	0.	26.	0.014	19.61	1.568s
AG-110M	3750.60	937.49	14.	2.	0.001	403.11	1.589s
PA-234	3784.70	946.02	5.	3.	0.002	147.99	1.595s
EU-152	3857.05	964.11	25.	-5.	-0.003	157.47	1.609s
AC-228	3876.48	968.97	13.	6.	0.003	98.72	1.612s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s
PA-234M	4004.55	1001.00	17.	4.	0.002	140.74	1.636s
EU-154	4019.65	1004.77	11.	0.	0.000	1000.00	1.639s
Co-56	4151.87	1037.84	5.	12.	0.007	51.21	1.664s
Cs-136	4192.77	1048.07	15.	2.	0.001	282.84	1.671s
RH-106	4201.93	1050.36	15.	6.	0.003	100.00	1.673s
BI-207	4255.11	1063.66	10.	3.	0.002	238.82	1.682s
Ga-68	4310.04	1077.40	15.	-5.	-0.003	176.07	1.692s
EU-152	4448.68	1112.07	25.	6.	0.003	124.62	1.717s
BI-214	4481.51	1120.29	11.	6.	0.003	94.06	1.723s
Sc-46	4482.57	1120.55	17.	6.	0.003	105.66	1.723s
Ta-182	4485.56	1121.30	24.	-6.	-0.003	128.31	1.724s
CO-60	4693.21	1173.24	11.	3.	0.002	209.01	1.760s
Ta-182	4756.42	1189.05	10.	3.	0.002	238.82	1.771s
Co-56	4953.23	1238.28	22.	-3.	-0.001	286.70	1.804s
NA-22	5098.13	1274.53	11.	1.	0.001	357.07	1.828s
EU-154	5098.19	1274.54	12.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	32.	-16.	-0.009	85.94	1.840s
TL-210	5251.91	1313.00	5.	6.	0.003	101.72	1.854s
CO-60	5329.85	1332.50	0.	8.	0.004	35.36	1.866s
AG-110M	5536.88	1384.30	5.	1.	0.000	796.87	1.899s
EU-152	5631.62	1408.00	0.	6.	0.003	40.82	1.914s
K-40	5844.13	1461.18	4.	148.	0.082	8.46	1.664
La-140	6383.73	1596.21	11.	-6.	-0.004	193.96	2.024s
BI-214	7056.06	1764.49	2.	8.	0.004	47.33	2.114s
Co-56	7083.46	1771.35	20.	-7.	-0.004	94.59	2.117s
y-88	7341.96	1836.06	6.	-4.	-0.002	156.12	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.4318E+00				5.31E+01	
			477.60	-2.432E+00	?(	1.348E+01 1.60E+02 1.05E+01	G
NA-22	C	1.2947E-01				9.50E+02	
			1274.53	1.295E-01	?(	1.741E+00 3.57E+02 9.99E+01	G
K-40	N	1.5090E+02				4.66E+11	
			1460.83	1.509E+02	(P	1.239E+01 8.46E+00 1.07E+01	G
Sc-46	F	2.4881E-01				8.38E+01	
			889.28	-2.391E-02	%(	1.820E+00 2.07E+03 1.00E+02	G
			1120.55	5.215E-01	?(	1.910E+00 1.06E+02 1.00E+02	G
CR-51	F	-4.4160E+00				2.77E+01	
			320.08	-4.416E+00	&(P	1.561E+01 8.02E+01 9.94E+00	G
MN-54	C	6.8026E-02				3.12E+02	
			834.85	6.803E-02	?(	1.370E+00 8.00E+02 1.00E+02	G
FE-59	F	1.0207E-01				4.45E+01	
			1099.25	1.021E-01	%(P	3.178E+00 1.28E+03 5.65E+01	G
			1291.60	-3.556E+00	+	6.604E+00 8.59E+01 4.32E+01	G
Co-56	C	8.2361E-01				7.73E+01	
			846.77	-2.296E-02	%(	1.167E+00 1.95E+03 9.99E+01	G
			1238.28	-3.658E-01	+ P	3.490E+00 2.87E+02 6.61E+01	G
			1037.84	6.811E+00	&(P	7.713E+00 5.12E+01 1.41E+01	G
			1771.35	-6.083E+00	+	1.970E+01 9.46E+01 1.55E+01	A
CO-58	C	-7.0648E-01				7.09E+01	
			810.78	-7.065E-01	?(P	2.120E+00 5.49E+01 9.95E+01	G
CO-60	F	8.0614E-01				1.93E+03	
			1332.50	8.061E-01	?(	7.427E-01 3.54E+01 1.00E+02	G
			1173.24	3.154E-01	& P	1.615E+00 2.09E+02 9.99E+01	G
ZN-65	F	6.2758E-02				2.44E+02	
			1115.55	6.276E-02	%(	4.887E+00 2.14E+03 5.06E+01	G
NB-94	I	5.0699E-01				7.41E+06	
			702.63	5.070E-01	?(	1.173E+00 9.38E+01 9.79E+01	G
			871.10	-5.174E-01	-	1.779E+00 1.00E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	4.0551E-02					6.40E+01	
			756.73	-8.234E-02	?(P	1.894E+00	8.04E+02	5.45E+01 G
			724.20	1.921E-01	?(	3.044E+00	4.31E+02	4.42E+01 G
NB-95	I	-3.1699E-01					6.40E+01	
			765.79	-3.170E-01	?(	1.834E+00	1.65E+02	9.98E+01 G
RU-103	I	9.6988E-02					3.93E+01	
			497.05	9.699E-02	?(	9.142E-01	3.46E+02	9.09E+01 G
			610.30	0.000E+00	-	4.833E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.6150E+00					3.74E+02	
			621.92	3.569E-01	%(	2.824E+01	2.28E+03	9.93E+00 G
			1050.36	3.172E+01	?(	1.097E+02	1.00E+02	1.56E+00 G
			511.86	1.333E+01	?	5.319E+00	2.33E+01	2.00E+01 GA
AG-108M	C	-3.1709E-01					1.53E+05	
			433.94	-3.171E-01	&(P	1.117E+00	1.50E+02	9.05E+01 G
			722.94	0.000E+00	+	1.563E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	3.110E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.6218E-01					2.50E+02	
			884.68	0.000E+00	?(	2.478E+00	1.00E+03	7.27E+01 G
			657.76	3.943E-01	?(	1.173E+00	8.71E+01	9.46E+01 G
			937.49	4.363E-01	?(	4.395E+00	4.03E+02	3.44E+01 G
			1384.30	2.855E-01	?(	5.770E+00	7.97E+02	2.43E+01 G
			763.94	-9.446E-01	+	6.867E+00	2.03E+02	2.23E+01 G
SN-113	F	-3.4827E-01					1.15E+02	
			391.69	-3.483E-01	&(	2.177E+00	1.81E+02	6.40E+01 G
SB-124	F	-1.2101E-01					6.02E+01	
			602.73	-4.819E-01	?(	2.952E+00	1.80E+02	9.83E+01 G
			1690.98	-6.857E-02	% P	1.899E+00	4.72E+03	4.78E+01 G
			722.79	3.160E+00	?(	1.135E+01	1.03E+02	1.08E+01 G
SB-125	I	2.9707E-01					1.01E+03	
			427.88	-1.619E+00	?(P	4.047E+00	8.83E+01	2.96E+01 G
			600.50	-2.639E+00	+	1.672E+01	1.86E+02	1.79E+01 G
			635.89	5.312E+00	?(P	6.239E+00	4.13E+01	1.13E+01 G
			463.37	-4.180E+00	+ P	1.326E+01	1.05E+02	1.05E+01 G
I-131	I	-9.6058E-02					8.02E+00	
			364.48	-9.606E-02	?(P	1.030E+00	4.70E+02	8.17E+01 G
			284.30	-6.045E+00	+ P	1.582E+01	1.49E+02	6.14E+00 G
			636.97	-3.674E+00	+ P	1.853E+01	9.66E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-1.3804E-01					2.42E+02	
			97.50	-1.380E-01	?(	2.549E+00	5.33E+02	3.00E+01 G
			103.20	-1.094E+00	&	4.272E+00	1.16E+02	2.18E+01 G
Ga-68	C	-1.4975E+01					4.71E-02	
			1077.40	-1.497E+01	?(	6.217E+01	1.76E+02	3.30E+00 G
Tc-99m	I	2.0757E-01					2.51E-01	
			140.51	2.076E-01	(	8.968E-01	1.27E+02	8.93E+01 G
BA-133	F	-6.1245E-01					3.85E+03	
			356.00	-6.125E-01	?(	3.089E+00	1.49E+02	6.20E+01 G
			302.85	0.000E+00	+	9.992E+00	1.00E+03	1.83E+01 G
			383.84	3.090E+00	?	1.250E+01	1.18E+02	8.94E+00 GA
			80.99	-8.283E-01	+	2.606E+00	1.17E+02	3.41E+01 GA
CS-134	I	2.0720E-01					7.54E+02	
			604.71	-2.512E-01	*(	2.879E+00	3.34E+02	9.76E+01 G
			795.87	5.547E-01	?(	1.675E+00	8.85E+01	8.55E+01 G
			569.32	1.605E-01	&	6.159E+00	1.01E+03	1.54E+01 G
			801.95	1.009E+00	?(	2.126E+01	5.84E+02	8.69E+00 G
			563.24	1.172E+00	?(	1.251E+01	3.98E+02	8.35E+00 G
CS-137	I	-3.7112E-01					1.10E+04	
			661.66	-3.711E-01	?(P	1.900E+00	9.97E+01	8.52E+01 G
CE-139	F	-2.6831E-01					1.38E+02	
			165.85	-2.683E-01	?(	1.130E+00	1.24E+02	7.99E+01 G
Ba-140	I	5.8922E-01					1.28E+01	
			537.26	-5.634E-02	%(P	4.150E+00	3.78E+03	2.44E+01 G
			162.66	3.121E+00	?(	1.212E+01	1.14E+02	6.22E+00 G
			304.85	0.000E+00	-	4.293E+01	1.00E+03	4.29E+00 G
La-140	I	-5.1067E-01					1.28E+01	
			1596.21	-7.940E-01	?(P	2.273E+00	1.94E+02	9.54E+01 G
			487.02	-9.525E-01	&	2.921E+00	1.22E+02	4.55E+01 G
			328.76	8.209E-01	?(	4.051E+00	1.83E+02	2.03E+01 G
			815.77	4.377E-02	% P	1.008E+01	6.46E+03	2.33E+01 G
CE-141	I	-4.4631E-01					3.25E+01	
			145.44	-4.463E-01	?(P	2.010E+00	1.15E+02	4.82E+01 G
CE-144	I	1.1492E+00					2.85E+02	
			133.54	1.149E+00	?(	9.625E+00	2.46E+02	1.11E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	4.9593E-01					3.63E+02	
			696.54	4.959E-01	?(	1.152E+00	9.41E+01	9.90E+01 G
			618.06	-8.893E-02	-	2.772E+00	9.00E+02	9.91E+01 G
EU-152	F	1.3675E+00					4.94E+03	
			344.29	-1.722E+00	&(	6.446E+00	1.11E+02	2.65E+01 G
			1112.07	3.784E+00	?(	1.640E+01	1.25E+02	1.36E+01 G
			121.78	-5.153E-01	+	2.694E+00	1.53E+02	2.86E+01 G
			778.92	5.455E+00	?(	3.655E+00	3.02E+01	1.29E+01 G
			964.11	-2.452E+00	+	1.359E+01	1.57E+02	1.46E+01 G
			244.69	8.397E-01	?(P	2.195E+01	7.64E+02	7.58E+00 G
			1408.00	3.015E+00	?	3.703E+00	4.08E+01	2.10E+01 GA
EU-154	I	2.5211E+00					3.14E+03	
			873.23	2.782E+00	?(	1.519E+01	1.56E+02	1.23E+01 G
			123.10	-1.651E-01	-	1.925E+00	3.38E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.199E+00	1.00E+03	3.52E+01 G
			723.36	1.470E+00	?(	5.756E+00	1.12E+02	2.02E+01 G
			1004.77	0.000E+00	-	7.962E+00	1.00E+03	1.80E+01 G
			996.33	4.224E+00	?(	1.308E+01	8.99E+01	1.06E+01 G
EU-155	I	-1.1544E+00					1.81E+03	
			105.31	-1.154E+00	?(P	5.675E+00	8.83E+01	2.12E+01 G
			86.54	-8.278E-01	+	4.505E+00	1.62E+02	3.07E+01 G
HF-181	F	2.6686E-01					4.24E+01	
			482.00	2.669E-01	?(	1.737E+00	1.87E+02	8.05E+01 G
			133.02	-2.693E-01	+ P	2.367E+00	1.93E+02	4.33E+01 G
			345.83	-2.767E+00	+ P	1.206E+01	9.07E+01	1.51E+01 G
			136.30	-2.619E-07	%	1.802E+01	2.00E+09	5.85E+00 G
Ta-182	F	-4.3025E-01					1.14E+02	
			1121.30	-1.417E+00	?(	6.337E+00	1.28E+02	3.49E+01 G
			1221.41	1.156E-01	%	6.217E+00	2.23E+03	2.70E+01 G
			1189.05	1.695E+00	?(	9.858E+00	2.39E+02	1.62E+01 G
Hg-203	F	3.1362E-01					4.66E+01	
			279.20	3.136E-01	?(	1.102E+00	1.03E+02	8.15E+01 G
TL-208	N	1.1887E+00					6.98E+02	
			583.02	9.536E-01	?(	1.124E+00	4.92E+01	8.45E+01 G
			277.28	3.009E+00	?(	1.384E+01	1.33E+02	6.31E+00 G
			860.56	1.864E+00	?(P	1.284E+01	2.82E+02	1.24E+01 G
pm-146	C	-1.5797E+00					2.02E+03	
			747.16	-1.580E+00	?(	4.448E+00	1.15E+02	3.40E+01 G
			735.72	-1.398E-01	% P	2.004E+00	1.12E+03	2.25E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          453.88-8.060E-01 + P 1.940E+00 8.55E+01 6.50E+01 G

y-88     F  -7.7166E-02                                     1.07E+02
                          898.04-7.717E-02 ?(  1.555E+00 8.00E+02 9.37E+01 G
                         1836.06-5.324E-01 +   1.880E+00 1.56E+02 9.92E+01 G

Cd-113m     -1.7347E+03                                     5.33E+03
                          263.70-1.735E+03 ?(  1.547E+04 2.55E+02 6.00E-03   K

Cd-109   F   6.3257E+00                                     4.53E+02
                           88.04 6.326E+00 ?(  3.247E+01 1.52E+02 3.79E+00 G

Cf-251   T   2.5633E-01                                     3.28E+05
                          176.60 2.563E-01 &(  4.151E+00 5.78E+02 1.70E+01 G
                          227.00-2.432E-01 %   1.260E+01 1.83E+03 6.30E+00 GA

Cf-249   T   3.9268E-01                                     1.28E+05
                          387.95 3.927E-01 ?(  1.860E+00 1.38E+02 6.60E+01 G
                          333.44-1.155E+00 &   6.304E+00 2.04E+02 1.55E+01 G

Sn-126      -1.3505E+00                                     3.65E+07
                           87.57 0.000E+00 +   3.526E+00 1.00E+03 3.75E+01 GA
                           64.28-1.350E+00 ?(  1.115E+01 2.41E+02 9.70E+00 G
                           86.94-1.648E+00 +   1.490E+01 2.67E+02 9.04E+00 GA

PB-210   N  -1.5916E+00                                     8.14E+03
                           46.54-1.592E+00 &(P 3.136E+01 6.47E+02 4.25E+00 G

PB-212   N   5.0004E+00                                     6.98E+02
                          238.63 5.000E+00  (P 1.292E+00 1.26E+01 4.33E+01 G
                          300.03-5.671E+00 - P 5.642E+01 1.79E+02 3.28E+00 GA

PB-214   N   7.4057E+00                                     5.84E+05
                          351.93 6.875E+00  (P 1.586E+00 1.38E+01 3.76E+01 G
                          295.09 8.439E+00 *(P 3.243E+00 2.00E+01 1.93E+01 G
                          242.00 8.741E+00     8.664E+00 3.32E+01 7.43E+00 GA

BI-207   C   1.4517E-01                                     1.18E+04
                          569.70 0.000E+00 &(  3.725E-01 1.00E+03 9.77E+01 G
                         1063.66 3.356E-01 ?(  1.952E+00 2.39E+02 7.45E+01 G

BI-212   N  -1.3373E-01                                     6.98E+02
                          727.17-1.337E-01 %(  1.854E+01 3.72E+03 7.55E+00 G
                          785.42 1.851E+01 ?   8.555E+01 1.84E+02 1.28E+00 GA

U-235    N   2.2478E+00                                     2.57E+11
                          143.79 1.510E+00  (P 7.595E+00 1.48E+02 1.10E+01 G
                          205.33 2.252E+00 &(  1.306E+01 2.07E+02 5.01E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			163.38	3.836E+00	?(	1.591E+01	1.22E+02	5.08E+00 G
			185.72	3.671E-01	-	1.495E+00	1.20E+02	5.40E+01 GA
BI-214	N	6.8971E+00						5.84E+05
			609.31	7.124E+00	(P	1.246E+00	1.33E+01	4.61E+01 G
			1120.29	3.271E+00	- P	1.061E+01	9.41E+01	1.51E+01 G
			1764.49	6.218E+00	?(P	8.355E+00	4.73E+01	1.54E+01 G
BI-210M	T	-4.7151E-01						1.10E+09
			265.83	-4.715E-01	?(	2.125E+00	1.32E+02	5.00E+01 G
			304.90	0.000E+00	+	6.578E+00	1.00E+03	2.80E+01 G
AC-228	N	6.5613E+00						2.10E+03
			911.07	6.561E+00	?(	1.860E+00	1.96E+01	2.90E+01 G
			968.97	2.473E+00	-	8.469E+00	9.87E+01	1.75E+01 G
			338.32	-8.881E-02	&	1.106E+01	3.54E+03	1.20E+01 G
			93.35	2.354E+00	-	2.202E+01	2.76E+02	5.56E+00 XA
TH-227	N	-3.4521E-01						7.95E+03
			50.14	-3.452E-01	&(	1.370E+01	1.34E+03	8.00E+00 G
			256.24	1.210E-01	%	1.123E+01	3.40E+03	7.00E+00 G
TH-229	N	1.6784E+00						2.68E+06
			193.51	1.678E+00	(	1.528E+01	3.24E+02	4.40E+00 G
			210.85	-2.893E+00	+	2.806E+01	3.48E+02	2.99E+00 G
TH-234	N	1.0322E+01						1.63E+12
			63.29	2.742E+00	(P	1.951E+01	2.23E+02	3.81E+00 G
			92.59	1.549E+01	*(P	1.025E+01	2.55E+01	5.58E+00 G
PA-233	C	-1.0058E+00						7.82E+08
			312.01	-1.006E+00	?(	5.840E+00	1.72E+02	3.60E+01 G
			300.18	0.000E+00	+	2.932E+01	1.00E+03	6.20E+00 G
PA-234	N	3.3866E-02						1.63E+12
			131.29	-1.340E+00	?(P	5.697E+00	9.29E+01	1.80E+01 G
			946.02	1.879E+00	?(	7.202E+00	1.48E+02	1.34E+01 G
			569.47	0.000E+00	&	4.438E+00	1.00E+03	8.20E+00 G
			883.24	0.000E+00	-	1.873E+01	1.00E+03	9.60E+00 G
			880.53	-3.161E+00	+	2.832E+01	2.49E+02	6.00E+00 GA
PA-234M	N	6.9742E+01						1.63E+12
			1001.00	4.129E+01	?(P	2.055E+02	1.41E+02	8.37E-01 G
			766.41	1.507E+02	?(	6.230E+02	1.20E+02	2.94E-01 G
AM-241	T	-1.2974E+00						1.58E+05
			59.54	-1.297E+00	?(P	3.034E+00	6.85E+01	3.59E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-237   F  -1.9405E+00                                      2.14E+06
                          86.49-1.941E+00 ?(  1.081E+01 1.66E+02 1.31E+01 G

Ir-192   F  -4.7684E-01                                      7.40E+01
                         316.49-4.768E-01 &(  1.640E+00 1.02E+02 8.70E+01 G
                         468.06-2.314E-01 +   2.972E+00 3.66E+02 5.18E+01 G
                         308.44 0.000E+00 +   5.857E+00 1.00E+03 3.18E+01 G

Cs-136   F   1.7746E-01                                      1.30E+01
                         818.50 1.548E-01 ?(  1.151E+00 2.93E+02 1.00E+02 G
                        1048.07 2.058E-01 ?(  2.136E+00 2.83E+02 8.00E+01 G
                         340.57-9.612E-01 +   3.394E+00 1.05E+02 4.69E+01 G

Np-239   T  -1.0885E+00                                      2.36E+00
                         103.70-5.445E-01 +   4.061E+00 2.19E+02 2.40E+01 X
                         106.13-1.089E+00  (  5.646E+00 1.54E+02 2.27E+01 G
                          99.50 1.165E+00 &   4.376E+00 1.11E+02 1.50E+01 X

Nd-147       3.5831E+00                                      1.11E+01
                         531.00 3.583E+00 ?(  4.310E+00 5.03E+01 1.30E+01 G
                          91.10 3.392E-01 -   4.413E+00 3.83E+02 2.83E+01 G

TL-210   N   3.1411E-01                                      5.84E+05
                         799.60 3.141E-01 ?(  1.701E+00 1.54E+02 9.90E+01 G
                         296.00-3.687E-01 +   2.377E+00 1.90E+02 7.90E+01 G
                        1313.00 2.685E+00 ?   6.383E+00 1.02E+02 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
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F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	74.	-2.	-0.001	647.06	-1.592E+00	P
AM-241	59.54	102.	-21.	-0.012	68.55	-1.297E+00	P
Sn-126	64.28	120.	-6.	-0.004	241.05	-1.350E+00	
BA-133	80.99	117.	-17.	-0.009	116.57	-8.283E-01	
Np-237	86.49	332.	-16.	-0.009	165.79	-1.941E+00	
EU-155	86.54	316.	-16.	-0.009	161.91	-8.278E-01	
Sn-126	86.94	300.	-9.	-0.005	267.49	-1.648E+00	
Cd-109	88.04	252.	15.	0.008	152.49	6.326E+00	
Nd-147	91.10	267.	6.	0.003	383.39	3.392E-01	
Gd-153	97.50	100.	-3.	-0.001	532.98	-1.380E-01	
Np-239	99.50	73.	11.	0.006	110.81	1.165E+00	
Gd-153	103.20	154.	-16.	-0.009	116.03	-1.094E+00	
Np-239	103.70	170.	-8.	-0.005	219.34	-5.445E-01	
EU-155	105.31	264.	-16.	-0.009	88.33	-1.154E+00	P
Np-239	106.13	301.	-16.	-0.009	154.34	-1.089E+00	
EU-152	121.78	102.	-10.	-0.005	153.45	-5.153E-01	
EU-154	123.10	105.	-4.	-0.002	338.37	-1.651E-01	
PA-234	131.29	177.	-15.	-0.008	92.87	-1.340E+00	P
HF-181	133.02	175.	-7.	-0.004	193.37	-2.693E-01	P
CO-57	136.47	212.	-16.	-0.009	127.84	-2.470E+00	
Tc-99m	140.51	93.	11.	0.006	127.28	2.076E-01	
U-235	143.79	105.	10.	0.006	147.96	1.510E+00	P
CE-141	145.44	143.	-13.	-0.007	115.08	-4.463E-01	P
Ba-140	162.66	72.	11.	0.006	114.43	3.121E+00	
U-235	163.38	83.	11.	0.006	122.14	3.836E+00	
CE-139	165.85	107.	-12.	-0.007	124.42	-2.683E-01	
Cf-251	176.60	57.	2.	0.001	577.82	2.563E-01	
U-235	185.72	69.	10.	0.006	119.70	3.671E-01	
TH-229	193.51	43.	4.	0.002	323.72	1.678E+00	
U-235	205.33	37.	5.	0.003	206.63	2.252E+00	
TH-229	210.85	60.	-4.	-0.002	348.21	-2.893E+00	
EU-152	244.69	196.	3.	0.001	764.19	8.397E-01	P
Cd-113m	263.70	50.	-4.	-0.002	254.95	-1.735E+03	
BI-210M	265.83	66.	-9.	-0.005	131.94	-4.715E-01	
Hg-203	279.20	42.	9.	0.005	103.19	3.136E-01	
I-131	284.30	48.	-13.	-0.007	148.71	-6.045E+00	P
TL-210	296.00	182.	-10.	-0.006	190.21	-3.687E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-233	312.01	210.	-12.	-0.007	171.83	-1.006E+00	
Ir-192	316.49	91.	-14.	-0.008	102.04	-4.768E-01	
CR-51	320.08	106.	-14.	-0.008	80.17	-4.416E+00	P
La-140	328.76	26.	5.	0.003	182.91	8.209E-01	
Cf-249	333.44	37.	-6.	-0.003	204.28	-1.155E+00	
Cs-136	340.57	101.	-14.	-0.008	104.74	-9.612E-01	
EU-152	344.29	115.	-14.	-0.008	111.02	-1.722E+00	
HF-181	345.83	130.	-13.	-0.007	90.69	-2.767E+00	P
BA-133	356.00	138.	-11.	-0.006	148.83	-6.125E-01	
I-131	364.48	22.	-2.	-0.001	469.96	-9.606E-02	P
BA-133	383.84	38.	8.	0.004	117.76	3.090E+00	
Cf-249	387.95	46.	7.	0.004	137.50	3.927E-01	
SN-113	391.69	59.	-6.	-0.003	180.94	-3.483E-01	
SB-125	427.88	36.	-12.	-0.007	88.26	-1.619E+00	P
AG-108M	433.94	24.	-7.	-0.004	149.67	-3.171E-01	P
pm-146	453.88	36.	-13.	-0.007	85.50	-8.060E-01	P
SB-125	463.37	43.	-11.	-0.006	104.55	-4.180E+00	P
Ir-192	468.06	53.	-3.	-0.002	365.85	-2.314E-01	
BE-7	477.59	43.	-6.	-0.003	159.86	-2.432E+00	
HF-181	482.00	41.	5.	0.003	186.55	2.669E-01	
La-140	487.02	36.	-10.	-0.006	121.66	-9.525E-01	
RU-103	497.05	12.	2.	0.001	346.41	9.699E-02	
RH-106	511.86	20.	59.	0.033	23.30	1.333E+01	
Nd-147	531.00	4.	10.	0.006	50.33	3.583E+00	
CS-134	563.24	16.	2.	0.001	397.91	1.172E+00	
SB-125	600.50	140.	-9.	-0.005	186.20	-2.639E+00	
SB-124	602.73	131.	-9.	-0.005	179.96	-4.819E-01	
CS-134	604.71	122.	-5.	-0.003	333.58	-2.512E-01	
PM-144	618.06	112.	-2.	-0.001	900.00	-8.893E-02	
SB-125	635.89	5.	11.	0.006	41.33	5.312E+00	P
I-131	636.97	22.	-5.	-0.003	96.55	-3.674E+00	P
AG-110M	657.76	14.	7.	0.004	87.08	3.943E-01	
CS-137	661.66	32.	-6.	-0.003	99.71	-3.711E-01	P
PM-144	696.54	13.	8.	0.005	94.15	4.959E-01	
NB-94	702.63	13.	8.	0.005	93.83	5.070E-01	
SB-124	722.79	14.	6.	0.003	103.40	3.160E+00	
EU-154	723.36	13.	5.	0.003	111.62	1.470E+00	
ZR-95	724.20	18.	1.	0.001	430.54	1.921E-01	
pm-146	747.16	22.	-9.	-0.005	114.77	-1.580E+00	
ZR-95	756.73	9.	-1.	0.000	804.42	-8.234E-02	P
AG-110M	763.94	21.	-3.	-0.002	203.47	-9.446E-01	
NB-95	765.79	32.	-5.	-0.003	165.33	-3.170E-01	
PA-234M	766.41	32.	7.	0.004	119.81	1.507E+02	
EU-152	778.92	0.	11.	0.006	30.15	5.455E+00	
BI-212	785.42	9.	4.	0.002	184.30	1.851E+01	
CS-134	795.87	17.	7.	0.004	88.46	5.547E-01	
TL-210	799.60	24.	5.	0.003	154.01	3.141E-01	
CS-134	801.95	30.	1.	0.001	584.17	1.009E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-58	810.78	39.	-11.	-0.006	54.93	-7.065E-01	P
Cs-136	818.50	10.	2.	0.001	292.83	1.548E-01	
MN-54	834.85	14.	1.	0.001	800.00	6.803E-02	
NB-94	871.10	23.	-7.	-0.004	100.21	-5.174E-01	
EU-154	873.23	26.	5.	0.003	155.52	2.782E+00	
PA-234	880.53	21.	-3.	-0.001	248.75	-3.161E+00	
y-88	898.04	14.	-1.	-0.001	800.00	-7.717E-02	
AG-110M	937.49	14.	2.	0.001	403.11	4.363E-01	
PA-234	946.02	5.	3.	0.002	147.99	1.879E+00	
EU-152	964.11	25.	-5.	-0.003	157.47	-2.452E+00	
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00	
PA-234M	1001.00	17.	4.	0.002	140.74	4.129E+01	P
Co-56	1037.84	5.	12.	0.007	51.21	6.811E+00	P
Cs-136	1048.07	15.	2.	0.001	282.84	2.058E-01	
RH-106	1050.36	15.	6.	0.003	100.00	3.172E+01	
BI-207	1063.66	10.	3.	0.002	238.82	3.356E-01	
Ga-68	1077.40	15.	-5.	-0.003	176.07	-1.497E+01	
EU-152	1112.07	25.	6.	0.003	124.62	3.784E+00	
Sc-46	1120.55	17.	6.	0.003	105.66	5.215E-01	
Ta-182	1121.30	24.	-6.	-0.003	128.31	-1.417E+00	
Ta-182	1189.05	10.	3.	0.002	238.82	1.695E+00	
Co-56	1238.28	22.	-3.	-0.001	286.70	-3.658E-01	P
NA-22	1274.53	11.	1.	0.001	357.07	1.295E-01	
FE-59	1291.60	32.	-16.	-0.009	85.94	-3.556E+00	
TL-210	1313.00	5.	6.	0.003	101.72	2.685E+00	
AG-110M	1384.30	5.	1.	0.000	796.87	2.855E-01	
EU-152	1408.00	0.	6.	0.003	40.82	3.015E+00	
La-140	1596.21	11.	-6.	-0.004	193.96	-7.940E-01	P
Co-56	1771.35	20.	-7.	-0.004	94.59	-6.083E+00	
y-88	1836.06	6.	-4.	-0.002	156.12	-5.324E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-2.4317E+00	-2.4318E+00	1.599E+02%	1.35E+01
NA-22	#A	1.2947E-01	1.2947E-01	3.571E+02%	1.74E+00
K-40		1.5090E+02	1.5090E+02	8.460E+00%	1.24E+01
Sc-46	#A	2.4881E-01	2.4881E-01	1.057E+02%	1.82E+00
CR-51	#A	-4.4159E+00	-4.4160E+00	8.017E+01%	1.56E+01
MN-54	#A	6.8026E-02	6.8026E-02	8.000E+02%	1.37E+00
FE-59	#A	1.0207E-01	1.0207E-01	1.277E+03%	3.18E+00
Co-56	#A	8.2360E-01	8.2361E-01	5.121E+01%	1.17E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	9.39E-01
CO-58	#A	-7.0647E-01	-7.0648E-01	5.493E+01%	2.12E+00

CO-60	#	8.0614E-01	8.0614E-01	3.536E+01%	7.43E-01
ZN-65	#A	6.2758E-02	6.2758E-02	2.145E+03%	4.89E+00
NB-94	#A	5.0699E-01	5.0699E-01	9.383E+01%	1.17E+00
ZR-95	#A	4.0551E-02	4.0551E-02	4.305E+02%	1.89E+00
NB-95	#A	-3.1699E-01	-3.1699E-01	1.653E+02%	1.83E+00
RU-103	#A	9.6987E-02	9.6988E-02	3.464E+02%	9.14E-01
RH-106	#A	4.6150E+00	4.6150E+00	1.000E+02%	2.82E+01
AG-108M	#A	-3.1709E-01	-3.1709E-01	1.497E+02%	1.12E+00
AG-110M	#A	2.6217E-01	2.6218E-01	8.708E+01%	2.48E+00
SN-113	#A	-3.4827E-01	-3.4827E-01	1.809E+02%	2.18E+00
SB-124	#A	-1.2101E-01	-1.2101E-01	1.034E+02%	2.95E+00
SB-125	#A	2.9707E-01	2.9707E-01	4.133E+01%	4.05E+00
I-131	#A	-9.6053E-02	-9.6058E-02	4.700E+02%	1.03E+00
Gd-153	#A	-1.3804E-01	-1.3804E-01	5.330E+02%	2.55E+00
Ga-68	#A	-1.4835E+01	-1.4975E+01	1.761E+02%	6.22E+01
Tc-99m	#A	2.0720E-01	2.0757E-01	1.273E+02%	8.97E-01
BA-133	#A	-6.1245E-01	-6.1245E-01	1.488E+02%	3.09E+00
CS-134	#A	2.0720E-01	2.0720E-01	8.846E+01%	2.88E+00
CS-137	#A	-3.7112E-01	-3.7112E-01	9.971E+01%	1.90E+00
CE-139	#A	-2.6831E-01	-2.6831E-01	1.244E+02%	1.13E+00
Ba-140	#A	5.8920E-01	5.8922E-01	1.144E+02%	4.15E+00
La-140	#A	-5.1065E-01	-5.1067E-01	1.333E+02%	2.27E+00
CE-141	#A	-4.4631E-01	-4.4631E-01	1.151E+02%	2.01E+00
CE-144	#A	1.1492E+00	1.1492E+00	2.464E+02%	9.62E+00
PM-144	#A	4.9593E-01	4.9593E-01	9.415E+01%	1.15E+00
EU-152	#A	1.3675E+00	1.3675E+00	3.015E+01%	6.45E+00
EU-154	#A	2.5211E+00	2.5211E+00	7.049E+01%	1.52E+01
EU-155	#A	-1.1544E+00	-1.1544E+00	8.833E+01%	5.68E+00
HF-181	#A	2.6686E-01	2.6686E-01	1.865E+02%	1.74E+00
Ta-182	#A	-4.3024E-01	-4.3025E-01	1.283E+02%	6.34E+00
Hg-203	#A	3.1362E-01	3.1362E-01	1.032E+02%	1.10E+00
TL-208	#	1.1887E+00	1.1887E+00	4.921E+01%	1.12E+00
pm-146	#A	-1.5797E+00	-1.5797E+00	1.148E+02%	4.45E+00
y-88	#A	-7.7166E-02	-7.7166E-02	8.000E+02%	1.55E+00
Cd-113m	#A	-1.7347E+03	-1.7347E+03	2.550E+02%	1.55E+04
Cd-109	#A	6.3257E+00	6.3257E+00	1.525E+02%	3.25E+01
Cf-251	#A	2.5633E-01	2.5633E-01	5.778E+02%	4.15E+00
Cf-249	#A	3.9268E-01	3.9268E-01	1.375E+02%	1.86E+00
Sn-126	#A	-1.3505E+00	-1.3505E+00	2.411E+02%	1.11E+01
PB-210	#A	-1.5916E+00	-1.5916E+00	6.471E+02%	3.14E+01
PB-212		5.0004E+00	5.0004E+00	1.265E+01%	1.29E+00
PB-214		7.4057E+00	7.4057E+00	1.217E+01%	1.59E+00
BI-207	#A	1.4517E-01	1.4517E-01	2.388E+02%	3.72E-01
BI-212	#A	-1.3373E-01	-1.3373E-01	3.723E+03%	1.85E+01
U-235	#A	2.2478E+00	2.2478E+00	9.399E+01%	7.59E+00
BI-214		6.8971E+00	6.8971E+00	1.328E+01%	1.25E+00
BI-210M	#A	-4.7151E-01	-4.7151E-01	1.319E+02%	2.13E+00
AC-228	#	6.5613E+00	6.5613E+00	1.961E+01%	1.86E+00
TH-227	#A	-3.4521E-01	-3.4521E-01	1.340E+03%	1.37E+01

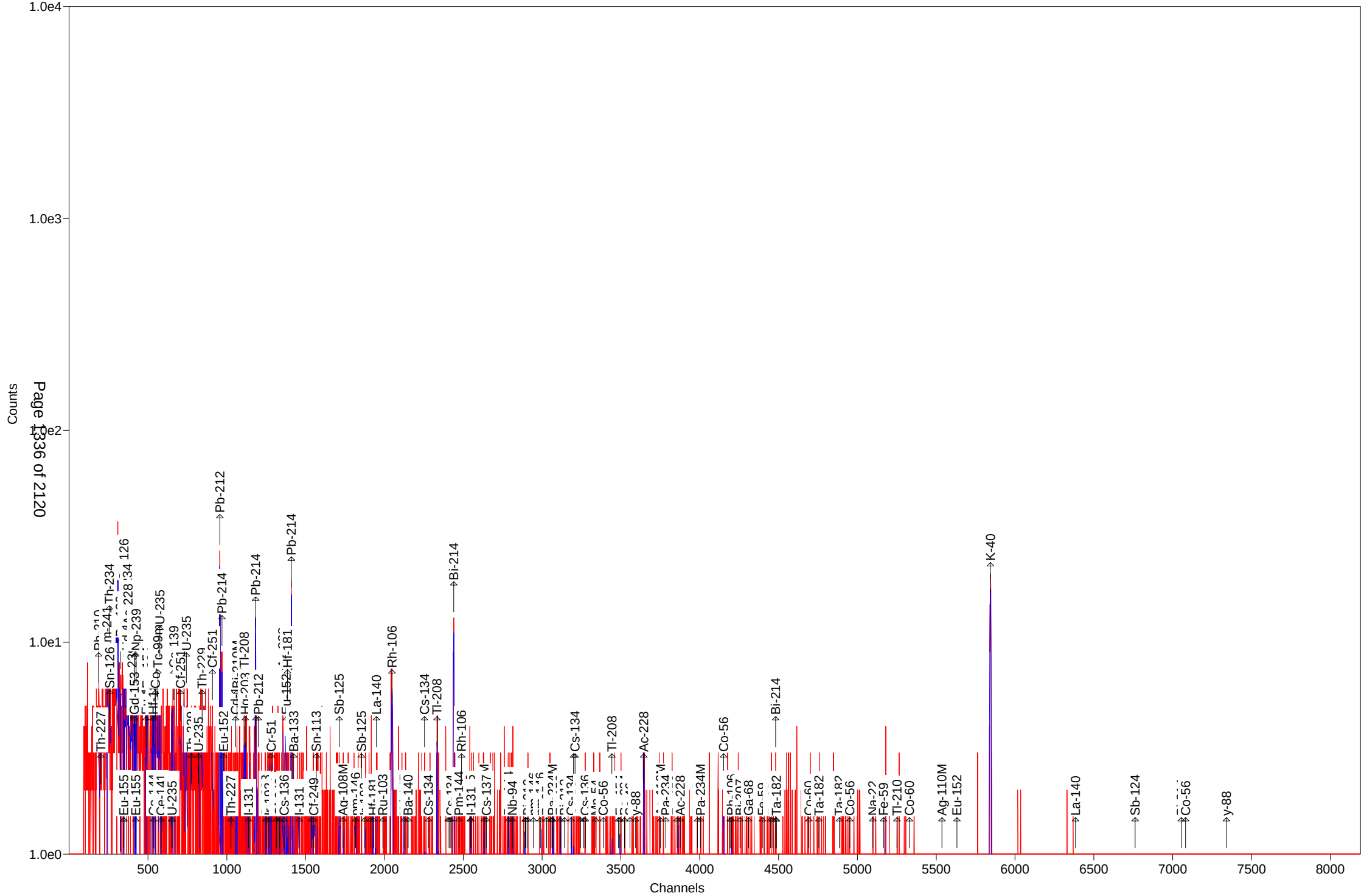
TH-229 #A	1.6784E+00	1.6784E+00	3.237E+02%	1.53E+01
TH-234 A	1.0322E+01	1.0322E+01	2.551E+01%	1.95E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.36E+01
PA-233 #A	-1.0058E+00	-1.0058E+00	1.718E+02%	5.84E+00
PA-234 #A	3.3866E-02	3.3866E-02	8.736E+01%	5.70E+00
PA-234M#A	6.9742E+01	6.9742E+01	9.241E+01%	2.05E+02
AM-241 #A	-1.2974E+00	-1.2974E+00	6.855E+01%	3.03E+00
Np-237 #A	-1.9405E+00	-1.9405E+00	1.658E+02%	1.08E+01
Ir-192 #A	-4.7684E-01	-4.7684E-01	1.020E+02%	1.64E+00
Cs-136 #A	1.7745E-01	1.7746E-01	2.036E+02%	1.15E+00
Np-239 #A	-1.0883E+00	-1.0885E+00	1.543E+02%	5.65E+00
Nd-147 #A	3.5830E+00	3.5831E+00	5.033E+01%	4.31E+00
TL-210 #A	3.1411E-01	3.1411E-01	1.540E+02%	1.70E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 1.702E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 1.7020193E+02 Bq/Sample

379951_Gamma_160-29881-A-31-B. 5_Gamma_20182909.spc.



Test America St. Louis Spectrum ID: 9_Gamma_20183565

Sample Description: 379951_Gamma_160-29881-A-32-C
Detector: Detector # 9
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-32-C

Decay to Time: 8/23/2018 07:43 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:43:16 Real Time: 1807 sec
Analysis Time: 8/23/2018 08:13 Dead Time: 0.37 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Long_Rev14.lib
Bkgd Correction File: 9_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	7.696E+00	97.0	7.462E+00	7.473E+00	2.482E+01
NA-22	1.362E-01	476.3	6.488E-01	6.488E-01	2.258E+00
K-40	1.393E+02	8.1	1.125E+01	1.332E+01	1.533E+01
Sc-46	-8.396E-01	131.8	1.107E+00	1.107E+00	3.702E+00
CR-51	-2.312E+00	827.9	1.915E+01	1.915E+01	6.355E+01
MN-54	-7.326E-01	149.2	1.093E+00	1.093E+00	2.389E+00
FE-59	-2.249E+00	93.8	2.109E+00	2.112E+00	4.452E+00
Co-56	3.909E-01	93.3	3.648E-01	3.653E-01	2.182E+00
CO-57	-1.265E-01	556.0	7.032E-01	7.032E-01	2.347E+00
CO-58	-1.369E+00	81.0	1.109E+00	1.111E+00	3.676E+00
CO-60	1.376E+00	42.6	5.862E-01	5.903E-01	2.177E+00
ZN-65	-3.111E+00	143.0	4.450E+00	4.453E+00	1.480E+01
NB-94	-1.067E+00	82.4	8.787E-01	8.805E-01	2.918E+00
ZR-95	-1.372E+00	120.1	1.649E+00	1.650E+00	3.608E+00
NB-95	0.000E+00	1.#INF	4.426E-01	4.426E-01	3.962E+00
RU-103	-7.776E-01	118.3	9.199E-01	9.208E-01	1.987E+00
RH-106	-8.313E-01	2382.8	1.981E+01	1.981E+01	9.282E+01
AG-108M	-8.466E-01	107.1	9.064E-01	9.074E-01	2.146E+00
AG-110M	2.955E+00	29.1	8.605E-01	8.737E-01	4.906E+00
SN-113	1.255E+00	104.6	1.313E+00	1.314E+00	4.362E+00
SB-124	8.312E-01	81.5	6.771E-01	6.785E-01	9.163E+00
SB-125	1.678E+00	163.4	2.742E+00	2.743E+00	6.413E+00
I-131	9.292E-01	68.5	6.369E-01	6.387E-01	2.085E+00
Gd-153	-1.726E-05	36310294.6	6.266E+00	6.266E+00	2.074E+01
Ga-68	2.050E+01	158.8	3.256E+01	3.258E+01	6.999E+01
Tc-99m	-9.001E-01	131.3	1.182E+00	1.183E+00	3.913E+00
BA-133	-1.294E+00	268.5	3.473E+00	3.474E+00	1.151E+01
CS-134	4.534E-01	103.5	4.693E-01	4.699E-01	9.244E+00
CS-137	-1.668E+00	75.6	1.261E+00	1.264E+00	4.173E+00
CE-139	-2.767E-03	32635.2	9.029E-01	9.029E-01	3.015E+00
Ba-140	-6.918E-01	525.0	3.632E+00	3.632E+00	7.477E+00
La-140	7.060E-01	101.8	7.188E-01	7.197E-01	2.819E+00
CE-141	-1.672E+00	136.9	2.290E+00	2.292E+00	7.582E+00

CE-144	-6.649E+00	143.1	9.517E+00	9.523E+00	3.151E+01
PM-144	9.835E-01	81.6	8.021E-01	8.038E-01	2.665E+00
EU-152	3.600E+00	56.7	2.042E+00	2.050E+00	1.435E+01
EU-154	-8.588E+00	81.8	7.028E+00	7.042E+00	2.298E+01
EU-155	5.618E-01	641.0	3.601E+00	3.601E+00	1.199E+01
HF-181	1.015E+00	99.7	1.012E+00	1.014E+00	3.368E+00
Ta-182	3.107E+00	125.0	3.885E+00	3.888E+00	2.033E+01
Hg-203	-1.113E+00	79.1	8.811E-01	8.834E-01	2.916E+00
TL-208	3.513E+00	22.8	8.010E-01	8.214E-01	1.696E+00
pm-146	3.555E-01	112.1	3.987E-01	3.991E-01	5.444E+00
y-88	3.637E-01	178.3	6.485E-01	6.488E-01	2.275E+00
Cd-113m	-1.532E+04	82.8	1.269E+04	1.273E+04	4.200E+04
Cd-109	0.000E+00	1.#INF	5.262E+01	5.262E+01	1.740E+02
Cf-251	-4.851E+00	92.7	4.497E+00	4.517E+00	1.130E+01
Cf-249	1.279E+00	101.6	1.300E+00	1.302E+00	4.318E+00
Sn-126	1.046E+01	135.4	1.417E+01	1.418E+01	4.690E+01
PB-210	1.740E+02	10.2	1.771E+01	2.045E+01	5.085E+01
PB-212	1.715E+00	161.5	2.770E+00	2.772E+00	9.184E+00
PB-214	2.705E+02	1.4	3.708E+00	1.454E+01	4.886E+00
BI-207	2.622E-01	212.9	5.582E-01	5.583E-01	1.894E+00
BI-212	-1.594E+01	74.5	1.187E+01	1.189E+01	3.931E+01
U-235	2.588E+01	21.1	5.458E+00	5.615E+00	1.326E+01
BI-214	2.414E+02	1.7	4.200E+00	1.323E+01	3.448E+00
BI-210M	-1.881E+00	82.4	1.549E+00	1.553E+00	5.127E+00
AC-228	1.155E+01	16.9	1.951E+00	2.038E+00	4.405E+00
TH-227	-1.114E+01	76.1	8.470E+00	8.492E+00	5.760E+01
TH-229	-1.915E+01	101.2	1.938E+01	1.944E+01	4.657E+01
TH-234	9.071E+01	10.0	9.061E+00	1.023E+01	5.529E+01
PA-231	0.000E+00	1.#INF	6.428E+00	6.428E+00	2.114E+02
PA-233	-2.447E+00	134.8	3.297E+00	3.300E+00	1.739E+01
PA-234	8.366E-01	84.2	7.041E-01	7.055E-01	1.958E+01
PA-234M	2.919E+02	24.5	7.154E+01	7.304E+01	1.522E+02
AM-241	3.066E+00	135.3	4.148E+00	4.151E+00	1.373E+01
Np-237	0.000E+00	1.#INF	1.566E+01	1.566E+01	5.176E+01
Ir-192	5.317E-03	85.6	4.549E-03	4.560E-03	7.233E+00
Cs-136	4.995E-01	101.0	5.044E-01	5.053E-01	3.417E+00
Np-239	-1.497E-01	2251.5	3.370E+00	3.370E+00	1.123E+01
Nd-147	-7.704E+00	86.5	6.664E+00	6.679E+00	1.549E+01
TL-210	-8.847E-02	964.0	8.529E-01	8.529E-01	2.901E+00
Total	1.316E+03				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-32-C

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20183565.An1

Acquisition information
Start time: 8/23/2018 7:43:16 AM
Live time: 1800
Real time: 1807
Dead time: 0.37 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:43:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2018-08-11_1245.PBC 8/11/2018 12:45:42 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 43 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1115

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.59	343.	10.19	1.00	2.592E-02	46.54	4.250	1.738E+02	PB210
49.83	91.	38.73	1.00	2.884E-02	50.14	8.000	PBC<MDA	TH227
53.07	126.	29.71	1.00	3.161E-02				
59.54	72.	135.29	1.01	3.659E-02	59.54	35.900	PBC<MDA	AM241
63.30	291.	24.73	1.03	3.922E-02	63.29	3.810	1.082E+02	TH234
					64.28	9.700	4.181E+01	Sn126
67.73	670.	10.93	0.94	4.200E-02				
74.88	1330.	4.76	1.03	4.577E-02				
77.15	2433.	2.80	1.03	4.679E-02				
79.38	268.	21.24	1.03	4.770E-02				
81.06	292.	16.98	1.03	4.833E-02	80.99	34.060	9.858E+00	BA133
83.82	532.	9.45	1.03	4.928E-02				
87.23	776.	6.47	1.04	5.029E-02	86.49	13.100	6.570E+01	Np237
					86.54	30.700	2.803E+01	EU155
					86.94	9.040	9.497E+01	Sn126
					87.57	37.500	2.282E+01	Sn126
					88.04	3.790	2.252E+02	Cd109
89.91	350.	12.82	1.04	5.097E-02				
92.86	454.	9.92	1.04	5.161E-02	92.59	5.584	8.758E+01	TH234
					93.35	5.561	8.769E+01	AC228
94.81	185.	22.02	1.04	5.198E-02				
105.31	11.	641.02	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
122.07	93.	56.71	2.93	5.305E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.142E+00	CO57
					123.10	40.790	2.400E+00	EU154
143.87	257.	21.09	0.70	5.038E-02	143.79	10.960	2.588E+01	U235
157.47	40.	91.59	0.47	4.793E-02				
163.33	21.	269.88	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
185.97	1095.	7.03	1.29	4.399E-02	185.72	54.000	2.558E+01	U235
201.03	100.	41.12	0.38	4.181E-02				
205.13	66.	50.16	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
210.85	30.	197.50	1.15	4.052E-02	210.85	2.990	PBC<MDA	TH229
227.00	15.	361.70	1.17	3.858E-02	227.00	6.300	PBC<MDA	Cf251
235.55	191.	17.70	1.18	3.765E-02				
238.55	199.	16.74	1.18	3.733E-02	238.63	43.300	PBC<MDA	PB212
241.91	1431.	3.28	1.18	3.698E-02	242.00	7.430	2.893E+02	PB214
244.61	53.	154.77	1.18	3.670E-02	244.69	7.580	PBC<MDA	EU152
250.93	60.	65.59	2.18	3.608E-02				
256.18	103.	27.17	0.79	3.558E-02	256.24	7.000	2.298E+01	TH227
284.30	66.	68.54	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.12	2991.	2.22	1.22	3.232E-02	295.09	19.300	2.664E+02	PB214
					296.00	79.000	6.523E+01	TL210
338.29	85.	27.34	1.27	2.940E-02	338.32	12.010	1.339E+01	AC228
340.54	22.	277.98	1.27	2.927E-02	340.57	46.900	PBC<MDA	Cs136
344.26	36.	164.49	1.28	2.905E-02	344.29	26.500	PBC<MDA	EU152
351.82	5277.	1.61	1.27	2.861E-02	351.93	37.600	2.726E+02	PB214
383.84	40.	99.43	1.31	2.691E-02	383.84	8.940	PBC<MDA	BA133
387.95	41.	101.61	1.31	2.671E-02	387.95	66.000	PBC<MDA	Cf249
391.69	38.	104.56	1.32	2.653E-02	391.69	64.000	PBC<MDA	SN113
427.88	22.	163.38	1.35	2.491E-02	427.88	29.600	PBC<MDA	SB125
453.88	28.	118.91	1.37	2.388E-02	453.88	65.000	PBC<MDA	pm146
468.06	38.	85.56	1.38	2.335E-02	468.06	51.750	PBC<MDA	Ir192
477.69	34.	96.96	1.39	2.301E-02	477.60	10.520	PBC<MDA	BE7
482.00	34.	99.73	1.40	2.286E-02	482.00	80.500	PBC<MDA	HF181
487.02	33.	101.81	1.40	2.269E-02	487.02	45.500	PBC<MDA	La140
511.86	44.	118.59	2.67	2.188E-02	511.86	20.000	PBC<MDA	RH106
569.32	19.	103.51	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.250E+00	PA234
					569.70	97.740	5.245E-01	BI207
569.70	9.	212.85	1.47	2.023E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.125E+00	PA234
					569.70	97.740	2.622E-01	BI207
583.50	106.	22.80	1.30	1.989E-02	583.02	84.500	3.513E+00	TL208
609.36	3855.	1.74	1.44	1.925E-02	609.31	46.090	2.414E+02	BI214
					610.30	5.750	1.937E+03	RU103
696.54	31.	81.56	1.58	1.741E-02	696.54	99.000	PBC<MDA	PM144
722.79	29.	81.46	1.60	1.693E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.036E+00	AG108M
					723.36	20.220	4.654E+00	EU154
735.72	8.	270.47	1.61	1.671E-02	735.72	22.500	PBC<MDA	pm146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
763.94	18.	187.11	1.63	1.624E-02	763.94	22.280	PBC<MDA	AG110M
766.55	25.	134.59	1.63	1.620E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.887E+02	PA234M
768.37	416.	7.16	1.52	1.616E-02				
777.45	7.	324.04	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
785.42	29.	78.69	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
898.04	14.	178.30	1.74	1.434E-02	898.04	93.700	PBC<MDA	y88
911.57	80.	19.86	2.40	1.418E-02	911.07	29.000	1.078E+01	AC228
934.25	239.	10.05	1.62	1.391E-02				
946.02	25.	84.77	1.77	1.377E-02	946.02	13.400	PBC<MDA	PA234
969.21	31.	71.54	1.79	1.352E-02	968.97	17.460	PBC<MDA	AC228
1000.99	58.	24.51	2.18	1.318E-02	1001.00	0.837	2.930E+02	PA234M
1004.77	22.	100.12	1.82	1.314E-02	1004.77	18.010	PBC<MDA	EU154
1037.84	22.	93.31	1.84	1.281E-02	1037.84	14.130	PBC<MDA	Co56
1048.05	17.	101.00	1.85	1.271E-02	1048.07	80.000	PBC<MDA	Cs136
1076.01	13.	158.83	1.87	1.244E-02	1077.40	3.300	PBC<MDA	Ga68
1120.35	910.	4.21	1.49	1.206E-02	1120.29	15.100	2.775E+02	BI214
					1120.55	99.987	4.191E+01	Sc46
					1121.30	34.900	1.201E+02	Ta182
1173.25	40.	42.59	1.94	1.163E-02	1173.24	99.900	1.907E+00	CO60
1221.41	11.	198.21	1.97	1.126E-02	1221.41	27.000	PBC<MDA	Ta182
1238.32	379.	8.10	1.48	1.114E-02	1238.28	66.070	2.862E+01	Co56
1274.53	3.	476.31	2.01	1.088E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.868E-01	EU154
1291.60	9.	193.61	2.02	1.077E-02	1291.60	43.200	PBC<MDA	FE59
1329.58	16.	123.43	2.05	1.050E-02	1332.50	99.980	PBC<MDA	CO60
1384.30	53.	29.12	2.08	1.018E-02	1384.30	24.290	1.195E+01	AG110M
1407.76	140.	10.59	1.94	1.004E-02	1408.00	21.005	3.686E+01	EU152
1461.02	261.	8.07	1.85	9.748E-03	1460.83	10.670	1.393E+02	K40
1596.21	3.	738.67	2.22	9.069E-03	1596.21	95.400	PBC<MDA	La140
1764.46	691.	3.93	1.98	8.350E-03	1764.49	15.400	2.984E+02	BI214
1836.06	2.	602.46	2.35	8.079E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
212.43	53.19	633.	130.	4.104E+03	28.81	1.004	-	D
270.49	67.73	1044.	659.	1.569E+04	7.95	1.018	-	sD
299.13	74.89	1343.	1328.	2.901E+04	4.77	1.025	-	sD
308.21	77.16	1101.	2426.	5.185E+04	2.80	1.027	-	D
317.11	79.39	1491.	258.	5.408E+03	22.07	1.029	-	sD
323.86	81.08	1082.	284.	5.868E+03	17.44	1.031	-	sD
334.87	83.83	998.	524.	1.064E+04	9.58	1.034	-	D
359.22	89.92	836.	345.	6.769E+03	13.02	1.040	-	D
378.83	94.82	739.	188.	3.616E+03	21.72	1.044	-	sD

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
629.40	157.47	497.	40.	8.416E+02	91.59	0.470	- sc
802.80	201.03	401.	73.	1.739E+03	40.68	1.144	- sD
941.23	235.53	487.	182.	4.833E+03	18.69	1.176	- D
1003.15	250.93	411.	60.	1.672E+03	65.59	2.175	- s
3073.46	768.37	112.	372.	2.302E+04	6.56	1.634	- D
3736.61	934.25	58.	239.	1.718E+04	10.05	1.618	- s
4953.44	1238.32	73.	380.	3.409E+04	8.08	1.482	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.80	46.54	438.	343.	0.191	10.18	0.998D
TH-227	200.20	50.14	2605.	-47.	-0.026	76.05	1.001s
AM-241	237.77	59.54	4772.	72.	0.040	135.29	1.010s
TH-234	252.77	63.29	981.	260.	0.145	18.12	1.014D
Sn-126	256.74	64.28	4826.	73.	0.040	135.44	1.015s
BA-133	323.56	80.99	17198.	-72.	-0.040	256.80	1.031s
Np-237	345.55	86.49	17055.	0.	0.000	254.43	1.036A
EU-155	345.76	86.54	16983.	-73.	-0.040	253.89	1.036D
Sn-126	347.35	86.94	16546.	85.	0.047	66.44	1.037D
Sn-126	349.87	87.57	15894.	356.	0.198	15.59	1.037D
Cd-109	351.75	88.04	16401.	0.	0.000	249.17	1.038A
Nd-147	363.99	91.10	15821.	-73.	-0.041	244.06	1.041
TH-234	369.94	92.59	780.	449.	0.249	9.99	1.042D
AC-228	372.98	93.35	15748.	-31.	-0.017	568.72	1.043
Np-239	397.58	99.50	5942.	-76.	-0.042	144.68	1.049s
Gd-153	412.37	103.20	2559.	-65.	-0.036	111.45	1.052
Np-239	414.37	103.70	2641.	-11.	-0.006	637.86	1.053s
EU-155	420.82	105.31	2664.	11.	0.006	641.02	1.054s
EU-152	487.84	122.07	739.	93.	0.052	56.71	2.927s
CO-57	487.80	122.06	1645.	-10.	-0.006	556.01	1.070s
EU-154	491.95	123.10	1514.	-66.	-0.037	83.79	1.071s
PA-234	524.72	131.29	4962.	-69.	-0.038	145.42	1.079s
HF-181	531.64	133.02	4893.	-69.	-0.038	144.20	1.081s
CE-144	533.69	133.54	4824.	-69.	-0.038	143.12	1.081s
HF-181	544.74	136.30	4755.	-69.	-0.038	141.76	1.084
CO-57	545.43	136.47	4722.	-62.	-0.034	157.24	1.084
Tc-99m	561.57	140.51	4376.	-72.	-0.040	131.32	1.088s
U-235	575.02	143.87	768.	257.	0.143	21.09	0.704s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	581.29	145.44	4923.	-73.	-0.040	136.95	1.092s
Ba-140	650.15	162.66	1585.	-69.	-0.038	78.69	1.108s
U-235	653.03	163.38	1527.	21.	0.011	269.88	1.109s
Cf-251	705.90	176.60	1100.	-68.	-0.038	92.70	1.122s
U-235	743.38	185.97	997.	1096.	0.609	7.01	1.285
TH-229	773.52	193.51	1112.	-65.	-0.036	101.21	1.137
U-235	820.80	205.33	513.	66.	0.037	50.16	1.148D
TH-229	842.87	210.85	908.	30.	0.017	197.50	1.153s
Cf-251	907.45	227.00	764.	15.	0.008	361.70	1.168s
PB-212	953.97	238.63	3220.	50.	0.028	161.46	1.179
PB-214	967.43	242.00	390.	1431.	0.795	3.29	1.182D
EU-152	978.21	244.69	3364.	53.	0.030	154.77	1.185s
TH-227	1024.40	256.24	848.	-36.	-0.020	159.25	1.195s
Cd-113m	1054.23	263.70	1114.	-58.	-0.032	82.81	1.202s
BI-210M	1062.75	265.83	1141.	-59.	-0.033	82.37	1.204s
TL-208	1108.55	277.28	923.	-46.	-0.025	30.61	1.215s
Hg-203	1116.22	279.20	913.	-55.	-0.030	79.14	1.216s
I-131	1136.61	284.30	512.	66.	0.037	68.54	1.221s
PB-214	1179.88	295.12	344.	2991.	1.662	2.22	1.216
TL-210	1183.41	296.00	5536.	-44.	-0.025	238.72	1.231s
PB-212	1199.52	300.03	5492.	0.	0.000	1000.00	1.235
PA-231	1199.68	300.07	5492.	0.	0.000	1000.00	1.235
PA-233	1200.12	300.18	5492.	0.	0.000	1000.00	1.235
PA-231	1210.00	302.65	5492.	0.	0.000	1000.00	1.237s
BA-133	1210.81	302.85	5492.	0.	0.000	1000.00	1.238s
Ba-140	1218.80	304.85	5492.	0.	0.000	1000.00	1.240s
BI-210M	1218.99	304.90	5492.	0.	0.000	1000.00	1.240s
Ir-192	1233.16	308.44	5619.	-49.	-0.027	217.38	1.243s
PA-233	1247.44	312.01	5570.	-49.	-0.027	134.75	1.246s
Ir-192	1265.35	316.49	5521.	-49.	-0.027	214.24	1.250s
CR-51	1279.73	320.08	5472.	-13.	-0.007	827.94	1.253
La-140	1314.43	328.76	1909.	-46.	-0.026	143.84	1.261s
Cf-249	1333.15	333.44	1863.	-46.	-0.026	132.56	1.265s
AC-228	1352.66	338.32	228.	85.	0.047	27.34	1.270D
Cs-136	1361.66	340.57	1786.	22.	0.012	277.98	1.272s
EU-152	1376.53	344.29	1772.	36.	0.020	164.49	1.275
HF-181	1382.70	345.83	1848.	-48.	-0.027	128.05	1.276s
PB-214	1406.68	351.82	389.	5277.	2.932	1.61	1.273
BA-133	1423.37	356.00	6038.	-41.	-0.023	268.48	1.285
I-131	1457.31	364.48	316.	-14.	-0.008	592.51	1.293s
BA-133	1534.73	383.84	790.	40.	0.022	99.43	1.310s
Cf-249	1551.17	387.95	830.	41.	0.023	101.61	1.314s
SN-113	1566.12	391.69	785.	38.	0.021	104.56	1.317s
SB-125	1710.86	427.88	313.	22.	0.012	163.38	1.349s
AG-108M	1735.10	433.94	321.	-34.	-0.019	107.06	1.354s
pm-146	1814.87	453.88	265.	28.	0.016	118.91	1.372s
SB-125	1852.82	463.37	576.	-41.	-0.023	81.96	1.380s
Ir-192	1871.59	468.06	498.	38.	0.021	85.56	1.384

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	1909.73	477.60	512.	34.	0.019	96.96	1.392s
HF-181	1927.34	482.00	546.	34.	0.019	99.73	1.396s
La-140	1947.43	487.02	561.	33.	0.019	101.81	1.400s
RU-103	1987.56	497.05	225.	-28.	-0.016	118.30	1.409s
RH-106	2046.81	511.86	392.	44.	0.024	118.59	2.672s
Nd-147	2123.35	531.00	256.	-38.	-0.021	86.50	1.438s
Ba-140	2148.39	537.26	204.	-6.	-0.004	525.00	1.444s
CS-134	2252.30	563.24	197.	-9.	-0.005	368.47	1.466s
CS-134	2276.64	569.32	177.	19.	0.010	103.51	1.471s
PA-234	2277.24	569.47	196.	0.	0.000	1000.00	1.471s
BI-207	2278.16	569.70	193.	9.	0.005	212.85	1.471s
TL-208	2333.38	583.50	109.	106.	0.059	22.80	1.304s
SB-125	2401.36	600.50	4491.	-17.	-0.010	141.77	1.497s
CS-134	2418.21	604.71	4474.	0.	0.000	1000.00	1.500s
BI-214	2436.82	609.36	126.	3855.	2.142	1.74	1.438
RU-103	2440.56	610.30	4474.	0.	0.000	1000.00	1.505s
AG-108M	2456.49	614.28	4474.	0.	0.000	1000.00	1.508s
PM-144	2471.62	618.06	4474.	0.	0.000	1000.00	1.512s
SB-125	2542.94	635.89	232.	-34.	-0.019	65.71	1.526s
I-131	2547.28	636.97	258.	-14.	-0.008	164.25	1.527s
AG-110M	2630.43	657.76	570.	-47.	-0.026	73.59	1.544s
CS-137	2646.03	661.66	589.	-46.	-0.026	75.61	1.548s
PM-144	2785.58	696.54	294.	31.	0.017	81.56	1.576s
NB-94	2809.93	702.63	343.	-33.	-0.018	82.38	1.581
SB-124	2890.57	722.79	258.	29.	0.016	81.46	1.598s
AG-108M	2891.17	722.94	287.	0.	0.000	1000.00	1.598s
EU-154	2892.85	723.36	287.	0.	0.000	1000.00	1.598s
ZR-95	2896.22	724.20	287.	0.	0.000	1000.00	1.599s
BI-212	2908.11	727.17	351.	-37.	-0.020	74.46	1.601
pm-146	2942.31	735.72	113.	8.	0.005	270.47	1.608s
pm-146	2988.08	747.16	126.	-15.	-0.008	160.83	1.617s
ZR-95	3026.36	756.73	140.	-22.	-0.012	120.15	1.625s
AG-110M	3055.23	763.94	566.	18.	0.010	187.11	1.631s
NB-95	3062.61	765.79	584.	0.	0.000	1000.00	1.632s
PA-234M	3065.10	766.41	542.	25.	0.014	134.59	1.633s
EU-152	3115.14	778.92	105.	7.	0.004	324.04	1.643s
BI-212	3141.15	785.42	250.	29.	0.016	78.69	1.648
CS-134	3182.95	795.87	333.	-35.	-0.019	75.59	1.656s
TL-210	3197.88	799.60	283.	-2.	-0.001	964.03	1.659s
CS-134	3207.29	801.95	406.	-37.	-0.021	78.84	1.661s
CO-58	3242.59	810.78	455.	-38.	-0.021	80.96	1.668s
La-140	3262.58	815.77	263.	-32.	-0.018	74.18	1.672s
MN-54	3338.91	834.85	180.	-20.	-0.011	149.16	1.687s
Co-56	3386.61	846.77	145.	-13.	-0.007	170.07	1.696s
TL-208	3441.80	860.56	156.	-16.	-0.009	142.52	1.707
NB-94	3483.94	871.10	196.	-8.	-0.005	240.30	1.715
EU-154	3492.47	873.23	236.	-28.	-0.015	81.84	1.717
PA-234	3521.68	880.53	390.	-36.	-0.020	79.49	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3532.53	883.24	367.	-10.	-0.005	280.12	1.724s
AG-110M	3538.30	884.68	376.	0.	0.000	1000.00	1.725s
Sc-46	3556.69	889.28	403.	-22.	-0.012	131.81	1.729s
y-88	3591.74	898.04	126.	14.	0.008	178.30	1.736s
AC-228	3645.87	911.57	41.	80.	0.044	19.86	2.396s
AG-110M	3749.60	937.49	356.	-6.	-0.004	423.38	1.766s
PA-234	3783.72	946.02	86.	25.	0.014	84.77	1.772s
EU-152	3856.11	964.11	254.	-16.	-0.009	146.25	1.786s
AC-228	3875.56	968.97	232.	31.	0.017	71.54	1.790s
EU-154	3985.03	996.33	293.	-25.	-0.014	100.13	1.810s
PA-234M	4003.68	1000.99	35.	58.	0.032	24.51	2.184s
EU-154	4018.82	1004.77	242.	22.	0.013	100.12	1.816s
Co-56	4151.13	1037.84	75.	22.	0.012	93.31	1.841s
Cs-136	4192.07	1048.07	133.	17.	0.009	101.00	1.848s
RH-106	4201.23	1050.36	181.	-25.	-0.014	80.33	1.850s
BI-207	4254.46	1063.66	118.	-10.	-0.005	210.56	1.860s
Ga-68	4309.44	1077.40	80.	13.	0.007	158.83	1.870s
FE-59	4396.88	1099.25	128.	-28.	-0.016	93.77	1.886s
EU-152	4448.20	1112.07	1220.	-34.	-0.019	145.26	1.895
ZN-65	4462.09	1115.55	1186.	-34.	-0.019	143.05	1.897s
BI-214	4481.33	1120.35	82.	910.	0.505	4.21	1.493
Sc-46	4482.12	1120.55	1151.	-34.	-0.019	140.73	1.901
Ta-182	4485.12	1121.30	1053.	30.	0.017	152.49	1.901
CO-60	4692.96	1173.24	48.	40.	0.022	42.59	1.938s
Ta-182	4756.25	1189.05	102.	-20.	-0.011	120.52	1.949
Ta-182	4885.75	1221.41	79.	11.	0.006	198.21	1.972
Co-56	4953.27	1238.28	511.	-29.	-0.016	58.68	1.984s
NA-22	5098.35	1274.53	79.	3.	0.001	476.31	2.008s
EU-154	5098.40	1274.54	82.	0.	0.000	1000.00	2.008s
FE-59	5166.65	1291.60	57.	9.	0.005	193.61	2.020
TL-210	5252.32	1313.00	113.	-32.	-0.018	80.87	2.034s
CO-60	5330.37	1332.50	68.	16.	0.009	123.43	2.047s
AG-110M	5537.69	1384.30	34.	53.	0.030	29.12	2.082s
EU-152	5631.61	1407.76	16.	140.	0.078	10.59	1.936
K-40	5844.79	1461.02	31.	261.	0.145	8.07	1.847s
La-140	6385.95	1596.21	78.	3.	0.002	738.67	2.215s
SB-124	6765.35	1690.98	38.	-4.	-0.002	524.31	2.272s
BI-214	7059.52	1764.46	9.	691.	0.384	3.93	1.977
Co-56	7087.11	1771.35	754.	-18.	-0.010	216.62	2.318s
y-88	7346.20	1836.06	32.	2.	0.001	602.46	2.354s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	7.6961E+00				5.31E+01	
			477.60	7.696E+00	?(	2.482E+01 9.70E+01 1.05E+01	G
NA-22	C	1.3620E-01				9.50E+02	
			1274.53	1.362E-01	?(	2.258E+00 4.76E+02 9.99E+01	G
K-40	N	1.3934E+02				4.66E+11	
			1460.83	1.393E+02	@(P	1.533E+01 8.07E+00 1.07E+01	G
Sc-46	F	-8.3958E-01				8.38E+01	
			889.28	-8.396E-01	&(	3.702E+00 1.32E+02 1.00E+02	G
			1120.55	-1.583E+00	+	7.411E+00 1.41E+02 1.00E+02	G
CR-51	F	-2.3125E+00				2.77E+01	
			320.08	-2.312E+00	?(	6.355E+01 8.28E+02 9.94E+00	G
MN-54	C	-7.3256E-01				3.12E+02	
			834.85	-7.326E-01	?(	2.389E+00 1.49E+02 1.00E+02	G
FE-59	F	-2.2487E+00				4.45E+01	
			1099.25	-2.249E+00	?(	4.452E+00 9.38E+01 5.65E+01	G
			1291.60	1.105E+00	+ P	4.516E+00 1.94E+02 4.32E+01	G
Co-56	C	3.9095E-01				7.73E+01	
			846.77	-4.942E-01	?(P	2.182E+00 1.70E+02 9.99E+01	G
			1238.28	-2.189E+00	+ P	8.154E+00 5.87E+01 6.61E+01	G
			1037.84	6.651E+00	?(P	1.324E+01 9.33E+01 1.41E+01	G
			1771.35	-7.777E+00	+	5.635E+01 2.17E+02 1.55E+01	A
CO-57	C	-1.2646E-01				2.72E+02	
			122.06	-1.265E-01	*(	2.347E+00 5.56E+02 8.56E+01	G
			136.47	-6.263E+00	+	3.262E+01 1.57E+02 1.07E+01	G
CO-58	C	-1.3693E+00				7.09E+01	
			810.78	-1.369E+00	&(	3.676E+00 8.10E+01 9.95E+01	G
CO-60	F	1.3764E+00				1.93E+03	
			1332.50	8.466E-01	&(	2.177E+00 1.23E+02 1.00E+02	G
			1173.24	1.907E+00	?(P	1.676E+00 4.26E+01 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-3.1108E+00					2.44E+02	
			1115.55	-3.111E+00	?(	1.480E+01	1.43E+02	5.06E+01 G
NB-94	I	-1.0667E+00					7.41E+06	
			702.63	-1.067E+00	(	2.918E+00	8.24E+01	9.79E+01 G
			871.10	-3.157E-01	+	2.576E+00	2.40E+02	9.99E+01 G
ZR-95	I	-1.3723E+00					6.40E+01	
			756.73	-1.372E+00	?(	3.608E+00	1.20E+02	5.45E+01 G
			724.20	0.000E+00	&	6.077E+00	1.00E+03	4.42E+01 G
RU-103	I	-7.7763E-01					3.93E+01	
			497.05	-7.776E-01	(P	1.987E+00	1.18E+02	9.09E+01 G
			610.30	0.000E+00	+	1.580E+02	1.00E+03	5.75E+00 GA
RH-106	I	-8.3130E-01					3.74E+02	
			621.92	-8.313E-01	%(P	9.282E+01	2.38E+03	9.93E+00 G
			1050.36	-7.075E+01	+ P	1.836E+02	8.03E+01	1.56E+00 G
			511.86	5.585E+00	?	1.206E+01	1.19E+02	2.00E+01 GA
AG-108M	C	-8.4662E-01					1.53E+05	
			433.94	-8.466E-01	(P	2.146E+00	1.07E+02	9.05E+01 G
			722.94	0.000E+00	+	2.950E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	&	1.016E+01	1.00E+03	8.98E+01 G
AG-110M	F	2.9547E+00					2.50E+02	
			884.68	0.000E+00	?(	4.906E+00	1.00E+03	7.27E+01 G
			657.76	-1.512E+00	+	3.680E+00	7.36E+01	9.46E+01 G
			937.49	-7.383E-01	&	1.057E+01	4.23E+02	3.44E+01 G
			1384.30	1.195E+01	?(	6.712E+00	2.91E+01	2.43E+01 G
			763.94	2.783E+00	&(	1.744E+01	1.87E+02	2.23E+01 G
SN-113	F	1.2553E+00					1.15E+02	
			391.69	1.255E+00	&(P	4.362E+00	1.05E+02	6.40E+01 G
SB-124	F	8.3124E-01					6.02E+01	
			602.73	-3.449E-02	&(P	9.163E+00	2.05E+03	9.83E+01 G
			1690.98	-5.489E-01	+ P	4.230E+00	5.24E+02	4.78E+01 G
			722.79	8.701E+00	?(	2.355E+01	8.15E+01	1.08E+01 G
SB-125	I	1.6781E+00					1.01E+03	
			427.88	1.678E+00	&(P	6.413E+00	1.63E+02	2.96E+01 G
			600.50	-2.734E+00	+ P	5.036E+01	1.42E+02	1.79E+01 G
			635.89	-8.953E+00	+	1.943E+01	6.57E+01	1.13E+01 G
			463.37	-9.259E+00	& P	2.585E+01	8.20E+01	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	9.2919E-01					8.02E+00	
			364.48	-3.489E-01	?(P	2.085E+00	5.93E+02	8.17E+01 G
			284.30	1.794E+01	&(P	2.952E+01	6.85E+01	6.14E+00 G
			636.97	-5.832E+00	+	3.227E+01	1.64E+02	7.17E+00 G
Gd-153	F	-1.7256E-05					2.42E+02	
			97.50	-1.726E-05	%(	2.074E+01	3.63E+07	3.00E+01 G
			103.20	-3.104E+00	&	1.146E+01	1.11E+02	2.18E+01 G
Ga-68	C	2.0497E+01					4.71E-02	
			1077.40	2.050E+01	&(	6.999E+01	1.59E+02	3.30E+00 G
Tc-99m	I	-9.0007E-01					2.51E-01	
			140.51	-9.001E-01	(	3.913E+00	1.31E+02	8.93E+01 G
BA-133	F	-1.2938E+00					3.85E+03	
			356.00	-1.294E+00	?(	1.151E+01	2.68E+02	6.20E+01 G
			302.85	0.000E+00	+	3.323E+01	1.00E+03	1.83E+01 G
			383.84	9.350E+00	&	3.087E+01	9.94E+01	8.94E+00 GA
			80.99	-2.441E+00	+	2.073E+01	2.57E+02	3.41E+01 GA
CS-134	I	4.5342E-01					7.54E+02	
			604.71	0.000E+00	?(	9.244E+00	1.00E+03	9.76E+01 G
			795.87	-1.446E+00	&	3.622E+00	7.56E+01	8.55E+01 G
			569.32	3.331E+00	?(	1.156E+01	1.04E+02	1.54E+01 G
			801.95	-1.511E+01	&	3.950E+01	7.88E+01	8.69E+00 G
			563.24	-2.984E+00	+ P	2.222E+01	3.68E+02	8.35E+00 G
CS-137	I	-1.6677E+00					1.10E+04	
			661.66	-1.668E+00	(	4.173E+00	7.56E+01	8.52E+01 G
CE-139	F	-2.7666E-03					1.38E+02	
			165.85	-2.767E-03	%(P	3.015E+00	3.26E+04	7.99E+01 G
Ba-140	I	-6.9179E-01					1.28E+01	
			537.26	-6.918E-01	*(P	7.477E+00	5.25E+02	2.44E+01 G
			162.66	-1.314E+01	& P	3.584E+01	7.87E+01	6.22E+00 G
			304.85	0.000E+00	+	1.426E+02	1.00E+03	4.29E+00 G
La-140	I	7.0602E-01					1.28E+01	
			1596.21	1.861E-01	&(P	2.819E+00	7.39E+02	9.54E+01 G
			487.02	1.796E+00	*(	6.084E+00	1.02E+02	4.55E+01 G
			328.76	-4.215E+00	+ P	1.883E+01	1.44E+02	2.03E+01 G
			815.77	-4.921E+00	+	1.210E+01	7.42E+01	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-1.6725E+00					3.25E+01	
			145.44	-1.672E+00	?(	7.582E+00	1.37E+02	4.82E+01 G
CE-144	I	-6.6494E+00					2.85E+02	
			133.54	-6.649E+00	*(	3.151E+01	1.43E+02	1.11E+01 G
PM-144	C	9.8352E-01					3.63E+02	
			696.54	9.835E-01	&(	2.665E+00	8.16E+01	9.90E+01 G
			618.06	0.000E+00	-	9.255E+00	1.00E+03	9.91E+01 G
EU-152	F	3.6001E+00					4.94E+03	
			344.29	2.625E+00	&(	1.435E+01	1.64E+02	2.65E+01 G
			1112.07	-1.149E+01	+	5.554E+01	1.45E+02	1.36E+01 G
			121.78	3.420E+00	*(	4.740E+00	5.67E+01	2.86E+01 G
			778.92	1.879E+00	&(	1.354E+01	3.24E+02	1.29E+01 G
			964.11	-4.382E+00	+	2.156E+01	1.46E+02	1.46E+01 G
			244.69	1.063E+01	?(	5.452E+01	1.55E+02	7.58E+00 G
			1408.00	3.686E+01		5.622E+00	1.06E+01	2.10E+01 GA
EU-154	I	-8.5878E+00					3.14E+03	
			873.23	-8.588E+00	?(P	2.298E+01	8.18E+01	1.23E+01 G
			123.10	-1.707E+00	+	4.733E+00	8.38E+01	4.08E+01 G
			1274.54	0.000E+00	+	6.514E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.326E+01	1.00E+03	2.02E+01 G
			1004.77	5.282E+00	+	1.767E+01	1.00E+02	1.80E+01 G
			996.33	-9.774E+00	+	3.266E+01	1.00E+02	1.06E+01 G
EU-155	I	5.6176E-01					1.81E+03	
			105.31	5.618E-01	&(P	1.199E+01	6.41E+02	2.12E+01 G
			86.54	-2.625E+00	+	2.203E+01	2.54E+02	3.07E+01 G
HF-181	F	1.0151E+00					4.24E+01	
			482.00	1.015E+00	&(	3.368E+00	9.97E+01	8.05E+01 G
			133.02	-1.700E+00	+	8.117E+00	1.44E+02	4.33E+01 G
			345.83	-6.085E+00	+	2.585E+01	1.28E+02	1.51E+01 G
			136.30	-1.273E+01	+	5.973E+01	1.42E+02	5.85E+00 G
Ta-182	F	3.1069E+00					1.14E+02	
			1121.30	4.003E+00	(	2.033E+01	1.52E+02	3.49E+01 G
			1221.41	1.949E+00	(	8.080E+00	1.98E+02	2.70E+01 G
			1189.05	-5.962E+00	+	1.484E+01	1.21E+02	1.62E+01 G
Hg-203	F	-1.1133E+00					4.66E+01	
			279.20	-1.113E+00	?(	2.916E+00	7.91E+01	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	3.5134E+00					6.98E+02	
			583.02	3.513E+00	*(P	1.696E+00	2.28E+01	8.45E+01 G
			277.28	-1.193E+01	& P	3.766E+01	3.06E+01	6.31E+00 G
			860.56	-4.815E+00	- P	1.838E+01	1.43E+02	1.24E+01 G
pm-146	C	3.5552E-01					2.02E+03	
			747.16	-1.484E+00	?(	5.444E+00	1.61E+02	3.40E+01 G
			735.72	1.238E+00	?(P	7.709E+00	2.70E+02	2.25E+01 G
			453.88	1.012E+00	*(P	2.811E+00	1.19E+02	6.50E+01 G
y-88	F	3.6372E-01					1.07E+02	
			898.04	5.776E-01	?(P	2.275E+00	1.78E+02	9.37E+01 G
			1836.06	1.617E-01	?(	2.006E+00	6.02E+02	9.92E+01 G
Cd-113m		-1.5323E+04					5.33E+03	
			263.70	-1.532E+04	?(	4.200E+04	8.28E+01	6.00E-03 K
Cf-251	T	-4.8506E+00					3.28E+05	
			176.60	-4.851E+00	?(	1.130E+01	9.27E+01	1.70E+01 G
			227.00	3.428E+00	+	3.006E+01	3.62E+02	6.30E+00 GA
Cf-249	T	1.2795E+00					1.28E+05	
			387.95	1.279E+00	(	4.318E+00	1.02E+02	6.60E+01 G
			333.44	-5.588E+00	+	2.459E+01	1.33E+02	1.55E+01 G
Sn-126		1.0460E+01					3.65E+07	
			87.57	1.046E+01	}	1.735E+01	1.56E+01	3.75E+01 GA
			64.28	1.046E+01	&(	4.690E+01	1.35E+02	9.70E+00 G
			86.94	1.046E+01	}	7.370E+01	6.64E+01	9.04E+00 GA
PB-210	N	1.7401E+02					8.14E+03	
			46.54	1.740E+02	(P	5.085E+01	1.02E+01	4.25E+00 G
PB-212	N	1.7155E+00					6.98E+02	
			238.63	1.715E+00	?(P	9.184E+00	1.61E+02	4.33E+01 G
			300.03	0.000E+00	-	1.845E+02	1.00E+03	3.28E+00 GA
PB-214	N	2.7052E+02					5.84E+05	
			351.93	2.726E+02	(P	4.886E+00	1.61E+00	3.76E+01 G
			295.09	2.664E+02	(P	7.935E+00	2.22E+00	1.93E+01 G
			242.00	2.893E+02	+	1.917E+01	3.29E+00	7.43E+00 GA
BI-207	C	2.6224E-01					1.18E+04	
			569.70	2.622E-01	?(	1.894E+00	2.13E+02	9.77E+01 G
			1063.66	-5.714E-01	+ P	3.160E+00	2.11E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-1.5937E+01					6.98E+02	
			727.17	-1.594E+01	?(	3.931E+01	7.45E+01	7.55E+00 G
			785.42	7.977E+01		2.084E+02	7.87E+01	1.28E+00 GA
U-235	N	2.5878E+01					2.57E+11	
			143.79	2.588E+01	(P	1.326E+01	2.11E+01	1.10E+01 G
			205.33	1.772E+01	- P	2.912E+01	5.02E+01	5.01E+00 G
			163.38	4.806E+00	- P	4.323E+01	2.70E+02	5.08E+00 G
			185.72	2.562E+01		3.501E+00	7.01E+00	5.40E+01 GA
BI-214	N	2.4141E+02					5.84E+05	
			609.31	2.414E+02	(P	3.448E+00	1.74E+00	4.61E+01 G
			1120.29	2.775E+02	+ P	1.372E+01	4.21E+00	1.51E+01 G
			1764.49	2.984E+02	+ P	7.305E+00	3.93E+00	1.54E+01 G
BI-210M	T	-1.8808E+00					1.10E+09	
			265.83	-1.881E+00	&(	5.127E+00	8.24E+01	5.00E+01 G
			304.90	0.000E+00	+	2.185E+01	1.00E+03	2.80E+01 G
AC-228	N	1.1546E+01					2.10E+03	
			911.07	1.078E+01	(	4.405E+00	1.99E+01	2.90E+01 G
			968.97	7.325E+00	-	1.736E+01	7.15E+01	1.75E+01 G
			338.32	1.339E+01	(	1.150E+01	2.73E+01	1.20E+01 G
			93.35	-6.032E+00	-	1.135E+02	5.69E+02	5.56E+00 XA
TH-227	N	-1.1137E+01					7.95E+03	
			50.14	-1.114E+01	?(P	5.760E+01	7.61E+01	8.00E+00 G
			256.24	-8.031E+00	+	3.088E+01	1.59E+02	7.00E+00 G
TH-229	N	-1.9146E+01					2.68E+06	
			193.51	-1.915E+01	&(	4.657E+01	1.01E+02	4.40E+00 G
			210.85	1.376E+01	&	6.563E+01	1.98E+02	2.99E+00 G
TH-234	N	9.0707E+01					1.63E+12	
			63.29	9.676E+01	(	5.529E+01	1.81E+01	3.81E+00 G
			92.59	8.657E+01	(	2.564E+01	9.99E+00	5.58E+00 G
PA-233	C	-2.4469E+00					7.82E+08	
			312.01	-2.447E+00	&(P	1.739E+01	1.35E+02	3.60E+01 G
			300.18	0.000E+00	+	9.764E+01	1.00E+03	6.20E+00 G
PA-234	N	8.3664E-01					1.63E+12	
			131.29	-4.067E+00	?(	1.958E+01	1.45E+02	1.80E+01 G
			946.02	7.424E+00	?(P	1.381E+01	8.48E+01	1.34E+01 G
			569.47	0.000E+00	-	2.275E+01	1.00E+03	8.20E+00 G
			883.24	-3.877E+00	+	3.663E+01	2.80E+02	9.60E+00 G
			880.53	-2.285E+01	+	6.025E+01	7.95E+01	6.00E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	2.9185E+02					1.63E+12	
			1001.00	2.930E+02	(	1.522E+02	2.45E+01	8.37E-01 G
			766.41	2.887E+02	?(	1.298E+03	1.35E+02	2.94E-01 G
AM-241	T	3.0659E+00					1.58E+05	
			59.54	3.066E+00	?(	1.373E+01	1.35E+02	3.59E+01 G
Ir-192	F	5.3171E-03					7.40E+01	
			316.49	-1.019E+00	*(	7.233E+00	2.14E+02	8.70E+01 G
			468.06	1.728E+00	&(	4.906E+00	8.56E+01	5.18E+01 G
			308.44	-2.728E+00	+	1.965E+01	2.17E+02	3.18E+01 G
Cs-136	F	4.9948E-01					1.30E+01	
			818.50	-4.488E-03	%(	3.417E+00	2.24E+04	1.00E+02 G
			1048.07	9.105E-01	?(	3.088E+00	1.01E+02	8.00E+01 G
			340.57	8.730E-01	?(	8.082E+00	2.78E+02	4.69E+01 G
Np-239	T	-1.4967E-01					2.36E+00	
			103.70	-4.975E-01	+	1.056E+01	6.38E+02	2.40E+01 X
			106.13	-1.497E-01	%(	1.123E+01	2.25E+03	2.27E+01 G
			99.50	-5.316E+00	+	2.545E+01	1.45E+02	1.50E+01 X
Nd-147		-7.7044E+00					1.11E+01	
			531.00	-7.704E+00	&(	1.549E+01	8.65E+01	1.30E+01 G
			91.10	-2.795E+00	+	2.256E+01	2.44E+02	2.83E+01 G
TL-210	N	-8.8473E-02					5.84E+05	
			799.60	-8.847E-02	?(	2.901E+00	9.64E+02	9.90E+01 G
			296.00	-9.631E-01	+	7.620E+00	2.39E+02	7.90E+01 G
			1313.00	-7.879E+00	&	1.302E+01	8.09E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	2605.	-47.	-0.026	76.05	-1.114E+01	P
AM-241	59.54	4772.	72.	0.040	135.29	3.066E+00	
BA-133	80.99	17198.	-72.	-0.040	256.80	-2.441E+00	
Nd-147	91.10	15821.	-73.	-0.041	244.06	-2.795E+00	
Np-239	99.50	5942.	-76.	-0.042	144.68	-5.316E+00	
Gd-153	103.20	2559.	-65.	-0.036	111.45	-3.104E+00	
Np-239	103.70	2641.	-11.	-0.006	637.86	-4.975E-01	
CO-57	122.06	1645.	-10.	-0.006	556.01	-1.265E-01	
EU-154	123.10	1514.	-66.	-0.037	83.79	-1.707E+00	
PA-234	131.29	4962.	-69.	-0.038	145.42	-4.067E+00	
HF-181	133.02	4893.	-69.	-0.038	144.20	-1.700E+00	
CE-144	133.54	4824.	-69.	-0.038	143.12	-6.649E+00	
HF-181	136.30	4755.	-69.	-0.038	141.76	-1.273E+01	
CO-57	136.47	4722.	-62.	-0.034	157.24	-6.263E+00	
Tc-99m	140.51	4376.	-72.	-0.040	131.32	-9.001E-01	
CE-141	145.44	4923.	-73.	-0.040	136.95	-1.672E+00	
Ba-140	162.66	1585.	-69.	-0.038	78.69	-1.314E+01	P
Cf-251	176.60	1100.	-68.	-0.038	92.70	-4.851E+00	
TH-229	193.51	1112.	-65.	-0.036	101.21	-1.915E+01	
TH-229	210.85	908.	30.	0.017	197.50	1.376E+01	
Cf-251	227.00	764.	15.	0.008	361.70	3.428E+00	
TH-227	256.24	848.	-36.	-0.020	159.25	-8.031E+00	
Cd-113m	263.70	1114.	-58.	-0.032	82.81	-1.532E+04	
BI-210M	265.83	1141.	-59.	-0.033	82.37	-1.881E+00	
Hg-203	279.20	913.	-55.	-0.030	79.14	-1.113E+00	
I-131	284.30	512.	66.	0.037	68.54	1.794E+01	P
TL-210	296.00	5536.	-44.	-0.025	238.72	-9.631E-01	
Ir-192	308.44	5619.	-49.	-0.027	217.38	-2.728E+00	
PA-233	312.01	5570.	-49.	-0.027	134.75	-2.447E+00	P
Ir-192	316.49	5521.	-49.	-0.027	214.24	-1.019E+00	
CR-51	320.08	5472.	-13.	-0.007	827.94	-2.312E+00	
La-140	328.76	1909.	-46.	-0.026	143.84	-4.215E+00	P
Cf-249	333.44	1863.	-46.	-0.026	132.56	-5.588E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	345.83	1848.	-48.	-0.027	128.05	-6.085E+00	
BA-133	356.00	6038.	-41.	-0.023	268.48	-1.294E+00	
I-131	364.48	316.	-14.	-0.008	592.51	-3.489E-01	P
BA-133	383.84	790.	40.	0.022	99.43	9.350E+00	
Cf-249	387.95	830.	41.	0.023	101.61	1.279E+00	
SN-113	391.69	785.	38.	0.021	104.56	1.255E+00	P
SB-125	427.88	313.	22.	0.012	163.38	1.678E+00	P
AG-108M	433.94	321.	-34.	-0.019	107.06	-8.466E-01	P
pm-146	453.88	265.	28.	0.016	118.91	1.012E+00	P
SB-125	463.37	576.	-41.	-0.023	81.96	-9.259E+00	P
Ir-192	468.06	498.	38.	0.021	85.56	1.728E+00	
HF-181	482.00	546.	34.	0.019	99.73	1.015E+00	
La-140	487.02	561.	33.	0.019	101.81	1.796E+00	
RU-103	497.05	225.	-28.	-0.016	118.30	-7.776E-01	P
RH-106	511.86	392.	44.	0.024	118.59	5.585E+00	
Nd-147	531.00	256.	-38.	-0.021	86.50	-7.704E+00	
Ba-140	537.26	204.	-6.	-0.004	525.00	-6.918E-01	P
CS-134	563.24	197.	-9.	-0.005	368.47	-2.984E+00	P
CS-134	569.32	177.	19.	0.010	103.51	3.331E+00	
BI-207	569.70	193.	9.	0.005	212.85	2.622E-01	
SB-125	600.50	4491.	-17.	-0.010	141.77	-2.734E+00	P
SB-125	635.89	232.	-34.	-0.019	65.71	-8.953E+00	
I-131	636.97	258.	-14.	-0.008	164.25	-5.832E+00	
AG-110M	657.76	570.	-47.	-0.026	73.59	-1.512E+00	
CS-137	661.66	589.	-46.	-0.026	75.61	-1.668E+00	
PM-144	696.54	294.	31.	0.017	81.56	9.835E-01	
NB-94	702.63	343.	-33.	-0.018	82.38	-1.067E+00	
SB-124	722.79	258.	29.	0.016	81.46	8.701E+00	
BI-212	727.17	351.	-37.	-0.020	74.46	-1.594E+01	
pm-146	735.72	113.	8.	0.005	270.47	1.238E+00	P
pm-146	747.16	126.	-15.	-0.008	160.83	-1.484E+00	
ZR-95	756.73	140.	-22.	-0.012	120.15	-1.372E+00	
AG-110M	763.94	566.	18.	0.010	187.11	2.783E+00	
BI-212	785.42	250.	29.	0.016	78.69	7.977E+01	
CS-134	795.87	333.	-35.	-0.019	75.59	-1.446E+00	
TL-210	799.60	283.	-2.	-0.001	964.03	-8.847E-02	
CS-134	801.95	406.	-37.	-0.021	78.84	-1.511E+01	
CO-58	810.78	455.	-38.	-0.021	80.96	-1.369E+00	
La-140	815.77	263.	-32.	-0.018	74.18	-4.921E+00	
MN-54	834.85	180.	-20.	-0.011	149.16	-7.326E-01	
Co-56	846.77	145.	-13.	-0.007	170.07	-4.942E-01	P
NB-94	871.10	196.	-8.	-0.005	240.30	-3.157E-01	
EU-154	873.23	236.	-28.	-0.015	81.84	-8.588E+00	P
PA-234	880.53	390.	-36.	-0.020	79.49	-2.285E+01	
PA-234	883.24	367.	-10.	-0.005	280.12	-3.877E+00	
Sc-46	889.28	403.	-22.	-0.012	131.81	-8.396E-01	
y-88	898.04	126.	14.	0.008	178.30	5.776E-01	P
AG-110M	937.49	356.	-6.	-0.004	423.38	-7.383E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	946.02	86.	25.	0.014	84.77	7.424E+00	P
EU-154	996.33	293.	-25.	-0.014	100.13	-9.774E+00	
EU-154	1004.77	242.	22.	0.013	100.12	5.282E+00	
Co-56	1037.84	75.	22.	0.012	93.31	6.651E+00	P
RH-106	1050.36	181.	-25.	-0.014	80.33	-7.075E+01	P
BI-207	1063.66	118.	-10.	-0.005	210.56	-5.714E-01	P
FE-59	1099.25	128.	-28.	-0.016	93.77	-2.249E+00	
ZN-65	1115.55	1186.	-34.	-0.019	143.05	-3.111E+00	
Sc-46	1120.55	1151.	-34.	-0.019	140.73	-1.583E+00	
Ta-182	1121.30	1053.	30.	0.017	152.49	4.003E+00	
Ta-182	1189.05	102.	-20.	-0.011	120.52	-5.962E+00	
Ta-182	1221.41	79.	11.	0.006	198.21	1.949E+00	
Co-56	1238.28	511.	-29.	-0.016	58.68	-2.189E+00	P
NA-22	1274.53	79.	3.	0.001	476.31	1.362E-01	
FE-59	1291.60	57.	9.	0.005	193.61	1.105E+00	P
TL-210	1313.00	113.	-32.	-0.018	80.87	-7.879E+00	
AG-110M	1384.30	34.	53.	0.030	29.12	1.195E+01	
La-140	1596.21	78.	3.	0.002	738.67	1.861E-01	P
SB-124	1690.98	38.	-4.	-0.002	524.31	-5.489E-01	P
Co-56	1771.35	754.	-18.	-0.010	216.62	-7.777E+00	
y-88	1836.06	32.	2.	0.001	602.46	1.617E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	7.6961E+00	7.6961E+00	9.696E+01%	2.48E+01
NA-22	#A	1.3620E-01	1.3620E-01	4.763E+02%	2.26E+00
K-40	#	1.3934E+02	1.3934E+02	8.072E+00%	1.53E+01
Sc-46	#A	-8.3957E-01	-8.3958E-01	1.318E+02%	3.70E+00
CR-51	#A	-2.3125E+00	-2.3125E+00	8.279E+02%	6.35E+01
MN-54	#A	-7.3256E-01	-7.3256E-01	1.492E+02%	2.39E+00
FE-59	#A	-2.2487E+00	-2.2487E+00	9.377E+01%	4.45E+00
Co-56	#A	3.9095E-01	3.9095E-01	9.331E+01%	2.18E+00
CO-57	#A	-1.2646E-01	-1.2646E-01	5.560E+02%	2.35E+00
CO-58	#A	-1.3693E+00	-1.3693E+00	8.096E+01%	3.68E+00
CO-60	#A	1.3764E+00	1.3764E+00	4.259E+01%	2.18E+00
ZN-65	#A	-3.1108E+00	-3.1108E+00	1.430E+02%	1.48E+01
NB-94	#A	-1.0667E+00	-1.0667E+00	8.238E+01%	2.92E+00
ZR-95	#A	-1.3723E+00	-1.3723E+00	1.201E+02%	3.61E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.96E+00
RU-103	#A	-7.7762E-01	-7.7763E-01	1.183E+02%	1.99E+00
RH-106	#A	-8.3130E-01	-8.3130E-01	2.383E+03%	9.28E+01
AG-108M	#A	-8.4662E-01	-8.4662E-01	1.071E+02%	2.15E+00
AG-110M	#A	2.9547E+00	2.9547E+00	2.912E+01%	4.91E+00

SN-113 #A	1.2553E+00	1.2553E+00	1.046E+02%	4.36E+00
SB-124 #A	8.3124E-01	8.3124E-01	8.146E+01%	9.16E+00
SB-125 #A	1.6781E+00	1.6781E+00	1.634E+02%	6.41E+00
I-131 #A	9.2917E-01	9.2919E-01	6.854E+01%	2.09E+00
Gd-153 #A	-1.7256E-05	-1.7256E-05	3.631E+07%	2.07E+01
Ga-68 A	2.0441E+01	2.0497E+01	1.588E+02%	7.00E+01
Tc-99m #A	-8.9961E-01	-9.0007E-01	1.313E+02%	3.91E+00
BA-133 #A	-1.2938E+00	-1.2938E+00	2.685E+02%	1.15E+01
CS-134 #A	4.5342E-01	4.5342E-01	1.035E+02%	9.24E+00
CS-137 #A	-1.6677E+00	-1.6677E+00	7.561E+01%	4.17E+00
CE-139 #A	-2.7666E-03	-2.7666E-03	3.264E+04%	3.01E+00
Ba-140 #A	-6.9179E-01	-6.9179E-01	5.250E+02%	7.48E+00
La-140 #A	7.0601E-01	7.0602E-01	1.018E+02%	2.82E+00
CE-141 #A	-1.6725E+00	-1.6725E+00	1.369E+02%	7.58E+00
CE-144 #A	-6.6494E+00	-6.6494E+00	1.431E+02%	3.15E+01
PM-144 #A	9.8352E-01	9.8352E-01	8.156E+01%	2.66E+00
EU-152 A	3.6001E+00	3.6001E+00	5.671E+01%	1.44E+01
EU-154 #A	-8.5878E+00	-8.5878E+00	8.184E+01%	2.30E+01
EU-155 #A	5.6176E-01	5.6176E-01	6.410E+02%	1.20E+01
HF-181 #A	1.0151E+00	1.0151E+00	9.973E+01%	3.37E+00
Ta-182 #A	3.1069E+00	3.1069E+00	1.250E+02%	2.03E+01
Hg-203 #A	-1.1133E+00	-1.1133E+00	7.914E+01%	2.92E+00
TL-208 #	3.5134E+00	3.5134E+00	2.280E+01%	1.70E+00
pm-146 #A	3.5552E-01	3.5552E-01	1.121E+02%	5.44E+00
y-88 #A	3.6372E-01	3.6372E-01	1.783E+02%	2.28E+00
Cd-113m#A	-1.5323E+04	-1.5323E+04	8.281E+01%	4.20E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.74E+02
Cf-251 #A	-4.8506E+00	-4.8506E+00	9.270E+01%	1.13E+01
Cf-249 #A	1.2795E+00	1.2795E+00	1.016E+02%	4.32E+00
Sn-126 #A	1.0460E+01	1.0460E+01	1.354E+02%	4.69E+01
PB-210	1.7401E+02	1.7401E+02	1.018E+01%	5.09E+01
PB-212 #A	1.7155E+00	1.7155E+00	1.615E+02%	9.18E+00
PB-214	2.7052E+02	2.7052E+02	1.371E+00%	4.89E+00
BI-207 #A	2.6224E-01	2.6224E-01	2.129E+02%	1.89E+00
BI-212 #A	-1.5937E+01	-1.5937E+01	7.446E+01%	3.93E+01
U-235	2.5878E+01	2.5878E+01	2.109E+01%	1.33E+01
BI-214	2.4141E+02	2.4141E+02	1.740E+00%	3.45E+00
BI-210M#A	-1.8808E+00	-1.8808E+00	8.237E+01%	5.13E+00
AC-228	1.1546E+01	1.1546E+01	1.689E+01%	4.41E+00
TH-227 #A	-1.1137E+01	-1.1137E+01	7.605E+01%	5.76E+01
TH-229 #A	-1.9146E+01	-1.9146E+01	1.012E+02%	4.66E+01
TH-234	9.0707E+01	9.0707E+01	9.989E+00%	5.53E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%	2.11E+02
PA-233 #A	-2.4469E+00	-2.4469E+00	1.348E+02%	1.74E+01
PA-234 #A	8.3664E-01	8.3664E-01	8.416E+01%	1.96E+01
PA-234M	2.9185E+02	2.9185E+02	2.451E+01%	1.52E+02
AM-241 #A	3.0659E+00	3.0659E+00	1.353E+02%	1.37E+01
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.18E+01
Ir-192 #A	5.3171E-03	5.3171E-03	8.556E+01%	7.23E+00

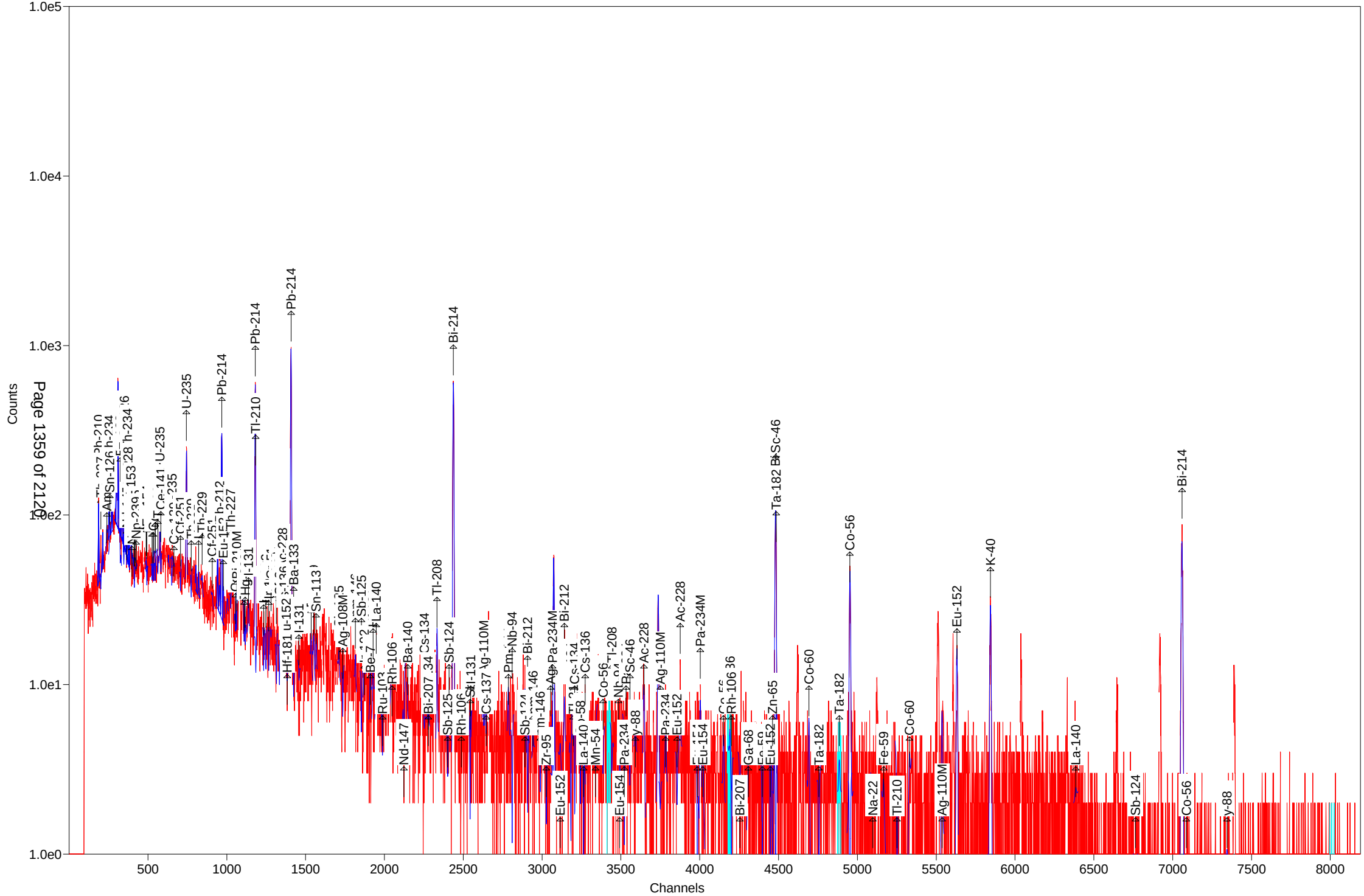
Cs-136 #A	4.9947E-01	4.9948E-01	1.010E+02%		3.42E+00
Np-239 #A	-1.4966E-01	-1.4967E-01	2.252E+03%		1.12E+01
Nd-147 #A	-7.7043E+00	-7.7044E+00	8.650E+01%		1.55E+01
TL-210 #A	-8.8473E-02	-8.8473E-02	9.640E+02%		2.90E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.3 keV) 1.249E+03 Bq/Sample
Total Decayed Activity (25.1 to 1999.3 keV) 1.2487694E+03 Bq/Sample

379951_Gamma_160-29881-A-32-C. 9_Gamma_20183565.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181529

Sample Description: 379951_Gamma_160-29881-A-33-C
Detector: Detector #12
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-33-C

Decay to Time: 8/23/2018 07:44 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:44:31 Real Time: 1801 sec
Analysis Time: 8/23/2018 08:14 Dead Time: 0.07 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.534E+00	106.6	3.767E+00	3.771E+00	1.278E+01
NA-22	-6.088E-01	84.8	5.162E-01	5.171E-01	1.749E+00
K-40	1.794E+02	6.4	1.146E+01	1.461E+01	5.395E+00
Sc-46	-4.753E-01	157.1	7.466E-01	7.470E-01	2.549E+00
CR-51	1.602E+00	192.5	3.084E+00	3.085E+00	8.202E+00
MN-54	3.599E-01	119.5	4.301E-01	4.305E-01	1.036E+00
FE-59	-4.873E-02	126.1	6.143E-02	6.148E-02	2.976E+00
Co-56	6.316E-01	108.8	6.871E-01	6.879E-01	1.079E+00
CO-57	-1.539E-01	202.7	3.120E-01	3.121E-01	1.061E+00
CO-58	-7.928E-01	82.6	6.552E-01	6.565E-01	2.193E+00
CO-60	4.574E-01	86.7	3.965E-01	3.972E-01	1.003E+00
ZN-65	0.000E+00	1.#INF	5.019E-01	5.019E-01	5.336E+00
NB-94	-7.107E-01	102.4	7.275E-01	7.284E-01	1.673E+00
ZR-95	8.447E-01	77.3	6.532E-01	6.546E-01	2.406E+00
NB-95	5.646E-02	1109.3	6.264E-01	6.264E-01	2.188E+00
RU-103	7.736E-02	443.5	3.431E-01	3.431E-01	9.109E-01
RH-106	5.828E+00	163.9	9.554E+00	9.559E+00	3.219E+01
AG-108M	-3.507E-02	1040.8	3.650E-01	3.650E-01	9.597E-01
AG-110M	3.859E-01	198.5	7.660E-01	7.663E-01	3.350E+00
SN-113	5.178E-01	122.3	6.331E-01	6.337E-01	2.148E+00
SB-124	0.000E+00	1.#INF	1.168E-01	1.168E-01	3.389E+00
SB-125	2.768E+00	34.3	9.499E-01	9.601E-01	2.498E+00
I-131	3.909E-01	100.7	3.937E-01	3.942E-01	9.881E-01
Gd-153	-1.171E+00	144.0	1.685E+00	1.687E+00	5.632E+00
Ga-68	-6.567E+00	308.5	2.026E+01	2.027E+01	4.674E+01
Tc-99m	0.000E+00	1.#INF	1.938E-01	1.938E-01	2.178E+00
BA-133	-5.884E-01	176.4	1.038E+00	1.038E+00	3.498E+00
CS-134	-6.089E-01	176.3	1.074E+00	1.074E+00	3.611E+00
CS-137	-3.431E-01	188.7	6.474E-01	6.476E-01	2.226E+00
CE-139	-2.212E-01	194.8	4.308E-01	4.310E-01	1.458E+00
Ba-140	1.420E+00	97.1	1.380E+00	1.381E+00	3.378E+00
La-140	3.281E-01	98.7	3.237E-01	3.241E-01	1.659E+00
CE-141	6.807E-01	165.3	1.125E+00	1.126E+00	3.764E+00

CE-144	-2.991E+00	163.4	4.885E+00	4.888E+00	1.633E+01
PM-144	6.073E-02	913.4	5.547E-01	5.548E-01	1.337E+00
EU-152	1.235E+00	89.9	1.110E+00	1.112E+00	5.460E+00
EU-154	5.409E+00	82.9	4.487E+00	4.495E+00	1.507E+01
EU-155	-8.118E-01	312.2	2.534E+00	2.535E+00	8.504E+00
HF-181	-5.219E-01	112.3	5.863E-01	5.868E-01	1.984E+00
Ta-182	2.092E+00	88.5	1.852E+00	1.855E+00	7.082E+00
Hg-203	-2.375E-01	181.5	4.310E-01	4.312E-01	1.470E+00
TL-208	4.215E+00	14.8	6.237E-01	6.594E-01	1.058E+00
pm-146	3.805E-01	166.1	6.321E-01	6.324E-01	2.811E+00
y-88	4.048E-01	127.4	5.156E-01	5.160E-01	1.200E+00
Cd-113m	-2.417E+03	205.7	4.970E+03	4.972E+03	1.707E+04
Cd-109	0.000E+00	1.#INF	2.951E+00	2.951E+00	5.150E+01
Cf-251	5.607E-01	360.1	2.019E+00	2.019E+00	5.263E+00
Cf-249	7.328E-01	79.3	5.809E-01	5.821E-01	1.485E+00
Sn-126	-2.500E+00	245.2	6.130E+00	6.132E+00	2.059E+01
PB-210	2.912E+01	43.1	1.254E+01	1.267E+01	3.394E+01
PB-212	9.826E+00	8.6	8.485E-01	9.912E-01	1.800E+00
PB-214	1.344E+01	8.3	1.111E+00	1.304E+00	1.618E+00
BI-207	8.882E-01	34.9	3.104E-01	3.136E-01	1.623E+00
BI-212	-9.187E+00	84.4	7.756E+00	7.770E+00	2.599E+01
U-235	0.000E+00	1.#INF	1.556E+00	1.556E+00	1.735E+01
BI-214	1.482E+01	9.8	1.450E+00	1.635E+00	2.090E+00
BI-210M	-3.646E-01	170.4	6.214E-01	6.217E-01	2.123E+00
AC-228	1.137E+01	13.2	1.502E+00	1.609E+00	2.726E+00
TH-227	-3.377E+00	224.6	7.585E+00	7.588E+00	2.562E+01
TH-229	-6.969E+00	134.5	9.373E+00	9.380E+00	2.406E+01
TH-234	5.279E+01	17.1	9.030E+00	9.508E+00	2.575E+01
PA-231	6.534E-01	3744.5	2.447E+01	2.447E+01	8.285E+01
PA-233	0.000E+00	1.#INF	3.356E-01	3.356E-01	6.789E+00
PA-234	-1.811E+00	120.8	2.188E+00	2.190E+00	7.321E+00
PA-234M	1.015E+02	59.1	5.998E+01	6.020E+01	1.727E+02
AM-241	-1.045E+00	167.5	1.750E+00	1.751E+00	5.862E+00
Np-237	7.285E+00	27.4	1.993E+00	2.035E+00	6.130E+00
Ir-192	2.420E-01	123.2	2.982E-01	2.985E-01	2.831E+00
Cs-136	3.665E-01	96.8	3.549E-01	3.555E-01	2.501E+00
Np-239	1.299E+00	154.3	2.004E+00	2.005E+00	6.710E+00
Nd-147	-4.736E-01	725.3	3.435E+00	3.435E+00	8.567E+00
TL-210	0.000E+00	1.#INF	5.035E-02	5.035E-02	1.877E+00
Total	4.579E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-33-C

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181529.An1

Acquisition information

Start time:	8/23/2018 7:44:31 AM
Live time:	1800
Real time:	1801
Dead time:	0.07 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:44:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1410

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.44	40.	43.06	0.90	1.797E-02	46.54	4.250	PBC<MDA	PB210
63.27	113.	22.03	0.96	2.977E-02	63.29	3.810	5.515E+01	TH234
74.50	92.	20.64	0.88	3.325E-02				
77.09	144.	14.33	0.88	3.385E-02				
86.82	61.	27.36	0.89	3.559E-02	86.49	13.100	7.285E+00	Np237
					86.54	30.700	3.108E+00	EU155
					86.94	9.040	1.054E+01	Sn126
92.53	164.	13.59	1.32	3.637E-02	92.59	5.584	4.488E+01	TH234
					93.35	5.561	4.496E+01	AC228
106.13	20.	154.25	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
121.78	14.	136.28	0.93	3.725E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.440E-01	CO57
123.10	15.	115.87	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	21.	165.33	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
176.60	6.	360.07	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
185.81	155.	14.98	0.96	3.214E-02	185.72	54.000	4.957E+00	U235
209.44	59.	23.91	0.40	2.992E-02				
227.00	5.	295.97	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.44	215.	9.18	0.99	2.744E-02	238.63	43.300	1.006E+01	PB212
241.81	63.	19.55	1.05	2.716E-02	242.00	7.430	1.745E+01	PB214
276.82	16.	90.35	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
295.04	139.	11.31	0.77	2.350E-02	295.09	19.300	1.703E+01	PB214
					296.00	79.000	4.169E+00	TL210
299.96	13.	8.92	1.11	2.321E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.310E+01	PA231
					300.18	6.200	5.200E+00	PA233
320.08	6.	192.52	1.13	2.210E-02	320.08	9.940	PBC<MDA	CR51

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
328.76	14.	98.66	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
333.44	14.	105.40	1.14	2.142E-02	333.44	15.510	PBC<MDA	Cf249
338.00	53.	21.38	1.21	2.118E-02	338.32	12.010	1.161E+01	AC228
340.57	11.	145.71	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
344.29	11.	151.60	1.15	2.090E-02	344.29	26.500	PBC<MDA	EU152
351.71	187.	8.27	0.79	2.056E-02	351.93	37.600	1.344E+01	PB214
364.48	11.	100.72	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
383.84	7.	133.74	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	118.44	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
391.69	11.	122.26	1.20	1.893E-02	391.69	64.000	PBC<MDA	SN113
427.88	10.	97.02	1.23	1.770E-02	427.88	29.600	PBC<MDA	SB125
453.88	5.	196.98	1.26	1.692E-02	453.88	65.000	PBC<MDA	pm146
463.37	24.	34.31	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	10.	123.20	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	106.60	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
487.02	10.	125.43	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	443.47	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	73.	30.69	2.56	1.546E-02	511.86	20.000	1.318E+01	RH106
537.26	9.	97.13	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
569.70	8.	142.83	1.37	1.427E-02	569.32	15.380	2.108E+00	CS134
					569.47	8.200	3.954E+00	PA234
					569.70	97.740	3.319E-01	BI207
583.04	88.	14.80	1.29	1.403E-02	583.02	84.500	4.115E+00	TL208
609.21	167.	9.78	1.53	1.358E-02	609.31	46.090	1.482E+01	BI214
621.92	14.	163.94	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
696.54	1.	913.44	1.49	1.232E-02	696.54	99.000	PBC<MDA	PM144
724.20	12.	77.33	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
735.72	4.	216.89	1.52	1.184E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	403.11	1.53	1.171E-02	747.16	34.000	PBC<MDA	pm146
756.73	6.	191.49	1.54	1.160E-02	756.73	54.460	PBC<MDA	ZR95
766.41	13.	83.27	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	2.173E+02	PA234M
785.42	2.	619.68	1.57	1.129E-02	785.42	1.280	PBC<MDA	BI212
795.87	4.	257.39	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
818.50	5.	314.84	1.60	1.096E-02	818.50	100.000	PBC<MDA	Cs136
834.85	7.	119.52	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
846.77	3.	289.64	1.63	1.070E-02	846.77	99.935	PBC<MDA	Co56
860.61	17.	47.55	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
873.23	12.	82.95	1.65	1.046E-02	873.23	12.270	PBC<MDA	EU154
898.04	7.	127.38	1.67	1.025E-02	898.04	93.700	PBC<MDA	y88
911.18	60.	15.55	0.96	1.015E-02	911.07	29.000	1.127E+01	AC228
964.11	6.	176.42	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.84	9.	86.21	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
1001.00	9.	83.88	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	5.	96.82	1.81	9.162E-03	1048.07	80.000	PBC<MDA	Cs136
1063.66	20.	34.94	1.82	9.063E-03	1063.66	74.500	1.618E+00	BI207
1119.84	23.	41.33	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.451E+00	Sc46

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.85	13.	88.54	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.377E+00	Ta182
1173.24	6.	156.94	1.92	8.426E-03	1173.24	99.900	PBC<MDA	CO60
1188.39	8.	95.58	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.06	4.	344.44	1.96	8.175E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	13.	108.79	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	4.	137.50	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	10.	84.92	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	7.	86.68	2.05	7.647E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	198.49	2.10	7.423E-03	1384.30	24.290	PBC<MDA	AG110M
1408.00	4.	156.12	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.70	245.	6.39	1.82	7.112E-03	1460.83	10.670	1.794E+02	K40
1764.04	12.	61.24	2.40	6.075E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	3.	333.13	2.41	6.055E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.55	74.51	136.	92.	2.778E+03	20.64	0.880	- sD
307.89	77.10	141.	144.	4.260E+03	14.33	0.882	- sD
742.55	185.81	77.	172.	5.352E+03	13.24	0.960	- s
837.02	209.44	40.	59.	1.972E+03	23.91	0.396	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.38	46.44	90.	40.	0.022	43.06	0.903s
TH-227	200.18	50.14	282.	-11.	-0.006	224.61	0.855s
AM-241	237.74	59.54	498.	-19.	-0.011	167.53	0.865s
TH-234	252.74	63.29	115.	108.	0.060	17.11	0.868D
Sn-126	256.71	64.28	514.	-13.	-0.007	245.22	0.869s
BA-133	323.50	80.99	247.	-26.	-0.015	107.25	0.887s
Np-237	345.49	86.49	109.	61.	0.034	27.36	0.892D
EU-155	345.70	86.54	755.	-24.	-0.013	163.13	0.892s
Sn-126	347.29	86.94	731.	-24.	-0.013	160.51	0.892
Sn-126	349.81	87.57	703.	-5.	-0.003	729.42	0.893s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cd-109	351.68	88.04	698.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	707.	-26.	-0.014	147.65	0.897s
TH-234	369.87	92.59	207.	100.	0.055	22.83	0.898D
AC-228	372.91	93.35	585.	24.	0.013	144.05	0.899s
Gd-153	389.50	97.50	550.	-23.	-0.013	143.98	0.903s
Np-239	397.50	99.50	573.	-23.	-0.013	146.65	0.905s
Gd-153	412.29	103.20	597.	-23.	-0.013	148.92	0.909s
Np-239	414.29	103.70	620.	-23.	-0.013	151.68	0.909s
EU-155	420.73	105.31	643.	-12.	-0.006	312.18	0.911s
Np-239	424.00	106.13	456.	20.	0.011	154.25	0.912s
EU-152	486.55	121.78	175.	14.	0.008	136.28	0.928s
CO-57	487.69	122.06	156.	-9.	-0.005	202.67	0.928
EU-154	491.84	123.10	147.	15.	0.008	115.87	0.929s
PA-234	524.60	131.29	330.	-22.	-0.012	120.81	0.938
HF-181	531.51	133.02	691.	-23.	-0.013	164.07	0.939s
CE-144	533.57	133.54	629.	-22.	-0.012	163.36	0.940s
HF-181	544.61	136.30	651.	-17.	-0.009	218.39	0.943
CO-57	545.30	136.47	668.	0.	0.000	1000.00	0.943
Tc-99m	561.44	140.51	668.	0.	0.000	1000.00	0.947
U-235	574.53	143.79	668.	0.	0.000	1000.00	0.950
CE-141	581.15	145.44	602.	21.	0.012	165.33	0.952s
Ba-140	649.99	162.66	241.	-3.	-0.001	825.00	0.969s
U-235	652.87	163.38	243.	0.	0.000	1000.00	0.970s
CE-139	662.76	165.85	217.	-11.	-0.006	194.76	0.973s
Cf-251	705.72	176.60	117.	6.	0.003	360.07	0.983s
U-235	742.18	185.72	311.	-35.	-0.019	68.25	0.992
TH-229	773.32	193.51	150.	-17.	-0.010	134.50	1.000s
U-235	820.59	205.33	213.	-9.	-0.005	227.66	1.012
TH-229	842.65	210.85	248.	-13.	-0.007	175.71	1.018s
Cf-251	907.22	227.00	70.	5.	0.003	295.97	1.034s
PB-212	953.73	238.63	59.	210.	0.117	8.64	1.045D
PB-214	967.18	242.00	45.	63.	0.035	19.55	1.049D
EU-152	977.96	244.69	458.	-15.	-0.008	206.64	1.051s
TH-227	1024.13	256.24	92.	-14.	-0.008	133.82	1.063s
Cd-113m	1053.96	263.70	91.	-7.	-0.004	205.67	1.070s
BI-210M	1062.48	265.83	97.	-8.	-0.005	170.41	1.072s
TL-208	1108.27	277.28	91.	16.	0.009	90.35	1.084s
Hg-203	1115.93	279.20	116.	-9.	-0.005	181.48	1.086
I-131	1136.32	284.30	59.	-4.	-0.002	394.28	1.091s
PB-214	1179.27	295.04	27.	139.	0.077	11.31	0.769s
TL-210	1183.11	296.00	443.	-14.	-0.008	209.41	1.102
PB-212	1199.22	300.03	34.	13.	0.007	8.92	1.106A
PA-233	1199.82	300.18	428.	0.	0.000	1000.00	1.107s
BA-133	1210.50	302.85	428.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	428.	0.	0.000	1000.00	1.111
BI-210M	1218.68	304.90	428.	0.	0.000	1000.00	1.111
Ir-192	1232.85	308.44	428.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	428.	0.	0.000	1000.00	1.118s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CR-51	1279.41	320.08	41.	6.	0.004	192.52	1.126
La-140	1314.10	328.76	84.	14.	0.008	98.66	1.135s
Cf-249	1332.81	333.44	98.	14.	0.008	105.40	1.139s
AC-228	1351.04	338.00	20.	53.	0.030	21.38	1.212
Cs-136	1361.32	340.57	113.	11.	0.006	145.71	1.146s
EU-152	1376.18	344.29	123.	11.	0.006	151.60	1.150
HF-181	1382.35	345.83	205.	-15.	-0.008	137.66	1.151s
PB-214	1405.89	351.71	18.	187.	0.104	8.27	0.790s
BA-133	1423.02	356.00	272.	-13.	-0.007	176.39	1.162s
I-131	1456.95	364.48	32.	11.	0.006	100.72	1.170s
BA-133	1534.35	383.84	37.	7.	0.004	133.74	1.189s
Cf-249	1550.79	387.95	44.	8.	0.005	118.44	1.193s
SN-113	1565.74	391.69	90.	11.	0.006	122.26	1.196s
SB-125	1710.45	427.88	20.	10.	0.005	97.02	1.232s
pm-146	1814.45	453.88	24.	5.	0.003	196.98	1.257s
SB-125	1852.39	463.37	22.	24.	0.013	34.31	1.266s
Ir-192	1871.16	468.06	67.	10.	0.005	123.20	1.271s
BE-7	1909.29	477.60	62.	11.	0.006	106.60	1.280s
HF-181	1926.90	482.00	88.	-12.	-0.007	112.33	1.284s
La-140	1946.98	487.02	74.	10.	0.006	125.43	1.289s
RU-103	1987.11	497.05	20.	2.	0.001	443.47	1.298
RH-106	2046.35	511.86	67.	73.	0.041	30.69	2.563
Nd-147	2122.88	531.00	35.	-2.	-0.001	725.26	1.331s
Ba-140	2147.92	537.26	17.	9.	0.005	97.13	1.337s
CS-134	2251.82	563.24	52.	-10.	-0.006	150.55	1.362
CS-134	2276.15	569.32	61.	-18.	-0.010	66.31	1.367s
PA-234	2276.75	569.47	72.	-2.	-0.001	545.80	1.368s
BI-207	2277.68	569.70	67.	8.	0.005	142.83	1.368s
TL-208	2331.02	583.04	18.	88.	0.049	14.80	1.288
SB-125	2400.87	600.50	299.	-9.	-0.005	278.80	1.397s
SB-124	2409.79	602.73	290.	0.	0.000	1000.00	1.399s
CS-134	2417.71	604.71	325.	-15.	-0.008	176.32	1.401s
BI-214	2435.72	609.21	20.	167.	0.093	9.78	1.530
RU-103	2440.06	610.30	310.	-15.	-0.008	171.77	1.406s
AG-108M	2455.99	614.28	295.	-6.	-0.004	382.72	1.410s
PM-144	2471.12	618.06	346.	-18.	-0.010	150.27	1.414s
RH-106	2486.54	621.92	254.	14.	0.008	163.94	1.417s
SB-125	2542.43	635.89	30.	-7.	-0.004	112.45	1.430s
I-131	2546.77	636.97	54.	-8.	-0.005	131.79	1.432s
AG-110M	2629.92	657.76	57.	-14.	-0.008	79.57	1.451s
CS-137	2645.51	661.66	77.	-7.	-0.004	188.69	1.455s
PM-144	2785.05	696.54	33.	1.	0.001	913.44	1.487s
NB-94	2809.41	702.63	51.	-15.	-0.009	102.36	1.493s
SB-124	2890.04	722.79	51.	-1.	-0.001	764.85	1.512s
AG-108M	2890.65	722.94	53.	0.	0.000	1000.00	1.512s
EU-154	2892.32	723.36	53.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	36.	12.	0.007	77.33	1.513s
BI-212	2907.58	727.17	72.	-15.	-0.008	84.43	1.516s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2941.78	735.72	19.	4.	0.002	216.89	1.524s
pm-146	2987.55	747.16	14.	2.	0.001	403.11	1.535s
ZR-95	3025.83	756.73	28.	6.	0.003	191.49	1.543s
AG-110M	3054.69	763.94	64.	-17.	-0.010	70.27	1.550s
PA-234M	3064.57	766.41	54.	13.	0.007	83.27	1.552s
EU-152	3114.61	778.92	23.	-4.	-0.002	241.30	1.564s
BI-212	3140.62	785.42	23.	2.	0.001	619.68	1.570s
CS-134	3182.42	795.87	51.	4.	0.002	257.39	1.579
TL-210	3197.35	799.60	55.	0.	0.000	1000.00	1.583
CS-134	3206.76	801.95	75.	-16.	-0.009	82.38	1.585s
CO-58	3242.06	810.78	76.	-16.	-0.009	82.65	1.593s
La-140	3262.05	815.77	92.	-16.	-0.009	89.79	1.598s
Cs-136	3272.97	818.50	100.	5.	0.003	314.84	1.600s
MN-54	3338.38	834.85	14.	7.	0.004	119.52	1.615s
Co-56	3386.08	846.77	15.	3.	0.002	289.64	1.626s
TL-208	3441.27	860.56	10.	17.	0.009	47.55	1.638
NB-94	3483.41	871.10	42.	-15.	-0.008	66.33	1.648s
EU-154	3491.95	873.23	48.	12.	0.007	82.95	1.650s
PA-234	3521.16	880.53	68.	-14.	-0.008	86.82	1.657s
PA-234	3532.00	883.24	82.	-2.	-0.001	682.43	1.659s
AG-110M	3537.78	884.68	84.	0.	0.000	1000.00	1.660s
Sc-46	3556.17	889.28	92.	-9.	-0.005	157.07	1.664s
y-88	3591.22	898.04	15.	7.	0.004	127.38	1.672s
AC-228	3643.79	911.18	6.	60.	0.033	15.55	0.961s
AG-110M	3749.09	937.49	35.	-9.	-0.005	148.31	1.708s
PA-234	3783.21	946.02	30.	-10.	-0.006	124.50	1.716s
EU-152	3855.60	964.11	62.	6.	0.004	176.42	1.732s
AC-228	3875.05	968.97	23.	9.	0.005	86.21	1.736
EU-154	3984.54	996.33	51.	-3.	-0.002	360.79	1.761s
PA-234M	4003.22	1001.00	22.	9.	0.005	83.88	1.765s
EU-154	4018.33	1004.77	58.	-8.	-0.005	133.96	1.768s
Cs-136	4191.60	1048.07	11.	5.	0.003	96.82	1.807s
RH-106	4200.76	1050.36	19.	-1.	-0.001	624.50	1.809s
BI-207	4253.99	1063.66	5.	20.	0.011	34.94	1.820s
Ga-68	4308.98	1077.40	16.	-3.	-0.002	308.52	1.833s
FE-59	4396.44	1099.25	27.	-6.	-0.003	211.36	1.852s
EU-152	4447.76	1112.07	82.	-9.	-0.005	148.00	1.863s
ZN-65	4461.66	1115.55	73.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	33.	23.	0.013	41.33	1.870D
Sc-46	4481.68	1120.55	73.	0.	0.000	1000.00	1.870s
Ta-182	4484.69	1121.30	60.	13.	0.007	88.54	1.871s
CO-60	4692.57	1173.24	16.	6.	0.003	156.94	1.916s
Ta-182	4755.86	1189.05	11.	8.	0.005	95.58	1.930s
Ta-182	4885.39	1221.41	28.	4.	0.002	344.44	1.957s
Co-56	4952.92	1238.28	34.	13.	0.007	108.79	1.972s
NA-22	5098.03	1274.53	23.	-9.	-0.005	84.79	2.003s
EU-154	5098.09	1274.54	31.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	4.	0.002	137.50	2.017s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	5252.04	1313.00	11.	10.	0.006	84.92	2.036
CO-60	5330.11	1332.50	6.	7.	0.004	86.68	2.052s
AG-110M	5537.48	1384.30	17.	5.	0.003	198.49	2.096s
EU-152	5632.39	1408.00	6.	4.	0.002	156.12	2.115s
K-40	5843.40	1460.70	0.	245.	0.136	6.39	1.816
La-140	6386.02	1596.21	12.	-2.	-0.001	424.26	2.269s
SB-124	6765.58	1690.98	0.	0.	0.000	1000.00	2.345s
BI-214	7060.00	1764.49	20.	12.	0.007	61.24	2.403s
Co-56	7087.48	1771.35	33.	3.	0.001	333.13	2.408s
y-88	7346.69	1836.06	0.	0.	0.000	1000.00	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.5338E+00					5.31E+01	
			477.60	3.534E+00	?(	1.278E+01	1.07E+02	1.05E+01 G
NA-22	C	-6.0876E-01					9.50E+02	
			1274.53	-6.088E-01	?(	1.749E+00	8.48E+01	9.99E+01 G
K-40	N	1.7936E+02					4.66E+11	
			1460.83	1.794E+02	(	5.395E+00	6.39E+00	1.07E+01 G
Sc-46	F	-4.7533E-01					8.38E+01	
			889.28	-4.753E-01	&(	2.549E+00	1.57E+02	1.00E+02 G
			1120.55	0.000E+00	+	2.709E+00	1.00E+03	1.00E+02 G
CR-51	F	1.6019E+00					2.77E+01	
			320.08	1.602E+00	(	8.202E+00	1.93E+02	9.94E+00 G
MN-54	C	3.5989E-01					3.12E+02	
			834.85	3.599E-01	?(	1.036E+00	1.20E+02	1.00E+02 G
FE-59	F	-4.8726E-02					4.45E+01	
			1099.25	-6.299E-01	?(	2.976E+00	2.11E+02	5.65E+01 G
			1291.60	7.114E-01	?(	2.266E+00	1.37E+02	4.32E+01 G
Co-56	C	6.3162E-01					7.73E+01	
			846.77	1.559E-01	&(	1.079E+00	2.90E+02	9.99E+01 G
			1238.28	1.351E+00	&(	3.106E+00	1.09E+02	6.61E+01 G
			1037.84	-1.420E-01	%	1.032E+01	3.15E+03	1.41E+01 G
			1771.35	1.483E+00	?	1.759E+01	3.33E+02	1.55E+01 A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	-1.5395E-01					2.72E+02	
			122.06	-1.539E-01	(	1.061E+00	2.03E+02	8.56E+01 G
			136.47	0.000E+00	+	1.754E+01	1.00E+03	1.07E+01 G
CO-58	C	-7.9281E-01					7.09E+01	
			810.78	-7.928E-01	?(	2.193E+00	8.26E+01	9.95E+01 G
CO-60	F	4.5742E-01					1.93E+03	
			1332.50	5.188E-01	?(	1.003E+00	8.67E+01	1.00E+02 G
			1173.24	3.960E-01	?(	1.409E+00	1.57E+02	9.99E+01 G
NB-94	I	-7.1073E-01					7.41E+06	
			702.63	-7.107E-01	?(	1.673E+00	1.02E+02	9.79E+01 G
			871.10	-7.959E-01	+	1.746E+00	6.63E+01	9.99E+01 G
ZR-95	I	8.4473E-01					6.40E+01	
			756.73	5.275E-01	?(	2.406E+00	1.91E+02	5.45E+01 G
			724.20	1.236E+00	?(	3.202E+00	7.73E+01	4.42E+01 G
NB-95	I	5.6464E-02					6.40E+01	
			765.79	5.646E-02	%(	2.188E+00	1.11E+03	9.98E+01 G
RU-103	I	7.7361E-02					3.93E+01	
			497.05	7.736E-02	?(	9.109E-01	4.43E+02	9.09E+01 G
			610.30	-1.045E+01	+	6.036E+01	1.72E+02	5.75E+00 GA
RH-106	I	5.8277E+00					3.74E+02	
			621.92	5.828E+00	?(	3.219E+01	1.64E+02	9.93E+00 G
			1050.36	-3.893E+00	&	8.963E+01	6.24E+02	1.56E+00 G
			511.86	1.318E+01		7.325E+00	3.07E+01	2.00E+01 GA
AG-108M	C	-3.5068E-02					1.53E+05	
			433.94	-3.507E-02	%(	9.597E-01	1.04E+03	9.05E+01 G
			722.94	0.000E+00	+	1.863E+00	1.00E+03	9.08E+01 G
			614.28	-2.924E-01	&	3.792E+00	3.83E+02	8.98E+01 G
AG-110M	F	3.8593E-01					2.50E+02	
			884.68	0.000E+00	?(	3.350E+00	1.00E+03	7.27E+01 G
			657.76	-6.522E-01	+	1.736E+00	7.96E+01	9.46E+01 G
			937.49	-1.464E+00	+	4.926E+00	1.48E+02	3.44E+01 G
			1384.30	1.541E+00	?(	6.756E+00	1.98E+02	2.43E+01 G
			763.94	-3.715E+00	+	8.664E+00	7.03E+01	2.23E+01 G
SN-113	F	5.1784E-01					1.15E+02	
			391.69	5.178E-01	?(	2.148E+00	1.22E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	2.7682E+00					1.01E+03	
			427.88	1.015E+00	?(	2.498E+00	9.70E+01	2.96E+01 G
			600.50	-2.001E+00	+	1.886E+01	2.79E+02	1.79E+01 G
			635.89	-2.736E+00	+	1.059E+01	1.12E+02	1.13E+01 G
			463.37	7.725E+00	?(	7.904E+00	3.43E+01	1.05E+01 G
I-131	I	3.9086E-01					8.02E+00	
			364.48	3.909E-01	?(	9.881E-01	1.01E+02	8.17E+01 G
			284.30	-1.373E+00	+	1.438E+01	3.94E+02	6.14E+00 G
			636.97	-4.813E+00	+	2.175E+01	1.32E+02	7.17E+00 G
Gd-153	F	-1.1705E+00					2.42E+02	
			97.50	-1.171E+00	?(	5.632E+00	1.44E+02	3.00E+01 G
			103.20	-1.606E+00	+	7.989E+00	1.49E+02	2.18E+01 G
Ga-68	C	-6.5675E+00					4.71E-02	
			1077.40	-6.567E+00	?(	4.674E+01	3.09E+02	3.30E+00 G
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	&(	3.498E+00	1.76E+02	6.20E+01 G
			302.85	0.000E+00	+	1.304E+01	1.00E+03	1.83E+01 G
			383.84	2.180E+00	?	1.008E+01	1.34E+02	8.94E+00 GA
			80.99	-1.247E+00	&	3.572E+00	1.07E+02	3.41E+01 GA
CS-134	I	-6.0885E-01					7.54E+02	
			604.71	-6.089E-01	?(	3.611E+00	1.76E+02	9.76E+01 G
			795.87	2.322E-01	+	2.089E+00	2.57E+02	8.55E+01 G
			569.32	-4.499E+00	+	9.867E+00	6.63E+01	1.54E+01 G
			801.95	-8.957E+00	+	2.469E+01	8.24E+01	8.69E+00 G
			563.24	-4.622E+00	+	1.678E+01	1.51E+02	8.35E+00 G
CS-137	I	-3.4311E-01					1.10E+04	
			661.66	-3.431E-01	?(	2.226E+00	1.89E+02	8.52E+01 G
CE-139	F	-2.2121E-01					1.38E+02	
			165.85	-2.212E-01	?(	1.458E+00	1.95E+02	7.99E+01 G
Ba-140	I	1.4203E+00					1.28E+01	
			537.26	1.420E+00	?(	3.378E+00	9.71E+01	2.44E+01 G
			162.66	-6.934E-01	&	1.950E+01	8.25E+02	6.22E+00 G
			304.85	0.000E+00	&	5.598E+01	1.00E+03	4.29E+00 G
La-140	I	3.2807E-01					1.28E+01	
			1596.21	-1.760E-01	?(	1.659E+00	4.24E+02	9.54E+01 G
			487.02	7.610E-01	?(	3.250E+00	1.25E+02	4.55E+01 G
			328.76	1.727E+00	&(	5.741E+00	9.87E+01	2.03E+01 G
			815.77	-3.412E+00	+	1.028E+01	8.98E+01	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	6.8074E-01					3.25E+01	
			145.44	6.807E-01	&(	3.764E+00	1.65E+02	4.82E+01 G
CE-144	I	-2.9905E+00					2.85E+02	
			133.54	-2.991E+00	?(	1.633E+01	1.63E+02	1.11E+01 G
PM-144	C	6.0732E-02					3.63E+02	
			696.54	6.073E-02	&(	1.337E+00	9.13E+02	9.90E+01 G
			618.06	-7.390E-01	&	3.726E+00	1.50E+02	9.91E+01 G
EU-152	F	1.2351E+00					4.94E+03	
			344.29	1.061E+00	&(	5.460E+00	1.52E+02	2.65E+01 G
			1112.07	-4.122E+00	+	2.084E+01	1.48E+02	1.36E+01 G
			121.78	7.306E-01	&(	3.358E+00	1.36E+02	2.86E+01 G
			778.92	-1.637E+00	+	9.529E+00	2.41E+02	1.29E+01 G
			964.11	2.539E+00	?(	1.545E+01	1.76E+02	1.46E+01 G
			244.69	-4.014E+00	+	2.785E+01	2.07E+02	7.58E+00 G
			1408.00	1.445E+00	?	5.101E+00	1.56E+02	2.10E+01 GA
EU-154	I	5.4093E+00					3.14E+03	
			873.23	5.409E+00	?(	1.507E+01	8.29E+01	1.23E+01 G
			123.10	5.552E-01	-	2.166E+00	1.16E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.744E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	8.372E+00	1.00E+03	2.02E+01 G
			1004.77	-2.725E+00	-	1.250E+01	1.34E+02	1.80E+01 G
			996.33	-1.562E+00	-	1.981E+01	3.61E+02	1.06E+01 G
EU-155	I	-8.1182E-01					1.81E+03	
			105.31	-8.118E-01	?(	8.504E+00	3.12E+02	2.12E+01 G
			86.54	-1.220E+00	+	6.647E+00	1.63E+02	3.07E+01 G
HF-181	F	-5.2192E-01					4.24E+01	
			482.00	-5.219E-01	&(	1.984E+00	1.12E+02	8.05E+01 G
			133.02	-7.981E-01	+	4.375E+00	1.64E+02	4.33E+01 G
			345.83	-2.650E+00	+	1.229E+01	1.38E+02	1.51E+01 G
			136.30	-4.325E+00	+	3.163E+01	2.18E+02	5.85E+00 G
Ta-182	F	2.0919E+00					1.14E+02	
			1121.30	2.377E+00	?(	7.082E+00	8.85E+01	3.49E+01 G
			1221.41	9.229E-01	?(	6.926E+00	3.44E+02	2.70E+01 G
			1189.05	3.426E+00	?(	7.371E+00	9.56E+01	1.62E+01 G
Hg-203	F	-2.3751E-01					4.66E+01	
			279.20	-2.375E-01	(	1.470E+00	1.81E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	4.2152E+00					6.98E+02	
			583.02	4.115E+00	(P	1.058E+00	1.48E+01	8.45E+01 G
			277.28	5.554E+00	?(	1.684E+01	9.04E+01	6.31E+00 G
			860.56	7.192E+00	+	7.380E+00	4.75E+01	1.24E+01 G
pm-146	C	3.8053E-01					2.02E+03	
			747.16	2.791E-01	?(	2.811E+00	4.03E+02	3.40E+01 G
			735.72	9.036E-01	?(	4.763E+00	2.17E+02	2.25E+01 G
			453.88	2.525E-01	?(	1.290E+00	1.97E+02	6.50E+01 G
y-88	F	4.0479E-01					1.07E+02	
			898.04	4.048E-01	?(	1.200E+00	1.27E+02	9.37E+01 G
			1836.06	0.000E+00	-	7.036E-01	1.00E+03	9.92E+01 G
Cd-113m		-2.4167E+03					5.33E+03	
			263.70	-2.417E+03	&(	1.707E+04	2.06E+02	6.00E-03 K
Cf-251	T	5.6073E-01					3.28E+05	
			176.60	5.607E-01	?(	5.263E+00	3.60E+02	1.70E+01 G
			227.00	1.657E+00	&	1.293E+01	2.96E+02	6.30E+00 GA
Cf-249	T	7.3281E-01					1.28E+05	
			387.95	3.659E-01	?(	1.485E+00	1.18E+02	6.60E+01 G
			333.44	2.294E+00	&(	8.154E+00	1.05E+02	1.55E+01 G
Sn-126		-2.4998E+00					3.65E+07	
			87.57	-2.134E-01	+	5.233E+00	7.29E+02	3.75E+01 GA
			64.28	-2.500E+00	&(	2.059E+01	2.45E+02	9.70E+00 G
			86.94	-4.139E+00	+	2.218E+01	1.61E+02	9.04E+00 GA
PB-210	N	2.9124E+01					8.14E+03	
			46.54	2.912E+01	(P	3.394E+01	4.31E+01	4.25E+00 G
PB-212	N	9.8257E+00					6.98E+02	
			238.63	9.826E+00	(P	1.800E+00	8.64E+00	4.33E+01 G
			300.03	9.826E+00	}	2.170E+01	8.92E+00	3.28E+00 GA
PB-214	N	1.3440E+01					5.84E+05	
			351.93	1.344E+01	(P	1.618E+00	8.27E+00	3.76E+01 G
			295.09	1.703E+01	+	3.298E+00	1.13E+01	1.93E+01 G
			242.00	1.745E+01	+ P	9.316E+00	1.95E+01	7.43E+00 GA
BI-207	C	8.8823E-01					1.18E+04	
			569.70	3.319E-01	?(	1.623E+00	1.43E+02	9.77E+01 G
			1063.66	1.618E+00	?(	1.108E+00	3.49E+01	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	-9.1865E+00					6.98E+02	
			727.17	-9.187E+00	?(	2.599E+01	8.44E+01	7.55E+00 G
			785.42	6.405E+00	+	9.691E+01	6.20E+02	1.28E+00 GA
BI-214	N	1.4819E+01					5.84E+05	
			609.31	1.482E+01	(	2.090E+00	9.78E+00	4.61E+01 G
			1120.29	9.609E+00	-	1.242E+01	4.13E+01	1.51E+01 G
			1764.49	7.025E+00	-	1.409E+01	6.12E+01	1.54E+01 G
BI-210M	T	-3.6464E-01					1.10E+09	
			265.83	-3.646E-01	?(	2.123E+00	1.70E+02	5.00E+01 G
			304.90	0.000E+00	&	8.577E+00	1.00E+03	2.80E+01 G
AC-228	N	1.1366E+01					2.10E+03	
			911.07	1.127E+01	(	2.726E+00	1.55E+01	2.90E+01 G
			968.97	2.800E+00	-	8.191E+00	8.62E+01	1.75E+01 G
			338.32	1.161E+01	(	5.124E+00	2.14E+01	1.20E+01 G
			93.35	6.575E+00	-	3.164E+01	1.44E+02	5.56E+00 XA
TH-227	N	-3.3772E+00					7.95E+03	
			50.14	-3.377E+00	(	2.562E+01	2.25E+02	8.00E+00 G
			256.24	-4.159E+00	+	1.440E+01	1.34E+02	7.00E+00 G
TH-229	N	-6.9692E+00					2.68E+06	
			193.51	-6.969E+00	?(	2.406E+01	1.34E+02	4.40E+00 G
			210.85	-8.003E+00	+	4.744E+01	1.76E+02	2.99E+00 G
TH-234	N	5.2787E+01					1.63E+12	
			63.29	5.279E+01	(P	2.575E+01	1.71E+01	3.81E+00 G
			92.59	2.724E+01	- P	1.908E+01	2.28E+01	5.58E+00 G
PA-231	N	6.5342E-01					1.20E+07	
			302.65	6.534E-01	%(	8.285E+01	3.74E+03	2.88E+00 G
			300.07	-1.008E+00	%	9.657E+01	2.83E+03	2.46E+00 G
PA-234	N	-1.8110E+00					1.63E+12	
			131.29	-1.811E+00	(	7.321E+00	1.21E+02	1.80E+01 G
			946.02	-4.199E+00	+	1.186E+01	1.24E+02	1.34E+01 G
			569.47	-1.050E+00	+	2.002E+01	5.46E+02	8.20E+00 G
			883.24	-1.053E+00	+	2.506E+01	6.82E+02	9.60E+00 G
			880.53	-1.256E+01	+	3.662E+01	8.68E+01	6.00E+00 GA
PA-234M	N	1.0149E+02					1.63E+12	
			1001.00	6.081E+01	?(	1.727E+02	8.39E+01	8.37E-01 G
			766.41	2.173E+02	?(	6.074E+02	8.33E+01	2.94E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T -1.0447E+00					1.58E+05	
		59.54	-1.045E+00	?(	5.862E+00	1.68E+02	3.59E+01 G
Np-237	F 7.2849E+00					2.14E+06	
		86.49	7.285E+00	(	6.130E+00	2.74E+01	1.31E+01 G
Ir-192	F 2.4202E-01					7.40E+01	
		316.49	9.546E-03	&(	2.831E+00	8.75E+03	8.70E+01 G
		468.06	6.330E-01	(	2.658E+00	1.23E+02	5.18E+01 G
		308.44	0.000E+00	-	7.631E+00	1.00E+03	3.18E+01 G
Cs-136	F 3.6654E-01					1.30E+01	
		818.50	2.304E-01	?(	2.501E+00	3.15E+02	1.00E+02 G
		1048.07	4.042E-01	?(	1.359E+00	9.68E+01	8.00E+01 G
		340.57	5.924E-01	(	2.933E+00	1.46E+02	4.69E+01 G
Np-239	T 1.2990E+00					2.36E+00	
		103.70	-1.459E+00	+	7.390E+00	1.52E+02	2.40E+01 X
		106.13	1.299E+00	*(	6.710E+00	1.54E+02	2.27E+01 G
		99.50	-2.337E+00	&	1.145E+01	1.47E+02	1.50E+01 X
Nd-147	-4.7363E-01					1.11E+01	
		531.00	-4.736E-01	?(	8.567E+00	7.25E+02	1.30E+01 G
		91.10	-1.393E+00	+	6.864E+00	1.48E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	282.	-11.	-0.006	224.61	-3.377E+00	
AM-241	59.54	498.	-19.	-0.011	167.53	-1.045E+00	
Sn-126	64.28	514.	-13.	-0.007	245.22	-2.500E+00	
BA-133	80.99	247.	-26.	-0.015	107.25	-1.247E+00	
EU-155	86.54	755.	-24.	-0.013	163.13	-1.220E+00	
Sn-126	86.94	731.	-24.	-0.013	160.51	-4.139E+00	
Sn-126	87.57	703.	-5.	-0.003	729.42	-2.134E-01	
Nd-147	91.10	707.	-26.	-0.014	147.65	-1.393E+00	
Gd-153	97.50	550.	-23.	-0.013	143.98	-1.171E+00	
Np-239	99.50	573.	-23.	-0.013	146.65	-2.337E+00	
Gd-153	103.20	597.	-23.	-0.013	148.92	-1.606E+00	
Np-239	103.70	620.	-23.	-0.013	151.68	-1.459E+00	
EU-155	105.31	643.	-12.	-0.006	312.18	-8.118E-01	
Np-239	106.13	456.	20.	0.011	154.25	1.299E+00	
EU-152	121.78	175.	14.	0.008	136.28	7.306E-01	
CO-57	122.06	156.	-9.	-0.005	202.67	-1.539E-01	
EU-154	123.10	147.	15.	0.008	115.87	5.552E-01	
PA-234	131.29	330.	-22.	-0.012	120.81	-1.811E+00	
HF-181	133.02	691.	-23.	-0.013	164.07	-7.981E-01	
CE-144	133.54	629.	-22.	-0.012	163.36	-2.991E+00	
HF-181	136.30	651.	-17.	-0.009	218.39	-4.325E+00	
CE-141	145.44	602.	21.	0.012	165.33	6.807E-01	
Ba-140	162.66	241.	-3.	-0.001	825.00	-6.934E-01	
CE-139	165.85	217.	-11.	-0.006	194.76	-2.212E-01	
Cf-251	176.60	117.	6.	0.003	360.07	5.607E-01	
U-235	185.72	311.	-35.	-0.019	68.25	-1.107E+00	P
TH-229	193.51	150.	-17.	-0.010	134.50	-6.969E+00	
U-235	205.33	213.	-9.	-0.005	227.66	-3.355E+00	
TH-229	210.85	248.	-13.	-0.007	175.71	-8.003E+00	
Cf-251	227.00	70.	5.	0.003	295.97	1.657E+00	
EU-152	244.69	458.	-15.	-0.008	206.64	-4.014E+00	
TH-227	256.24	92.	-14.	-0.008	133.82	-4.159E+00	
Cd-113m	263.70	91.	-7.	-0.004	205.67	-2.417E+03	
BI-210M	265.83	97.	-8.	-0.005	170.41	-3.646E-01	
Hg-203	279.20	116.	-9.	-0.005	181.48	-2.375E-01	
I-131	284.30	59.	-4.	-0.002	394.28	-1.373E+00	
TL-210	296.00	443.	-14.	-0.008	209.41	-4.300E-01	
CR-51	320.08	41.	6.	0.004	192.52	1.602E+00	
La-140	328.76	84.	14.	0.008	98.66	1.727E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	333.44	98.	14.	0.008	105.40	2.294E+00	
Cs-136	340.57	113.	11.	0.006	145.71	5.924E-01	
EU-152	344.29	123.	11.	0.006	151.60	1.061E+00	
HF-181	345.83	205.	-15.	-0.008	137.66	-2.650E+00	
BA-133	356.00	272.	-13.	-0.007	176.39	-5.884E-01	
I-131	364.48	32.	11.	0.006	100.72	3.909E-01	
BA-133	383.84	37.	7.	0.004	133.74	2.180E+00	
Cf-249	387.95	44.	8.	0.005	118.44	3.659E-01	
SN-113	391.69	90.	11.	0.006	122.26	5.178E-01	
pm-146	453.88	24.	5.	0.003	196.98	2.525E-01	
Ir-192	468.06	67.	10.	0.005	123.20	6.330E-01	
BE-7	477.60	62.	11.	0.006	106.60	3.534E+00	
HF-181	482.00	88.	-12.	-0.007	112.33	-5.219E-01	
La-140	487.02	74.	10.	0.006	125.43	7.610E-01	
RU-103	497.05	20.	2.	0.001	443.47	7.736E-02	
RH-106	511.86	67.	73.	0.041	30.69	1.318E+01	
Nd-147	531.00	35.	-2.	-0.001	725.26	-4.736E-01	
Ba-140	537.26	17.	9.	0.005	97.13	1.420E+00	
CS-134	563.24	52.	-10.	-0.006	150.55	-4.622E+00	
CS-134	569.32	61.	-18.	-0.010	66.31	-4.499E+00	
PA-234	569.47	72.	-2.	-0.001	545.80	-1.050E+00	
BI-207	569.70	67.	8.	0.005	142.83	3.319E-01	
CS-134	604.71	325.	-15.	-0.008	176.32	-6.089E-01	
RU-103	610.30	310.	-15.	-0.008	171.77	-1.045E+01	
AG-108M	614.28	295.	-6.	-0.004	382.72	-2.924E-01	
PM-144	618.06	346.	-18.	-0.010	150.27	-7.390E-01	
RH-106	621.92	254.	14.	0.008	163.94	5.828E+00	
I-131	636.97	54.	-8.	-0.005	131.79	-4.813E+00	
AG-110M	657.76	57.	-14.	-0.008	79.57	-6.522E-01	
CS-137	661.66	77.	-7.	-0.004	188.69	-3.431E-01	
PM-144	696.54	33.	1.	0.001	913.44	6.073E-02	
NB-94	702.63	51.	-15.	-0.009	102.36	-7.107E-01	
SB-124	722.79	51.	-1.	-0.001	764.85	-5.713E-01	
ZR-95	724.20	36.	12.	0.007	77.33	1.236E+00	
BI-212	727.17	72.	-15.	-0.008	84.43	-9.187E+00	
pm-146	735.72	19.	4.	0.002	216.89	9.036E-01	
pm-146	747.16	14.	2.	0.001	403.11	2.791E-01	
ZR-95	756.73	28.	6.	0.003	191.49	5.275E-01	
AG-110M	763.94	64.	-17.	-0.010	70.27	-3.715E+00	
PA-234M	766.41	54.	13.	0.007	83.27	2.173E+02	
EU-152	778.92	23.	-4.	-0.002	241.30	-1.637E+00	
BI-212	785.42	23.	2.	0.001	619.68	6.405E+00	
CS-134	795.87	51.	4.	0.002	257.39	2.322E-01	
CS-134	801.95	75.	-16.	-0.009	82.38	-8.957E+00	
CO-58	810.78	76.	-16.	-0.009	82.65	-7.928E-01	
La-140	815.77	92.	-16.	-0.009	89.79	-3.412E+00	
Cs-136	818.50	100.	5.	0.003	314.84	2.304E-01	
MN-54	834.85	14.	7.	0.004	119.52	3.599E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	846.77	15.	3.	0.002	289.64	1.559E-01	
NB-94	871.10	42.	-15.	-0.008	66.33	-7.959E-01	
EU-154	873.23	48.	12.	0.007	82.95	5.409E+00	
PA-234	880.53	68.	-14.	-0.008	86.82	-1.256E+01	
PA-234	883.24	82.	-2.	-0.001	682.43	-1.053E+00	
Sc-46	889.28	92.	-9.	-0.005	157.07	-4.753E-01	
y-88	898.04	15.	7.	0.004	127.38	4.048E-01	
AG-110M	937.49	35.	-9.	-0.005	148.31	-1.464E+00	
PA-234	946.02	30.	-10.	-0.006	124.50	-4.199E+00	
EU-152	964.11	62.	6.	0.004	176.42	2.539E+00	
EU-154	996.33	51.	-3.	-0.002	360.79	-1.562E+00	
PA-234M	1001.00	22.	9.	0.005	83.88	6.081E+01	
EU-154	1004.77	58.	-8.	-0.005	133.96	-2.725E+00	
Cs-136	1048.07	11.	5.	0.003	96.82	4.042E-01	
RH-106	1050.36	19.	-1.	-0.001	624.50	-3.893E+00	
BI-207	1063.66	5.	20.	0.011	34.94	1.618E+00	
Ga-68	1077.40	16.	-3.	-0.002	308.52	-6.567E+00	
FE-59	1099.25	27.	-6.	-0.003	211.36	-6.299E-01	
EU-152	1112.07	82.	-9.	-0.005	148.00	-4.122E+00	
CO-60	1173.24	16.	6.	0.003	156.94	3.960E-01	
Co-56	1238.28	34.	13.	0.007	108.79	1.351E+00	
NA-22	1274.53	23.	-9.	-0.005	84.79	-6.088E-01	
FE-59	1291.60	6.	4.	0.002	137.50	7.114E-01	
TL-210	1313.00	11.	10.	0.006	84.92	3.426E+00	
CO-60	1332.50	6.	7.	0.004	86.68	5.188E-01	
AG-110M	1384.30	17.	5.	0.003	198.49	1.541E+00	
EU-152	1408.00	6.	4.	0.002	156.12	1.445E+00	
La-140	1596.21	12.	-2.	-0.001	424.26	-1.760E-01	
Co-56	1771.35	33.	3.	0.001	333.13	1.483E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.5338E+00	3.5338E+00	1.066E+02%	1.28E+01
NA-22	#A	-6.0876E-01	-6.0876E-01	8.479E+01%	1.75E+00
K-40		1.7936E+02	1.7936E+02	6.389E+00%	5.40E+00
Sc-46	#A	-4.7532E-01	-4.7533E-01	1.571E+02%	2.55E+00
CR-51	#A	1.6019E+00	1.6019E+00	1.925E+02%	8.20E+00
MN-54	#A	3.5989E-01	3.5989E-01	1.195E+02%	1.04E+00
FE-59	#A	-4.8726E-02	-4.8726E-02	1.261E+02%	2.98E+00
Co-56	#A	6.3162E-01	6.3162E-01	1.088E+02%	1.08E+00
CO-57	#A	-1.5394E-01	-1.5395E-01	2.027E+02%	1.06E+00
CO-58	#A	-7.9280E-01	-7.9281E-01	8.265E+01%	2.19E+00
CO-60	#A	4.5742E-01	4.5742E-01	8.668E+01%	1.00E+00

ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.34E+00
NB-94	#A	-7.1073E-01	-7.1073E-01	1.024E+02%	1.67E+00
ZR-95	#A	8.4473E-01	8.4473E-01	7.733E+01%	2.41E+00
NB-95	#A	5.6463E-02	5.6464E-02	1.109E+03%	2.19E+00
RU-103	#A	7.7361E-02	7.7361E-02	4.435E+02%	9.11E-01
RH-106	#A	5.8277E+00	5.8277E+00	1.639E+02%	3.22E+01
AG-108M	#A	-3.5068E-02	-3.5068E-02	1.041E+03%	9.60E-01
AG-110M	#A	3.8593E-01	3.8593E-01	1.985E+02%	3.35E+00
SN-113	#A	5.1784E-01	5.1784E-01	1.223E+02%	2.15E+00
SB-124	#A	0.0000E+00	0.0000E+00	7.071E+02%	3.39E+00
SB-125	#C	2.7682E+00	2.7682E+00	3.431E+01%	2.50E+00
I-131	#A	3.9085E-01	3.9086E-01	1.007E+02%	9.88E-01
Gd-153	#A	-1.1705E+00	-1.1705E+00	1.440E+02%	5.63E+00
Ga-68	#A	-6.5329E+00	-6.5675E+00	3.085E+02%	4.67E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+00
BA-133	#A	-5.8842E-01	-5.8842E-01	1.764E+02%	3.50E+00
CS-134	#A	-6.0885E-01	-6.0885E-01	1.763E+02%	3.61E+00
CS-137	#A	-3.4311E-01	-3.4311E-01	1.887E+02%	2.23E+00
CE-139	#A	-2.2121E-01	-2.2121E-01	1.948E+02%	1.46E+00
Ba-140	#A	1.4203E+00	1.4203E+00	9.713E+01%	3.38E+00
La-140	#A	3.2807E-01	3.2807E-01	9.866E+01%	1.66E+00
CE-141	#A	6.8073E-01	6.8074E-01	1.653E+02%	3.76E+00
CE-144	#A	-2.9905E+00	-2.9905E+00	1.634E+02%	1.63E+01
PM-144	#A	6.0731E-02	6.0732E-02	9.134E+02%	1.34E+00
EU-152	#A	1.2351E+00	1.2351E+00	8.986E+01%	5.46E+00
EU-154	#A	5.4093E+00	5.4093E+00	8.295E+01%	1.51E+01
EU-155	#A	-8.1182E-01	-8.1182E-01	3.122E+02%	8.50E+00
HF-181	#A	-5.2192E-01	-5.2192E-01	1.123E+02%	1.98E+00
Ta-182	#A	2.0919E+00	2.0919E+00	8.854E+01%	7.08E+00
Hg-203	#A	-2.3751E-01	-2.3751E-01	1.815E+02%	1.47E+00
TL-208		4.2152E+00	4.2152E+00	1.480E+01%	1.06E+00
pm-146	#A	3.8053E-01	3.8053E-01	1.661E+02%	2.81E+00
y-88	#A	4.0479E-01	4.0479E-01	1.274E+02%	1.20E+00
Cd-113m	#A	-2.4167E+03	-2.4167E+03	2.057E+02%	1.71E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.15E+01
Cf-251	#A	5.6073E-01	5.6073E-01	3.601E+02%	5.26E+00
Cf-249	#A	7.3281E-01	7.3281E-01	7.927E+01%	1.49E+00
Sn-126	#A	-2.4998E+00	-2.4998E+00	2.452E+02%	2.06E+01
PB-210	#A	2.9124E+01	2.9124E+01	4.306E+01%	3.39E+01
PB-212		9.8257E+00	9.8257E+00	8.635E+00%	1.80E+00
PB-214		1.3440E+01	1.3440E+01	8.269E+00%	1.62E+00
BI-207	#A	8.8823E-01	8.8823E-01	3.494E+01%	1.62E+00
BI-212	#A	-9.1865E+00	-9.1865E+00	8.443E+01%	2.60E+01
U-235	#A	0.0000E+00	0.0000E+00	7.071E+02%	1.73E+01
BI-214		1.4819E+01	1.4819E+01	9.785E+00%	2.09E+00
BI-210M	#A	-3.6464E-01	-3.6464E-01	1.704E+02%	2.12E+00
AC-228		1.1366E+01	1.1366E+01	1.322E+01%	2.73E+00
TH-227	#A	-3.3772E+00	-3.3772E+00	2.246E+02%	2.56E+01
TH-229	#A	-6.9692E+00	-6.9692E+00	1.345E+02%	2.41E+01

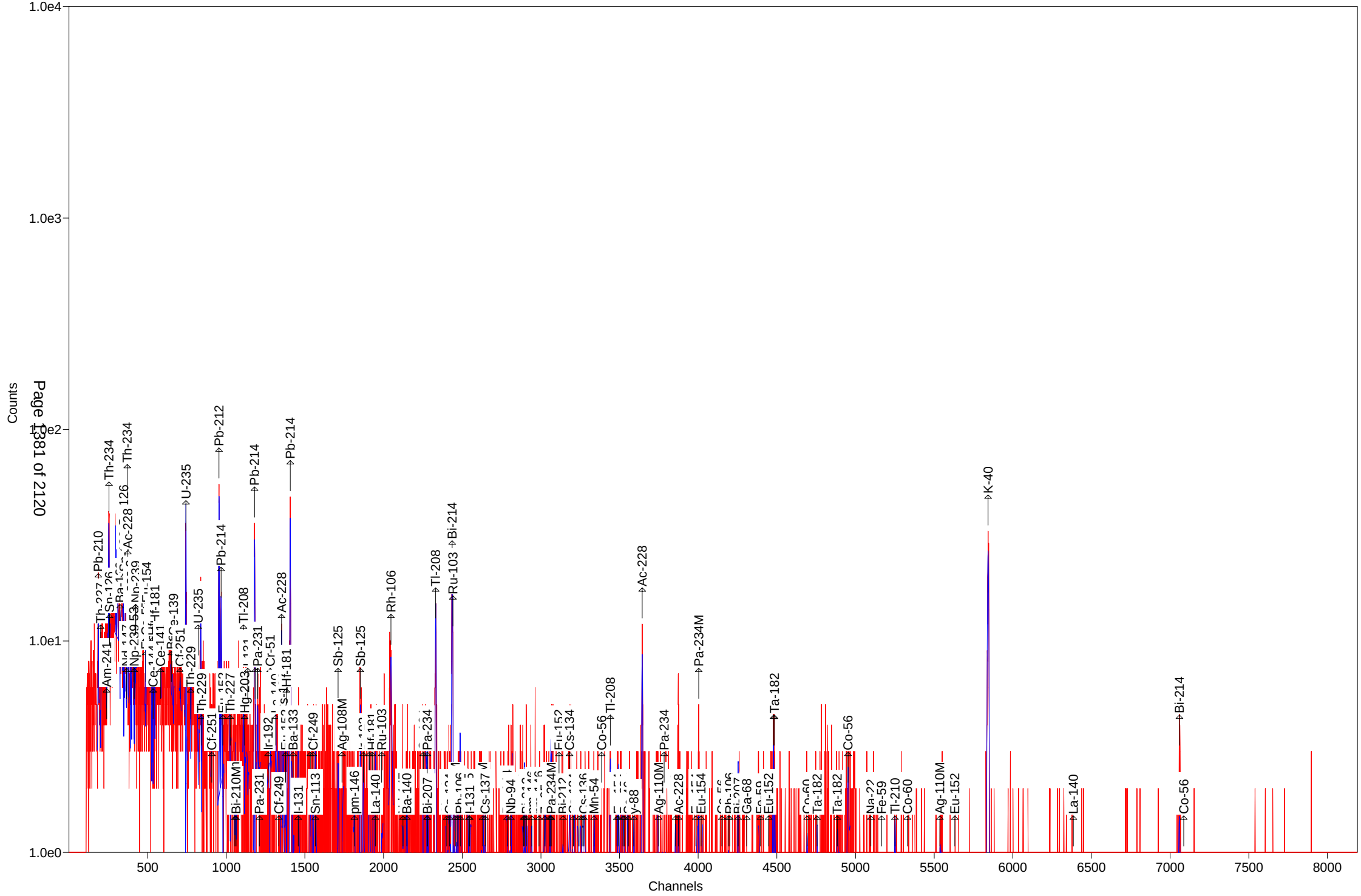
TH-234	5.2787E+01	5.2787E+01	1.711E+01%	2.57E+01
PA-231 #A	6.5342E-01	6.5342E-01	3.744E+03%	8.29E+01
PA-233 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.79E+00
PA-234 #A	-1.8110E+00	-1.8110E+00	1.208E+02%	7.32E+00
PA-234M#A	1.0149E+02	1.0149E+02	5.910E+01%	1.73E+02
AM-241 #A	-1.0447E+00	-1.0447E+00	1.675E+02%	5.86E+00
Np-237	7.2849E+00	7.2849E+00	2.736E+01%	6.13E+00
Ir-192 #A	2.4202E-01	2.4202E-01	1.232E+02%	2.83E+00
Cs-136 #A	3.6654E-01	3.6654E-01	9.682E+01%	2.50E+00
Np-239 #A	1.2989E+00	1.2990E+00	1.543E+02%	6.71E+00
Nd-147 #A	-4.7362E-01	-4.7363E-01	7.253E+02%	8.57E+00
TL-210 A	0.0000E+00	0.0000E+00	1.000E+03%	1.88E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 3.222E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 3.2222159E+02 Bq/Sample

379951_Gamma_160-29881-A-33-C. 12_Gamma_20181529.spc.


Counts
Channels
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Th-234
Pb-210
Th-227
Sn-126
Ac-228
Np-239
Ce-141
Hf-181
Cf-251
U-235
Th-229
Pb-212
Pb-214
Th-227
Cf-251
Tl-208
Pa-231
Ac-228
Hf-181
Cr-51
Ba-133
Cf-249
Sb-125
Ag-108M
Rh-106
Ru-103
Bi-214
Pa-234
Cs-134
Co-56
Pa-234M
Ta-182
K-40
Bi-214
Co-56
La-140
Ag-110M
Eu-152
Na-22
Fe-59
Tl-210
Co-60
Ag-110M
Eu-152
Ac-228
Pa-234
Eu-154
Ga-68
Eu-152
Co-60
Ta-182
Ta-182
Co-56
Bi-210M
Pa-231
Cf-249
I-131
Sn-113
pm-146
La-140
Ba-140
Bi-207
Cs-137
Nb-94
Pa-234M
Cs-136
Mn-54
y-88
Co-56
Pb-214
Pb-214
Pb-214

Test America St. Louis Spectrum ID: 14_Gamma_20183189

Sample Description: 379951_Gamma_160-29881-A-34-B
Detector: Detector #14
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-A-34-B

Decay to Time: 8/23/2018 07:43 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:43:40 Real Time: 1803 sec
Analysis Time: 8/23/2018 08:14 Dead Time: 0.14 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Long_Rev14.lib
Bkgd Correction File: 14_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.222E+00	123.9	2.752E+00	2.755E+00	9.487E+00
NA-22	-1.925E-01	183.7	3.537E-01	3.538E-01	1.294E+00
K-40	2.000E+02	6.2	1.249E+01	1.615E+01	8.867E+00
Sc-46	4.972E-01	111.2	5.527E-01	5.533E-01	1.885E+00
CR-51	-2.394E-01	1021.4	2.446E+00	2.446E+00	8.670E+00
MN-54	2.648E-01	98.7	2.612E-01	2.616E-01	6.523E-01
FE-59	2.261E-01	431.6	9.759E-01	9.760E-01	2.347E+00
Co-56	7.269E-01	37.0	2.688E-01	2.714E-01	8.860E-01
CO-57	5.707E-02	344.7	1.967E-01	1.968E-01	6.813E-01
CO-58	-1.253E-01	308.5	3.866E-01	3.866E-01	1.383E+00
CO-60	2.107E-02	179.4	3.780E-02	3.781E-02	1.598E+00
ZN-65	6.093E-08	1875749788.4	1.143E+00	1.143E+00	4.112E+00
NB-94	2.970E-01	100.5	2.984E-01	2.988E-01	7.533E-01
ZR-95	-5.779E-01	98.8	5.707E-01	5.715E-01	2.113E+00
NB-95	2.377E-01	103.3	2.454E-01	2.457E-01	8.579E-01
RU-103	0.000E+00	1.#INF	5.237E-02	5.237E-02	8.721E-01
RH-106	-8.011E-01	70.9	5.677E-01	5.693E-01	1.498E+01
AG-108M	-1.774E-01	170.6	3.026E-01	3.027E-01	8.258E-01
AG-110M	5.221E-01	57.0	2.974E-01	2.986E-01	2.697E+00
SN-113	2.872E-01	142.0	4.077E-01	4.080E-01	1.410E+00
SB-124	-4.743E-01	159.9	7.582E-01	7.586E-01	2.565E+00
SB-125	3.961E-01	229.7	9.100E-01	9.102E-01	2.485E+00
I-131	-1.541E-01	76.7	1.181E-01	1.184E-01	9.974E-01
Gd-153	5.565E-01	118.8	6.609E-01	6.617E-01	2.233E+00
Ga-68	-8.907E+00	250.8	2.234E+01	2.235E+01	5.244E+01
Tc-99m	1.834E-01	129.5	2.375E-01	2.378E-01	8.044E-01
BA-133	6.947E-02	997.4	6.929E-01	6.929E-01	2.389E+00
CS-134	-6.313E-02	88.7	5.601E-02	5.610E-02	2.503E+00
CS-137	1.624E-01	234.6	3.809E-01	3.810E-01	1.353E+00
CE-139	2.106E-01	120.8	2.544E-01	2.552E-01	8.621E-01
Ba-140	-3.680E-02	132.3	4.868E-02	4.872E-02	3.469E+00
La-140	4.443E-01	46.6	2.071E-01	2.084E-01	6.716E-01
CE-141	3.504E-01	138.1	4.841E-01	4.844E-01	1.637E+00

CE-144	7.613E-01	253.5	1.930E+00	1.930E+00	6.600E+00
PM-144	3.761E-01	94.0	3.537E-01	3.543E-01	8.690E-01
EU-152	1.107E+00	64.3	7.117E-01	7.141E-01	4.651E+00
EU-154	-4.890E+00	84.9	4.153E+00	4.161E+00	1.399E+01
EU-155	8.660E-02	182.8	1.583E-01	1.584E-01	3.254E+00
HF-181	3.275E-01	128.6	4.210E-01	4.213E-01	1.238E+00
Ta-182	1.573E+00	69.0	1.086E+00	1.089E+00	3.606E+00
Hg-203	2.204E-01	103.5	2.281E-01	2.284E-01	7.798E-01
TL-208	1.691E+00	23.7	4.003E-01	4.098E-01	8.715E-01
pm-146	9.444E-01	95.6	9.026E-01	9.040E-01	2.264E+00
y-88	1.316E-01	44.7	5.885E-02	5.923E-02	9.795E-01
Cd-113m	3.412E+02	1118.0	3.815E+03	3.815E+03	1.345E+04
Cd-109	4.991E+00	164.6	8.214E+00	8.218E+00	2.766E+01
Cf-251	8.586E-01	110.7	9.504E-01	9.534E-01	2.622E+00
Cf-249	-1.387E-01	392.5	5.445E-01	5.446E-01	1.890E+00
Sn-126	2.377E+00	111.9	2.660E+00	2.663E+00	8.975E+00
PB-210	2.589E+00	242.9	6.288E+00	6.289E+00	2.039E+01
PB-212	3.455E+00	14.7	5.065E-01	5.536E-01	1.180E+00
PB-214	6.411E+00	12.2	7.825E-01	8.505E-01	1.401E+00
BI-207	-2.879E-01	122.1	3.515E-01	3.518E-01	1.209E+00
BI-212	-4.835E+00	83.4	4.031E+00	4.039E+00	2.075E+01
U-235	1.312E+00	152.1	1.995E+00	1.996E+00	6.767E+00
BI-214	4.455E+00	18.7	8.310E-01	8.626E-01	1.662E+00
BI-210M	2.048E-01	225.1	4.610E-01	4.611E-01	1.296E+00
AC-228	8.575E-01	146.4	1.256E+00	1.256E+00	5.545E+00
TH-227	-4.009E+00	74.5	2.985E+00	2.993E+00	1.295E+01
TH-229	-5.900E+00	88.7	5.234E+00	5.255E+00	1.692E+01
TH-234	9.389E-01	918.1	8.620E+00	8.621E+00	2.526E+01
PA-231	-1.033E+01	166.2	1.717E+01	1.718E+01	5.793E+01
PA-233	-1.458E-02	5628.8	8.207E-01	8.207E-01	4.876E+00
PA-234	3.712E-01	413.3	1.534E+00	1.534E+00	4.297E+00
PA-234M	5.047E+01	81.7	4.124E+01	4.132E+01	1.502E+02
AM-241	6.458E-01	124.5	8.038E-01	8.045E-01	2.309E+00
Np-237	0.000E+00	1.#INF	2.524E+00	2.524E+00	8.593E+00
Ir-192	-6.325E-02	430.7	2.724E-01	2.724E-01	9.606E-01
Cs-136	4.720E-03	60.2	2.840E-03	2.853E-03	1.650E+00
Np-239	1.018E-01	888.8	9.052E-01	9.052E-01	3.123E+00
Nd-147	-2.848E+00	97.0	2.762E+00	2.767E+00	6.970E+00
TL-210	-3.075E-01	128.1	3.938E-01	3.942E-01	1.367E+00
Total	6.362E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-A-34-B

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20183189.An1

Acquisition information
Start time: 8/23/2018 7:43:40 AM
Live time: 1800
Real time: 1803
Dead time: 0.14 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.14keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:43:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2499

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.85	4.	242.85	1.00	2.171E-02	46.54	4.250	PBC<MDA	PB210
58.99	13.	124.46	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.29	2.	918.12	0.77	3.281E-02	63.29	3.810	PBC<MDA	TH234
64.28	14.	111.90	0.77	3.334E-02	64.28	9.700	PBC<MDA	Sn126
77.23	74.	21.66	0.81	3.900E-02				
86.54	12.	221.13	0.79	4.164E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	5.036E-01	EU155
					86.94	9.040	1.706E+00	Sn126
87.43	16.	161.89	0.79	4.186E-02	87.57	37.500	PBC<MDA	Sn126
88.04	14.	164.56	0.79	4.196E-02	88.04	3.790	PBC<MDA	Cd109
91.10	14.	168.10	0.79	4.255E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-11.	225.09	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
97.73	13.	118.76	0.80	4.345E-02	97.50	30.000	PBC<MDA	Gd153
99.50	4.	373.78	0.80	4.365E-02	99.50	15.000	PBC<MDA	Np239
106.13	2.	888.77	0.81	4.406E-02	106.13	22.700	PBC<MDA	Np239
121.78	11.	110.43	0.83	4.380E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.702E-01	CO57
122.06	4.	344.72	0.83	4.378E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	5.707E-02	CO57
131.29	2.	696.85	0.84	4.301E-02	131.29	18.000	PBC<MDA	PA234
133.54	6.	253.50	0.84	4.277E-02	133.54	11.090	PBC<MDA	CE144
140.51	12.	129.52	0.85	4.193E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
143.79	11.	152.09	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
145.44	13.	138.14	0.85	4.125E-02	145.44	48.200	PBC<MDA	CE141
162.66	12.	132.29	0.87	3.853E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	120.78	0.87	3.872E-02	165.85	79.900	PBC<MDA	CE139
176.60	10.	110.69	0.88	3.692E-02	176.60	17.000	PBC<MDA	Cf251
185.72	19.	74.57	0.89	3.553E-02	185.72	54.000	PBC<MDA	U235
227.00	4.	318.53	0.93	3.046E-02	227.00	6.300	PBC<MDA	Cf251
238.35	90.	14.49	0.51	2.934E-02	238.63	43.300	3.561E+00	PB212
241.74	15.	62.76	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
244.69	10.	191.08	0.95	2.875E-02	244.69	7.580	PBC<MDA	EU152
265.83	5.	225.14	0.97	2.697E-02	265.83	50.000	PBC<MDA	BI210M
277.28	2.	351.19	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
279.20	8.	103.50	0.99	2.596E-02	279.20	81.460	PBC<MDA	Hg203
284.30	8.	115.59	0.99	2.560E-02	284.30	6.140	PBC<MDA	I131
294.84	53.	23.88	0.77	2.488E-02	295.09	19.300	5.970E+00	PB214
345.83	3.	317.09	1.05	2.197E-02	345.83	15.070	PBC<MDA	HF181
351.57	104.	11.10	1.14	2.169E-02	351.93	37.600	6.637E+00	PB214
356.00	2.	997.40	1.06	2.148E-02	356.00	62.050	PBC<MDA	BA133
391.69	7.	141.98	1.09	1.993E-02	391.69	64.000	PBC<MDA	SN113
427.88	4.	229.73	1.13	1.859E-02	427.88	29.600	PBC<MDA	SB125
453.88	6.	106.27	1.15	1.774E-02	453.88	65.000	PBC<MDA	pm146
477.60	7.	123.89	1.18	1.704E-02	477.60	10.520	PBC<MDA	BE7
482.00	7.	128.55	1.18	1.691E-02	482.00	80.500	PBC<MDA	HF181
511.86	22.	80.73	2.46	1.612E-02	511.86	20.000	PBC<MDA	RH106
583.02	37.	23.67	1.27	1.453E-02	583.02	84.500	1.691E+00	TL208
609.14	51.	18.65	1.18	1.403E-02	609.31	46.090	4.403E+00	BI214
618.06	12.	136.63	1.30	1.387E-02	618.06	99.100	PBC<MDA	PM144
657.76	7.	88.43	1.34	1.319E-02	657.76	94.640	PBC<MDA	AG110M
661.66	3.	234.56	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
696.54	6.	129.28	1.37	1.260E-02	696.54	99.000	PBC<MDA	PM144
702.63	7.	100.45	1.38	1.251E-02	702.63	97.900	PBC<MDA	NB94
747.16	7.	95.58	1.42	1.191E-02	747.16	34.000	PBC<MDA	pm146
763.94	5.	88.61	1.43	1.170E-02	763.94	22.280	PBC<MDA	AG110M
765.79	5.	103.26	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.073E+01	PA234M
766.41	5.	122.19	1.43	1.167E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.076E+01	PA234M
778.92	7.	92.55	1.44	1.151E-02	778.92	12.940	PBC<MDA	EU152
785.42	15.	37.88	1.45	1.144E-02	785.42	1.280	5.848E+01	BI212
795.87	7.	88.72	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
834.85	5.	98.66	1.49	1.088E-02	834.85	99.980	PBC<MDA	MN54
846.77	5.	128.35	1.50	1.076E-02	846.77	99.935	PBC<MDA	Co56
884.68	9.	116.29	1.53	1.038E-02	884.68	72.680	PBC<MDA	AG110M
889.28	9.	111.15	1.54	1.034E-02	889.28	99.984	PBC<MDA	Sc46
911.07	1.	913.44	1.55	1.014E-02	911.07	29.000	PBC<MDA	AC228
946.02	1.	444.47	1.58	9.832E-03	946.02	13.400	PBC<MDA	PA234
964.11	8.	81.72	1.60	9.682E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	146.42	1.60	9.642E-03	968.97	17.460	PBC<MDA	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
996.33	6.	90.33	1.62	9.425E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	108.53	1.63	9.389E-03	1001.00	0.837	PBC<MDA	PA234M
1037.84	8.	92.33	1.65	9.116E-03	1037.84	14.130	PBC<MDA	Co56
1048.07	8.	69.36	1.66	9.043E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	6.	102.41	1.66	9.027E-03	1050.36	1.560	PBC<MDA	RH106
1099.25	2.	431.57	1.70	8.697E-03	1099.25	56.500	PBC<MDA	FE59
1119.93	11.	51.46	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.94	8.	69.03	1.72	8.556E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.573E+00	Ta182
1173.24	4.	183.07	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	8.	36.98	1.80	7.886E-03	1238.28	66.070	8.089E-01	Co56
1408.00	8.	35.36	1.92	7.092E-03	1408.00	21.005	2.984E+00	EU152
1461.26	264.	6.24	2.09	6.879E-03	1460.83	10.670	2.000E+02	K40
1596.21	5.	46.61	2.04	6.391E-03	1596.21	95.400	PBC<MDA	La140
1764.27	14.	26.73	2.14	5.878E-03	1764.49	15.400	8.592E+00	BI214
1836.06	5.	44.72	2.19	5.686E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.30	77.23	66.	74.	1.904E+03	21.66	0.811	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.82	46.85	45.	4.	0.002	242.85	0.995s
TH-227	199.98	50.14	84.	-14.	-0.008	74.46	0.751s
AM-241	237.55	59.54	85.	13.	0.007	124.46	0.761s
TH-234	252.55	63.29	135.	2.	0.001	918.12	0.765s
Sn-126	256.52	64.28	113.	14.	0.008	111.90	0.766
BA-133	323.33	80.99	123.	-17.	-0.010	109.69	0.784
Np-237	345.33	86.49	307.	0.	0.000	1000.00	0.789A
EU-155	345.54	86.54	322.	12.	0.006	221.13	0.790D
Sn-126	349.65	87.57	309.	16.	0.009	161.89	0.791s
Cd-109	351.53	88.04	269.	14.	0.008	164.56	0.791s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.77	91.10	284.	14.	0.008	168.10	0.794s
TH-234	369.72	92.59	324.	-11.	-0.006	225.09	0.796s
AC-228	372.76	93.35	315.	-5.	-0.003	462.21	0.797s
Gd-153	389.36	97.50	114.	13.	0.007	118.76	0.801s
Np-239	397.36	99.50	126.	4.	0.002	373.78	0.803s
Gd-153	412.15	103.20	130.	-3.	-0.002	487.44	0.807s
Np-239	414.15	103.70	134.	0.	0.000	1000.00	0.807s
EU-155	420.60	105.31	124.	-9.	-0.005	291.09	0.809s
Np-239	423.87	106.13	132.	2.	0.001	888.77	0.810s
EU-152	486.43	121.78	75.	11.	0.006	110.43	0.826s
CO-57	487.58	122.06	86.	4.	0.002	344.72	0.826s
EU-154	491.73	123.10	98.	-13.	-0.007	115.00	0.828
PA-234	524.50	131.29	150.	2.	0.001	696.85	0.836s
HF-181	531.42	133.02	153.	0.	0.000	1000.00	0.838s
CE-144	533.47	133.54	132.	6.	0.004	253.50	0.838s
HF-181	544.52	136.30	162.	-14.	-0.008	131.25	0.841s
CO-57	545.21	136.47	158.	-6.	-0.004	284.75	0.841s
Tc-99m	561.35	140.51	115.	12.	0.007	129.52	0.845s
U-235	574.45	143.79	128.	11.	0.006	152.09	0.849s
CE-141	581.07	145.44	144.	13.	0.007	138.14	0.850s
Ba-140	649.93	162.66	120.	12.	0.007	132.29	0.868s
CE-139	662.70	165.85	94.	12.	0.007	120.78	0.871s
Cf-251	705.68	176.60	33.	10.	0.005	110.69	0.882s
U-235	742.15	185.72	62.	19.	0.011	74.57	0.892s
TH-229	773.30	193.51	87.	-16.	-0.009	88.70	0.899s
U-235	820.58	205.33	50.	0.	0.000	1000.00	0.912s
TH-229	842.65	210.85	57.	-3.	-0.001	506.06	0.917s
Cf-251	907.23	227.00	50.	4.	0.002	318.53	0.933s
PB-212	953.75	238.63	27.	79.	0.044	14.66	0.945D
PB-214	967.21	242.00	37.	15.	0.008	62.76	0.948D
EU-152	977.99	244.69	175.	10.	0.006	191.08	0.951s
TH-227	1024.17	256.24	51.	-9.	-0.005	106.73	0.962
BI-210M	1062.53	265.83	38.	5.	0.003	225.14	0.972s
TL-208	1108.33	277.28	36.	2.	0.001	351.19	0.983
Hg-203	1115.99	279.20	34.	8.	0.005	103.50	0.985s
I-131	1136.39	284.30	22.	8.	0.004	115.59	0.990s
PB-214	1178.54	294.84	26.	52.	0.029	24.49	0.769
TL-210	1183.18	296.00	280.	-13.	-0.007	177.62	1.002s
PB-212	1199.30	300.03	267.	-14.	-0.008	172.72	1.006
PA-231	1199.46	300.07	253.	-14.	-0.008	168.39	1.006s
PA-233	1199.90	300.18	240.	-14.	-0.008	163.91	1.006s
PA-231	1209.78	302.65	229.	-13.	-0.007	166.20	1.008s
BA-133	1210.59	302.85	242.	0.	0.000	1000.00	1.009s
Ba-140	1218.57	304.85	242.	0.	0.000	1000.00	1.011s
BI-210M	1218.76	304.90	242.	0.	0.000	1000.00	1.011s
Ir-192	1232.94	308.44	242.	0.	0.000	1000.00	1.014s
Ir-192	1265.13	316.49	49.	-2.	-0.001	430.71	1.022s
La-140	1314.21	328.76	44.	-2.	-0.001	624.50	1.034s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-249	1332.92	333.44	37.	-9.	-0.005	135.05	1.039
AC-228	1352.44	338.32	97.	-12.	-0.007	119.45	1.043s
EU-152	1376.30	344.29	98.	-12.	-0.007	120.11	1.049s
HF-181	1382.47	345.83	60.	3.	0.002	317.09	1.050
PB-214	1405.44	351.57	15.	97.	0.054	12.21	1.140s
BA-133	1423.15	356.00	137.	2.	0.001	997.40	1.060
I-131	1457.08	364.48	37.	-12.	-0.007	100.76	1.069s
BA-133	1534.50	383.84	72.	-11.	-0.006	116.34	1.087s
Cf-249	1550.94	387.95	83.	-3.	-0.002	392.50	1.091s
SN-113	1565.90	391.69	40.	7.	0.004	141.98	1.095s
SB-125	1710.63	427.88	22.	4.	0.002	229.73	1.129s
AG-108M	1734.87	433.94	22.	-5.	-0.003	170.56	1.135s
pm-146	1814.64	453.88	8.	6.	0.003	106.27	1.154s
SB-125	1852.59	463.37	51.	-11.	-0.006	84.08	1.163s
BE-7	1909.50	477.60	36.	7.	0.004	123.89	1.176s
HF-181	1927.10	482.00	35.	7.	0.004	128.55	1.180s
RU-103	1987.33	497.05	20.	0.	0.000	1000.00	1.194s
RH-106	2046.57	511.86	47.	22.	0.012	80.73	2.458
Nd-147	2123.11	531.00	24.	-10.	-0.006	96.99	1.225s
Ba-140	2148.15	537.26	20.	-5.	-0.003	352.08	1.231s
CS-134	2276.40	569.32	20.	-8.	-0.004	86.60	1.260s
BI-207	2277.92	569.70	38.	-8.	-0.004	122.08	1.261s
TL-208	2331.20	583.02	13.	37.	0.021	23.67	1.273s
SB-125	2401.12	600.50	186.	-12.	-0.007	165.30	1.289s
SB-124	2410.04	602.73	174.	-12.	-0.007	159.87	1.291s
CS-134	2417.96	604.71	162.	-12.	-0.007	154.30	1.292s
BI-214	2435.69	609.14	13.	51.	0.028	18.65	1.180
RU-103	2440.31	610.30	150.	-9.	-0.005	187.58	1.297s
PM-144	2471.37	618.06	128.	12.	0.007	136.63	1.304s
RH-106	2486.79	621.92	54.	-11.	-0.006	98.00	1.308s
SB-125	2542.69	635.89	60.	-16.	-0.009	73.31	1.320s
I-131	2547.03	636.97	61.	-3.	-0.002	360.64	1.321s
AG-110M	2630.18	657.76	14.	7.	0.004	88.43	1.339
CS-137	2645.77	661.66	28.	3.	0.002	234.56	1.343s
PM-144	2785.32	696.54	13.	6.	0.003	129.28	1.374s
NB-94	2809.67	702.63	9.	7.	0.004	100.45	1.379
SB-124	2890.31	722.79	28.	-9.	-0.005	89.58	1.396s
AG-108M	2890.91	722.94	37.	0.	0.000	1000.00	1.397s
EU-154	2892.59	723.36	37.	0.	0.000	1000.00	1.397s
BI-212	2907.84	727.17	46.	-8.	-0.004	83.37	1.400s
pm-146	2987.81	747.16	9.	7.	0.004	95.58	1.417s
ZR-95	3026.09	756.73	22.	-7.	-0.004	98.75	1.426s
AG-110M	3054.96	763.94	6.	5.	0.003	88.61	1.432s
NB-95	3062.34	765.79	11.	5.	0.003	103.26	1.433s
PA-234M	3064.83	766.41	16.	5.	0.003	122.19	1.434s
EU-152	3114.87	778.92	9.	7.	0.004	92.55	1.444s
BI-212	3140.88	785.42	5.	15.	0.009	37.88	1.450s
CS-134	3182.67	795.87	17.	7.	0.004	88.72	1.459s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	3197.61	799.60	28.	-6.	-0.003	128.07	1.462s
CS-134	3207.01	801.95	1.	0.	0.000	1000.00	1.464s
CO-58	3242.31	810.77	28.	-2.	-0.001	308.54	1.471s
La-140	3262.30	815.77	31.	0.	0.000	1000.00	1.475s
Cs-136	3273.22	818.50	42.	-10.	-0.005	98.33	1.478s
MN-54	3338.63	834.85	5.	5.	0.003	98.66	1.492s
Co-56	3386.32	846.77	10.	5.	0.003	128.35	1.501
TL-208	3441.51	860.56	23.	-12.	-0.007	91.86	1.513s
NB-94	3483.65	871.10	23.	-5.	-0.003	151.52	1.522s
EU-154	3492.19	873.23	41.	-11.	-0.006	84.94	1.523s
PA-234	3521.39	880.53	61.	-13.	-0.007	89.21	1.529s
PA-234	3532.24	883.24	74.	-13.	-0.007	97.80	1.531s
AG-110M	3538.01	884.68	53.	9.	0.005	116.29	1.533s
Sc-46	3556.40	889.28	48.	9.	0.005	111.15	1.536s
y-88	3591.45	898.04	9.	-4.	-0.002	157.08	1.543s
AC-228	3643.58	911.07	33.	1.	0.001	913.44	1.554s
AG-110M	3749.30	937.49	28.	-8.	-0.004	144.70	1.576s
PA-234	3783.42	946.02	10.	1.	0.001	444.47	1.582s
EU-152	3855.80	964.11	17.	8.	0.004	81.72	1.597s
AC-228	3875.25	968.97	31.	6.	0.003	146.42	1.601s
EU-154	3984.71	996.33	10.	6.	0.003	90.33	1.622s
PA-234M	4003.39	1001.00	16.	6.	0.003	108.53	1.626s
EU-154	4018.51	1004.77	53.	-11.	-0.006	95.84	1.629s
Co-56	4150.81	1037.84	10.	8.	0.005	92.33	1.655s
Cs-136	4191.74	1048.07	12.	8.	0.005	69.36	1.663s
RH-106	4200.91	1050.36	15.	6.	0.003	102.41	1.665s
BI-207	4254.12	1063.66	21.	-7.	-0.004	93.99	1.675s
Ga-68	4309.10	1077.40	20.	-4.	-0.002	250.83	1.685s
FE-59	4396.54	1099.25	15.	2.	0.001	431.57	1.702s
EU-152	4447.85	1112.07	50.	-10.	-0.006	102.90	1.712s
BI-214	4480.72	1120.29	10.	11.	0.006	51.46	1.718D
Sc-46	4481.77	1120.55	33.	-10.	-0.006	84.67	1.718s
Ta-182	4484.77	1121.30	13.	8.	0.005	69.03	1.719s
CO-60	4692.60	1173.24	10.	4.	0.002	183.07	1.757s
Ta-182	4755.88	1189.05	20.	-8.	-0.004	127.88	1.769s
Ta-182	4885.38	1221.41	27.	-8.	-0.004	41.29	1.792s
Co-56	4952.89	1238.28	0.	8.	0.004	36.98	1.805s
NA-22	5097.96	1274.53	11.	-3.	-0.001	183.71	1.831s
EU-154	5098.01	1274.54	13.	0.	0.000	1000.00	1.831s
TL-210	5251.92	1313.00	21.	-5.	-0.003	201.56	1.858s
CO-60	5329.96	1332.50	16.	-3.	-0.002	308.52	1.871s
AG-110M	5537.26	1384.30	11.	-8.	-0.004	103.35	1.907s
EU-152	5632.13	1408.00	0.	8.	0.004	35.36	1.923s
K-40	5845.31	1461.26	4.	264.	0.147	6.24	2.089
La-140	6385.44	1596.21	0.	5.	0.003	46.61	2.044s
SB-124	6764.81	1690.98	0.	0.	0.000	1000.00	2.102s
BI-214	7059.07	1764.49	0.	14.	0.008	26.73	2.145s
Co-56	7086.53	1771.35	14.	0.	0.000	1000.00	2.149s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	7345.59	1836.06	0.	5.	0.003	44.72	2.185s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.2215E+00					5.31E+01	
			477.60	2.222E+00	?(	9.487E+00	1.24E+02 1.05E+01	G
NA-22	C	-1.9251E-01					9.50E+02	
			1274.53	-1.925E-01	?(	1.294E+00	1.84E+02 9.99E+01	G
K-40	N	2.0003E+02					4.66E+11	
			1460.83	2.000E+02	(P	8.867E+00	6.24E+00 1.07E+01	G
Sc-46	F	4.9725E-01					8.38E+01	
			889.28	4.972E-01	?(	1.885E+00	1.11E+02 1.00E+02	G
			1120.55	-6.717E-01	+	1.919E+00	8.47E+01 1.00E+02	G
CR-51	F	-2.3945E-01					2.77E+01	
			320.08	-2.394E-01	%(	8.670E+00	1.02E+03 9.94E+00	G
MN-54	C	2.6478E-01					3.12E+02	
			834.85	2.648E-01	?(	6.523E-01	9.87E+01 1.00E+02	G
FE-59	F	2.2613E-01					4.45E+01	
			1099.25	2.261E-01	&(	2.347E+00	4.32E+02 5.65E+01	G
			1291.60	-1.988E-02	% P	3.617E+00	2.44E+03 4.32E+01	G
Co-56	C	7.2685E-01					7.73E+01	
			846.77	2.790E-01	&(P	8.860E-01	1.28E+02 9.99E+01	G
			1238.28	8.089E-01	?(P	7.859E-01	3.70E+01 6.61E+01	G
			1037.84	3.510E+00	(	7.525E+00	9.23E+01 1.41E+01	G
			1771.35	0.000E+00	-	1.234E+01	1.00E+03 1.55E+01	A
CO-57	C	5.7072E-02					2.72E+02	
			122.06	5.707E-02	?(	6.813E-01	3.45E+02 8.56E+01	G
			136.47	-7.738E-01	&	7.521E+00	2.85E+02 1.07E+01	G
CO-58	C	-1.2529E-01					7.09E+01	
			810.78	-1.253E-01	?(	1.383E+00	3.09E+02 9.95E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	F	2.1072E-02					1.93E+03	
			1332.50	-2.246E-01	?(	1.598E+00	3.09E+02	1.00E+02 G
			1173.24	2.669E-01	?(P	1.179E+00	1.83E+02	9.99E+01 G
ZN-65	F	6.0931E-08					2.44E+02	
			1115.55	6.093E-08	%(	4.112E+00	1.88E+09	5.06E+01 G
NB-94	I	2.9703E-01					7.41E+06	
			702.63	2.970E-01	?(P	7.533E-01	1.00E+02	9.79E+01 G
			871.10	-2.468E-01	-	1.317E+00	1.52E+02	9.99E+01 G
ZR-95	I	-5.7789E-01					6.40E+01	
			756.73	-5.779E-01	?(P	2.113E+00	9.88E+01	5.45E+01 G
			724.20	-5.994E-03	% P	3.203E+00	1.13E+04	4.42E+01 G
NB-95	I	2.3768E-01					6.40E+01	
			765.79	2.377E-01	?(	8.579E-01	1.03E+02	9.98E+01 G
RH-106	I	-8.0107E-01					3.74E+02	
			621.92	-4.515E+00	?(	1.498E+01	9.80E+01	9.93E+00 G
			1050.36	2.284E+01	?(	8.113E+01	1.02E+02	1.56E+00 G
			511.86	3.864E+00	? P	5.962E+00	8.07E+01	2.00E+01 GA
AG-108M	C	-1.7740E-01					1.53E+05	
			433.94	-1.774E-01	?(P	8.258E-01	1.71E+02	9.05E+01 G
			722.94	0.000E+00	+	1.553E+00	1.00E+03	9.08E+01 G
			614.28	-4.230E-08	&	2.575E+00	1.76E+09	8.98E+01 G
AG-110M	F	5.2213E-01					2.50E+02	
			884.68	6.795E-01	?(	2.697E+00	1.16E+02	7.27E+01 G
			657.76	2.930E-01	?(	8.870E-01	8.84E+01	9.46E+01 G
			937.49	-1.306E+00	+	4.467E+00	1.45E+02	3.44E+01 G
			1384.30	-2.438E+00	+	5.702E+00	1.03E+02	2.43E+01 G
			763.94	9.819E-01	?(P	3.006E+00	8.86E+01	2.23E+01 G
SN-113	F	2.8716E-01					1.15E+02	
			391.69	2.872E-01	?(	1.410E+00	1.42E+02	6.40E+01 G
SB-124	F	-4.7425E-01					6.02E+01	
			602.73	-4.743E-01	&(	2.565E+00	1.60E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.407E+00	1.00E+03	4.78E+01 G
			722.79	-3.782E+00	+	1.150E+01	8.96E+01	1.08E+01 G
SB-125	I	3.9613E-01					1.01E+03	
			427.88	3.961E-01	?(P	2.485E+00	2.30E+02	2.96E+01 G
			600.50	-2.597E+00	+	1.452E+01	1.65E+02	1.79E+01 G
			635.89	-5.761E+00	+	1.406E+01	7.33E+01	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	-3.284E+00	+ P	1.099E+01	8.41E+01	1.05E+01 G
I-131	I	-1.5405E-01					8.02E+00	
			364.48	-3.788E-01	?(	9.974E-01	1.01E+02	8.17E+01 G
			284.30	2.837E+00	&(P	8.755E+00	1.16E+02	6.14E+00 G
			636.97	-1.774E+00	&	2.236E+01	3.61E+02	7.17E+00 G
Gd-153	F	5.5646E-01					2.42E+02	
			97.50	5.565E-01	?(	2.233E+00	1.19E+02	3.00E+01 G
			103.20	-1.934E-01	&	3.244E+00	4.87E+02	2.18E+01 G
Ga-68	C	-8.9069E+00					4.71E-02	
			1077.40	-8.907E+00	?(	5.244E+01	2.51E+02	3.30E+00 G
Tc-99m	I	1.8339E-01					2.51E-01	
			140.51	1.834E-01	(	8.044E-01	1.30E+02	8.93E+01 G
BA-133	F	6.9474E-02					3.85E+03	
			356.00	6.947E-02	&(	2.389E+00	9.97E+02	6.20E+01 G
			302.85	0.000E+00	&	9.353E+00	1.00E+03	1.83E+01 G
			383.84	-3.281E+00	+	1.297E+01	1.16E+02	8.94E+00 GA
			80.99	-7.076E-01	+	2.207E+00	1.10E+02	3.41E+01 GA
CS-134	I	-6.3131E-02					7.54E+02	
			604.71	-4.793E-01	(	2.503E+00	1.54E+02	9.76E+01 G
			795.87	4.118E-01	?(	1.248E+00	8.87E+01	8.55E+01 G
			569.32	-1.951E+00	+	5.743E+00	8.66E+01	1.54E+01 G
			801.95	0.000E+00	+	4.190E+00	1.00E+03	8.69E+00 G
			563.24	-6.248E-01	% P	8.515E+00	1.29E+03	8.35E+00 G
CS-137	I	1.6238E-01					1.10E+04	
			661.66	1.624E-01	&(P	1.353E+00	2.35E+02	8.52E+01 G
CE-139	F	2.1065E-01					1.38E+02	
			165.85	2.106E-01	?(	8.621E-01	1.21E+02	7.99E+01 G
Ba-140	I	-3.6799E-02					1.28E+01	
			537.26	-7.556E-01	&(P	3.469E+00	3.52E+02	2.44E+01 G
			162.66	2.782E+00	(	1.246E+01	1.32E+02	6.22E+00 G
			304.85	0.000E+00	&	4.017E+01	1.00E+03	4.29E+00 G
La-140	I	4.4431E-01					1.28E+01	
			1596.21	4.443E-01	?(P	6.716E-01	4.66E+01	9.54E+01 G
			487.02	-3.859E-02	% P	1.734E+00	1.73E+03	4.55E+01 G
			328.76	-2.394E-01	-	4.025E+00	6.24E+02	2.03E+01 G
			815.77	0.000E+00	&	6.166E+00	1.00E+03	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	3.5043E-01					3.25E+01	
			145.44	3.504E-01	*(	1.637E+00	1.38E+02	4.82E+01 G
CE-144	I	7.6130E-01					2.85E+02	
			133.54	7.613E-01	?(	6.600E+00	2.53E+02	1.11E+01 G
PM-144	C	3.7610E-01					3.63E+02	
			696.54	2.672E-01	?(	8.690E-01	1.29E+02	9.90E+01 G
			618.06	4.849E-01	?(	2.243E+00	1.37E+02	9.91E+01 G
EU-152	F	1.1067E+00					4.94E+03	
			344.29	-1.143E+00	?(	4.651E+00	1.20E+02	2.65E+01 G
			1112.07	-4.832E+00	+	1.689E+01	1.03E+02	1.36E+01 G
			121.78	5.096E-01	+	1.907E+00	1.10E+02	2.86E+01 G
			778.92	2.649E+00	?(	6.126E+00	9.25E+01	1.29E+01 G
			964.11	3.086E+00	?(	8.539E+00	8.17E+01	1.46E+01 G
			244.69	2.528E+00	?(	1.639E+01	1.91E+02	7.58E+00 G
			1408.00	2.984E+00	?	2.749E+00	3.54E+01	2.10E+01 GA
EU-154	I	-4.8897E+00					3.14E+03	
			873.23	-4.890E+00	?(	1.399E+01	8.49E+01	1.23E+01 G
			123.10	-3.906E-01	+	1.519E+00	1.15E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.044E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	6.981E+00	1.00E+03	2.02E+01 G
			1004.77	-3.734E+00	&	1.210E+01	9.58E+01	1.80E+01 G
			996.33	3.137E+00	+	9.769E+00	9.03E+01	1.06E+01 G
EU-155	I	8.6602E-02					1.81E+03	
			105.31	-5.172E-01	?(P	3.254E+00	2.91E+02	2.12E+01 G
			86.54	5.036E-01	!(	3.754E+00	2.21E+02	3.07E+01 G
HF-181	F	3.2747E-01					4.24E+01	
			482.00	2.788E-01	?(	1.238E+00	1.29E+02	8.05E+01 G
			133.02	0.000E+00	-	1.808E+00	1.00E+03	4.33E+01 G
			345.83	5.872E-01	?(	6.503E+00	3.17E+02	1.51E+01 G
			136.30	-3.137E+00	&	1.389E+01	1.31E+02	5.85E+00 G
Ta-182	F	1.5727E+00					1.14E+02	
			1121.30	1.573E+00	?(	3.606E+00	6.90E+01	3.49E+01 G
			1221.41	-2.038E+00	- P	6.935E+00	4.13E+01	2.70E+01 G
			1189.05	-3.365E+00	-	9.905E+00	1.28E+02	1.62E+01 G
Hg-203	F	2.2038E-01					4.66E+01	
			279.20	2.204E-01	?(	7.798E-01	1.04E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.6909E+00					6.98E+02	
			583.02	1.691E+00	(P	8.715E-01	2.37E+01	8.45E+01 G
			277.28	8.250E-01	- P	1.029E+01	3.51E+02	6.31E+00 G
			860.56	-4.955E+00	-	1.062E+01	9.19E+01	1.24E+01 G
pm-146	C	9.4437E-01					2.02E+03	
			747.16	9.444E-01	?(P	2.264E+00	9.56E+01	3.40E+01 G
			735.72	-1.365E-01	%	4.997E+00	1.43E+03	2.25E+01 G
			453.88	2.733E-01	-	7.657E-01	1.06E+02	6.50E+01 G
y-88	F	1.3158E-01					1.07E+02	
			898.04	-2.505E-01	?(	9.795E-01	1.57E+02	9.37E+01 G
			1836.06	4.925E-01	?(	7.259E-01	4.47E+01	9.92E+01 G
Cd-113m		3.4122E+02					5.33E+03	
			263.70	3.412E+02	%(	1.345E+04	1.12E+03	6.00E-03 K
Cd-109	F	4.9914E+00					4.53E+02	
			88.04	4.991E+00	&(	2.766E+01	1.65E+02	3.79E+00 G
Cf-251	T	8.5855E-01					3.28E+05	
			176.60	8.586E-01	(	2.622E+00	1.11E+02	1.70E+01 G
			227.00	1.158E+00		1.032E+01	3.19E+02	6.30E+00 GA
Cf-249	T	-1.3874E-01					1.28E+05	
			387.95	-1.387E-01	?(	1.890E+00	3.93E+02	6.60E+01 G
			333.44	-1.373E+00	+	4.900E+00	1.35E+02	1.55E+01 G
Sn-126		2.3773E+00					3.65E+07	
			87.57	5.501E-01	-	2.994E+00	1.62E+02	3.75E+01 GA
			64.28	2.377E+00	(	8.975E+00	1.12E+02	9.70E+00 G
			86.94	0.000E+00	}	6.570E+00	1.17E+03	9.04E+00 GA
PB-210	N	2.5891E+00					8.14E+03	
			46.54	2.589E+00	(P	2.039E+01	2.43E+02	4.25E+00 G
PB-212	N	3.4547E+00					6.98E+02	
			238.63	3.455E+00	(P	1.180E+00	1.47E+01	4.33E+01 G
			300.03	-9.342E+00	-	5.438E+01	1.73E+02	3.28E+00 GA
PB-214	N	6.4108E+00					5.84E+05	
			351.93	6.637E+00	*(P	1.401E+00	1.22E+01	3.76E+01 G
			295.09	5.970E+00	(P	3.086E+00	2.45E+01	1.93E+01 G
			242.00	3.889E+00	- P	8.000E+00	6.28E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-2.8794E-01					1.18E+04	
			569.70	-2.879E-01	?(	1.209E+00	1.22E+02	9.77E+01 G
			1063.66	-5.538E-01	+ P	1.993E+00	9.40E+01	7.45E+01 G
BI-212	N	-4.8346E+00					6.98E+02	
			727.17	-4.835E+00	?(P	2.075E+01	8.34E+01	7.55E+00 G
			785.42	5.848E+01	? P	4.817E+01	3.79E+01	1.28E+00 GA
U-235	N	1.3118E+00					2.57E+11	
			143.79	1.312E+00	?(P	6.767E+00	1.52E+02	1.10E+01 G
			205.33	0.000E+00	-	1.202E+01	1.00E+03	5.01E+00 G
			163.38	-1.917E-01	% P	1.606E+01	2.43E+03	5.08E+00 G
			185.72	5.530E-01	P	1.140E+00	7.46E+01	5.40E+01 GA
BI-214	N	4.4554E+00					5.84E+05	
			609.31	4.403E+00	(P	1.662E+00	1.87E+01	4.61E+01 G
			1120.29	4.615E+00	(P	7.443E+00	5.15E+01	1.51E+01 G
			1764.49	8.592E+00	+	4.523E+00	2.67E+01	1.54E+01 G
BI-210M	T	2.0475E-01					1.10E+09	
			265.83	2.048E-01	?(P	1.296E+00	2.25E+02	5.00E+01 G
			304.90	0.000E+00	&	6.155E+00	1.00E+03	2.80E+01 G
AC-228	N	8.5754E-01					2.10E+03	
			911.07	2.519E-01	?(	5.545E+00	9.13E+02	2.90E+01 G
			968.97	1.863E+00	?(	9.505E+00	1.46E+02	1.75E+01 G
			338.32	-2.489E+00	+	1.007E+01	1.19E+02	1.20E+01 G
			93.35	-1.271E+00	+	1.990E+01	4.62E+02	5.56E+00 XA
TH-227	N	-4.0093E+00					7.95E+03	
			50.14	-4.009E+00	&(P	1.295E+01	7.45E+01	8.00E+00 G
			256.24	-2.571E+00	+ P	1.029E+01	1.07E+02	7.00E+00 G
TH-229	N	-5.9002E+00					2.68E+06	
			193.51	-5.900E+00	?(P	1.692E+01	8.87E+01	4.40E+00 G
			210.85	-1.537E+00	+	2.178E+01	5.06E+02	2.99E+00 G
TH-234	N	9.3893E-01					1.63E+12	
			63.29	9.389E-01	*(P	2.526E+01	9.18E+02	3.81E+00 G
			92.59	-2.611E+00	+ P	2.012E+01	2.25E+02	5.58E+00 G
PA-231	N	-1.0330E+01					1.20E+07	
			302.65	-1.033E+01	&(	5.793E+01	1.66E+02	2.88E+00 G
			300.07	-1.246E+01	+	7.071E+01	1.68E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	-1.4580E-02					7.82E+08	
			312.01	-1.458E-02	&(P	4.876E+00	5.63E+03	3.60E+01 G
			300.18	-4.945E+00	+	2.733E+01	1.64E+02	6.20E+00 G
PA-234	N	3.7116E-01					1.63E+12	
			131.29	1.794E-01	?(	4.297E+00	6.97E+02	1.80E+01 G
			946.02	6.288E-01	?(P	7.202E+00	4.44E+02	1.34E+01 G
			569.47	7.624E-02	%	1.269E+01	4.56E+03	8.20E+00 G
			883.24	-7.221E+00	+	2.382E+01	9.78E+01	9.60E+00 G
			880.53	-1.157E+01	+	3.474E+01	8.92E+01	6.00E+00 GA
PA-234M	N	5.0466E+01					1.63E+12	
			1001.00	3.982E+01	?(P	1.502E+02	1.09E+02	8.37E-01 G
			766.41	8.076E+01	?(	3.465E+02	1.22E+02	2.94E-01 G
AM-241	T	6.4582E-01					1.58E+05	
			59.54	6.458E-01	&(P	2.309E+00	1.24E+02	3.59E+01 G
Ir-192	F	-6.3246E-02					7.40E+01	
			316.49	-6.325E-02	?(	9.606E-01	4.31E+02	8.70E+01 G
			468.06	4.307E-02	%	2.266E+00	1.48E+03	5.18E+01 G
			308.44	0.000E+00	+	5.477E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.7200E-03					1.30E+01	
			818.50	-4.939E-01	?(	1.650E+00	9.83E+01	1.00E+02 G
			1048.07	6.280E-01	?(	1.448E+00	6.94E+01	8.00E+01 G
			340.57	-6.075E-02	%	2.738E+00	1.30E+03	4.69E+01 G
Np-239	T	1.0185E-01					2.36E+00	
			103.70	0.000E+00	-	2.981E+00	1.00E+03	2.40E+01 X
			106.13	1.018E-01	&(	3.123E+00	8.89E+02	2.27E+01 G
			99.50	3.631E-01	&	4.664E+00	3.74E+02	1.50E+01 X
Nd-147		-2.8478E+00					1.11E+01	
			531.00	-2.848E+00	?(	6.970E+00	9.70E+01	1.30E+01 G
			91.10	6.619E-01	+	3.746E+00	1.68E+02	2.83E+01 G
TL-210	N	-3.0750E-01					5.84E+05	
			799.60	-3.075E-01	?(	1.367E+00	1.28E+02	9.90E+01 G
			296.00	-3.823E-01	+	2.288E+00	1.78E+02	7.90E+01 G
			1313.00	-1.878E+00	+	8.532E+00	2.02E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	84.	-14.	-0.008	74.46	-4.009E+00	P
TH-234	63.29	135.	2.	0.001	918.12	9.389E-01	P
BA-133	80.99	123.	-17.	-0.010	109.69	-7.076E-01	
EU-155	86.54	322.	12.	0.006	221.13	5.036E-01	
Cd-109	88.04	269.	14.	0.008	164.56	4.991E+00	
Nd-147	91.10	284.	14.	0.008	168.10	6.619E-01	
TH-234	92.59	324.	-11.	-0.006	225.09	-2.611E+00	P
AC-228	93.35	315.	-5.	-0.003	462.21	-1.271E+00	
Np-239	99.50	126.	4.	0.002	373.78	3.631E-01	
EU-155	105.31	124.	-9.	-0.005	291.09	-5.172E-01	P
Np-239	106.13	132.	2.	0.001	888.77	1.018E-01	
EU-152	121.78	75.	11.	0.006	110.43	5.096E-01	
CO-57	122.06	86.	4.	0.002	344.72	5.707E-02	
EU-154	123.10	98.	-13.	-0.007	115.00	-3.906E-01	
PA-234	131.29	150.	2.	0.001	696.85	1.794E-01	
CE-144	133.54	132.	6.	0.004	253.50	7.613E-01	
HF-181	136.30	162.	-14.	-0.008	131.25	-3.137E+00	
CO-57	136.47	158.	-6.	-0.004	284.75	-7.738E-01	
Tc-99m	140.51	115.	12.	0.007	129.52	1.834E-01	
U-235	143.79	128.	11.	0.006	152.09	1.312E+00	P
CE-141	145.44	144.	13.	0.007	138.14	3.504E-01	
Ba-140	162.66	120.	12.	0.007	132.29	2.782E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CE-139	165.85	94.	12.	0.007	120.78	2.106E-01		
Cf-251	176.60	33.	10.	0.005	110.69	8.586E-01		
U-235	185.72	62.	19.	0.011	74.57	5.530E-01		P
TH-229	193.51	87.	-16.	-0.009	88.70	-5.900E+00		P
TH-229	210.85	57.	-3.	-0.001	506.06	-1.537E+00		
Cf-251	227.00	50.	4.	0.002	318.53	1.158E+00		
EU-152	244.69	175.	10.	0.006	191.08	2.528E+00		
TH-227	256.24	51.	-9.	-0.005	106.73	-2.571E+00		P
BI-210M	265.83	38.	5.	0.003	225.14	2.048E-01		P
Hg-203	279.20	34.	8.	0.005	103.50	2.204E-01		
I-131	284.30	22.	8.	0.004	115.59	2.837E+00		P
TL-210	296.00	280.	-13.	-0.007	177.62	-3.823E-01		
PA-231	300.07	253.	-14.	-0.008	168.39	-1.246E+01		
PA-233	300.18	240.	-14.	-0.008	163.91	-4.945E+00		
PA-231	302.65	229.	-13.	-0.007	166.20	-1.033E+01		
Ir-192	316.49	49.	-2.	-0.001	430.71	-6.325E-02		
La-140	328.76	44.	-2.	-0.001	624.50	-2.394E-01		
Cf-249	333.44	37.	-9.	-0.005	135.05	-1.373E+00		
AC-228	338.32	97.	-12.	-0.007	119.45	-2.489E+00		
EU-152	344.29	98.	-12.	-0.007	120.11	-1.143E+00		
HF-181	345.83	60.	3.	0.002	317.09	5.872E-01		
BA-133	356.00	137.	2.	0.001	997.40	6.947E-02		
I-131	364.48	37.	-12.	-0.007	100.76	-3.788E-01		
BA-133	383.84	72.	-11.	-0.006	116.34	-3.281E+00		
Cf-249	387.95	83.	-3.	-0.002	392.50	-1.387E-01		
SN-113	391.69	40.	7.	0.004	141.98	2.872E-01		
SB-125	427.88	22.	4.	0.002	229.73	3.961E-01		P
AG-108M	433.94	22.	-5.	-0.003	170.56	-1.774E-01		P
pm-146	453.88	8.	6.	0.003	106.27	2.733E-01		
SB-125	463.37	51.	-11.	-0.006	84.08	-3.284E+00		P
BE-7	477.60	36.	7.	0.004	123.89	2.222E+00		
HF-181	482.00	35.	7.	0.004	128.55	2.788E-01		
RH-106	511.86	47.	22.	0.012	80.73	3.864E+00		P
Nd-147	531.00	24.	-10.	-0.006	96.99	-2.848E+00		
Ba-140	537.26	20.	-5.	-0.003	352.08	-7.556E-01		P
CS-134	569.32	20.	-8.	-0.004	86.60	-1.951E+00		
BI-207	569.70	38.	-8.	-0.004	122.08	-2.879E-01		
SB-125	600.50	186.	-12.	-0.007	165.30	-2.597E+00		
SB-124	602.73	174.	-12.	-0.007	159.87	-4.743E-01		
CS-134	604.71	162.	-12.	-0.007	154.30	-4.793E-01		
RU-103	610.30	150.	-9.	-0.005	187.58	-6.474E+00		
PM-144	618.06	128.	12.	0.007	136.63	4.849E-01		
RH-106	621.92	54.	-11.	-0.006	98.00	-4.515E+00		
SB-125	635.89	60.	-16.	-0.009	73.31	-5.761E+00		
I-131	636.97	61.	-3.	-0.002	360.64	-1.774E+00		
AG-110M	657.76	14.	7.	0.004	88.43	2.930E-01		
CS-137	661.66	28.	3.	0.002	234.56	1.624E-01		P
PM-144	696.54	13.	6.	0.003	129.28	2.672E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-94	702.63	9.	7.	0.004	100.45	2.970E-01	P
SB-124	722.79	28.	-9.	-0.005	89.58	-3.782E+00	
BI-212	727.17	46.	-8.	-0.004	83.37	-4.835E+00	P
pm-146	747.16	9.	7.	0.004	95.58	9.444E-01	P
ZR-95	756.73	22.	-7.	-0.004	98.75	-5.779E-01	P
AG-110M	763.94	6.	5.	0.003	88.61	9.819E-01	P
NB-95	765.79	11.	5.	0.003	103.26	2.377E-01	
PA-234M	766.41	16.	5.	0.003	122.19	8.076E+01	
EU-152	778.92	9.	7.	0.004	92.55	2.649E+00	
BI-212	785.42	5.	15.	0.009	37.88	5.848E+01	P
CS-134	795.87	17.	7.	0.004	88.72	4.118E-01	
TL-210	799.60	28.	-6.	-0.003	128.07	-3.075E-01	
CO-58	810.77	28.	-2.	-0.001	308.54	-1.253E-01	
Cs-136	818.50	42.	-10.	-0.005	98.33	-4.939E-01	
MN-54	834.85	5.	5.	0.003	98.66	2.648E-01	
Co-56	846.77	10.	5.	0.003	128.35	2.790E-01	P
NB-94	871.10	23.	-5.	-0.003	151.52	-2.468E-01	
EU-154	873.23	41.	-11.	-0.006	84.94	-4.890E+00	
PA-234	880.53	61.	-13.	-0.007	89.21	-1.157E+01	
PA-234	883.24	74.	-13.	-0.007	97.80	-7.221E+00	
AG-110M	884.68	53.	9.	0.005	116.29	6.795E-01	
Sc-46	889.28	48.	9.	0.005	111.15	4.972E-01	
y-88	898.04	9.	-4.	-0.002	157.08	-2.505E-01	
AC-228	911.07	33.	1.	0.001	913.44	2.519E-01	
AG-110M	937.49	28.	-8.	-0.004	144.70	-1.306E+00	
PA-234	946.02	10.	1.	0.001	444.47	6.288E-01	P
EU-152	964.11	17.	8.	0.004	81.72	3.086E+00	
AC-228	968.97	31.	6.	0.003	146.42	1.863E+00	
EU-154	996.33	10.	6.	0.003	90.33	3.137E+00	
PA-234M	1001.00	16.	6.	0.003	108.53	3.982E+01	P
EU-154	1004.77	53.	-11.	-0.006	95.84	-3.734E+00	
Co-56	1037.84	10.	8.	0.005	92.33	3.510E+00	
Cs-136	1048.07	12.	8.	0.005	69.36	6.280E-01	
RH-106	1050.36	15.	6.	0.003	102.41	2.284E+01	
BI-207	1063.66	21.	-7.	-0.004	93.99	-5.538E-01	P
Ga-68	1077.40	20.	-4.	-0.002	250.83	-8.907E+00	
FE-59	1099.25	15.	2.	0.001	431.57	2.261E-01	
EU-152	1112.07	50.	-10.	-0.006	102.90	-4.832E+00	
Sc-46	1120.55	33.	-10.	-0.006	84.67	-6.717E-01	
CO-60	1173.24	10.	4.	0.002	183.07	2.669E-01	P
Co-56	1238.28	0.	8.	0.004	36.98	8.089E-01	P
NA-22	1274.53	11.	-3.	-0.001	183.71	-1.925E-01	
TL-210	1313.00	21.	-5.	-0.003	201.56	-1.878E+00	
CO-60	1332.50	16.	-3.	-0.002	308.52	-2.246E-01	
AG-110M	1384.30	11.	-8.	-0.004	103.35	-2.438E+00	
EU-152	1408.00	0.	8.	0.004	35.36	2.984E+00	
La-140	1596.21	0.	5.	0.003	46.61	4.443E-01	P
y-88	1836.06	0.	5.	0.003	44.72	4.925E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.2215E+00	2.2215E+00	1.239E+02%	9.49E+00
NA-22	#A	-1.9251E-01	-1.9251E-01	1.837E+02%	1.29E+00
K-40		2.0003E+02	2.0003E+02	6.243E+00%	8.87E+00
Sc-46	#A	4.9724E-01	4.9725E-01	1.112E+02%	1.89E+00
CR-51	#A	-2.3945E-01	-2.3945E-01	1.021E+03%	8.67E+00
MN-54	#A	2.6478E-01	2.6478E-01	9.866E+01%	6.52E-01
FE-59	#A	2.2613E-01	2.2613E-01	4.316E+02%	2.35E+00
Co-56	#A	7.2685E-01	7.2685E-01	3.698E+01%	8.86E-01
CO-57	#A	5.7072E-02	5.7072E-02	3.447E+02%	6.81E-01
CO-58	#A	-1.2529E-01	-1.2529E-01	3.085E+02%	1.38E+00
CO-60	#A	2.1072E-02	2.1072E-02	1.794E+02%	1.60E+00
ZN-65	#A	6.0931E-08	6.0931E-08	1.876E+09%	4.11E+00
NB-94	#A	2.9703E-01	2.9703E-01	1.005E+02%	7.53E-01
ZR-95	#A	-5.7789E-01	-5.7789E-01	9.875E+01%	2.11E+00
NB-95	#A	2.3768E-01	2.3768E-01	1.033E+02%	8.58E-01
RU-103	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.72E-01
RH-106	#A	-8.0107E-01	-8.0107E-01	7.087E+01%	1.50E+01
AG-108M	#A	-1.7740E-01	-1.7740E-01	1.706E+02%	8.26E-01
AG-110M	#A	5.2213E-01	5.2213E-01	5.695E+01%	2.70E+00
SN-113	#A	2.8716E-01	2.8716E-01	1.420E+02%	1.41E+00
SB-124	#A	-4.7425E-01	-4.7425E-01	1.599E+02%	2.57E+00
SB-125	#A	3.9613E-01	3.9613E-01	2.297E+02%	2.48E+00
I-131	#A	-1.5405E-01	-1.5405E-01	7.667E+01%	9.97E-01
Gd-153	#A	5.5646E-01	5.5646E-01	1.188E+02%	2.23E+00
Ga-68	#A	-8.8464E+00	-8.9069E+00	2.508E+02%	5.24E+01
Tc-99m	#A	1.8316E-01	1.8339E-01	1.295E+02%	8.04E-01
BA-133	#A	6.9474E-02	6.9474E-02	9.974E+02%	2.39E+00
CS-134	#A	-6.3131E-02	-6.3131E-02	8.872E+01%	2.50E+00
CS-137	#A	1.6238E-01	1.6238E-01	2.346E+02%	1.35E+00
CE-139	#A	2.1065E-01	2.1065E-01	1.208E+02%	8.62E-01
Ba-140	#A	-3.6798E-02	-3.6799E-02	1.323E+02%	3.47E+00
La-140	#A	4.4430E-01	4.4431E-01	4.661E+01%	6.72E-01
CE-141	#A	3.5042E-01	3.5043E-01	1.381E+02%	1.64E+00
CE-144	#A	7.6130E-01	7.6130E-01	2.535E+02%	6.60E+00
PM-144	#A	3.7610E-01	3.7610E-01	9.405E+01%	8.69E-01
EU-152	#A	1.1067E+00	1.1067E+00	6.431E+01%	4.65E+00
EU-154	#A	-4.8897E+00	-4.8897E+00	8.494E+01%	1.40E+01
EU-155	#A	8.6602E-02	8.6602E-02	1.828E+02%	3.25E+00
HF-181	#A	3.2746E-01	3.2747E-01	1.286E+02%	1.24E+00
Ta-182	#A	1.5727E+00	1.5727E+00	6.903E+01%	3.61E+00
Hg-203	#A	2.2038E-01	2.2038E-01	1.035E+02%	7.80E-01

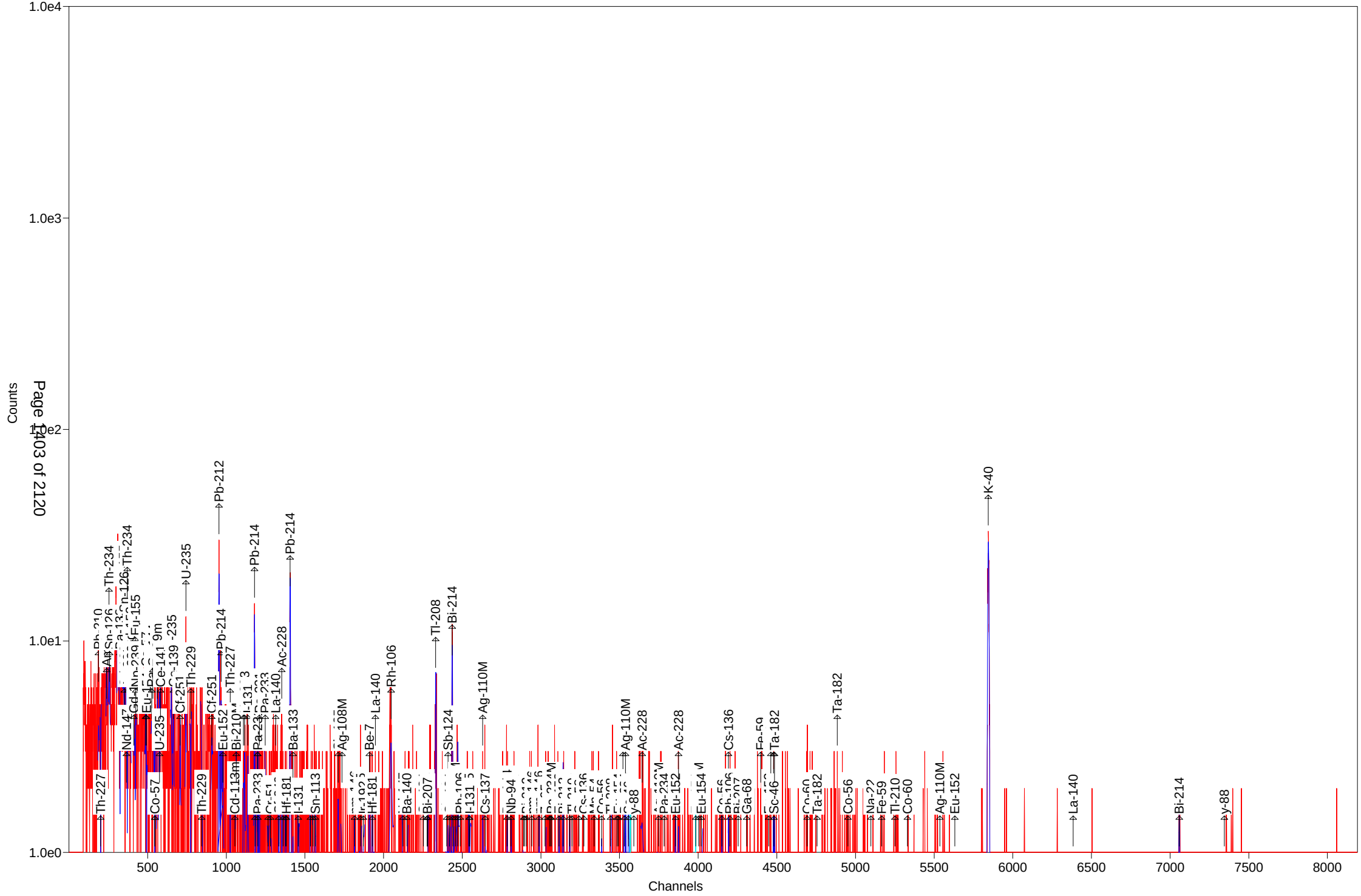
TL-208 #	1.6909E+00	1.6909E+00	2.367E+01%		8.71E-01
pm-146 #A	9.4437E-01	9.4437E-01	9.558E+01%		2.26E+00
y-88 #A	1.3158E-01	1.3158E-01	4.472E+01%		9.80E-01
Cd-113m#B	3.4122E+02	3.4122E+02	1.118E+03%		1.34E+04
Cd-109 #A	4.9914E+00	4.9914E+00	1.646E+02%		2.77E+01
Cf-251 #A	8.5855E-01	8.5855E-01	1.107E+02%		2.62E+00
Cf-249 #A	-1.3874E-01	-1.3874E-01	3.925E+02%		1.89E+00
Sn-126 A	2.3773E+00	2.3773E+00	1.119E+02%		8.97E+00
PB-210 A	2.5891E+00	2.5891E+00	2.429E+02%		2.04E+01
PB-212	3.4546E+00	3.4547E+00	1.466E+01%		1.18E+00
PB-214	6.4108E+00	6.4108E+00	1.221E+01%		1.40E+00
BI-207 #A	-2.8794E-01	-2.8794E-01	1.221E+02%		1.21E+00
BI-212 #A	-4.8346E+00	-4.8346E+00	8.337E+01%		2.07E+01
U-235 #A	1.3118E+00	1.3118E+00	1.521E+02%		6.77E+00
BI-214	4.4554E+00	4.4554E+00	1.865E+01%		1.66E+00
BI-210M#A	2.0475E-01	2.0475E-01	2.251E+02%		1.30E+00
AC-228 #A	8.5754E-01	8.5754E-01	1.464E+02%		5.54E+00
TH-227 #A	-4.0093E+00	-4.0093E+00	7.446E+01%		1.30E+01
TH-229 #A	-5.9002E+00	-5.9002E+00	8.870E+01%		1.69E+01
TH-234 #A	9.3893E-01	9.3893E-01	9.181E+02%		2.53E+01
PA-231 #A	-1.0330E+01	-1.0330E+01	1.662E+02%		5.79E+01
PA-233 #A	-1.4580E-02	-1.4580E-02	5.629E+03%		4.88E+00
PA-234 #A	3.7116E-01	3.7116E-01	4.133E+02%		4.30E+00
PA-234M#A	5.0466E+01	5.0466E+01	8.172E+01%		1.50E+02
AM-241 #A	6.4582E-01	6.4582E-01	1.245E+02%		2.31E+00
Np-237 #A	0.0000E+00	0.0000E+00	1.000E+03%		8.59E+00
Ir-192 #A	-6.3245E-02	-6.3246E-02	4.307E+02%		9.61E-01
Cs-136 #A	4.7199E-03	4.7200E-03	6.017E+01%		1.65E+00
Np-239 #A	1.0183E-01	1.0185E-01	8.888E+02%		3.12E+00
Nd-147 #A	-2.8477E+00	-2.8478E+00	9.699E+01%		6.97E+00
TL-210 #A	-3.0750E-01	-3.0750E-01	1.281E+02%		1.37E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 2.159E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 2.1592329E+02 Bq/Sample

379951_Gamma_160-29881-A-34-B. 14_Gamma_20183189.spc.


Counts
Channels
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
K-40
Pb-212
Pb-214
Th-234
U-235
Tl-208
Bi-214
Ac-228
Ag-110M
Ta-182
La-140
Rh-106
Th-227
Th-229
Cf-251
Eu-152
Cs-137
Cs-136
Co-56
Co-60
Eu-152
Ag-110M
Na-22
Fe-59
Tl-210
Bi-214
y-88
Co-57
Sn-113
Hf-181
Ba-133
Be-7
Sb-124
Ga-68
Sc-46
Nd-147
Ce-141
Ce-139
Pb-210
Ag-108M
Ba-140
Bi-207
Nb-94
Eu-154
Eu-155
Pa-233
Pa-234
Cd-113m
Bi-210M
Th-227
Th-229
Th-234
Pb-214
Ac-228
Ac-228
Ag-110M
Ag-110M
Ag-108M
Ag-110M
Eu-152
Eu-152
Co-57
Co-60
Co-56
Co-60
Ta-182
Ta-182
Ga-68
Fe-59
Sc-46
Cs-136
Cs-137
Rh-106
Rh-106
Pb-214
Pb-214
Pb-212
Pb-214
Pb-214
Pb-214

Test America St. Louis Spectrum ID: 15_Gamma_20182799

Sample Description: 379951_Gamma_160-29881-B-35-C
Detector: Detector #15
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-35-C

Decay to Time: 8/23/2018 07:45 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:45:38 Real Time: 1801 sec
Analysis Time: 8/23/2018 08:15 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.801E+00	145.8	4.083E+00	4.086E+00	1.400E+01
NA-22	7.605E-01	33.3	2.535E-01	2.563E-01	6.227E-01
K-40	1.368E+02	8.3	1.135E+01	1.333E+01	1.062E+01
Sc-46	-3.829E-01	161.8	6.195E-01	6.198E-01	2.145E+00
CR-51	-3.950E+00	30.9	1.219E+00	1.237E+00	2.123E+01
MN-54	2.341E-01	204.6	4.791E-01	4.792E-01	1.179E+00
FE-59	1.444E+00	30.2	4.354E-01	4.413E-01	9.674E-01
Co-56	1.119E+00	32.9	3.678E-01	3.723E-01	7.572E-01
CO-57	4.809E-01	41.8	2.013E-01	2.028E-01	4.940E-01
CO-58	-6.373E-01	89.4	5.697E-01	5.706E-01	1.849E+00
CO-60	-3.968E-02	1661.1	6.592E-01	6.592E-01	1.623E+00
ZN-65	-2.458E+00	81.9	2.013E+00	2.017E+00	6.729E+00
NB-94	-6.374E-01	108.9	6.940E-01	6.948E-01	1.612E+00
ZR-95	4.551E-01	133.7	6.084E-01	6.088E-01	2.264E+00
NB-95	-5.269E-01	101.5	5.350E-01	5.357E-01	1.820E+00
RU-103	7.775E-02	336.5	2.616E-01	2.617E-01	7.031E-01
RH-106	-2.949E+00	101.0	2.978E+00	2.982E+00	1.605E+01
AG-108M	9.420E-02	322.6	3.039E-01	3.040E-01	8.156E-01
AG-110M	3.382E-01	95.3	3.222E-01	3.226E-01	1.902E+00
SN-113	5.118E-01	127.8	6.539E-01	6.544E-01	2.224E+00
SB-124	-3.371E-02	81.0	2.732E-02	2.737E-02	3.055E+00
SB-125	1.865E+00	43.4	8.096E-01	8.152E-01	1.444E+00
I-131	3.094E-01	98.3	3.043E-01	3.047E-01	7.768E-01
Gd-153	-1.156E+00	177.3	2.050E+00	2.051E+00	6.841E+00
Ga-68	2.581E+00	702.4	1.813E+01	1.813E+01	4.503E+01
Tc-99m	2.905E-01	172.2	5.001E-01	5.003E-01	1.678E+00
BA-133	3.991E-01	200.2	7.990E-01	7.992E-01	2.721E+00
CS-134	3.873E-02	108.7	4.208E-02	4.213E-02	2.981E+00
CS-137	-5.808E-02	1130.9	6.568E-01	6.568E-01	1.521E+00
CE-139	1.879E-01	149.9	2.817E-01	2.823E-01	9.610E-01
Ba-140	7.687E-01	129.6	9.964E-01	9.972E-01	2.238E+00
La-140	3.357E-01	113.6	3.813E-01	3.818E-01	7.974E-01
CE-141	4.453E-01	106.2	4.731E-01	4.737E-01	1.228E+00

CE-144	-2.426E+00	149.8	3.636E+00	3.638E+00	1.219E+01
PM-144	4.061E-01	105.8	4.297E-01	4.302E-01	8.833E-01
EU-152	7.819E-01	193.4	1.512E+00	1.513E+00	5.181E+00
EU-154	-6.883E+00	69.8	4.802E+00	4.815E+00	1.595E+01
EU-155	-1.709E+00	87.5	1.495E+00	1.498E+00	1.007E+01
HF-181	2.178E-01	199.7	4.349E-01	4.350E-01	1.948E+00
Ta-182	2.303E-01	101.7	2.343E-01	2.346E-01	1.107E+01
Hg-203	-2.011E-01	139.8	2.811E-01	2.813E-01	1.307E+00
TL-208	2.230E+00	16.1	3.587E-01	3.769E-01	5.184E-01
pm-146	1.058E+00	91.5	9.686E-01	9.702E-01	2.756E+00
y-88	6.646E-02	857.3	5.698E-01	5.698E-01	1.380E+00
Cd-113m	-1.156E+03	387.3	4.477E+03	4.478E+03	1.563E+04
Cd-109	0.000E+00	1.#INF	1.642E+01	1.642E+01	5.482E+01
Cf-251	-1.828E+00	99.6	1.821E+00	1.829E+00	4.682E+00
Cf-249	-2.795E-01	105.9	2.960E-01	2.963E-01	2.442E+00
Sn-126	3.649E+00	112.4	4.100E+00	4.104E+00	1.375E+01
PB-210	-1.008E+00	1225.0	1.235E+01	1.235E+01	4.247E+01
PB-212	5.540E+00	12.5	6.927E-01	7.799E-01	1.613E+00
PB-214	8.259E+00	10.5	8.699E-01	9.700E-01	1.677E+00
BI-207	8.266E-02	143.5	1.186E-01	1.187E-01	1.138E+00
BI-212	-9.411E-01	515.1	4.847E+00	4.848E+00	2.229E+01
U-235	7.014E-01	145.0	1.017E+00	1.018E+00	1.318E+01
BI-214	7.921E+00	14.6	1.158E+00	1.229E+00	2.146E+00
BI-210M	4.530E-01	91.7	4.154E-01	4.163E-01	1.409E+00
AC-228	6.656E+00	17.7	1.177E+00	1.225E+00	1.602E+00
TH-227	2.503E+00	203.4	5.093E+00	5.095E+00	1.399E+01
TH-229	-4.167E+00	167.2	6.966E+00	6.974E+00	1.817E+01
TH-234	-1.315E+01	73.8	9.710E+00	9.734E+00	3.739E+01
PA-231	-6.766E+00	299.2	2.024E+01	2.024E+01	6.862E+01
PA-233	0.000E+00	1.#INF	5.063E-01	5.063E-01	5.539E+00
PA-234	3.940E-01	96.8	3.812E-01	3.818E-01	7.440E+00
PA-234M	3.323E+01	87.4	2.903E+01	2.908E+01	3.056E+02
AM-241	1.048E+00	112.5	1.179E+00	1.180E+00	3.953E+00
Np-237	-6.903E-01	582.5	4.021E+00	4.021E+00	1.353E+01
Ir-192	1.689E-01	108.6	1.835E-01	1.837E-01	2.316E+00
Cs-136	3.561E-01	117.1	4.171E-01	4.176E-01	1.571E+00
Np-239	8.823E-01	315.5	2.783E+00	2.784E+00	9.310E+00
Nd-147	6.176E-01	374.7	2.314E+00	2.315E+00	6.025E+00
TL-210	-1.932E-01	288.9	5.584E-01	5.585E-01	1.962E+00
Total	2.270E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-35-C

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182799.An1

Acquisition information
Start time: 8/23/2018 7:45:38 AM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-08-11_1245.PBC 8/11/2018 12:45:21 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0857

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
50.14	8.	203.45	0.95	2.192E-02	50.14	8.000	PBC<MDA	TH227
59.54	19.	112.45	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
64.59	19.	112.36	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
77.16	88.	23.56	0.98	3.453E-02				
87.48	27.	49.10	0.98	3.698E-02	87.57	37.500	PBC<MDA	Sn126
93.23	70.	29.79	1.06	3.785E-02	93.35	5.561	1.839E+01	AC228
106.13	14.	315.49	1.00	3.878E-02	106.13	22.700	PBC<MDA	Np239
122.06	28.	41.85	0.75	3.846E-02	121.78	28.580	1.440E+00	EU152
					122.06	85.600	4.809E-01	CO57
123.10	13.	103.49	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
140.24	17.	172.16	1.03	3.678E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	14.	106.25	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
162.66	5.	291.89	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	9.	145.03	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	9.	149.91	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
185.72	53.	27.82	1.07	3.123E-02	185.72	54.000	1.757E+00	U235
238.67	116.	12.91	1.09	2.592E-02	238.63	43.300	5.730E+00	PB212
242.14	39.	25.83	1.12	2.565E-02	242.00	7.430	1.144E+01	PB214
265.83	10.	91.70	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
277.05	9.	105.20	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
295.10	67.	17.13	1.27	2.205E-02	295.09	19.300	8.755E+00	PB214
328.76	7.	172.85	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
333.44	7.	180.09	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.05	28.	30.48	1.08	1.983E-02	338.32	12.010	6.454E+00	AC228
340.57	7.	186.68	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
344.29	7.	193.40	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
345.83	7.	199.68	1.21	1.949E-02	345.83	15.070	PBC<MDA	HF181
351.75	104.	12.26	1.18	1.924E-02	351.93	37.600	8.005E+00	PB214
356.00	8.	200.19	1.22	1.906E-02	356.00	62.050	PBC<MDA	BA133
364.48	9.	98.33	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
391.69	10.	127.76	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
427.88	12.	43.41	1.28	1.647E-02	427.88	29.600	PBC<MDA	SB125
433.94	2.	322.62	1.29	1.629E-02	433.94	90.480	PBC<MDA	AG108M
463.37	6.	103.59	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
468.06	6.	108.61	1.32	1.533E-02	468.06	51.750	PBC<MDA	Ir192
487.02	9.	113.59	1.33	1.485E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	336.51	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	53.	26.45	2.60	1.426E-02	511.86	20.000	1.032E+01	RH106
531.00	2.	374.72	1.37	1.384E-02	531.00	13.000	PBC<MDA	Nd147
537.26	4.	129.62	1.37	1.371E-02	537.26	24.390	PBC<MDA	Ba140
563.24	2.	374.72	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.32	3.	229.13	1.40	1.307E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.382E+00	PA234
					569.70	97.740	1.160E-01	BI207
583.17	43.	16.09	2.22	1.282E-02	583.02	84.500	2.230E+00	TL208
609.66	68.	16.95	1.39	1.236E-02	609.31	46.090	6.616E+00	BI214
					610.30	5.750	5.310E+01	RU103
618.06	13.	125.87	1.44	1.222E-02	618.06	99.100	PBC<MDA	PM144
635.89	7.	82.07	1.45	1.193E-02	635.89	11.310	PBC<MDA	SB125
657.76	4.	153.16	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
696.54	4.	170.08	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
722.79	11.	81.04	1.52	1.072E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	6.024E-01	AG108M
					723.36	20.220	2.707E+00	EU154
724.20	6.	133.67	1.52	1.071E-02	724.20	44.150	PBC<MDA	ZR95
735.72	5.	149.09	1.53	1.056E-02	735.72	22.500	PBC<MDA	pm146
747.16	7.	106.18	1.54	1.043E-02	747.16	34.000	PBC<MDA	pm146
756.73	2.	416.87	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
766.41	11.	87.38	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	4.	204.63	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
801.95	8.	108.65	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
818.50	6.	141.45	1.59	9.655E-03	818.50	100.000	PBC<MDA	Cs136
834.85	4.	204.63	1.60	9.494E-03	834.85	99.980	PBC<MDA	MN54
846.77	2.	207.02	1.61	9.380E-03	846.77	99.935	PBC<MDA	Co56
871.10	1.	556.78	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
880.53	9.	94.93	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
884.68	6.	113.31	1.64	9.036E-03	884.68	72.680	PBC<MDA	AG110M
898.04	1.	857.32	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
911.41	31.	17.96	1.66	8.811E-03	911.07	29.000	6.740E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
946.02	6.	122.85	1.68	8.531E-03	946.02	13.400	PBC<MDA	PA234
967.86	2.	561.25	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
1004.77	10.	96.80	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	10.	32.86	1.75	7.875E-03	1037.84	14.130	4.878E+00	Co56
1050.36	3.	352.88	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	4.	183.77	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	1.	702.38	1.77	7.623E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	11.	30.15	1.79	7.491E-03	1099.25	56.500	1.444E+00	FE59
1120.40	20.	25.51	3.25	7.368E-03	1120.29	15.100	9.750E+00	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1173.24	-1.	686.91	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	101.72	1.85	6.994E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	3.	308.52	1.87	6.830E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	14.	45.16	1.88	6.748E-03	1238.28	66.070	1.800E+00	Co56
1274.53	9.	33.33	1.90	6.579E-03	1274.53	99.940	7.605E-01	NA22
					1274.54	35.190	2.160E+00	EU154
1313.00	2.	324.82	1.93	6.408E-03	1313.00	21.000	PBC<MDA	TL210
1461.09	153.	8.29	1.85	5.828E-03	1460.83	10.670	1.368E+02	K40
1764.69	14.	31.41	2.18	4.916E-03	1764.49	15.400	1.004E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.23	77.16	95.	88.	2.551E+03	23.56	0.979	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-227	200.23	50.14	79.	8.	0.004	203.45	0.950s
AM-241	237.79	59.54	208.	19.	0.010	112.45	0.958s
TH-234	252.78	63.29	240.	-26.	-0.015	73.84	0.962s
Sn-126	256.75	64.28	217.	19.	0.011	112.36	0.963s
BA-133	323.54	80.99	339.	-22.	-0.012	93.91	0.978s
Np-237	345.53	86.49	605.	-6.	-0.003	582.48	0.983s
EU-155	345.74	86.54	904.	-24.	-0.013	180.86	0.983s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Sn-126	347.33	86.94	874.	-24.	-0.013	177.80	0.984s
Sn-126	349.84	87.57	815.	27.	0.015	49.10	0.984D
Cd-109	351.72	88.04	850.	0.	0.000	175.20	0.985A
Nd-147	363.95	91.10	839.	-24.	-0.013	173.57	0.987s
TH-234	369.91	92.59	886.	-47.	-0.026	46.68	0.989s
AC-228	372.45	93.23	83.	70.	0.039	29.79	1.057s
Gd-153	389.54	97.50	887.	-24.	-0.013	177.29	0.993s
Np-239	397.53	99.50	911.	-24.	-0.013	179.31	0.995s
Gd-153	412.32	103.20	934.	-24.	-0.013	181.04	0.998s
Np-239	414.32	103.70	959.	-24.	-0.013	183.24	0.999s
EU-155	420.77	105.31	984.	-25.	-0.014	87.49	1.001s
Np-239	424.03	106.13	965.	14.	0.008	315.49	1.001s
EU-152	486.57	121.78	114.	-6.	-0.004	235.09	1.016s
CO-57	487.70	122.06	32.	28.	0.016	41.85	0.754s
EU-154	491.87	123.10	80.	13.	0.007	103.49	1.017s
PA-234	524.63	131.29	359.	-18.	-0.010	149.53	1.024s
HF-181	531.54	133.02	344.	-18.	-0.010	146.19	1.026s
CE-144	533.60	133.54	362.	-18.	-0.010	149.84	1.026s
HF-181	544.63	136.30	380.	-7.	-0.004	425.99	1.029s
CO-57	545.33	136.47	387.	0.	0.000	1000.00	1.029s
Tc-99m	561.46	140.51	403.	17.	0.009	172.16	1.032s
CE-141	581.17	145.44	59.	14.	0.008	106.25	1.037s
Ba-140	650.01	162.66	104.	5.	0.003	291.89	1.053s
U-235	652.88	163.38	75.	9.	0.005	145.03	1.053
CE-139	662.77	165.85	90.	9.	0.005	149.91	1.055s
Cf-251	705.73	176.60	88.	-18.	-0.010	99.61	1.065s
U-235	742.19	185.72	48.	53.	0.030	27.82	1.073s
TH-229	773.33	193.51	77.	-10.	-0.006	167.18	1.080s
U-235	820.60	205.33	88.	-19.	-0.011	66.65	1.091s
TH-229	842.65	210.85	89.	-11.	-0.006	118.03	1.096s
Cf-251	907.22	227.00	92.	-19.	-0.011	95.64	1.110s
PB-212	953.72	238.63	41.	112.	0.062	12.50	1.120D
PB-214	967.17	242.00	32.	39.	0.022	25.83	1.123D
EU-152	977.95	244.69	303.	-17.	-0.009	146.42	1.126s
TH-227	1024.12	256.24	88.	-19.	-0.011	93.58	1.136s
Cd-113m	1053.94	263.70	66.	-3.	-0.002	387.30	1.142s
BI-210M	1062.46	265.83	35.	10.	0.005	91.70	1.144s
TL-208	1108.25	277.28	40.	9.	0.005	105.20	1.154s
Hg-203	1115.91	279.20	79.	-7.	-0.004	139.78	1.156s
I-131	1136.30	284.30	48.	0.	0.000	1000.00	1.160s
PB-214	1179.49	295.10	17.	67.	0.037	17.13	1.271
TL-210	1183.08	296.00	310.	-13.	-0.007	186.48	1.170
PB-212	1199.19	300.03	295.	-14.	-0.008	30.46	1.174s
PA-231	1199.35	300.07	281.	-14.	-0.008	177.20	1.174s
PA-233	1199.79	300.18	267.	-14.	-0.008	172.95	1.174s
PA-231	1209.66	302.65	254.	-8.	-0.004	299.15	1.176s
BA-133	1210.47	302.85	246.	0.	0.000	1000.00	1.176s
Ba-140	1218.46	304.85	246.	0.	0.000	1000.00	1.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1218.64	304.90	246.	0.	0.000	1000.00	1.178s
Ir-192	1232.81	308.44	246.	0.	0.000	1000.00	1.181s
PA-233	1247.09	312.01	246.	0.	0.000	1000.00	1.184s
Ir-192	1265.00	316.49	246.	0.	0.000	1000.00	1.188s
CR-51	1279.37	320.08	266.	-15.	-0.008	30.86	1.191
La-140	1314.06	328.76	74.	7.	0.004	172.85	1.199s
Cf-249	1332.77	333.44	81.	7.	0.004	180.09	1.203s
AC-228	1351.20	338.05	11.	28.	0.015	30.48	1.084s
Cs-136	1361.28	340.57	89.	7.	0.004	186.68	1.209s
EU-152	1376.13	344.29	96.	7.	0.004	193.40	1.212s
HF-181	1382.30	345.83	103.	7.	0.004	199.68	1.213s
PB-214	1405.99	351.75	17.	104.	0.058	12.26	1.181
BA-133	1422.97	356.00	140.	8.	0.005	200.19	1.222s
I-131	1456.89	364.48	16.	9.	0.005	98.33	1.229s
BA-133	1534.29	383.84	97.	-14.	-0.008	105.10	1.246
Cf-249	1550.72	387.95	110.	-14.	-0.008	111.52	1.249s
SN-113	1565.67	391.69	83.	10.	0.006	127.76	1.253s
SB-125	1710.36	427.88	5.	12.	0.007	43.41	1.283s
AG-108M	1734.60	433.94	17.	2.	0.001	322.62	1.288s
pm-146	1814.35	453.88	35.	-13.	-0.007	60.73	1.304s
SB-125	1852.29	463.37	16.	6.	0.003	103.59	1.312s
Ir-192	1871.05	468.06	21.	6.	0.004	108.61	1.316s
BE-7	1909.18	477.60	64.	-8.	-0.004	145.77	1.324s
HF-181	1926.79	482.00	72.	0.	0.000	1000.00	1.328s
La-140	1946.87	487.02	51.	9.	0.005	113.59	1.332s
RU-103	1987.00	497.05	9.	2.	0.001	336.51	1.340s
RH-106	2046.22	511.86	21.	53.	0.029	26.45	2.602s
Nd-147	2122.75	531.00	13.	2.	0.001	374.72	1.368s
Ba-140	2147.78	537.26	5.	4.	0.002	129.62	1.373s
CS-134	2251.67	563.24	13.	2.	0.001	374.72	1.394s
CS-134	2276.00	569.32	17.	3.	0.001	229.13	1.399
PA-234	2276.59	569.47	21.	-1.	0.000	972.11	1.399s
BI-207	2277.52	569.70	25.	-3.	-0.002	220.45	1.399s
TL-208	2331.37	583.17	3.	43.	0.024	16.09	2.219s
SB-125	2400.69	600.50	206.	-13.	-0.007	53.31	1.424s
SB-124	2409.62	602.73	193.	-13.	-0.007	152.30	1.425
CS-134	2417.53	604.71	180.	-13.	-0.007	147.05	1.427s
BI-214	2437.32	609.66	17.	68.	0.038	16.95	1.393s
RU-103	2439.88	610.30	167.	-12.	-0.006	161.27	1.431s
PM-144	2470.93	618.06	132.	13.	0.007	125.87	1.437s
RH-106	2486.35	621.92	48.	-11.	-0.006	101.00	1.440s
SB-125	2542.23	635.89	13.	7.	0.004	82.07	1.451s
AG-110M	2629.71	657.76	22.	4.	0.002	153.16	1.469
PM-144	2784.82	696.54	10.	4.	0.002	170.08	1.499s
NB-94	2809.17	702.63	37.	-12.	-0.007	108.88	1.503s
SB-124	2889.79	722.79	31.	11.	0.006	81.04	1.519s
EU-154	2892.07	723.36	42.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	33.	6.	0.004	133.67	1.520s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	2907.33	727.17	40.	-1.	-0.001	515.09	1.522s
pm-146	2941.53	735.72	9.	5.	0.003	149.09	1.529s
pm-146	2987.29	747.16	10.	7.	0.004	106.18	1.537
ZR-95	3025.56	756.73	19.	2.	0.001	416.87	1.544s
AG-110M	3054.42	763.94	23.	-1.	-0.001	519.62	1.550s
NB-95	3061.80	765.79	43.	-10.	-0.005	101.53	1.551s
PA-234M	3064.30	766.41	43.	11.	0.006	87.38	1.552s
BI-212	3140.33	785.42	14.	4.	0.002	204.63	1.566s
CS-134	3182.12	795.87	35.	-11.	-0.006	82.55	1.574s
TL-210	3197.05	799.60	46.	-3.	-0.002	288.95	1.577s
CS-134	3206.46	801.95	32.	8.	0.004	108.65	1.578s
CO-58	3241.75	810.78	40.	-11.	-0.006	89.40	1.585s
La-140	3261.74	815.77	51.	-7.	-0.004	149.61	1.589s
Cs-136	3272.66	818.50	28.	6.	0.003	141.45	1.591s
MN-54	3338.05	834.85	14.	4.	0.002	204.63	1.603s
Co-56	3385.75	846.77	5.	2.	0.001	207.02	1.612s
NB-94	3483.06	871.10	15.	1.	0.001	556.78	1.629s
EU-154	3491.60	873.23	40.	-14.	-0.008	69.76	1.631s
PA-234	3520.80	880.53	32.	9.	0.005	94.93	1.636
PA-234	3531.64	883.24	41.	0.	0.000	1000.00	1.638s
AG-110M	3537.42	884.68	18.	6.	0.003	113.31	1.639s
Sc-46	3555.81	889.28	47.	-6.	-0.003	161.80	1.642s
y-88	3590.85	898.04	15.	1.	0.001	857.32	1.649s
AC-228	3642.98	911.07	0.	31.	0.017	17.96	1.658s
AG-110M	3748.69	937.49	20.	-8.	-0.004	127.88	1.677s
PA-234	3782.81	946.02	10.	6.	0.003	122.85	1.683s
EU-152	3855.18	964.11	38.	-12.	-0.007	78.17	1.696s
AC-228	3874.63	968.97	62.	2.	0.001	561.25	1.699s
EU-154	3984.09	996.33	41.	-12.	-0.007	81.39	1.718s
PA-234M	4002.77	1001.00	55.	-4.	-0.002	236.01	1.722s
EU-154	4017.88	1004.77	45.	10.	0.006	96.80	1.724s
Co-56	4150.18	1037.84	0.	10.	0.005	32.86	1.747s
Cs-136	4191.11	1048.07	32.	-14.	-0.008	64.32	1.754s
RH-106	4200.27	1050.36	40.	3.	0.001	352.88	1.755s
BI-207	4253.49	1063.66	10.	4.	0.002	183.77	1.765s
Ga-68	4308.47	1077.40	10.	1.	0.001	702.38	1.774s
FE-59	4395.90	1099.25	0.	11.	0.006	30.15	1.789s
EU-152	4447.22	1112.07	100.	-17.	-0.009	89.05	1.797s
ZN-65	4461.11	1115.55	84.	-17.	-0.009	81.88	1.800s
BI-214	4480.55	1120.40	2.	20.	0.011	25.51	3.249s
Sc-46	4481.13	1120.55	89.	-17.	-0.009	84.20	1.803s
Ta-182	4484.13	1121.30	108.	-7.	-0.004	219.21	1.803s
CO-60	4691.97	1173.24	17.	-1.	0.000	686.91	1.838s
Ta-182	4755.25	1189.05	5.	6.	0.003	101.72	1.848s
Ta-182	4884.75	1221.41	16.	3.	0.002	308.52	1.869s
Co-56	4952.26	1238.28	6.	14.	0.008	45.16	1.879s
NA-22	5097.34	1274.53	0.	9.	0.005	33.33	1.902s
EU-154	5097.40	1274.54	9.	0.	0.000	1000.00	1.902s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	5165.64	1291.60	16.	-4.	-0.002	232.74	1.913s
TL-210	5251.31	1313.00	11.	2.	0.001	324.82	1.926s
AG-110M	5536.68	1384.30	6.	-1.	0.000	846.32	1.970s
K-40	5844.08	1461.09	4.	153.	0.085	8.29	1.853
SB-124	6764.43	1690.98	0.	0.	0.000	1000.00	2.142s
BI-214	7058.76	1764.49	2.	14.	0.008	31.41	2.181s
Co-56	7086.23	1771.35	16.	0.	0.000	1000.00	2.184s
y-88	7345.35	1836.06	6.	-3.	-0.002	137.91	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.8011E+00				5.31E+01	
			477.60	-2.801E+00	?(	1.400E+01 1.46E+02 1.05E+01	G
NA-22	C	7.6046E-01				9.50E+02	
			1274.53	7.605E-01	?(	6.227E-01 3.33E+01 9.99E+01	G
K-40	N	1.3681E+02				4.66E+11	
			1460.83	1.368E+02	(P	1.062E+01 8.29E+00 1.07E+01	G
Sc-46	F	-3.8288E-01				8.38E+01	
			889.28	-3.829E-01	&(	2.145E+00 1.62E+02 1.00E+02	G
			1120.55	-1.251E+00	+	3.525E+00 8.42E+01 1.00E+02	G
CR-51	F	-3.9500E+00				2.77E+01	
			320.08	-3.950E+00	&(P	2.123E+01 3.09E+01 9.94E+00	G
MN-54	C	2.3412E-01				3.12E+02	
			834.85	2.341E-01	?(	1.179E+00 2.05E+02 1.00E+02	G
FE-59	F	1.4439E+00				4.45E+01	
			1099.25	1.444E+00	?(	9.674E-01 3.02E+01 5.65E+01	G
			1291.60	-7.912E-01	-	4.223E+00 2.33E+02 4.32E+01	G
Co-56	C	1.1194E+00				7.73E+01	
			846.77	1.383E-01	?(	7.572E-01 2.07E+02 9.99E+01	G
			1238.28	1.800E+00	?(P	1.706E+00 4.52E+01 6.61E+01	G
			1037.84	4.878E+00	?(P	3.680E+00 3.29E+01 1.41E+01	G
			1771.35	0.000E+00	-	1.564E+01 1.00E+03 1.55E+01	A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C	4.8093E-01					2.72E+02	
			122.06	4.809E-01	(	4.940E-01	4.18E+01	8.56E+01 G
			136.47	0.000E+00	-	1.318E+01	1.00E+03	1.07E+01 G
CO-58	C	-6.3727E-01					7.09E+01	
			810.78	-6.373E-01	?(P	1.849E+00	8.94E+01	9.95E+01 G
CO-60	F	-3.9682E-02					1.93E+03	
			1332.50	-3.968E-02	%(P	1.623E+00	1.66E+03	1.00E+02 G
			1173.24	-5.891E-02	+ P	1.712E+00	6.87E+02	9.99E+01 G
ZN-65	F	-2.4583E+00					2.44E+02	
			1115.55	-2.458E+00	?(	6.729E+00	8.19E+01	5.06E+01 G
NB-94	I	-6.3738E-01					7.41E+06	
			702.63	-6.374E-01	?(	1.612E+00	1.09E+02	9.79E+01 G
			871.10	6.074E-02	&	1.261E+00	5.57E+02	9.99E+01 G
ZR-95	I	4.5514E-01					6.40E+01	
			756.73	2.206E-01	?(P	2.264E+00	4.17E+02	5.45E+01 G
			724.20	7.444E-01	?(	3.449E+00	1.34E+02	4.42E+01 G
NB-95	I	-5.2688E-01					6.40E+01	
			765.79	-5.269E-01	?(	1.820E+00	1.02E+02	9.98E+01 G
RU-103	I	7.7746E-02					3.93E+01	
			497.05	7.775E-02	?(P	7.031E-01	3.37E+02	9.09E+01 G
			610.30	-9.007E+00	+	4.918E+01	1.61E+02	5.75E+00 GA
RH-106	I	-2.9489E+00					3.74E+02	
			621.92	-5.255E+00	?(P	1.605E+01	1.01E+02	9.93E+00 G
			1050.36	1.173E+01	?(P	1.466E+02	3.53E+02	1.56E+00 G
			511.86	1.032E+01	?	4.688E+00	2.64E+01	2.00E+01 GA
AG-108M	C	9.4204E-02					1.53E+05	
			433.94	9.420E-02	?(P	8.156E-01	3.23E+02	9.05E+01 G
			722.94	6.101E-03	%	1.875E+00	8.56E+03	9.08E+01 G
			614.28	1.921E-07	%	3.058E+00	4.62E+08	8.98E+01 G
AG-110M	F	3.3819E-01					2.50E+02	
			884.68	4.821E-01	?(	1.902E+00	1.13E+02	7.27E+01 G
			657.76	2.277E-01	?(	1.230E+00	1.53E+02	9.46E+01 G
			937.49	-1.504E+00	+	4.429E+00	1.28E+02	3.44E+01 G
			1384.30	-2.494E-01	-	5.163E+00	8.46E+02	2.43E+01 G
			763.94	-3.248E-01	+	6.144E+00	5.20E+02	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	5.1183E-01					1.15E+02	
			391.69	5.118E-01	?(	2.224E+00	1.28E+02	6.40E+01 G
SB-124	F	-3.3711E-02					6.02E+01	
			602.73	-5.942E-01	&(	3.055E+00	1.52E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.677E+00	1.00E+03	4.78E+01 G
			722.79	5.061E+00	?(	1.380E+01	8.10E+01	1.08E+01 G
SB-125	I	1.8651E+00					1.01E+03	
			427.88	1.416E+00	?(P	1.444E+00	4.34E+01	2.96E+01 G
			600.50	-3.283E+00	- P	1.730E+01	5.33E+01	1.79E+01 G
			635.89	2.882E+00	?(	8.032E+00	8.21E+01	1.13E+01 G
			463.37	2.038E+00	?(P	7.300E+00	1.04E+02	1.05E+01 G
I-131	I	3.0944E-01					8.02E+00	
			364.48	3.094E-01	?(P	7.768E-01	9.83E+01	8.17E+01 G
			284.30	0.000E+00	-	1.396E+01	1.00E+03	6.14E+00 G
			636.97	3.251E-01	%	1.614E+01	1.35E+03	7.17E+00 G
Gd-153	F	-1.1563E+00					2.42E+02	
			97.50	-1.156E+00	&(	6.841E+00	1.77E+02	3.00E+01 G
			103.20	-1.584E+00	+	9.565E+00	1.81E+02	2.18E+01 G
Ga-68	C	2.5812E+00					4.71E-02	
			1077.40	2.581E+00	?(	4.503E+01	7.02E+02	3.30E+00 G
Tc-99m	I	2.9046E-01					2.51E-01	
			140.51	2.905E-01	?(	1.678E+00	1.72E+02	8.93E+01 G
BA-133	F	3.9910E-01					3.85E+03	
			356.00	3.991E-01	?(	2.721E+00	2.00E+02	6.20E+01 G
			302.85	0.000E+00	-	1.063E+01	1.00E+03	1.83E+01 G
			383.84	-4.737E+00	+	1.679E+01	1.05E+02	8.94E+00 GA
			80.99	-1.015E+00	+ P	4.057E+00	9.39E+01	3.41E+01 GA
CS-134	I	3.8729E-02					7.54E+02	
			604.71	-6.004E-01	?(	2.981E+00	1.47E+02	9.76E+01 G
			795.87	-7.190E-01	+	1.998E+00	8.26E+01	8.55E+01 G
			569.32	7.368E-01	?(	6.110E+00	2.29E+02	1.54E+01 G
			801.95	5.050E+00	?(	1.883E+01	1.09E+02	8.69E+00 G
			563.24	1.009E+00	?(	9.843E+00	3.75E+02	8.35E+00 G
CS-137	I	-5.8083E-02					1.10E+04	
			661.66	-5.808E-02	%(P	1.521E+00	1.13E+03	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.8791E-01					1.38E+02	
			165.85	1.879E-01	&(	9.610E-01	1.50E+02	7.99E+01 G
Ba-140	I	7.6873E-01					1.28E+01	
			537.26	6.276E-01	?(P	2.238E+00	1.30E+02	2.44E+01 G
			162.66	1.322E+00	?(	1.328E+01	2.92E+02	6.22E+00 G
			304.85	0.000E+00	&	4.565E+01	1.00E+03	4.29E+00 G
La-140	I	3.3573E-01					1.28E+01	
			1596.21	-3.081E-03	%(P	7.974E-01	4.46E+04	9.54E+01 G
			487.02	7.615E-01	?(	2.951E+00	1.14E+02	4.55E+01 G
			328.76	9.738E-01	*(	5.782E+00	1.73E+02	2.03E+01 G
			815.77	-1.720E+00	+	8.872E+00	1.50E+02	2.33E+01 G
CE-141	I	4.4529E-01					3.25E+01	
			145.44	4.453E-01	&(P	1.228E+00	1.06E+02	4.82E+01 G
CE-144	I	-2.4264E+00					2.85E+02	
			133.54	-2.426E+00	(	1.219E+01	1.50E+02	1.11E+01 G
PM-144	C	4.0614E-01					3.63E+02	
			696.54	2.055E-01	?(P	8.833E-01	1.70E+02	9.90E+01 G
			618.06	6.066E-01	?(	2.580E+00	1.26E+02	9.91E+01 G
EU-152	F	7.8188E-01					4.94E+03	
			344.29	7.819E-01	?(	5.181E+00	1.93E+02	2.65E+01 G
			1112.07	-9.080E+00	+	2.710E+01	8.91E+01	1.36E+01 G
			121.78	-3.284E-01	&	2.645E+00	2.35E+02	2.86E+01 G
			778.92	-1.421E-01	%	7.226E+00	1.95E+03	1.29E+01 G
			964.11	-5.439E+00	+	1.425E+01	7.82E+01	1.46E+01 G
			244.69	-4.913E+00	+	2.416E+01	1.46E+02	7.58E+00 G
			1408.00	2.928E-01	%	8.080E+00	1.19E+03	2.10E+01 GA
EU-154	I	-6.8829E+00					3.14E+03	
			873.23	-6.883E+00	?(	1.595E+01	6.98E+01	1.23E+01 G
			123.10	4.518E-01	+	1.579E+00	1.03E+02	4.08E+01 G
			1274.54	0.000E+00	+	4.005E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	8.438E+00	1.00E+03	2.02E+01 G
			1004.77	3.955E+00	+	1.298E+01	9.68E+01	1.80E+01 G
			996.33	-7.677E+00	+	2.099E+01	8.14E+01	1.06E+01 G
EU-155	I	-1.7091E+00					1.81E+03	
			105.31	-1.709E+00	?(P	1.007E+01	8.75E+01	2.12E+01 G
			86.54	-1.164E+00	+	7.026E+00	1.81E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	2.1780E-01					4.24E+01	
			482.00	0.000E+00	?(	1.948E+00	1.00E+03	8.05E+01 G
			133.02	-6.203E-01	+	3.042E+00	1.46E+02	4.33E+01 G
			345.83	1.381E+00	?(	9.443E+00	2.00E+02	1.51E+01 G
			136.30	-1.657E+00	+	2.385E+01	4.26E+02	5.85E+00 G
Ta-182	F	2.3032E-01					1.14E+02	
			1121.30	-1.474E+00	(	1.107E+01	2.19E+02	3.49E+01 G
			1221.41	9.037E-01	?(	6.431E+00	3.09E+02	2.70E+01 G
			1189.05	2.779E+00	?(	6.606E+00	1.02E+02	1.62E+01 G
Hg-203	F	-2.0108E-01					4.66E+01	
			279.20	-2.011E-01	?(P	1.307E+00	1.40E+02	8.15E+01 G
TL-208	N	2.2298E+00					6.98E+02	
			583.02	2.230E+00	(P	5.184E-01	1.61E+01	8.45E+01 G
			277.28	3.406E+00	+ P	1.221E+01	1.05E+02	6.31E+00 G
			860.56	2.507E-01	% P	9.884E+00	1.55E+03	1.24E+01 G
pm-146	C	1.0584E+00					2.02E+03	
			747.16	1.049E+00	?(P	2.756E+00	1.06E+02	3.40E+01 G
			735.72	1.073E+00	?(P	3.974E+00	1.49E+02	2.25E+01 G
			453.88	-7.330E-01	- P	1.657E+00	6.07E+01	6.50E+01 G
y-88	F	6.6465E-02					1.07E+02	
			898.04	6.646E-02	?(	1.380E+00	8.57E+02	9.37E+01 G
			1836.06	-3.716E-01	+ P	1.685E+00	1.38E+02	9.92E+01 G
Cd-113m		-1.1559E+03					5.33E+03	
			263.70	-1.156E+03	?(	1.563E+04	3.87E+02	6.00E-03 K
Cf-251	T	-1.8285E+00					3.28E+05	
			176.60	-1.828E+00	?(	4.682E+00	9.96E+01	1.70E+01 G
			227.00	-6.319E+00	+	1.551E+01	9.56E+01	6.30E+00 GA
Cf-249	T	-2.7945E-01					1.28E+05	
			387.95	-6.490E-01	&(	2.442E+00	1.12E+02	6.60E+01 G
			333.44	1.293E+00	?(	7.992E+00	1.80E+02	1.55E+01 G
Sn-126		3.6488E+00					3.65E+07	
			87.57	1.062E+00	}	5.439E+00	4.91E+01	3.75E+01 GA
			64.28	3.649E+00	?(	1.375E+01	1.12E+02	9.70E+00 G
			86.94	-3.946E+00	&	2.342E+01	1.78E+02	9.04E+00 GA
PB-210	N	-1.0082E+00					8.14E+03	
			46.54	-1.008E+00	%(P	4.247E+01	1.23E+03	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	5.5396E+00					6.98E+02	
			238.63	5.540E+00	(P	1.613E+00	1.25E+01	4.33E+01 G
			300.03	-1.127E+01	& P	6.440E+01	3.05E+01	3.28E+00 GA
PB-214	N	8.2593E+00					5.84E+05	
			351.93	8.005E+00	(P	1.677E+00	1.23E+01	3.76E+01 G
			295.09	8.755E+00	(P	2.858E+00	1.71E+01	1.93E+01 G
			242.00	1.144E+01	+	8.445E+00	2.58E+01	7.43E+00 GA
BI-207	C	8.2664E-02					1.18E+04	
			569.70	-1.450E-01	?(	1.138E+00	2.20E+02	9.77E+01 G
			1063.66	3.814E-01	&(P	1.692E+00	1.84E+02	7.45E+01 G
BI-212	N	-9.4108E-01					6.98E+02	
			727.17	-9.411E-01	?(P	2.229E+01	5.15E+02	7.55E+00 G
			785.42	1.736E+01	&	8.746E+01	2.05E+02	1.28E+00 GA
U-235	N	7.0138E-01					2.57E+11	
			143.79	-2.851E-01	&(P	1.318E+01	1.09E+03	1.10E+01 G
			205.33	-7.282E+00	+ P	1.780E+01	6.67E+01	5.01E+00 G
			163.38	2.830E+00	?(P	1.401E+01	1.45E+02	5.08E+00 G
			185.72	1.757E+00	*	1.149E+00	2.78E+01	5.40E+01 GA
BI-214	N	7.9212E+00					5.84E+05	
			609.31	6.616E+00	(P	2.146E+00	1.70E+01	4.61E+01 G
			1120.29	9.750E+00	(P	5.014E+00	2.55E+01	1.51E+01 G
			1764.49	1.004E+01	?(P	7.203E+00	3.14E+01	1.54E+01 G
BI-210M	T	4.5303E-01					1.10E+09	
			265.83	4.530E-01	(	1.409E+00	9.17E+01	5.00E+01 G
			304.90	0.000E+00	&	6.995E+00	1.00E+03	2.80E+01 G
AC-228	N	6.6560E+00					2.10E+03	
			911.07	6.740E+00	?(	1.602E+00	1.80E+01	2.90E+01 G
			968.97	7.615E-01	&	1.500E+01	5.61E+02	1.75E+01 G
			338.32	6.454E+00	@(	4.291E+00	3.05E+01	1.20E+01 G
			93.35	1.839E+01	+	1.194E+01	2.98E+01	5.56E+00 XA
TH-227	N	2.5034E+00					7.95E+03	
			50.14	2.503E+00	?(	1.399E+01	2.03E+02	8.00E+00 G
			256.24	-6.248E+00	+	1.500E+01	9.36E+01	7.00E+00 G
TH-229	N	-4.1669E+00					2.68E+06	
			193.51	-4.167E+00	?(	1.817E+01	1.67E+02	4.40E+00 G
			210.85	-7.075E+00	+ P	3.047E+01	1.18E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-1.3150E+01					1.63E+12	
			63.29	-1.315E+01	*(P	3.739E+01	7.38E+01	3.81E+00 G
			92.59	-1.244E+01	+ P	3.727E+01	4.67E+01	5.58E+00 G
PA-231	N	-6.7662E+00					1.20E+07	
			302.65	-6.766E+00	?(	6.862E+01	2.99E+02	2.88E+00 G
			300.07	-1.404E+01	+	8.381E+01	1.77E+02	2.46E+00 G
PA-234	N	3.9400E-01					1.63E+12	
			131.29	-1.483E+00	?(	7.440E+00	1.50E+02	1.80E+01 G
			946.02	2.916E+00	?(	8.479E+00	1.23E+02	1.34E+01 G
			569.47	-3.456E-01	+	1.239E+01	9.72E+02	8.20E+00 G
			883.24	0.000E+00	-	2.082E+01	1.00E+03	9.60E+00 G
			880.53	9.186E+00	&	2.967E+01	9.49E+01	6.00E+00 GA
PA-234M	N	3.3229E+01					1.63E+12	
			1001.00	-2.886E+01	?(P	3.056E+02	2.36E+02	8.37E-01 G
			766.41	2.100E+02	?(P	6.184E+02	8.74E+01	2.94E-01 G
AM-241	T	1.0481E+00					1.58E+05	
			59.54	1.048E+00	?(	3.953E+00	1.12E+02	3.59E+01 G
Np-237	F	-6.9028E-01					2.14E+06	
			86.49	-6.903E-01	?(	1.353E+01	5.82E+02	1.31E+01 G
Ir-192	F	1.6893E-01					7.40E+01	
			316.49	0.000E+00	&(	2.316E+00	1.00E+03	8.70E+01 G
			468.06	4.531E-01	?(	1.701E+00	1.09E+02	5.18E+01 G
			308.44	0.000E+00	-	6.225E+00	1.00E+03	3.18E+01 G
Cs-136	F	3.5613E-01					1.30E+01	
			818.50	3.183E-01	?(	1.571E+00	1.41E+02	1.00E+02 G
			1048.07	-1.213E+00	+	2.573E+00	6.43E+01	8.00E+01 G
			340.57	4.369E-01	?(	2.797E+00	1.87E+02	4.69E+01 G
Np-239	T	8.8226E-01					2.36E+00	
			103.70	-1.438E+00	&	8.794E+00	1.83E+02	2.40E+01 X
			106.13	8.823E-01	*(	9.310E+00	3.15E+02	2.27E+01 G
			99.50	-2.307E+00	+	1.381E+01	1.79E+02	1.50E+01 X
Nd-147		6.1759E-01					1.11E+01	
			531.00	6.176E-01	&(	6.025E+00	3.75E+02	1.30E+01 G
			91.10	-1.243E+00	+	7.199E+00	1.74E+02	2.83E+01 G
TL-210	N	-1.9325E-01					5.84E+05	
			799.60	-1.932E-01	?(	1.962E+00	2.89E+02	9.90E+01 G
			296.00	-4.313E-01	+	2.708E+00	1.86E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	9.633E-01	?	7.402E+00	3.25E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	79.	8.	0.004	203.45	2.503E+00	
AM-241	59.54	208.	19.	0.010	112.45	1.048E+00	
TH-234	63.29	240.	-26.	-0.015	73.84	-1.315E+01	P
BA-133	80.99	339.	-22.	-0.012	93.91	-1.015E+00	P
Np-237	86.49	605.	-6.	-0.003	582.48	-6.903E-01	
EU-155	86.54	904.	-24.	-0.013	180.86	-1.164E+00	
Nd-147	91.10	839.	-24.	-0.013	173.57	-1.243E+00	
TH-234	92.59	886.	-47.	-0.026	46.68	-1.244E+01	P
Gd-153	97.50	887.	-24.	-0.013	177.29	-1.156E+00	
Np-239	99.50	911.	-24.	-0.013	179.31	-2.307E+00	
Gd-153	103.20	934.	-24.	-0.013	181.04	-1.584E+00	
Np-239	103.70	959.	-24.	-0.013	183.24	-1.438E+00	
EU-155	105.31	984.	-25.	-0.014	87.49	-1.709E+00	P
Np-239	106.13	965.	14.	0.008	315.49	8.823E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	121.78	114.	-6.	-0.004	235.09	-3.284E-01		
EU-154	123.10	80.	13.	0.007	103.49	4.518E-01		
PA-234	131.29	359.	-18.	-0.010	149.53	-1.483E+00		
HF-181	133.02	344.	-18.	-0.010	146.19	-6.203E-01		
CE-144	133.54	362.	-18.	-0.010	149.84	-2.426E+00		
HF-181	136.30	380.	-7.	-0.004	425.99	-1.657E+00		
CE-141	145.44	59.	14.	0.008	106.25	4.453E-01		P
Ba-140	162.66	104.	5.	0.003	291.89	1.322E+00		
U-235	163.38	75.	9.	0.005	145.03	2.830E+00		P
CE-139	165.85	90.	9.	0.005	149.91	1.879E-01		
Cf-251	176.60	88.	-18.	-0.010	99.61	-1.828E+00		
U-235	185.72	48.	53.	0.030	27.82	1.757E+00		
TH-229	193.51	77.	-10.	-0.006	167.18	-4.167E+00		
U-235	205.33	88.	-19.	-0.011	66.65	-7.282E+00		P
TH-229	210.85	89.	-11.	-0.006	118.03	-7.075E+00		P
Cf-251	227.00	92.	-19.	-0.011	95.64	-6.319E+00		
EU-152	244.69	303.	-17.	-0.009	146.42	-4.913E+00		
TH-227	256.24	88.	-19.	-0.011	93.58	-6.248E+00		
Cd-113m	263.70	66.	-3.	-0.002	387.30	-1.156E+03		
BI-210M	265.83	35.	10.	0.005	91.70	4.530E-01		
Hg-203	279.20	79.	-7.	-0.004	139.78	-2.011E-01		P
TL-210	296.00	310.	-13.	-0.007	186.48	-4.313E-01		
PA-231	300.07	281.	-14.	-0.008	177.20	-1.404E+01		
PA-233	300.18	267.	-14.	-0.008	172.95	-5.573E+00		
PA-231	302.65	254.	-8.	-0.004	299.15	-6.766E+00		
CR-51	320.08	266.	-15.	-0.008	30.86	-3.950E+00		P
La-140	328.76	74.	7.	0.004	172.85	9.738E-01		
Cf-249	333.44	81.	7.	0.004	180.09	1.293E+00		
Cs-136	340.57	89.	7.	0.004	186.68	4.369E-01		
EU-152	344.29	96.	7.	0.004	193.40	7.819E-01		
HF-181	345.83	103.	7.	0.004	199.68	1.381E+00		
BA-133	356.00	140.	8.	0.005	200.19	3.991E-01		
I-131	364.48	16.	9.	0.005	98.33	3.094E-01		P
BA-133	383.84	97.	-14.	-0.008	105.10	-4.737E+00		
Cf-249	387.95	110.	-14.	-0.008	111.52	-6.490E-01		
SN-113	391.69	83.	10.	0.006	127.76	5.118E-01		
AG-108M	433.94	17.	2.	0.001	322.62	9.420E-02		P
pm-146	453.88	35.	-13.	-0.007	60.73	-7.330E-01		P
Ir-192	468.06	21.	6.	0.004	108.61	4.531E-01		
BE-7	477.60	64.	-8.	-0.004	145.77	-2.801E+00		
La-140	487.02	51.	9.	0.005	113.59	7.615E-01		
RU-103	497.05	9.	2.	0.001	336.51	7.775E-02		P
RH-106	511.86	21.	53.	0.029	26.45	1.032E+01		
Nd-147	531.00	13.	2.	0.001	374.72	6.176E-01		
Ba-140	537.26	5.	4.	0.002	129.62	6.276E-01		P
CS-134	563.24	13.	2.	0.001	374.72	1.009E+00		
CS-134	569.32	17.	3.	0.001	229.13	7.368E-01		
PA-234	569.47	21.	-1.	0.000	972.11	-3.456E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	569.70	25.	-3.	-0.002	220.45	-1.450E-01	
SB-124	602.73	193.	-13.	-0.007	152.30	-5.942E-01	
CS-134	604.71	180.	-13.	-0.007	147.05	-6.004E-01	
RU-103	610.30	167.	-12.	-0.006	161.27	-9.007E+00	
PM-144	618.06	132.	13.	0.007	125.87	6.066E-01	
RH-106	621.92	48.	-11.	-0.006	101.00	-5.255E+00	P
AG-110M	657.76	22.	4.	0.002	153.16	2.277E-01	
PM-144	696.54	10.	4.	0.002	170.08	2.055E-01	P
NB-94	702.63	37.	-12.	-0.007	108.88	-6.374E-01	
SB-124	722.79	31.	11.	0.006	81.04	5.061E+00	
ZR-95	724.20	33.	6.	0.004	133.67	7.444E-01	
BI-212	727.17	40.	-1.	-0.001	515.09	-9.411E-01	P
pm-146	735.72	9.	5.	0.003	149.09	1.073E+00	P
pm-146	747.16	10.	7.	0.004	106.18	1.049E+00	P
ZR-95	756.73	19.	2.	0.001	416.87	2.206E-01	P
AG-110M	763.94	23.	-1.	-0.001	519.62	-3.248E-01	
NB-95	765.79	43.	-10.	-0.005	101.53	-5.269E-01	
PA-234M	766.41	43.	11.	0.006	87.38	2.100E+02	P
BI-212	785.42	14.	4.	0.002	204.63	1.736E+01	
CS-134	795.87	35.	-11.	-0.006	82.55	-7.190E-01	
TL-210	799.60	46.	-3.	-0.002	288.95	-1.932E-01	
CS-134	801.95	32.	8.	0.004	108.65	5.050E+00	
CO-58	810.78	40.	-11.	-0.006	89.40	-6.373E-01	P
La-140	815.77	51.	-7.	-0.004	149.61	-1.720E+00	
Cs-136	818.50	28.	6.	0.003	141.45	3.183E-01	
MN-54	834.85	14.	4.	0.002	204.63	2.341E-01	
NB-94	871.10	15.	1.	0.001	556.78	6.074E-02	
EU-154	873.23	40.	-14.	-0.008	69.76	-6.883E+00	
PA-234	880.53	32.	9.	0.005	94.93	9.186E+00	
AG-110M	884.68	18.	6.	0.003	113.31	4.821E-01	
Sc-46	889.28	47.	-6.	-0.003	161.80	-3.829E-01	
y-88	898.04	15.	1.	0.001	857.32	6.646E-02	
AG-110M	937.49	20.	-8.	-0.004	127.88	-1.504E+00	
PA-234	946.02	10.	6.	0.003	122.85	2.916E+00	
EU-152	964.11	38.	-12.	-0.007	78.17	-5.439E+00	
EU-154	996.33	41.	-12.	-0.007	81.39	-7.677E+00	
PA-234M	1001.00	55.	-4.	-0.002	236.01	-2.886E+01	P
EU-154	1004.77	45.	10.	0.006	96.80	3.955E+00	
Cs-136	1048.07	32.	-14.	-0.008	64.32	-1.213E+00	
RH-106	1050.36	40.	3.	0.001	352.88	1.173E+01	P
BI-207	1063.66	10.	4.	0.002	183.77	3.814E-01	P
Ga-68	1077.40	10.	1.	0.001	702.38	2.581E+00	
EU-152	1112.07	100.	-17.	-0.009	89.05	-9.080E+00	
ZN-65	1115.55	84.	-17.	-0.009	81.88	-2.458E+00	
Sc-46	1120.55	89.	-17.	-0.009	84.20	-1.251E+00	
Ta-182	1121.30	108.	-7.	-0.004	219.21	-1.474E+00	
CO-60	1173.24	17.	-1.	0.000	686.91	-5.891E-02	P
Ta-182	1189.05	5.	6.	0.003	101.72	2.779E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1221.41	16.	3.	0.002	308.52	9.037E-01		
TL-210	1313.00	11.	2.	0.001	324.82	9.633E-01		
AG-110M	1384.30	6.	-1.	0.000	846.32	-2.494E-01		
y-88	1836.06	6.	-3.	-0.002	137.91	-3.716E-01		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-2.8011E+00	-2.8011E+00	1.458E+02%	1.40E+01
NA-22	#	7.6046E-01	7.6046E-01	3.333E+01%	6.23E-01
K-40		1.3681E+02	1.3681E+02	8.295E+00%	1.06E+01
Sc-46	#A	-3.8288E-01	-3.8288E-01	1.618E+02%	2.14E+00
CR-51	#A	-3.9500E+00	-3.9500E+00	3.086E+01%	2.12E+01
MN-54	#A	2.3412E-01	2.3412E-01	2.046E+02%	1.18E+00
FE-59	#	1.4439E+00	1.4439E+00	3.015E+01%	9.67E-01
Co-56	#C	1.1194E+00	1.1194E+00	3.286E+01%	7.57E-01
CO-57	A	4.8093E-01	4.8093E-01	4.185E+01%	4.94E-01
CO-58	#A	-6.3726E-01	-6.3727E-01	8.940E+01%	1.85E+00
CO-60	#A	-3.9682E-02	-3.9682E-02	1.661E+03%	1.62E+00
ZN-65	#A	-2.4583E+00	-2.4583E+00	8.188E+01%	6.73E+00
NB-94	#A	-6.3738E-01	-6.3738E-01	1.089E+02%	1.61E+00
ZR-95	#A	4.5514E-01	4.5514E-01	1.337E+02%	2.26E+00
NB-95	#A	-5.2688E-01	-5.2688E-01	1.015E+02%	1.82E+00
RU-103	#A	7.7746E-02	7.7746E-02	3.365E+02%	7.03E-01
RH-106	#A	-2.9489E+00	-2.9489E+00	1.010E+02%	1.60E+01
AG-108M	#A	9.4204E-02	9.4204E-02	3.226E+02%	8.16E-01
AG-110M	#A	3.3819E-01	3.3819E-01	9.526E+01%	1.90E+00
SN-113	#A	5.1182E-01	5.1183E-01	1.278E+02%	2.22E+00
SB-124	#A	-3.3711E-02	-3.3711E-02	8.104E+01%	3.06E+00
SB-125	#	1.8651E+00	1.8651E+00	4.341E+01%	1.44E+00
I-131	#A	3.0943E-01	3.0944E-01	9.833E+01%	7.77E-01
Gd-153	#A	-1.1563E+00	-1.1563E+00	1.773E+02%	6.84E+00
Ga-68	#A	2.5646E+00	2.5812E+00	7.024E+02%	4.50E+01
Tc-99m	#A	2.9011E-01	2.9046E-01	1.722E+02%	1.68E+00
BA-133	#A	3.9910E-01	3.9910E-01	2.002E+02%	2.72E+00
CS-134	#A	3.8729E-02	3.8729E-02	1.087E+02%	2.98E+00
CS-137	#A	-5.8083E-02	-5.8083E-02	1.131E+03%	1.52E+00
CE-139	#A	1.8791E-01	1.8791E-01	1.499E+02%	9.61E-01
Ba-140	#A	7.6871E-01	7.6873E-01	1.296E+02%	2.24E+00
La-140	#A	3.3573E-01	3.3573E-01	1.136E+02%	7.97E-01
CE-141	#A	4.4529E-01	4.4529E-01	1.062E+02%	1.23E+00
CE-144	#A	-2.4264E+00	-2.4264E+00	1.498E+02%	1.22E+01
PM-144	#A	4.0614E-01	4.0614E-01	1.058E+02%	8.83E-01
EU-152	#A	7.8188E-01	7.8188E-01	1.934E+02%	5.18E+00

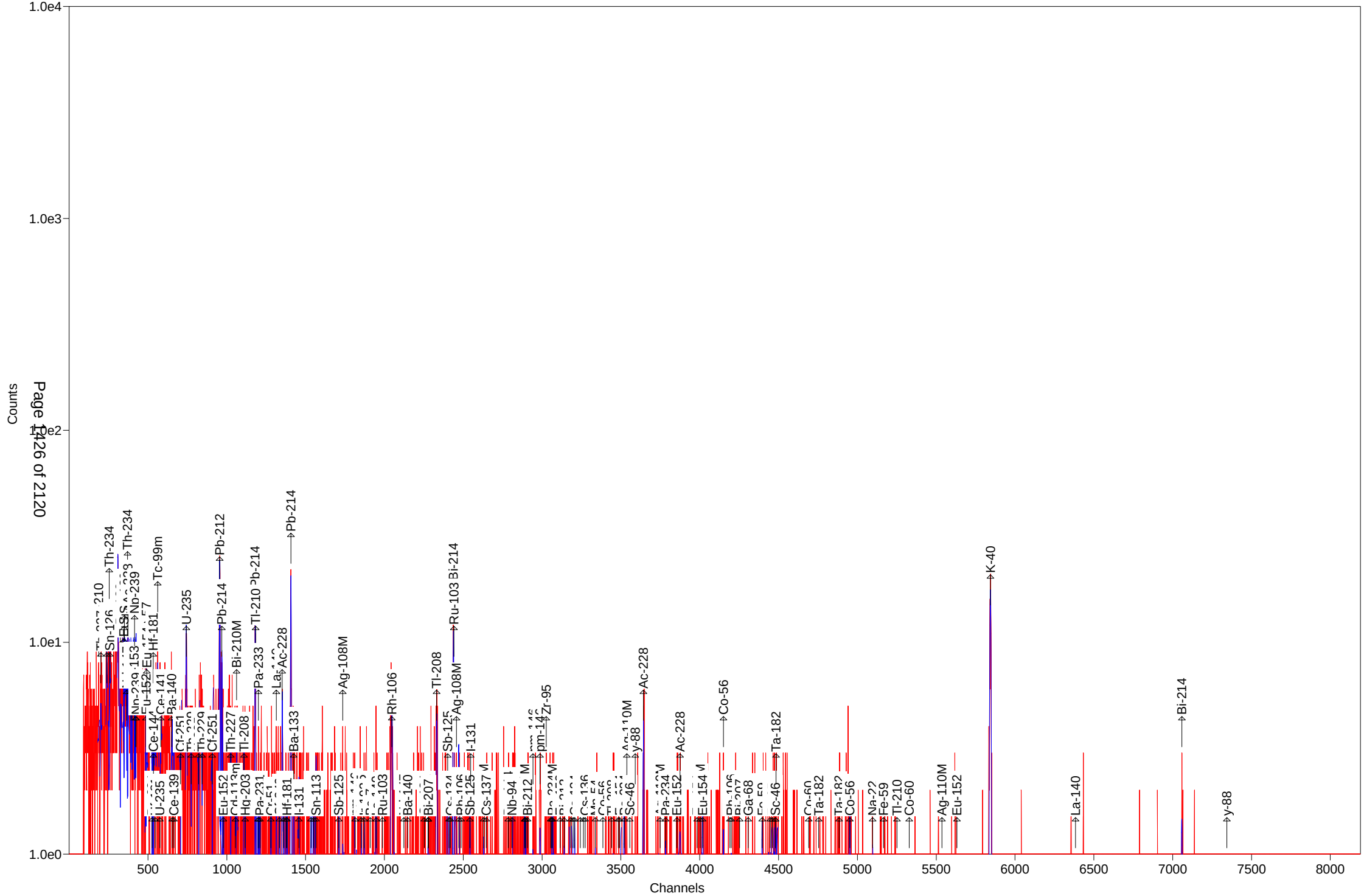
EU-154 #A	-6.8829E+00	-6.8829E+00	6.976E+01%		1.59E+01
EU-155 #A	-1.7091E+00	-1.7091E+00	8.749E+01%		1.01E+01
HF-181 #A	2.1779E-01	2.1780E-01	1.997E+02%		1.95E+00
Ta-182 #A	2.3032E-01	2.3032E-01	1.017E+02%		1.11E+01
Hg-203 #A	-2.0107E-01	-2.0108E-01	1.398E+02%		1.31E+00
TL-208 #	2.2298E+00	2.2298E+00	1.609E+01%		5.18E-01
pm-146 #A	1.0584E+00	1.0584E+00	9.152E+01%		2.76E+00
y-88 #A	6.6464E-02	6.6465E-02	8.573E+02%		1.38E+00
Cd-113m#A	-1.1559E+03	-1.1559E+03	3.873E+02%		1.56E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.48E+01
Cf-251 #A	-1.8285E+00	-1.8285E+00	9.961E+01%		4.68E+00
Cf-249 #A	-2.7945E-01	-2.7945E-01	1.059E+02%		2.44E+00
Sn-126 #A	3.6488E+00	3.6488E+00	1.124E+02%		1.37E+01
PB-210 #A	-1.0082E+00	-1.0082E+00	1.225E+03%		4.25E+01
PB-212 #	5.5396E+00	5.5396E+00	1.250E+01%		1.61E+00
PB-214	8.2593E+00	8.2593E+00	1.053E+01%		1.68E+00
BI-207 #A	8.2664E-02	8.2664E-02	1.435E+02%		1.14E+00
BI-212 #A	-9.4108E-01	-9.4108E-01	5.151E+02%		2.23E+01
U-235 #A	7.0138E-01	7.0138E-01	1.450E+02%		1.32E+01
BI-214	7.9212E+00	7.9212E+00	1.462E+01%		2.15E+00
BI-210M#A	4.5303E-01	4.5303E-01	9.170E+01%		1.41E+00
AC-228 #	6.6560E+00	6.6560E+00	1.769E+01%		1.60E+00
TH-227 #A	2.5034E+00	2.5034E+00	2.034E+02%		1.40E+01
TH-229 #A	-4.1669E+00	-4.1669E+00	1.672E+02%		1.82E+01
TH-234 #A	-1.3150E+01	-1.3150E+01	7.384E+01%		3.74E+01
PA-231 #A	-6.7662E+00	-6.7662E+00	2.992E+02%		6.86E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.54E+00
PA-234 #A	3.9400E-01	3.9400E-01	9.676E+01%		7.44E+00
PA-234M#A	3.3229E+01	3.3229E+01	8.738E+01%		3.06E+02
AM-241 #A	1.0481E+00	1.0481E+00	1.125E+02%		3.95E+00
Np-237 #A	-6.9028E-01	-6.9028E-01	5.825E+02%		1.35E+01
Ir-192 #A	1.6893E-01	1.6893E-01	1.086E+02%		2.32E+00
Cs-136 #A	3.5613E-01	3.5613E-01	1.171E+02%		1.57E+00
Np-239 #A	8.8214E-01	8.8226E-01	3.155E+02%		9.31E+00
Nd-147 #A	6.1757E-01	6.1759E-01	3.747E+02%		6.03E+00
TL-210 #A	-1.9325E-01	-1.9325E-01	2.889E+02%		1.96E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.679E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.6789325E+02 Bq/Sample

379951_Gamma_160-29881-B-35-C. 15_Gamma_20182799.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20182904

Sample Description: 379951_Gamma_160-29881-B-36-B
Detector: Detector #17
Batch ID: 379951
Work Order Number: Gamma
Lot Number: 160-29881-B-36-B

Decay to Time: 8/23/2018 07:47 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:47:16 Real Time: 1832 sec
Analysis Time: 8/23/2018 08:17 Dead Time: 1.75 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev14.lib
Bkgd Correction File: 17_2018-08-11_1255.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.347E+00	98.4	2.309E+00	2.312E+00	7.891E+00
NA-22	-2.322E-01	136.4	3.166E-01	3.168E-01	1.135E+00
K-40	1.621E+02	6.6	1.065E+01	1.350E+01	1.002E+01
Sc-46	-4.325E-01	116.0	5.017E-01	5.022E-01	1.714E+00
CR-51	5.198E-01	498.7	2.592E+00	2.592E+00	9.087E+00
MN-54	3.337E-01	96.4	3.216E-01	3.221E-01	7.764E-01
FE-59	3.770E-01	168.2	6.344E-01	6.347E-01	1.743E+00
Co-56	-1.072E-01	57.1	6.123E-02	6.148E-02	1.181E+00
CO-57	1.363E-01	184.2	2.511E-01	2.512E-01	8.751E-01
CO-58	-5.606E-01	89.7	5.026E-01	5.034E-01	1.693E+00
CO-60	3.198E-02	1093.8	3.497E-01	3.497E-01	8.944E-01
ZN-65	0.000E+00	1.#INF	1.596E-01	1.596E-01	4.134E+00
NB-94	-4.132E-01	72.6	2.998E-01	3.006E-01	1.246E+00
ZR-95	5.006E-01	99.1	4.960E-01	4.967E-01	1.525E+00
NB-95	2.366E-01	154.8	3.663E-01	3.665E-01	1.277E+00
RU-103	1.961E-01	106.2	2.082E-01	2.085E-01	5.495E-01
RH-106	-3.739E+00	187.8	7.023E+00	7.025E+00	2.382E+01
AG-108M	2.469E-01	75.1	1.854E-01	1.858E-01	5.701E-01
AG-110M	2.541E-01	81.9	2.081E-01	2.085E-01	2.095E+00
SN-113	3.781E-01	133.6	5.050E-01	5.053E-01	1.723E+00
SB-124	4.420E-01	120.9	5.343E-01	5.348E-01	2.108E+00
SB-125	1.315E+00	80.3	1.056E+00	1.058E+00	2.177E+00
I-131	2.224E-01	81.0	1.801E-01	1.805E-01	9.130E-01
Gd-153	4.176E-01	154.9	6.468E-01	6.473E-01	2.203E+00
Ga-68	7.867E+00	132.7	1.044E+01	1.045E+01	2.582E+01
Tc-99m	1.789E-01	153.7	2.751E-01	2.752E-01	9.317E-01
BA-133	-7.921E-02	845.6	6.698E-01	6.698E-01	2.307E+00
CS-134	8.470E-01	74.5	6.308E-01	6.323E-01	2.191E+00
CS-137	1.579E-01	222.7	3.515E-01	3.516E-01	1.247E+00
CE-139	-9.089E-03	2949.6	2.681E-01	2.681E-01	9.316E-01
Ba-140	9.459E-01	130.7	1.236E+00	1.237E+00	3.190E+00
La-140	5.316E-02	105.4	5.605E-02	5.612E-02	1.092E+00
CE-141	3.634E-01	129.8	4.716E-01	4.720E-01	1.594E+00

CE-144	1.792E-01	1251.7	2.244E+00	2.244E+00	7.701E+00
PM-144	6.047E-01	48.2	2.914E-01	2.931E-01	6.755E-01
EU-152	1.767E+00	72.9	1.287E+00	1.291E+00	3.483E+00
EU-154	-2.768E+00	100.1	2.772E+00	2.775E+00	9.520E+00
EU-155	-3.116E-02	3627.6	1.130E+00	1.130E+00	3.926E+00
HF-181	-3.795E-01	105.0	3.983E-01	3.988E-01	1.354E+00
Ta-182	-1.889E+00	103.8	1.961E+00	1.963E+00	6.640E+00
Hg-203	2.630E-01	100.7	2.648E-01	2.652E-01	8.987E-01
TL-208	1.360E+00	23.7	3.218E-01	3.295E-01	6.469E-01
pm-146	-4.594E-01	197.4	9.068E-01	9.071E-01	3.027E+00
y-88	-5.246E-04	51287.0	2.690E-01	2.690E-01	1.041E+00
Cd-113m	-4.425E+02	887.4	3.927E+03	3.927E+03	1.378E+04
Cd-109	3.972E+00	240.4	9.546E+00	9.549E+00	3.219E+01
Cf-251	-4.752E-01	289.0	1.373E+00	1.374E+00	3.797E+00
Cf-249	6.105E-01	80.7	4.925E-01	4.935E-01	1.736E+00
Sn-126	-2.078E+00	162.9	3.384E+00	3.385E+00	1.145E+01
PB-210	8.718E+00	95.3	8.307E+00	8.323E+00	2.452E+01
PB-212	2.519E+00	19.1	4.800E-01	5.069E-01	1.254E+00
PB-214	5.784E+00	13.9	8.037E-01	8.581E-01	1.519E+00
BI-207	1.922E-01	96.5	1.854E-01	1.857E-01	9.095E-01
BI-212	-3.493E+00	156.0	5.448E+00	5.451E+00	1.885E+01
U-235	-2.839E-01	317.1	9.002E-01	9.003E-01	7.841E+00
BI-214	3.891E+00	21.1	8.222E-01	8.467E-01	1.687E+00
BI-210M	-3.872E-01	131.8	5.103E-01	5.108E-01	1.739E+00
AC-228	3.101E+00	31.6	9.803E-01	9.930E-01	2.156E+00
TH-227	-4.365E+00	110.9	4.840E+00	4.846E+00	1.383E+01
TH-229	-1.221E-01	4252.1	5.190E+00	5.190E+00	1.457E+01
TH-234	1.309E+01	56.1	7.349E+00	7.381E+00	2.016E+01
PA-231	8.734E-01	685.0	5.983E+00	5.983E+00	5.247E+01
PA-233	-1.707E-02	7195.4	1.228E+00	1.228E+00	4.291E+00
PA-234	3.448E-01	167.6	5.780E-01	5.782E-01	4.696E+00
PA-234M	-5.897E+00	77.5	4.568E+00	4.578E+00	2.554E+02
AM-241	-2.093E-01	395.7	8.283E-01	8.284E-01	2.417E+00
Np-237	-1.001E+00	292.9	2.932E+00	2.932E+00	9.886E+00
Ir-192	3.164E-01	76.4	2.416E-01	2.423E-01	8.070E-01
Cs-136	4.606E-01	111.2	5.123E-01	5.130E-01	1.742E+00
Np-239	8.087E-01	124.5	1.007E+00	1.008E+00	3.395E+00
Nd-147	-2.772E+00	98.9	2.741E+00	2.746E+00	6.896E+00
TL-210	-5.983E-01	87.4	5.226E-01	5.238E-01	1.757E+00
Total	2.294E+02				

Analyst: kody Saulters

Sample description
379951_Gamma_160-29881-B-36-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20182904.An1

Acquisition information
Start time: 8/23/2018 7:47:16 AM
Live time: 1800
Real time: 1832
Dead time: 1.75 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:47:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-08-11_1255.PBC 8/11/2018 12:55:25 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1705

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.23	14.	95.28	0.99	2.100E-02	46.54	4.250	PBC<MDA	PB210
63.43	28.	56.12	0.75	3.172E-02	63.29	3.810	PBC<MDA	TH234
74.82	70.	19.84	0.80	3.678E-02				
77.16	68.	18.66	0.80	3.761E-02				
88.04	11.	240.35	0.81	4.060E-02	88.04	3.790	PBC<MDA	Cd109
92.70	17.	110.90	0.77	4.144E-02	92.59	5.584	PBC<MDA	TH234
97.50	10.	154.88	0.82	4.213E-02	97.50	30.000	PBC<MDA	Gd153
99.50	10.	144.50	0.82	4.234E-02	99.50	15.000	PBC<MDA	Np239
106.13	14.	124.47	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
123.10	14.	109.61	0.85	4.270E-02	123.10	40.790	PBC<MDA	EU154
136.47	10.	184.22	0.86	4.163E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.229E+00	CO57
140.51	12.	153.72	0.86	4.119E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	-6.	317.08	0.87	4.080E-02	143.79	10.960	PBC<MDA	U235
145.44	13.	129.78	0.87	4.059E-02	145.44	48.200	PBC<MDA	CE141
162.66	4.	380.79	0.88	3.813E-02	162.66	6.220	PBC<MDA	Ba140
185.72	21.	72.61	0.91	3.545E-02	185.72	54.000	PBC<MDA	U235
205.33	2.	617.24	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
227.00	6.	233.15	0.94	3.093E-02	227.00	6.300	PBC<MDA	Cf251
238.56	59.	20.14	1.13	2.989E-02	238.63	43.300	2.546E+00	PB212
241.85	29.	36.01	0.96	2.960E-02	242.00	7.430	PBC<MDA	PB214
275.63	4.	289.40	0.99	2.694E-02	277.28	6.310	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.20	10.	100.66	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
295.03	30.	34.74	0.70	2.580E-02	295.09	19.300	PBC<MDA	PB214
					296.00	79.000	8.323E-01	TL210
300.03	11.	176.08	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	2.	936.55	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.896E+00	PA231
					300.18	6.200	7.524E-01	PA233
316.49	9.	104.15	1.03	2.456E-02	316.49	87.040	PBC<MDA	Ir192
320.08	2.	498.69	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
328.76	8.	105.45	1.04	2.391E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	106.70	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
338.32	12.	121.92	1.05	2.344E-02	338.32	12.010	PBC<MDA	AC228
344.29	8.	144.34	1.05	2.315E-02	344.29	26.500	PBC<MDA	EU152
351.74	89.	13.89	0.89	2.280E-02	351.93	37.600	5.784E+00	PB214
387.61	11.	121.03	1.09	2.127E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	133.55	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	105.42	1.13	1.983E-02	427.88	29.600	PBC<MDA	SB125
433.94	6.	113.03	1.13	1.963E-02	433.94	90.480	PBC<MDA	AG108M
463.37	7.	113.69	1.16	1.872E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	111.71	1.16	1.859E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	98.37	1.17	1.832E-02	477.60	10.520	PBC<MDA	BE7
497.05	6.	106.19	1.19	1.779E-02	497.05	90.900	PBC<MDA	RU103
511.86	44.	45.24	2.45	1.742E-02	511.86	20.000	6.964E+00	RH106
537.26	7.	130.67	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
569.32	8.	74.48	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.170E+00	PA234
					569.70	97.740	2.661E-01	BI207
569.47	4.	167.61	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.665E+00	PA234
					569.70	97.740	1.397E-01	BI207
583.49	31.	23.66	1.15	1.584E-02	583.02	84.500	1.302E+00	TL208
600.50	9.	184.29	1.28	1.550E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	190.00	1.28	1.546E-02	602.73	98.260	PBC<MDA	SB124
604.71	9.	195.56	1.28	1.542E-02	604.71	97.620	PBC<MDA	CS134
609.39	47.	21.13	0.80	1.533E-02	609.31	46.090	3.680E+00	BI214
635.89	1.	768.11	1.31	1.486E-02	635.89	11.310	PBC<MDA	SB125
636.97	8.	80.97	1.31	1.484E-02	636.97	7.170	PBC<MDA	I131
657.76	8.	81.91	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
661.66	3.	222.67	1.33	1.443E-02	661.66	85.210	PBC<MDA	CS137
696.54	15.	48.20	1.36	1.389E-02	696.54	99.000	PBC<MDA	PM144
722.79	4.	149.52	1.39	1.351E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	1.781E-01	AG108M
					723.36	20.220	8.005E-01	EU154
722.94	7.	98.82	1.39	1.351E-02	722.79	10.810	2.592E+00	SB124
					722.94	90.840	3.085E-01	AG108M
					723.36	20.220	1.387E+00	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
723.36	7.	112.67	1.39	1.350E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.086E-01	AG108M
					723.36	20.220	1.387E+00	EU154
724.20	7.	124.95	1.39	1.349E-02	724.20	44.150	PBC<MDA	ZR95
756.73	5.	153.84	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
765.79	6.	154.81	1.42	1.294E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
766.41	6.	123.37	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
785.42	4.	146.76	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
801.95	10.	112.58	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
818.50	10.	111.24	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
834.85	7.	96.38	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
860.71	5.	109.69	1.50	1.185E-02	860.56	12.420	PBC<MDA	TL208
871.10	4.	128.89	1.51	1.175E-02	871.10	99.890	PBC<MDA	NB94
880.53	8.	104.58	1.52	1.165E-02	880.53	6.000	PBC<MDA	PA234
911.07	20.	31.62	1.55	1.135E-02	911.07	29.000	3.431E+00	AC228
964.11	5.	128.92	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
1037.84	8.	94.69	1.65	1.028E-02	1037.84	14.130	PBC<MDA	Co56
1063.66	6.	96.46	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	4.	132.68	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1099.25	3.	238.82	1.70	9.840E-03	1099.25	56.500	PBC<MDA	FE59
1112.07	10.	101.53	1.71	9.752E-03	1112.07	13.644	PBC<MDA	EU152
1189.05	2.	431.57	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1291.60	3.	237.05	1.85	8.689E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	89.70	1.87	8.579E-03	1313.00	21.000	PBC<MDA	TL210
1384.30	3.	206.16	1.93	8.233E-03	1384.30	24.290	PBC<MDA	AG110M
1461.14	246.	6.57	1.44	7.893E-03	1460.83	10.670	1.621E+02	K40
1765.17	9.	46.72	2.21	6.804E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.70	74.76	61.	70.	1.900E+03	19.84	0.802	-	D
308.07	77.10	45.	68.	1.801E+03	18.66	0.804	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	184.40	46.23	62.	14.	0.008	95.28	0.992s
TH-227	200.03	50.14	90.	-15.	-0.008	110.90	0.778s
AM-241	237.59	59.54	87.	-4.	-0.002	395.68	0.787
TH-234	253.18	63.43	78.	28.	0.016	56.12	0.754
Sn-126	256.56	64.28	175.	-12.	-0.006	162.86	0.792s
BA-133	323.36	80.99	103.	-8.	-0.004	157.64	0.807
Np-237	345.35	86.49	382.	-10.	-0.005	292.95	0.813s
EU-155	345.56	86.54	373.	0.	0.000	1000.00	0.813s
Sn-126	347.15	86.94	373.	0.	0.000	1000.00	0.813s
Sn-126	349.67	87.57	373.	0.	0.000	1000.00	0.814s
Cd-109	351.55	88.04	344.	11.	0.006	240.35	0.814s
Nd-147	363.79	91.10	355.	0.	0.000	1000.00	0.817s
TH-234	370.19	92.70	108.	17.	0.009	110.90	0.772s
AC-228	372.78	93.35	355.	0.	0.000	1000.00	0.819
Gd-153	389.37	97.50	104.	10.	0.005	154.88	0.823s
Np-239	397.37	99.50	103.	10.	0.006	144.50	0.825s
Gd-153	412.16	103.20	153.	-15.	-0.008	119.79	0.828s
Np-239	414.16	103.70	168.	-5.	-0.003	366.08	0.829s
Np-239	423.88	106.13	148.	14.	0.008	124.47	0.831s
EU-152	486.43	121.78	126.	-13.	-0.007	125.22	0.846s
CO-57	487.57	122.06	139.	0.	0.000	1000.00	0.846s
EU-154	491.73	123.10	113.	14.	0.008	109.61	0.847s
PA-234	524.49	131.29	174.	-4.	-0.002	534.90	0.855s
HF-181	531.41	133.02	174.	0.	0.000	1000.00	0.856s
HF-181	544.50	136.30	174.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	159.	10.	0.005	184.22	0.859s
Tc-99m	561.34	140.51	150.	12.	0.006	153.72	0.863s
U-235	574.43	143.79	168.	-6.	-0.003	317.08	0.866s
CE-141	581.05	145.44	132.	13.	0.007	129.78	0.868
Ba-140	649.90	162.66	114.	4.	0.002	380.79	0.884s
Cf-251	705.64	176.60	73.	-5.	-0.003	288.99	0.897
U-235	742.10	185.72	73.	21.	0.012	72.61	0.905s
U-235	820.52	205.33	54.	2.	0.001	617.24	0.924s
TH-229	842.58	210.85	73.	-12.	-0.007	126.80	0.929s
Cf-251	907.16	227.00	53.	6.	0.003	233.15	0.944s
PB-212	953.67	238.63	32.	59.	0.033	19.06	0.954D
PB-214	967.13	242.00	39.	29.	0.016	36.01	0.957D
EU-152	977.91	244.69	214.	-11.	-0.006	183.33	0.960s
TH-227	1024.08	256.24	70.	-15.	-0.009	99.61	0.971s
Cd-113m	1053.91	263.70	69.	-1.	-0.001	887.41	0.978s
BI-210M	1062.44	265.83	76.	-10.	-0.005	131.80	0.979s
TL-208	1108.23	277.28	65.	4.	0.002	289.40	0.990s
Hg-203	1115.89	279.20	49.	10.	0.006	100.66	0.992s
PB-214	1179.43	295.09	171.	6.	0.003	325.84	1.006s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	1183.07	296.00	177.	12.	0.006	164.52	1.007s
PB-212	1199.19	300.03	189.	11.	0.006	176.08	1.011
PA-231	1199.35	300.07	200.	2.	0.001	936.55	1.011
PA-233	1199.79	300.18	202.	0.	0.000	1000.00	1.011
PA-231	1209.66	302.65	202.	0.	0.000	1000.00	1.013
BA-133	1210.47	302.85	202.	0.	0.000	1000.00	1.013
Ba-140	1218.46	304.85	202.	0.	0.000	1000.00	1.015s
BI-210M	1218.64	304.90	202.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	202.	0.	0.000	1000.00	1.019s
Ir-192	1265.01	316.49	37.	9.	0.005	104.15	1.026s
CR-51	1279.38	320.08	63.	2.	0.001	498.69	1.029s
La-140	1314.07	328.76	18.	8.	0.004	105.45	1.037s
Cf-249	1332.79	333.44	26.	9.	0.005	106.70	1.041
AC-228	1352.30	338.32	95.	12.	0.006	121.92	1.046s
Cs-136	1361.30	340.57	107.	0.	0.000	1000.00	1.048s
EU-152	1376.16	344.29	59.	8.	0.004	144.34	1.051
HF-181	1382.33	345.83	116.	-9.	-0.005	173.42	1.053s
PB-214	1405.96	351.74	20.	89.	0.050	13.89	0.887s
BA-133	1423.00	356.00	142.	-2.	-0.001	845.58	1.062s
I-131	1456.93	364.48	34.	-4.	-0.002	318.38	1.070s
BA-133	1534.34	383.84	85.	-3.	-0.002	395.73	1.087s
Cf-249	1550.77	387.95	78.	11.	0.006	121.03	1.091s
SN-113	1565.73	391.69	71.	9.	0.005	133.55	1.094s
SB-125	1710.44	427.88	19.	8.	0.005	105.42	1.127s
AG-108M	1734.69	433.94	11.	6.	0.003	113.03	1.132s
pm-146	1814.44	453.88	24.	-4.	-0.002	244.95	1.150s
SB-125	1852.38	463.37	30.	7.	0.004	113.69	1.158s
Ir-192	1871.15	468.06	37.	8.	0.004	111.71	1.163s
BE-7	1909.29	477.59	28.	8.	0.005	98.37	1.171s
HF-181	1926.89	482.00	50.	-10.	-0.006	104.96	1.175s
La-140	1946.98	487.02	20.	-2.	-0.001	443.47	1.180s
RU-103	1987.11	497.05	8.	6.	0.003	106.19	1.188
RH-106	2046.35	511.86	53.	44.	0.024	45.24	2.452s
Nd-147	2122.88	531.00	28.	-11.	-0.006	98.89	1.219s
Ba-140	2147.92	537.26	20.	7.	0.004	130.67	1.224s
CS-134	2251.82	563.24	24.	-3.	-0.002	178.01	1.247s
CS-134	2276.15	569.32	12.	8.	0.004	74.48	1.252
PA-234	2276.75	569.47	20.	4.	0.002	167.61	1.253
TL-208	2332.83	583.49	8.	31.	0.017	23.66	1.147
SB-125	2400.86	600.50	130.	9.	0.005	184.29	1.280s
SB-124	2409.78	602.73	139.	9.	0.005	190.00	1.282
CS-134	2417.70	604.71	148.	9.	0.005	195.56	1.284
BI-214	2436.43	609.39	16.	47.	0.026	21.13	0.804s
AG-108M	2455.98	614.28	157.	0.	0.000	1000.00	1.292
PM-144	2471.11	618.06	157.	0.	0.000	1000.00	1.295s
RH-106	2486.52	621.92	175.	-10.	-0.006	187.81	1.299s
SB-125	2542.41	635.89	29.	1.	0.001	768.11	1.311s
I-131	2546.75	636.97	16.	8.	0.004	80.97	1.312s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	2629.90	657.76	18.	8.	0.004	81.91	1.330s
CS-137	2645.49	661.66	29.	3.	0.002	222.67	1.333s
PM-144	2785.03	696.54	9.	15.	0.008	48.20	1.363s
NB-94	2809.38	702.63	35.	-10.	-0.006	72.57	1.368s
SB-124	2890.01	722.79	15.	4.	0.002	149.52	1.386s
AG-108M	2890.61	722.94	19.	7.	0.004	98.82	1.386s
EU-154	2892.29	723.36	26.	7.	0.004	112.67	1.386s
ZR-95	2895.66	724.20	33.	7.	0.004	124.95	1.387s
BI-212	2907.54	727.17	46.	-6.	-0.004	155.95	1.390s
pm-146	2941.74	735.72	17.	-7.	-0.004	121.63	1.397s
pm-146	2987.51	747.16	22.	-4.	-0.002	197.40	1.407s
ZR-95	3025.79	756.73	13.	5.	0.003	153.84	1.415s
AG-110M	3054.64	763.94	27.	-6.	-0.003	129.10	1.421s
NB-95	3062.03	765.79	34.	6.	0.003	154.81	1.423s
PA-234M	3064.52	766.41	25.	6.	0.003	123.37	1.423s
EU-152	3114.56	778.92	26.	-10.	-0.006	73.89	1.434s
BI-212	3140.56	785.42	9.	4.	0.002	146.76	1.440s
CS-134	3182.35	795.87	49.	-12.	-0.007	85.16	1.448s
TL-210	3197.29	799.60	61.	-13.	-0.007	87.35	1.451s
CS-134	3206.69	801.95	60.	10.	0.006	112.58	1.454s
CO-58	3241.99	810.78	56.	-12.	-0.007	89.65	1.461s
La-140	3261.97	815.77	68.	-8.	-0.004	159.03	1.465s
Cs-136	3272.90	818.50	59.	10.	0.006	111.24	1.467
MN-54	3338.30	834.85	9.	7.	0.004	96.38	1.481s
Co-56	3385.99	846.77	24.	-12.	-0.007	63.99	1.491s
TL-208	3441.18	860.56	5.	5.	0.003	109.69	1.503s
NB-94	3483.32	871.10	9.	4.	0.002	128.89	1.512s
EU-154	3491.85	873.23	22.	-7.	-0.004	100.14	1.514s
PA-234	3521.06	880.53	31.	8.	0.004	104.58	1.520s
PA-234	3531.90	883.24	39.	0.	0.000	1000.00	1.522s
AG-110M	3537.67	884.68	39.	0.	0.000	1000.00	1.523s
Sc-46	3556.06	889.28	50.	-9.	-0.005	116.00	1.527s
AC-228	3643.24	911.07	5.	20.	0.011	31.62	1.545
AG-110M	3748.95	937.49	19.	-8.	-0.004	124.88	1.567s
PA-234	3783.07	946.02	19.	-4.	-0.002	255.36	1.574s
EU-152	3855.45	964.11	15.	5.	0.003	128.92	1.589s
EU-154	3984.36	996.33	51.	-13.	-0.007	85.06	1.616s
PA-234M	4003.04	1001.00	66.	-6.	-0.003	93.72	1.620s
Co-56	4150.45	1037.84	10.	8.	0.004	94.69	1.650s
Cs-136	4191.39	1048.07	37.	-1.	-0.001	866.03	1.658s
RH-106	4200.55	1050.36	48.	-7.	-0.004	151.49	1.661s
BI-207	4253.77	1063.66	5.	6.	0.003	96.46	1.671s
Ga-68	4308.74	1077.40	5.	4.	0.002	132.68	1.683s
FE-59	4396.18	1099.25	10.	3.	0.002	238.82	1.700s
EU-152	4447.49	1112.07	43.	10.	0.005	101.53	1.711s
ZN-65	4461.38	1115.55	53.	0.	0.000	1000.00	1.713s
BI-214	4480.35	1120.29	56.	-3.	-0.002	179.66	1.717s
Sc-46	4481.41	1120.55	53.	0.	0.000	1000.00	1.717s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.41	1121.30	66.	-12.	-0.006	103.80	1.718s
CO-60	4692.24	1173.24	25.	-2.	-0.001	299.77	1.760s
Ta-182	4755.52	1189.05	15.	2.	0.001	431.57	1.772s
Ta-182	4885.02	1221.41	37.	-6.	-0.004	222.86	1.798s
Co-56	4952.53	1238.28	28.	-2.	-0.001	408.21	1.812s
NA-22	5097.60	1274.53	11.	-4.	-0.002	136.36	1.840s
EU-154	5097.66	1274.54	14.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	11.	3.	0.002	237.05	1.854s
TL-210	5251.56	1313.00	5.	7.	0.004	89.70	1.870s
AG-110M	5536.92	1384.30	5.	3.	0.001	206.16	1.926s
EU-152	5631.79	1408.00	0.	0.	0.000	1000.00	1.944s
K-40	5844.47	1461.14	7.	246.	0.137	6.57	1.441s
La-140	6385.15	1596.21	6.	-2.	-0.001	343.80	2.087s
SB-124	6764.55	1690.98	0.	0.	0.000	1000.00	2.157s
BI-214	7058.84	1764.49	3.	9.	0.005	46.72	2.211s
Co-56	7086.31	1771.35	12.	0.	0.000	1000.00	2.216s
y-88	7345.39	1836.06	0.	0.	0.000	1000.00	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.3473E+00					5.31E+01	
			477.60	2.347E+00	?(	7.891E+00	9.84E+01	1.05E+01 G
NA-22	C	-2.3218E-01					9.50E+02	
			1274.53	-2.322E-01	?(	1.135E+00	1.36E+02	9.99E+01 G
K-40	N	1.6213E+02					4.66E+11	
			1460.83	1.621E+02	(P	1.002E+01	6.57E+00	1.07E+01 G
Sc-46	F	-4.3246E-01					8.38E+01	
			889.28	-4.325E-01	?(	1.714E+00	1.16E+02	1.00E+02 G
			1120.55	0.000E+00	+	2.099E+00	1.00E+03	1.00E+02 G
CR-51	F	5.1980E-01					2.77E+01	
			320.08	5.198E-01	?(	9.087E+00	4.99E+02	9.94E+00 G
MN-54	C	3.3372E-01					3.12E+02	
			834.85	3.337E-01	?(	7.764E-01	9.64E+01	1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	3.7704E-01					4.45E+01	
			1099.25	2.998E-01	?(	1.743E+00	2.39E+02	5.65E+01 G
			1291.60	4.781E-01	?(P	2.665E+00	2.37E+02	4.32E+01 G
Co-56	C	-1.0715E-01					7.73E+01	
			846.77	-5.522E-01	?(P	1.181E+00	6.40E+01	9.99E+01 G
			1238.28	-1.472E-01	+ P	2.546E+00	4.08E+02	6.61E+01 G
			1037.84	3.040E+00	&(P	6.717E+00	9.47E+01	1.41E+01 G
			1771.35	0.000E+00	+	9.975E+00	1.00E+03	1.55E+01 A
CO-57	C	1.3630E-01					2.72E+02	
			122.06	0.000E+00	?(	8.751E-01	1.00E+03	8.56E+01 G
			136.47	1.229E+00	*(	7.685E+00	1.84E+02	1.07E+01 G
CO-58	C	-5.6060E-01					7.09E+01	
			810.78	-5.606E-01	&(	1.693E+00	8.97E+01	9.95E+01 G
CO-60	F	3.1976E-02					1.93E+03	
			1332.50	3.198E-02	%(P	8.944E-01	1.09E+03	1.00E+02 G
			1173.24	-1.240E-01	+ P	1.548E+00	3.00E+02	9.99E+01 G
NB-94	I	-4.1316E-01					7.41E+06	
			702.63	-4.132E-01	?(P	1.246E+00	7.26E+01	9.79E+01 G
			871.10	1.736E-01	+	8.024E-01	1.29E+02	9.99E+01 G
ZR-95	I	5.0058E-01					6.40E+01	
			756.73	3.907E-01	?(	1.525E+00	1.54E+02	5.45E+01 G
			724.20	6.361E-01	?(	2.746E+00	1.25E+02	4.42E+01 G
NB-95	I	2.3663E-01					6.40E+01	
			765.79	2.366E-01	?(	1.277E+00	1.55E+02	9.98E+01 G
RU-103	I	1.9610E-01					3.93E+01	
			497.05	1.961E-01	&(P	5.495E-01	1.06E+02	9.09E+01 G
			610.30	1.681E-01	%	3.852E+01	6.65E+03	5.75E+00 GA
RH-106	I	-3.7393E+00					3.74E+02	
			621.92	-3.739E+00	?(	2.382E+01	1.88E+02	9.93E+00 G
			1050.36	-2.330E+01	+	1.219E+02	1.51E+02	1.56E+00 G
			511.86	6.964E+00	?	5.859E+00	4.52E+01	2.00E+01 GA
AG-108M	C	2.4694E-01					1.53E+05	
			433.94	1.851E-01	?(P	5.701E-01	1.13E+02	9.05E+01 G
			722.94	3.085E-01	?(	1.049E+00	9.88E+01	9.08E+01 G
			614.28	0.000E+00	-	2.479E+00	1.00E+03	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.5412E-01					2.50E+02	
			884.68	0.000E+00	?(	2.095E+00	1.00E+03	7.27E+01 G
			657.76	3.244E-01	?(	8.995E-01	8.19E+01	9.46E+01 G
			937.49	-1.116E+00	+	3.324E+00	1.25E+02	3.44E+01 G
			1384.30	7.408E-01	?(	3.743E+00	2.06E+02	2.43E+01 G
			763.94	-1.154E+00	+	5.179E+00	1.29E+02	2.23E+01 G
SN-113	F	3.7809E-01					1.15E+02	
			391.69	3.781E-01	&(P	1.723E+00	1.34E+02	6.40E+01 G
SB-124	F	4.4200E-01					6.02E+01	
			602.73	3.260E-01	&(	2.108E+00	1.90E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.218E+00	1.00E+03	4.78E+01 G
			722.79	1.496E+00	?(	7.972E+00	1.50E+02	1.08E+01 G
SB-125	I	1.3151E+00					1.01E+03	
			427.88	7.708E-01	?(P	2.177E+00	1.05E+02	2.96E+01 G
			600.50	1.786E+00	?(	1.121E+01	1.84E+02	1.79E+01 G
			635.89	3.306E-01	-	9.193E+00	7.68E+02	1.13E+01 G
			463.37	2.051E+00	?(P	8.020E+00	1.14E+02	1.05E+01 G
I-131	I	2.2244E-01					8.02E+00	
			364.48	-1.200E-01	(P	9.130E-01	3.18E+02	8.17E+01 G
			284.30	-3.417E-01	&	1.149E+01	1.24E+03	6.14E+00 G
			636.97	4.124E+00	?(	1.130E+01	8.10E+01	7.17E+00 G
Gd-153	F	4.1761E-01					2.42E+02	
			97.50	4.176E-01	?(	2.203E+00	1.55E+02	3.00E+01 G
			103.20	-8.936E-01	+	3.606E+00	1.20E+02	2.18E+01 G
Ga-68	C	7.8673E+00					4.71E-02	
			1077.40	7.867E+00	?(	2.582E+01	1.33E+02	3.30E+00 G
Tc-99m	I	1.7894E-01					2.51E-01	
			140.51	1.789E-01	(	9.317E-01	1.54E+02	8.93E+01 G
BA-133	F	-7.9210E-02					3.85E+03	
			356.00	-7.921E-02	?(	2.307E+00	8.46E+02	6.20E+01 G
			302.85	0.000E+00	+	8.248E+00	1.00E+03	1.83E+01 G
			383.84	-9.666E-01	&	1.327E+01	3.96E+02	8.94E+00 GA
			80.99	-3.395E-01	+ P	2.101E+00	1.58E+02	3.41E+01 GA
CS-134	I	8.4698E-01					7.54E+02	
			604.71	3.294E-01	(	2.191E+00	1.96E+02	9.76E+01 G
			795.87	-6.373E-01	+	1.825E+00	8.52E+01	8.55E+01 G
			569.32	1.690E+00	&(	4.225E+00	7.45E+01	1.54E+01 G
			801.95	5.169E+00	?(	1.980E+01	1.13E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-1.417E+00	+ P	1.055E+01	1.78E+02	8.35E+00 G
CS-137	I	1.5786E-01					1.10E+04	
			661.66	1.579E-01	&(	1.247E+00	2.23E+02	8.52E+01 G
CE-139	F	-9.0888E-03					1.38E+02	
			165.85	-9.089E-03	%(	9.316E-01	2.95E+03	7.99E+01 G
Ba-140	I	9.4594E-01					1.28E+01	
			537.26	9.482E-01	?(	3.190E+00	1.31E+02	2.44E+01 G
			162.66	9.369E-01	&(	1.229E+01	3.81E+02	6.22E+00 G
			304.85	0.000E+00	-	3.541E+01	1.00E+03	4.29E+00 G
La-140	I	5.3156E-02					1.28E+01	
			1596.21	-1.318E-01	?(	1.092E+00	3.44E+02	9.54E+01 G
			487.02	-1.352E-01	+	1.592E+00	4.43E+02	4.55E+01 G
			328.76	9.223E-01	?(	2.594E+00	1.05E+02	2.03E+01 G
			815.77	-1.461E+00	+	7.979E+00	1.59E+02	2.33E+01 G
CE-141	I	3.6338E-01					3.25E+01	
			145.44	3.634E-01	&(	1.594E+00	1.30E+02	4.82E+01 G
CE-144	I	1.7925E-01					2.85E+02	
			133.54	1.792E-01	%(	7.701E+00	1.25E+03	1.11E+01 G
PM-144	C	6.0467E-01					3.63E+02	
			696.54	6.047E-01	?(P	6.755E-01	4.82E+01	9.90E+01 G
			618.06	0.000E+00	&	2.258E+00	1.00E+03	9.91E+01 G
EU-152	F	1.7673E+00					4.94E+03	
			344.29	7.034E-01	?(P	3.483E+00	1.44E+02	2.65E+01 G
			1112.07	4.036E+00	?(	1.394E+01	1.02E+02	1.36E+01 G
			121.78	-5.908E-01	-	2.501E+00	1.25E+02	2.86E+01 G
			778.92	-3.425E+00	+ P	8.925E+00	7.39E+01	1.29E+01 G
			964.11	1.578E+00	?(	7.189E+00	1.29E+02	1.46E+01 G
			244.69	-2.856E+00	+	1.770E+01	1.83E+02	7.58E+00 G
			1408.00	0.000E+00	-	2.399E+00	1.00E+03	2.10E+01 GA
EU-154	I	-2.7678E+00					3.14E+03	
			873.23	-2.768E+00	?(	9.520E+00	1.00E+02	1.23E+01 G
			123.10	4.503E-01	&	1.664E+00	1.10E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.660E+00	1.00E+03	3.52E+01 G
			723.36	1.387E+00	+	5.394E+00	1.13E+02	2.02E+01 G
			1004.77	9.756E-02	%	1.207E+01	3.51E+03	1.80E+01 G
			996.33	-6.209E+00	+	1.775E+01	8.51E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-3.1157E-02					1.81E+03	
			105.31	-3.116E-02	%(P	3.926E+00	3.63E+03	2.12E+01 G
			86.54	0.000E+00	&	4.166E+00	1.00E+03	3.07E+01 G
HF-181	F	-3.7949E-01					4.24E+01	
			482.00	-3.795E-01	?(	1.354E+00	1.05E+02	8.05E+01 G
			133.02	0.000E+00	+	1.962E+00	1.00E+03	4.33E+01 G
			345.83	-1.430E+00	&	8.450E+00	1.73E+02	1.51E+01 G
			136.30	0.000E+00	+	1.463E+01	1.00E+03	5.85E+00 G
Ta-182	F	-1.8891E+00					1.14E+02	
			1121.30	-1.889E+00	&(	6.640E+00	1.04E+02	3.49E+01 G
			1221.41	-1.436E+00	+	7.072E+00	2.23E+02	2.70E+01 G
			1189.05	7.405E-01	+	7.685E+00	4.32E+02	1.62E+01 G
Hg-203	F	2.6303E-01					4.66E+01	
			279.20	2.630E-01	?(	8.987E-01	1.01E+02	8.15E+01 G
TL-208	N	1.3602E+00					6.98E+02	
			583.02	1.302E+00	(P	6.469E-01	2.37E+01	8.45E+01 G
			277.28	1.307E+00	&(	1.316E+01	2.89E+02	6.31E+00 G
			860.56	1.783E+00	?(P	5.021E+00	1.10E+02	1.24E+01 G
pm-146	C	-4.5938E-01					2.02E+03	
			747.16	-4.594E-01	?(P	3.027E+00	1.97E+02	3.40E+01 G
			735.72	-1.358E+00	+	4.095E+00	1.22E+02	2.25E+01 G
			453.88	-1.799E-01	+	1.149E+00	2.45E+02	6.50E+01 G
y-88	F	-5.2459E-04					1.07E+02	
			898.04	-5.246E-04	%(P	1.041E+00	5.13E+04	9.37E+01 G
			1836.06	0.000E+00	+	6.260E-01	1.00E+03	9.92E+01 G
Cd-113m		-4.4255E+02					5.33E+03	
			263.70	-4.425E+02	?(	1.378E+04	8.87E+02	6.00E-03 K
Cd-109	F	3.9719E+00					4.53E+02	
			88.04	3.972E+00	?(	3.219E+01	2.40E+02	3.79E+00 G
Cf-251	T	-4.7524E-01					3.28E+05	
			176.60	-4.752E-01	?(	3.797E+00	2.89E+02	1.70E+01 G
			227.00	1.616E+00	?	1.048E+01	2.33E+02	6.30E+00 GA
Cf-249	T	6.1052E-01					1.28E+05	
			387.95	4.222E-01	?(	1.736E+00	1.21E+02	6.60E+01 G
			333.44	1.412E+00	(	3.982E+00	1.07E+02	1.55E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sn-126		-2.0777E+00					3.65E+07	
			87.57	0.000E+00	+	3.392E+00	1.00E+03	3.75E+01 GA
			64.28	-2.078E+00	?(	1.145E+01	1.63E+02	9.70E+00 G
			86.94	0.000E+00	+	1.412E+01	1.00E+03	9.04E+00 GA
PB-210	N	8.7183E+00					8.14E+03	
			46.54	8.718E+00	(P	2.452E+01	9.53E+01	4.25E+00 G
PB-212	N	2.5186E+00					6.98E+02	
			238.63	2.519E+00	(P	1.254E+00	1.91E+01	4.33E+01 G
			300.03	7.438E+00	+ P	4.432E+01	1.76E+02	3.28E+00 GA
PB-214	N	5.7844E+00					5.84E+05	
			351.93	5.784E+00	@(P	1.519E+00	1.39E+01	3.76E+01 G
			295.09	6.396E-01	- P	7.099E+00	3.26E+02	1.93E+01 G
			242.00	7.265E+00		8.058E+00	3.60E+01	7.43E+00 GA
BI-207	C	1.9219E-01					1.18E+04	
			569.70	1.764E-02	%(	9.095E-01	1.41E+03	9.77E+01 G
			1063.66	4.212E-01	?(P	9.789E-01	9.65E+01	7.45E+01 G
BI-212	N	-3.4932E+00					6.98E+02	
			727.17	-3.493E+00	&(	1.885E+01	1.56E+02	7.55E+00 G
			785.42	1.481E+01	?	5.616E+01	1.47E+02	1.28E+00 GA
U-235	N	-2.8391E-01					2.57E+11	
			143.79	-7.393E-01	(P	7.841E+00	3.17E+02	1.10E+01 G
			205.33	7.123E-01	(P	1.236E+01	6.17E+02	5.01E+00 G
			163.38	-3.328E-01	% P	1.541E+01	1.64E+03	5.08E+00 G
			185.72	6.072E-01	* P	1.235E+00	7.26E+01	5.40E+01 GA
BI-214	N	3.8906E+00					5.84E+05	
			609.31	3.680E+00	(P	1.687E+00	2.11E+01	4.61E+01 G
			1120.29	-1.314E+00	- P	1.431E+01	1.80E+02	1.51E+01 G
			1764.49	4.520E+00	?(P	6.043E+00	4.67E+01	1.54E+01 G
BI-210M	T	-3.8717E-01					1.10E+09	
			265.83	-3.872E-01	?(	1.739E+00	1.32E+02	5.00E+01 G
			304.90	0.000E+00	&	5.425E+00	1.00E+03	2.80E+01 G
AC-228	N	3.1005E+00					2.10E+03	
			911.07	3.431E+00	?(	2.156E+00	3.16E+01	2.90E+01 G
			968.97	1.431E-01	%	9.926E+00	1.94E+03	1.75E+01 G
			338.32	2.303E+00	(	9.516E+00	1.22E+02	1.20E+01 G
			93.35	0.000E+00	-	2.176E+01	1.00E+03	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	-4.3647E+00					7.95E+03	
			50.14	-4.365E+00	(	1.383E+01	1.11E+02	8.00E+00 G
			256.24	-4.312E+00	&	1.163E+01	9.96E+01	7.00E+00 G
TH-229	N	-1.2206E-01					2.68E+06	
			193.51	-1.221E-01	%(	1.457E+01	4.25E+03	4.40E+00 G
			210.85	-7.045E+00	+	2.434E+01	1.27E+02	2.99E+00 G
TH-234	N	1.3094E+01					1.63E+12	
			63.29	1.309E+01	(P	2.016E+01	5.61E+01	3.81E+00 G
			92.59	3.985E+00	- P	1.230E+01	1.11E+02	5.58E+00 G
PA-231	N	8.7338E-01					1.20E+07	
			302.65	0.000E+00	(	5.247E+01	1.00E+03	2.88E+00 G
			300.07	1.896E+00	(	6.075E+01	9.37E+02	2.46E+00 G
PA-233	C	-1.7068E-02					7.82E+08	
			312.01	-1.707E-02	%(P	4.291E+00	7.20E+03	3.60E+01 G
			300.18	0.000E+00	+	2.423E+01	1.00E+03	6.20E+00 G
PA-234	N	3.4484E-01					1.63E+12	
			131.29	-2.564E-01	?(	4.696E+00	5.35E+02	1.80E+01 G
			946.02	-1.378E+00	+	8.583E+00	2.55E+02	1.34E+01 G
			569.47	1.665E+00	&(	9.910E+00	1.68E+02	8.20E+00 G
			883.24	0.000E+00	-	1.584E+01	1.00E+03	9.60E+00 G
			880.53	6.358E+00	?	2.277E+01	1.05E+02	6.00E+00 GA
PA-234M	N	-5.8967E+00					1.63E+12	
			1001.00	-3.912E+01	?(P	2.554E+02	9.37E+01	8.37E-01 G
			766.41	8.869E+01	&(P	3.796E+02	1.23E+02	2.94E-01 G
AM-241	T	-2.0934E-01					1.58E+05	
			59.54	-2.093E-01	?(	2.417E+00	3.96E+02	3.59E+01 G
Np-237	F	-1.0008E+00					2.14E+06	
			86.49	-1.001E+00	?(	9.886E+00	2.93E+02	1.31E+01 G
Ir-192	F	3.1640E-01					7.40E+01	
			316.49	2.270E-01	&(	8.070E-01	1.04E+02	8.70E+01 G
			468.06	4.669E-01	?(	1.788E+00	1.12E+02	5.18E+01 G
			308.44	0.000E+00	-	4.823E+00	1.00E+03	3.18E+01 G
Cs-136	F	4.6058E-01					1.30E+01	
			818.50	4.606E-01	?(	1.742E+00	1.11E+02	1.00E+02 G
			1048.07	-6.805E-02	-	2.113E+00	8.66E+02	8.00E+01 G
			340.57	0.000E+00	-	2.586E+00	1.00E+03	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T   8.0869E-01                                      2.36E+00
                          103.70-2.735E-01 -   3.422E+00 3.66E+02 2.40E+01 X
                          106.13 8.087E-01 ?(  3.395E+00 1.24E+02 2.27E+01 G
                           99.50 8.893E-01 &   4.371E+00 1.45E+02 1.50E+01 X

Nd-147      -2.7719E+00                                     1.11E+01
                          531.00-2.772E+00 ?(  6.896E+00 9.89E+01 1.30E+01 G
                           91.10 0.000E+00 +   4.314E+00 1.00E+03 2.83E+01 G

TL-210   N  -5.9832E-01                                     5.84E+05
                          799.60-5.983E-01 ?(  1.757E+00 8.74E+01 9.90E+01 G
                          296.00 3.172E-01 +   1.766E+00 1.65E+02 7.90E+01 G
                         1313.00 2.007E+00 ?   4.154E+00 8.97E+01 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	90.	-15.	-0.008	110.90	-4.365E+00	
AM-241	59.54	87.	-4.	-0.002	395.68	-2.093E-01	
Sn-126	64.28	175.	-12.	-0.006	162.86	-2.078E+00	
BA-133	80.99	103.	-8.	-0.004	157.64	-3.395E-01	P
Np-237	86.49	382.	-10.	-0.005	292.95	-1.001E+00	
Cd-109	88.04	344.	11.	0.006	240.35	3.972E+00	
Gd-153	97.50	104.	10.	0.005	154.88	4.176E-01	
Np-239	99.50	103.	10.	0.006	144.50	8.893E-01	
Gd-153	103.20	153.	-15.	-0.008	119.79	-8.936E-01	
Np-239	103.70	168.	-5.	-0.003	366.08	-2.735E-01	
Np-239	106.13	148.	14.	0.008	124.47	8.087E-01	
EU-152	121.78	126.	-13.	-0.007	125.22	-5.908E-01	
EU-154	123.10	113.	14.	0.008	109.61	4.503E-01	
PA-234	131.29	174.	-4.	-0.002	534.90	-2.564E-01	
CO-57	136.47	159.	10.	0.005	184.22	1.229E+00	
Tc-99m	140.51	150.	12.	0.006	153.72	1.789E-01	
U-235	143.79	168.	-6.	-0.003	317.08	-7.393E-01	P
CE-141	145.44	132.	13.	0.007	129.78	3.634E-01	
Ba-140	162.66	114.	4.	0.002	380.79	9.369E-01	
Cf-251	176.60	73.	-5.	-0.003	288.99	-4.752E-01	
U-235	185.72	73.	21.	0.012	72.61	6.072E-01	P
U-235	205.33	54.	2.	0.001	617.24	7.123E-01	P
TH-229	210.85	73.	-12.	-0.007	126.80	-7.045E+00	
Cf-251	227.00	53.	6.	0.003	233.15	1.616E+00	
EU-152	244.69	214.	-11.	-0.006	183.33	-2.856E+00	
TH-227	256.24	70.	-15.	-0.009	99.61	-4.312E+00	
Cd-113m	263.70	69.	-1.	-0.001	887.41	-4.425E+02	
BI-210M	265.83	76.	-10.	-0.005	131.80	-3.872E-01	
Hg-203	279.20	49.	10.	0.006	100.66	2.630E-01	
TL-210	296.00	177.	12.	0.006	164.52	3.172E-01	
PA-231	300.07	200.	2.	0.001	936.55	1.896E+00	
Ir-192	316.49	37.	9.	0.005	104.15	2.270E-01	
CR-51	320.08	63.	2.	0.001	498.69	5.198E-01	
La-140	328.76	18.	8.	0.004	105.45	9.223E-01	
EU-152	344.29	59.	8.	0.004	144.34	7.034E-01	P
HF-181	345.83	116.	-9.	-0.005	173.42	-1.430E+00	
BA-133	356.00	142.	-2.	-0.001	845.58	-7.921E-02	
I-131	364.48	34.	-4.	-0.002	318.38	-1.200E-01	P
BA-133	383.84	85.	-3.	-0.002	395.73	-9.666E-01	
SN-113	391.69	71.	9.	0.005	133.55	3.781E-01	P
SB-125	427.88	19.	8.	0.005	105.42	7.708E-01	P
AG-108M	433.94	11.	6.	0.003	113.03	1.851E-01	P
pm-146	453.88	24.	-4.	-0.002	244.95	-1.799E-01	
SB-125	463.37	30.	7.	0.004	113.69	2.051E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ir-192	468.06	37.	8.	0.004	111.71	4.669E-01		
BE-7	477.59	28.	8.	0.005	98.37	2.347E+00		
HF-181	482.00	50.	-10.	-0.006	104.96	-3.795E-01		
La-140	487.02	20.	-2.	-0.001	443.47	-1.352E-01		
RU-103	497.05	8.	6.	0.003	106.19	1.961E-01		P
RH-106	511.86	53.	44.	0.024	45.24	6.964E+00		
Nd-147	531.00	28.	-11.	-0.006	98.89	-2.772E+00		
Ba-140	537.26	20.	7.	0.004	130.67	9.482E-01		
CS-134	563.24	24.	-3.	-0.002	178.01	-1.417E+00		P
CS-134	569.32	12.	8.	0.004	74.48	1.690E+00		
PA-234	569.47	20.	4.	0.002	167.61	1.665E+00		
SB-125	600.50	130.	9.	0.005	184.29	1.786E+00		
SB-124	602.73	139.	9.	0.005	190.00	3.260E-01		
CS-134	604.71	148.	9.	0.005	195.56	3.294E-01		
RH-106	621.92	175.	-10.	-0.006	187.81	-3.739E+00		
SB-125	635.89	29.	1.	0.001	768.11	3.306E-01		
I-131	636.97	16.	8.	0.004	80.97	4.124E+00		
AG-110M	657.76	18.	8.	0.004	81.91	3.244E-01		
CS-137	661.66	29.	3.	0.002	222.67	1.579E-01		
PM-144	696.54	9.	15.	0.008	48.20	6.047E-01		P
NB-94	702.63	35.	-10.	-0.006	72.57	-4.132E-01		P
SB-124	722.79	15.	4.	0.002	149.52	1.496E+00		
AG-108M	722.94	19.	7.	0.004	98.82	3.085E-01		
EU-154	723.36	26.	7.	0.004	112.67	1.387E+00		
ZR-95	724.20	33.	7.	0.004	124.95	6.361E-01		
BI-212	727.17	46.	-6.	-0.004	155.95	-3.493E+00		
pm-146	735.72	17.	-7.	-0.004	121.63	-1.358E+00		
pm-146	747.16	22.	-4.	-0.002	197.40	-4.594E-01		P
ZR-95	756.73	13.	5.	0.003	153.84	3.907E-01		
AG-110M	763.94	27.	-6.	-0.003	129.10	-1.154E+00		
NB-95	765.79	34.	6.	0.003	154.81	2.366E-01		
PA-234M	766.41	25.	6.	0.003	123.37	8.869E+01		P
EU-152	778.92	26.	-10.	-0.006	73.89	-3.425E+00		P
BI-212	785.42	9.	4.	0.002	146.76	1.481E+01		
CS-134	795.87	49.	-12.	-0.007	85.16	-6.373E-01		
TL-210	799.60	61.	-13.	-0.007	87.35	-5.983E-01		
CS-134	801.95	60.	10.	0.006	112.58	5.169E+00		
CO-58	810.78	56.	-12.	-0.007	89.65	-5.606E-01		
La-140	815.77	68.	-8.	-0.004	159.03	-1.461E+00		
Cs-136	818.50	59.	10.	0.006	111.24	4.606E-01		
MN-54	834.85	9.	7.	0.004	96.38	3.337E-01		
Co-56	846.77	24.	-12.	-0.007	63.99	-5.522E-01		P
NB-94	871.10	9.	4.	0.002	128.89	1.736E-01		
EU-154	873.23	22.	-7.	-0.004	100.14	-2.768E+00		
PA-234	880.53	31.	8.	0.004	104.58	6.358E+00		
Sc-46	889.28	50.	-9.	-0.005	116.00	-4.325E-01		
AG-110M	937.49	19.	-8.	-0.004	124.88	-1.116E+00		
PA-234	946.02	19.	-4.	-0.002	255.36	-1.378E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-152	964.11	15.	5.	0.003	128.92	1.578E+00		
EU-154	996.33	51.	-13.	-0.007	85.06	-6.209E+00		
PA-234M	1001.00	66.	-6.	-0.003	93.72	-3.912E+01		P
Co-56	1037.84	10.	8.	0.004	94.69	3.040E+00		P
Cs-136	1048.07	37.	-1.	-0.001	866.03	-6.805E-02		
RH-106	1050.36	48.	-7.	-0.004	151.49	-2.330E+01		
BI-207	1063.66	5.	6.	0.003	96.46	4.212E-01		P
Ga-68	1077.40	5.	4.	0.002	132.68	7.867E+00		
FE-59	1099.25	10.	3.	0.002	238.82	2.998E-01		
EU-152	1112.07	43.	10.	0.005	101.53	4.036E+00		
Ta-182	1121.30	66.	-12.	-0.006	103.80	-1.889E+00		
CO-60	1173.24	25.	-2.	-0.001	299.77	-1.240E-01		P
Ta-182	1189.05	15.	2.	0.001	431.57	7.405E-01		
Ta-182	1221.41	37.	-6.	-0.004	222.86	-1.436E+00		
Co-56	1238.28	28.	-2.	-0.001	408.21	-1.472E-01		P
NA-22	1274.53	11.	-4.	-0.002	136.36	-2.322E-01		
FE-59	1291.60	11.	3.	0.002	237.05	4.781E-01		P
TL-210	1313.00	5.	7.	0.004	89.70	2.007E+00		
AG-110M	1384.30	5.	3.	0.001	206.16	7.408E-01		
La-140	1596.21	6.	-2.	-0.001	343.80	-1.318E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	2.3473E+00	2.3473E+00	9.837E+01%	7.89E+00
NA-22	#A	-2.3218E-01	-2.3218E-01	1.364E+02%	1.14E+00
K-40		1.6213E+02	1.6213E+02	6.570E+00%	1.00E+01
Sc-46	#A	-4.3246E-01	-4.3246E-01	1.160E+02%	1.71E+00
CR-51	#A	5.1980E-01	5.1980E-01	4.987E+02%	9.09E+00
MN-54	#A	3.3372E-01	3.3372E-01	9.638E+01%	7.76E-01
FE-59	#A	3.7704E-01	3.7704E-01	1.682E+02%	1.74E+00
Co-56	#A	-1.0715E-01	-1.0715E-01	5.714E+01%	1.18E+00
CO-57	#A	1.3630E-01	1.3630E-01	1.842E+02%	8.75E-01
CO-58	#A	-5.6059E-01	-5.6060E-01	8.965E+01%	1.69E+00
CO-60	#A	3.1976E-02	3.1976E-02	1.094E+03%	8.94E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.13E+00
NB-94	#A	-4.1316E-01	-4.1316E-01	7.257E+01%	1.25E+00
ZR-95	#A	5.0058E-01	5.0058E-01	9.909E+01%	1.52E+00
NB-95	#A	2.3663E-01	2.3663E-01	1.548E+02%	1.28E+00
RU-103	#A	1.9610E-01	1.9610E-01	1.062E+02%	5.50E-01
RH-106	#A	-3.7393E+00	-3.7393E+00	1.878E+02%	2.38E+01
AG-108M	#A	2.4694E-01	2.4694E-01	7.507E+01%	5.70E-01
AG-110M	#A	2.5412E-01	2.5412E-01	8.191E+01%	2.09E+00
SN-113	#A	3.7809E-01	3.7809E-01	1.336E+02%	1.72E+00

SB-124 #A	4.4200E-01	4.4200E-01	1.209E+02%		2.11E+00
SB-125 #A	1.3151E+00	1.3151E+00	8.028E+01%		2.18E+00
I-131 #A	2.2244E-01	2.2244E-01	8.097E+01%		9.13E-01
Gd-153 #A	4.1761E-01	4.1761E-01	1.549E+02%		2.20E+00
Ga-68 #A	7.8458E+00	7.8673E+00	1.327E+02%		2.58E+01
Tc-99m #A	1.7885E-01	1.7894E-01	1.537E+02%		9.32E-01
BA-133 #A	-7.9210E-02	-7.9210E-02	8.456E+02%		2.31E+00
CS-134 #A	8.4698E-01	8.4698E-01	7.448E+01%		2.19E+00
CS-137 #A	1.5786E-01	1.5786E-01	2.227E+02%		1.25E+00
CE-139 #A	-9.0888E-03	-9.0888E-03	2.950E+03%		9.32E-01
Ba-140 #A	9.4593E-01	9.4594E-01	1.307E+02%		3.19E+00
La-140 #A	5.3155E-02	5.3156E-02	1.054E+02%		1.09E+00
CE-141 #A	3.6338E-01	3.6338E-01	1.298E+02%		1.59E+00
CE-144 #A	1.7925E-01	1.7925E-01	1.252E+03%		7.70E+00
PM-144 #A	6.0467E-01	6.0467E-01	4.820E+01%		6.76E-01
EU-152 #A	1.7673E+00	1.7673E+00	7.285E+01%		3.48E+00
EU-154 #A	-2.7678E+00	-2.7678E+00	1.001E+02%		9.52E+00
EU-155 #A	-3.1157E-02	-3.1157E-02	3.628E+03%		3.93E+00
HF-181 #A	-3.7949E-01	-3.7949E-01	1.050E+02%		1.35E+00
Ta-182 #A	-1.8891E+00	-1.8891E+00	1.038E+02%		6.64E+00
Hg-203 #A	2.6303E-01	2.6303E-01	1.007E+02%		8.99E-01
TL-208	1.3602E+00	1.3602E+00	2.366E+01%		6.47E-01
pm-146 #A	-4.5938E-01	-4.5938E-01	1.974E+02%		3.03E+00
y-88 #A	-5.2459E-04	-5.2459E-04	5.129E+04%		1.04E+00
Cd-113m#A	-4.4255E+02	-4.4255E+02	8.874E+02%		1.38E+04
Cd-109 #A	3.9719E+00	3.9719E+00	2.404E+02%		3.22E+01
Cf-251 #A	-4.7524E-01	-4.7524E-01	2.890E+02%		3.80E+00
Cf-249 A	6.1052E-01	6.1052E-01	8.067E+01%		1.74E+00
Sn-126 #A	-2.0777E+00	-2.0777E+00	1.629E+02%		1.15E+01
PB-210 #A	8.7183E+00	8.7183E+00	9.528E+01%		2.45E+01
PB-212	2.5186E+00	2.5186E+00	1.906E+01%		1.25E+00
PB-214 #	5.7844E+00	5.7844E+00	1.389E+01%		1.52E+00
BI-207 #A	1.9219E-01	1.9219E-01	9.646E+01%		9.09E-01
BI-212 #A	-3.4932E+00	-3.4932E+00	1.560E+02%		1.88E+01
U-235 #A	-2.8391E-01	-2.8391E-01	3.171E+02%		7.84E+00
BI-214	3.8906E+00	3.8906E+00	2.113E+01%		1.69E+00
BI-210M#A	-3.8717E-01	-3.8717E-01	1.318E+02%		1.74E+00
AC-228 #	3.1005E+00	3.1005E+00	3.162E+01%		2.16E+00
TH-227 #A	-4.3647E+00	-4.3647E+00	1.109E+02%		1.38E+01
TH-229 #A	-1.2206E-01	-1.2206E-01	4.252E+03%		1.46E+01
TH-234 A	1.3094E+01	1.3094E+01	5.612E+01%		2.02E+01
PA-231 #A	8.7338E-01	8.7338E-01	6.850E+02%		5.25E+01
PA-233 #A	-1.7068E-02	-1.7068E-02	7.195E+03%		4.29E+00
PA-234 #A	3.4484E-01	3.4484E-01	1.676E+02%		4.70E+00
PA-234M#A	-5.8967E+00	-5.8967E+00	7.747E+01%		2.55E+02
AM-241 #A	-2.0934E-01	-2.0934E-01	3.957E+02%		2.42E+00
Np-237 #A	-1.0008E+00	-1.0008E+00	2.929E+02%		9.89E+00
Ir-192 #A	3.1640E-01	3.1640E-01	7.636E+01%		8.07E-01
Cs-136 #A	4.6057E-01	4.6058E-01	1.112E+02%		1.74E+00

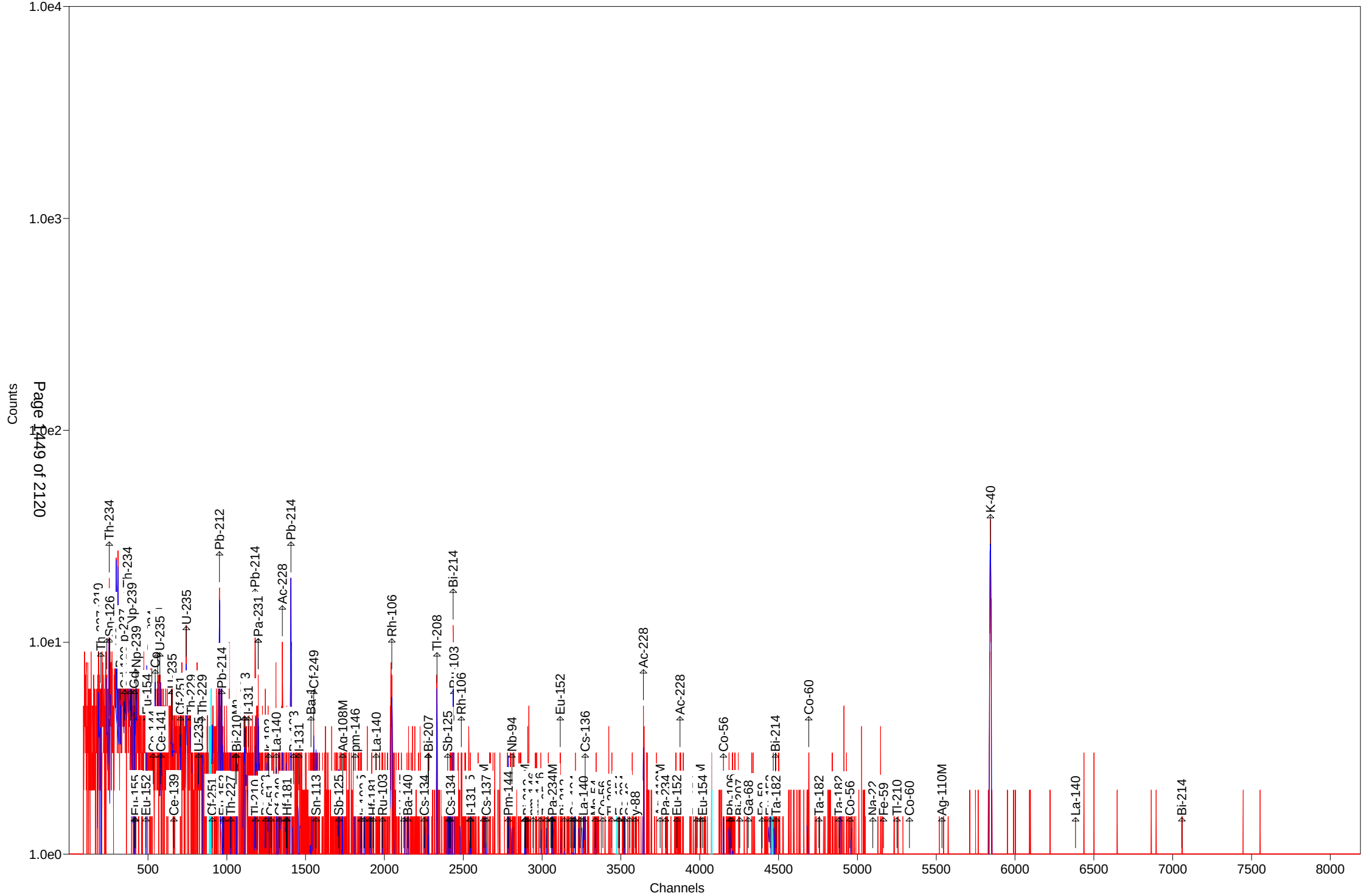
Np-239 #A	8.0864E-01	8.0869E-01	1.245E+02%	3.40E+00
Nd-147 #A	-2.7718E+00	-2.7719E+00	9.889E+01%	6.90E+00
TL-210 #A	-5.9832E-01	-5.9832E-01	8.735E+01%	1.76E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.888E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.8877802E+02 Bq/Sample

379951_Gamma_160-29881-B-36-B. 17_Gamma_20182904.spc.



Prep Batch: 379959

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Lab ID: MB 160-379959/1-A Analyzed: 08/23/18 07:50 Ts: 30 Sigma: 2
Client ID: Detector: GV5 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.1094	0.280	0.280	U	pCi/g		0.612	384697
Radium-226	0.01509	0.179	0.179	U	pCi/g	1.00	0.320	384697
Radium-228	0.1989	0.124	0.126	U	pCi/g		0.299	384697
Thallium-208	0.01106	0.0461	0.0461	U	pCi/g		0.0665	384697
Thorium-232	0.1989	0.124	0.126	U	pCi/g		0.299	384697
Thorium-234	-0.4934	0.677	0.679	U	pCi/g		1.24	384697
Uranium-235	0.01056	0.0839	0.0840	U	pCi/g		0.479	384697
Uranium-238	-0.4934	0.677	0.679	U	pCi/g		1.24	384697
Actinium-228	0.1989	0.124	0.126	U	pCi/g		0.299	384697
Bismuth-212	-0.4593	1.11	1.11	U	pCi/g		1.93	384697
Bismuth-214	0.01509	0.179	0.179	U	pCi/g		0.320	384697
Lead-210	-0.4517	1.30	1.30	U	pCi/g		2.14	384697
Lead-212	0.0007222	0.0912	0.0912	U	pCi/g		0.163	384697
Lead-214	0.01934	0.115	0.116	U	pCi/g		0.183	384697
Potassium-40	-0.5145	1.14	1.14	U	pCi/g		1.61	384697
Protactinium-231	0.5165	1.48	1.48	U	pCi/g		3.54	384697

Lab ID: LCS 160-379959/2-A Analyzed: 08/23/18 07:48 Ts: 30 Sigma: 2
Client ID: Detector: GV19 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	98.75	1.78	11.6		pCi/g		1.30	384705
Cesium-137	30.26	0.814	3.19		pCi/g		0.307	384705
Cobalt-60	13.74	0.465	1.45		pCi/g		0.190	384705

Lab ID: 160-29881-37 Analyzed: 08/23/18 18:46 Ts: 30 Sigma: 2
Client ID: CRC-B5-1618 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.381	0.579	0.581	U	pCi/g		0.799	384705
Radium-226	0.437	0.151	0.157		pCi/g	1.00	0.150	384705
Radium-228	0.181	0.330	0.330	U	pCi/g		0.377	384705
Thallium-208	0.172	0.0697	0.0719		pCi/g		0.0696	384705
Thorium-232	0.181	0.330	0.330	U	pCi/g		0.377	384705
Thorium-234	-0.649	1.15	1.15	U	pCi/g		3.35	384705
Uranium-235	-0.260	0.804	0.804	U	pCi/g		1.34	384705

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Lab ID: 160-29881-37 Analyzed: 08/23/18 18:46 Ts: 30 Sigma: 2
Client ID: CRC-B5-1618 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	-0.649	1.15	1.15	U	pCi/g		3.35	384705
Actinium-228	0.181	0.330	0.330	U	pCi/g		0.377	384705
Bismuth-212	-0.0181	1.04	1.04	U	pCi/g		1.43	384705
Bismuth-214	0.437	0.151	0.157		pCi/g		0.150	384705
Lead-210	-1.26	2.26	2.27	U	pCi/g		3.99	384705
Lead-212	0.446	0.110	0.119		pCi/g		0.118	384705
Lead-214	0.544	0.159	0.168		pCi/g		0.144	384705
Potassium-40	16.5	2.24	2.79		pCi/g		1.13	384705
Protactinium-231	0.901	2.34	2.35	U	pCi/g		5.36	384705

Lab ID: 160-29881-37 DU Analyzed: 08/23/18 17:34 Ts: 30 Sigma: 2
Client ID: CRC-B5-1618 Detector: GV12 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.3186	0.643	0.644	U	pCi/g		0.837	384701
Radium-226	0.4858	0.133	0.142		pCi/g	1.00	0.0901	384701
Radium-228	0.1778	0.228	0.228	U	pCi/g		0.364	384701
Thallium-208	0.08890	0.0562	0.0569		pCi/g		0.0674	384701
Thorium-232	0.1778	0.228	0.228	U	pCi/g		0.364	384701
Thorium-234	1.315	0.725	0.740	F	pCi/g		1.02	384701
Uranium-235	0.1145	0.242	0.243	U	pCi/g		1.18	384701
Uranium-238	1.315	0.725	0.740	F	pCi/g		1.02	384701
Actinium-228	0.1778	0.228	0.228	U	pCi/g		0.364	384701
Bismuth-212	0.1585	1.11	1.11	U	pCi/g		1.94	384701
Bismuth-214	0.4858	0.133	0.142		pCi/g		0.0901	384701
Lead-210	0.3684	1.47	1.47	U	pCi/g		2.31	384701
Lead-212	0.3106	0.0918	0.0974		pCi/g		0.109	384701
Lead-214	0.4844	0.138	0.147		pCi/g		0.154	384701
Potassium-40	15.81	1.95	2.52		pCi/g		0.441	384701
Protactinium-231	0.0000	0.335	0.335	U	pCi/g		5.12	384701

Lab ID: 160-29881-38 Analyzed: 08/23/18 07:52 Ts: 30 Sigma: 2
Client ID: CRC-B5-2224 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.225	0.604	0.605	U	pCi/g		1.02	384698

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Lab ID: 160-29881-38 Analyzed: 08/23/18 07:52 Ts: 30 Sigma: 2
Client ID: CRC-B5-2224 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.344	0.0853	0.0925		pCi/g	1.00	0.0390	384698
Radium-228	0.193	0.239	0.240	U	pCi/g		0.283	384698
Thallium-208	0.0639	0.0458	0.0463		pCi/g		0.0501	384698
Thorium-232	0.193	0.239	0.240	U	pCi/g		0.283	384698
Thorium-234	0.549	0.805	0.807	U	pCi/g		1.33	384698
Uranium-235	0.0986	0.154	0.155	U	pCi/g		0.406	384698
Uranium-238	0.549	0.805	0.807	U	pCi/g		1.33	384698
Actinium-228	0.193	0.239	0.240	U	pCi/g		0.283	384698
Bismuth-212	-0.0252	0.595	0.595	U	pCi/g		1.08	384698
Bismuth-214	0.344	0.0853	0.0925		pCi/g		0.0390	384698
Lead-210	0.779	1.15	1.15	U	pCi/g		1.90	384698
Lead-212	0.150	0.0680	0.0707		pCi/g		0.0984	384698
Lead-214	0.403	0.0913	0.100		pCi/g		0.0745	384698
Potassium-40	12.2	1.59	2.02		pCi/g		0.541	384698
Protactinium-231	-0.641	2.21	2.21	U	pCi/g		3.72	384698

Lab ID: 160-29881-39 Analyzed: 08/23/18 08:47 Ts: 30 Sigma: 2
Client ID: CRC-B5-2830 Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.315	1.11	1.11	U	pCi/g		1.89	384701
Radium-226	0.912	0.219	0.238		pCi/g	1.00	0.159	384701
Radium-228	0.656	0.262	0.271		pCi/g		0.212	384701
Thallium-208	0.146	0.0859	0.0872		pCi/g		0.0971	384701
Thorium-232	0.656	0.262	0.271		pCi/g		0.212	384701
Thorium-234	1.89	1.73	1.75	U	pCi/g		2.18	384701
Uranium-235	0.0525	0.0903	0.0904	U	pCi/g		1.15	384701
Uranium-238	1.89	1.73	1.75	U	pCi/g		2.18	384701
Actinium-228	0.656	0.262	0.271		pCi/g		0.212	384701
Bismuth-212	1.66	0.739	0.758		pCi/g		0.834	384701
Bismuth-214	0.912	0.219	0.238		pCi/g		0.159	384701
Lead-210	0.834	1.84	1.84	U	pCi/g		2.76	384701
Lead-212	0.351	0.122	0.128		pCi/g		0.167	384701
Lead-214	0.749	0.185	0.200		pCi/g		0.179	384701
Potassium-40	13.6	1.91	2.35		pCi/g		0.495	384701
Protactinium-231	0.000	0.753	0.753	U	pCi/g		6.69	384701

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Lab ID: 160-29881-40 Analyzed: 08/23/18 08:41 Ts: 30 Sigma: 2
Client ID: CRC-B11-1214 Detector: GV15 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.380	0.855	0.856	U	pCi/g		1.44	384704
Radium-226	0.435	0.125	0.133		pCi/g	1.00	0.105	384704
Radium-228	0.204	0.205	0.206	U	pCi/g		0.216	384704
Thallium-208	0.0663	0.102	0.102	U	pCi/g		0.114	384704
Thorium-232	0.204	0.205	0.206	U	pCi/g		0.216	384704
Thorium-234	0.277	0.505	0.506	U	pCi/g		1.49	384704
Uranium-235	0.191	0.441	0.441	U	pCi/g		1.02	384704
Uranium-238	0.277	0.505	0.506	U	pCi/g		1.49	384704
Actinium-228	0.204	0.205	0.206	U	pCi/g		0.216	384704
Bismuth-212	0.574	1.23	1.23	U	pCi/g		2.08	384704
Bismuth-214	0.435	0.125	0.133		pCi/g		0.105	384704
Lead-210	0.145	1.43	1.43	U	pCi/g		2.47	384704
Lead-212	0.182	0.0784	0.0819		pCi/g		0.105	384704
Lead-214	0.409	0.132	0.139		pCi/g		0.127	384704
Potassium-40	13.6	1.96	2.40		pCi/g		0.805	384704
Protactinium-231	0.000	0.812	0.812	U	pCi/g		4.70	384704

Lab ID: 160-29881-41 Analyzed: 08/23/18 08:44 Ts: 30 Sigma: 2
Client ID: CRC-B11-2022 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0246	0.775	0.775	U	pCi/g		1.14	384702
Radium-226	0.632	0.157	0.170		pCi/g	1.00	0.132	384702
Radium-228	0.339	0.263	0.265		pCi/g		0.284	384702
Thallium-208	0.131	0.0632	0.0647		pCi/g		0.0684	384702
Thorium-232	0.339	0.263	0.265		pCi/g		0.284	384702
Thorium-234	0.660	0.647	0.651	U	pCi/g		1.70	384702
Uranium-235	0.286	0.266	0.268	U	pCi/g		0.347	384702
Uranium-238	0.660	0.647	0.651	U	pCi/g		1.70	384702
Actinium-228	0.339	0.263	0.265		pCi/g		0.284	384702
Bismuth-212	0.579	1.20	1.20	U	pCi/g		2.02	384702
Bismuth-214	0.632	0.157	0.170		pCi/g		0.132	384702
Lead-210	1.10	1.73	1.74	U	pCi/g		2.41	384702
Lead-212	0.328	0.0880	0.0977		pCi/g		0.0990	384702
Lead-214	0.605	0.139	0.153		pCi/g		0.123	384702
Potassium-40	13.2	1.76	2.22		pCi/g		0.838	384702

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Lab ID: 160-29881-41 Analyzed: 08/23/18 08:44 Ts: 30 Sigma: 2
Client ID: CRC-B11-2022 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	0.000	0.476	0.476	U	pCi/g		4.44	384702

Lab ID: 160-29881-42 Analyzed: 08/23/18 08:41 Ts: 30 Sigma: 2
Client ID: CRC-B11-2628 Detector: GV19 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.122	0.250	0.251	U	pCi/g		1.88	384705
Radium-226	0.501	0.177	0.185		pCi/g	1.00	0.165	384705
Radium-228	0.562	0.193	0.201		pCi/g		0.131	384705
Thallium-208	0.158	0.0786	0.0802		pCi/g		0.0823	384705
Thorium-232	0.562	0.193	0.201		pCi/g		0.131	384705
Thorium-234	-1.72	1.46	1.48	U	pCi/g		3.35	384705
Uranium-235	0.000	0.196	0.196	U	pCi/g		1.34	384705
Uranium-238	-1.72	1.46	1.48	U	pCi/g		3.35	384705
Actinium-228	0.562	0.193	0.201		pCi/g		0.131	384705
Bismuth-212	0.348	1.34	1.35	U	pCi/g		2.32	384705
Bismuth-214	0.501	0.177	0.185		pCi/g		0.165	384705
Lead-210	1.56	1.94	1.95	U	pCi/g		2.71	384705
Lead-212	0.420	0.114	0.123		pCi/g		0.137	384705
Lead-214	0.655	0.160	0.174		pCi/g		0.171	384705
Potassium-40	14.7	2.10	2.57		pCi/g		1.10	384705
Protactinium-231	0.000	1.04	1.04	U	pCi/g		6.33	384705

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-379959/1-A	Actinium-227			0.1094	U	pCi/g							.78117664
MB 160-379959/1-A	Radium-226			0.01509	U	pCi/g							.16821316
MB 160-379959/1-A	Radium-228			0.1989	U	pCi/g							3.16814855
MB 160-379959/1-A	Thallium-208			0.01106	U	pCi/g							.48023536
MB 160-379959/1-A	Thorium-232			0.1989	U	pCi/g							3.16814855
MB 160-379959/1-A	Thorium-234			-0.4934	U	pCi/g							-1.45265702
MB 160-379959/1-A	Uranium-235			0.01056	U	pCi/g							.25155675
MB 160-379959/1-A	Uranium-238			-0.4934	U	pCi/g							-1.45265702
MB 160-379959/1-A	Actinium-228			0.1989	U	pCi/g							3.16814855
MB 160-379959/1-A	Bismuth-212			-0.4593	U	pCi/g							-.82452766
MB 160-379959/1-A	Bismuth-214			0.01509	U	pCi/g							.16821316
MB 160-379959/1-A	Lead-210			-0.4517	U	pCi/g							-.6935513
MB 160-379959/1-A	Lead-212			0.0007222	U	pCi/g							.01583264
MB 160-379959/1-A	Lead-214			0.01934	U	pCi/g							.33483732
MB 160-379959/1-A	Potassium-40			-0.5145	U	pCi/g							-.89900288
MB 160-379959/1-A	Protactinium-231			0.5165	U	pCi/g							.69767665

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-379959/2-A	Americium-241		96.8	98.75		pCi/g	102	87 - 116					.2407534637
LCS 160-379959/2-A	Cesium-137		28.2	30.26		pCi/g	107	87 - 120					.9506179766
LCS 160-379959/2-A	Cobalt-60		12.8	13.74		pCi/g	107	87 - 115					.9298796235

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-37	Actinium-227	0.381		0.3186	U	pCi/g			18	0.05	0.14	1	
160-29881-37	Radium-226	0.437		0.4858		pCi/g			11	0.16	0.46	1	
160-29881-37	Radium-228	0.181		0.1778	U	pCi/g			2	0.01	0.01	1	
160-29881-37	Thallium-208	0.172		0.08890		pCi/g			64	0.64	1.81	1	
160-29881-37	Thorium-232	0.181		0.1778	U	pCi/g			2	0.01	0.01	1	
160-29881-37	Thorium-234	-0.649		1.315	F	pCi/g			590	1.04	2.87	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 379959

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
160-29881-37	Uranium-235	-0.260		0.1145	U	pCi/g			514	0.36	0.89	1	
160-29881-37	Uranium-238	-0.649		1.315	F	pCi/g			590	1.04	2.87	1	
160-29881-37	Actinium-228	0.181		0.1778	U	pCi/g			2	0.01	0.01	1	
160-29881-37	Bismuth-212	-0.0181		0.1585	U	pCi/g			252	0.08	0.23	1	
160-29881-37	Bismuth-214	0.437		0.4858		pCi/g			11	0.16	0.46	1	
160-29881-37	Lead-210	-1.26		0.3684	U	pCi/g			366	0.43	1.20	1	
160-29881-37	Lead-212	0.446		0.3106		pCi/g			36	0.63	1.76	1	
160-29881-37	Lead-214	0.544		0.4844		pCi/g			12	0.19	0.53	1	
160-29881-37	Potassium-40	16.5		15.81		pCi/g			4	0.12	0.34	1	
160-29881-37	Protactinium-231	0.901		0.0000	U	pCi/g			200	0.34	0.76	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379959 Batch Start Date: 08/02/18 14:22 Batch Analyst: Willett, Elizabeth A

Batch Method: Fill_Geo-21 Batch End Date: 08/02/18 14:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-379959/1		Fill_Geo-21, 901.1				291.18 g	8/2/18 14:51	8/23/18	tuna can
LCS 160-379959/2		Fill_Geo-21, 901.1				341.9 g	8/2/18 14:51	8/23/18	tuna can
160-29881-A-37-A	CRC-B5-1618	Fill_Geo-21, 901.1	T	46.7 g	377.0 g	330.3 g	8/2/18 14:51	8/23/18	tuna can
160-29881-A-37-A DU	CRC-B5-1618	Fill_Geo-21, 901.1	T	46.7 g	377.0 g	330.3 g	8/2/18 14:51	8/23/18	tuna can
160-29881-B-38-B	CRC-B5-2224	Fill_Geo-21, 901.1	T	46.6 g	430.1 g	383.5 g	8/2/18 14:51	8/23/18	tuna can
160-29881-B-39-B	CRC-B5-2830	Fill_Geo-21, 901.1	T	46.6 g	341.0 g	294.4 g	8/2/18 14:51	8/23/18	tuna can
160-29881-A-40-B	CRC-B11-1214	Fill_Geo-21, 901.1	T	46.5 g	402.9 g	356.4 g	8/2/18 14:51	8/23/18	tuna can
160-29881-B-41-A	CRC-B11-2022	Fill_Geo-21, 901.1	T	46.6 g	369.9 g	323.3 g	8/2/18 14:51	8/23/18	tuna can
160-29881-A-42-B	CRC-B11-2628	Fill_Geo-21, 901.1	T	46.7 g	384.5 g	337.8 g	8/2/18 14:51	8/23/18	tuna can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00007					
MB 160-379959/1		Fill_Geo-21, 901.1							
LCS 160-379959/2		Fill_Geo-21, 901.1		# g					
160-29881-A-37-A	CRC-B5-1618	Fill_Geo-21, 901.1	T						
160-29881-A-37-A DU	CRC-B5-1618	Fill_Geo-21, 901.1	T						
160-29881-B-38-B	CRC-B5-2224	Fill_Geo-21, 901.1	T						
160-29881-B-39-B	CRC-B5-2830	Fill_Geo-21, 901.1	T						
160-29881-A-40-B	CRC-B11-1214	Fill_Geo-21, 901.1	T						
160-29881-B-41-A	CRC-B11-2022	Fill_Geo-21, 901.1	T						
160-29881-A-42-B	CRC-B11-2628	Fill_Geo-21, 901.1	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 160-29881-1

SDG No.:

Batch Number: 379959 Batch Start Date: 08/02/18 14:22 Batch Analyst: Willett, Elizabeth A

Batch Method: Fill_Geo-21 Batch End Date: 08/02/18 14:54

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003, ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 5_Gamma_20182910

Sample Description: 379959_Gamma_MB 160-379959~1-A
Detector: Detector # 5
Batch ID: 379959
Work Order Number: Gamma
Lot Number: MB 160-379959~1-A

Decay to Time: 8/23/2018 07:50 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:50:40 Real Time: 1810 sec
Analysis Time: 8/23/2018 08:21 Dead Time: 0.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.554E+00	111.2	1.727E+00	1.729E+00	6.154E+00
NA-22	0.000E+00	1.#INF	9.710E-02	9.710E-02	7.156E-01
K-40	-5.543E+00	111.1	6.160E+00	6.166E+00	1.737E+01
Sc-46	-4.782E-02	1039.2	4.969E-01	4.969E-01	1.820E+00
CR-51	-2.506E+00	115.2	2.886E+00	2.889E+00	1.056E+01
MN-54	-3.175E-01	201.8	6.406E-01	6.408E-01	1.554E+00
FE-59	3.752E-02	796.9	2.990E-01	2.990E-01	1.118E+00
Co-56	4.591E-02	979.8	4.499E-01	4.499E-01	1.167E+00
CO-57	1.812E-02	741.6	1.344E-01	1.344E-01	4.878E-01
CO-58	6.516E-01	32.9	2.144E-01	2.170E-01	4.918E-01
CO-60	6.046E-01	40.8	2.468E-01	2.487E-01	7.427E-01
ZN-65	0.000E+00	1.#INF	2.425E-01	2.425E-01	3.114E+00
NB-94	-2.205E-01	172.0	3.792E-01	3.794E-01	9.878E-01
ZR-95	3.267E-02	2128.8	6.956E-01	6.956E-01	1.894E+00
NB-95	2.008E-01	146.4	2.940E-01	2.941E-01	1.066E+00
RU-103	-3.879E-01	104.1	4.038E-01	4.043E-01	1.035E+00
RH-106	4.410E+00	100.4	4.428E+00	4.434E+00	1.909E+01
AG-108M	6.262E-02	136.3	8.538E-02	8.544E-02	8.286E-01
AG-110M	1.110E-01	166.1	1.844E-01	1.844E-01	2.462E+00
SN-113	1.440E+00	21.7	3.119E-01	3.205E-01	5.692E-01
SB-124	2.410E-01	155.7	3.752E-01	3.754E-01	1.322E+00
SB-125	7.983E-01	107.1	8.546E-01	8.556E-01	2.123E+00
I-131	3.737E-01	81.7	3.052E-01	3.058E-01	6.496E-01
Gd-153	-1.380E-01	309.2	4.269E-01	4.270E-01	1.519E+00
Ga-68	-8.962E+00	173.7	1.557E+01	1.558E+01	3.922E+01
Tc-99m	9.398E-02	184.4	1.733E-01	1.734E-01	6.049E-01
BA-133	2.887E-01	119.9	3.461E-01	3.465E-01	1.210E+00
CS-134	7.548E-01	23.6	1.779E-01	1.822E-01	1.447E+00
CS-137	1.958E-02	1836.1	3.595E-01	3.595E-01	1.348E+00
CE-139	1.211E-01	136.5	1.653E-01	1.657E-01	5.772E-01
Ba-140	-2.492E-01	482.7	1.203E+00	1.203E+00	3.111E+00
La-140	-1.518E-02	4909.3	7.455E-01	7.455E-01	9.063E-01
CE-141	7.369E-02	383.3	2.824E-01	2.825E-01	8.253E-01

CE-144	0.000E+00	1.#INF	2.032E-01	2.032E-01	5.263E+00
PM-144	2.495E-01	98.7	2.462E-01	2.465E-01	7.326E-01
EU-152	5.170E-01	162.7	8.409E-01	8.413E-01	3.407E+00
EU-154	3.609E+00	69.8	2.520E+00	2.527E+00	1.148E+01
EU-155	-7.546E-01	87.3	6.591E-01	6.604E-01	3.731E+00
HF-181	0.000E+00	1.#INF	5.337E-02	5.337E-02	6.316E-01
Ta-182	-2.913E-01	378.5	1.102E+00	1.103E+00	4.199E+00
Hg-203	-1.163E-02	2369.1	2.755E-01	2.755E-01	9.962E-01
TL-208	1.192E-01	208.2	2.481E-01	2.482E-01	7.170E-01
pm-146	4.895E-01	170.7	8.356E-01	8.360E-01	2.262E+00
y-88	-1.029E-01	493.7	5.080E-01	5.080E-01	1.308E+00
Cd-113m	-4.277E+03	98.9	4.231E+03	4.240E+03	1.438E+04
Cd-109	0.000E+00	1.#INF	8.469E-01	8.469E-01	1.934E+01
Cf-251	-9.521E-01	111.3	1.060E+00	1.063E+00	2.941E+00
Cf-249	0.000E+00	1.#INF	1.087E-01	1.087E-01	5.475E-01
Sn-126	-1.454E+00	151.9	2.209E+00	2.210E+00	7.612E+00
PB-210	-4.867E+00	144.1	7.011E+00	7.017E+00	2.308E+01
PB-212	-6.813E-01	71.5	4.870E-01	4.890E-01	1.991E+00
PB-214	2.084E-01	298.6	6.222E-01	6.223E-01	1.968E+00
BI-207	0.000E+00	1.#INF	1.011E-01	1.011E-01	4.700E-01
BI-212	-4.948E+00	121.2	5.996E+00	6.001E+00	2.081E+01
U-235	1.138E-01	397.5	4.522E-01	4.522E-01	5.161E+00
BI-214	1.626E-01	594.5	9.664E-01	9.664E-01	3.449E+00
BI-210M	-3.303E-01	157.3	5.196E-01	5.200E-01	1.798E+00
AC-228	2.142E+00	31.1	6.673E-01	6.762E-01	3.224E+00
TH-227	1.215E+00	131.9	1.603E+00	1.604E+00	7.166E+00
TH-229	-4.699E+00	104.8	4.926E+00	4.941E+00	1.356E+01
TH-234	6.953E+00	65.3	4.539E+00	4.554E+00	1.349E+01
PA-231	5.564E+00	143.2	7.969E+00	7.975E+00	3.811E+01
PA-233	-9.759E-02	142.0	1.386E-01	1.387E-01	3.598E+00
PA-234	6.097E-01	207.0	1.262E+00	1.263E+00	3.195E+00
PA-234M	2.237E+01	252.8	5.655E+01	5.657E+01	2.055E+02
AM-241	-8.749E-01	71.7	6.274E-01	6.290E-01	1.863E+00
Np-237	-1.120E+00	165.3	1.852E+00	1.853E+00	6.313E+00
Ir-192	-3.122E-01	101.5	3.168E-01	3.174E-01	1.080E+00
Cs-136	0.000E+00	1.#INF	2.317E-01	2.317E-01	4.930E-01
Np-239	-6.591E-01	160.1	1.055E+00	1.056E+00	3.590E+00
Nd-147	5.113E-02	693.9	3.548E-01	3.548E-01	5.694E+00
TL-210	8.183E-02	172.1	1.408E-01	1.409E-01	1.490E+00
Total	5.639E+01				

Analyst: kody Saulters

Sample description
379959_Gamma_MB 160-379959~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182910.An1

Acquisition information

Start time:	8/23/2018 7:50:40 AM
Live time:	1800
Real time:	1810
Dead time:	0.55 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_Soil_TunaCan.Clb

5_Soil_TunaCan_90099_032612

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	3/27/2012 5:20:37 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.43 %
Log(Eff):	-2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %

Energy Calibration

Normalized diff: 0.1614

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-7.	144.07	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	333.54	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.37	13.	65.28	0.74	2.712E-02	63.29	3.810	PBC<MDA	TH234
80.99	4.	174.40	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
91.10	1.	962.42	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.72	6.	143.73	0.79	3.527E-02	92.59	5.584	PBC<MDA	TH234
122.06	1.	741.62	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.812E-02	CO57
140.51	5.	184.39	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	2.	383.27	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
165.85	5.	136.50	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
185.72	5.	189.92	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
205.33	2.	397.49	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	224.72	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	1.	551.70	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
244.69	6.	162.66	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	5.	131.91	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
284.30	6.	120.76	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.09	3.	300.30	1.03	1.945E-02	295.09	19.300	PBC<MDA	PB214
296.00	5.	172.10	1.03	1.940E-02	296.00	79.000	PBC<MDA	TL210
300.03	5.	207.40	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.18	6.200	PBC<MDA	PA233
300.07	5.	192.91	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
300.18	5.	202.81	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
302.65	5.	211.77	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.148E-01	BA133
338.32	20.	31.15	1.07	1.736E-02	338.32	12.010	5.284E+00	AC228
351.93	1.	516.22	1.09	1.680E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	119.89	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	5.	110.03	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
391.69	26.	21.66	1.12	1.537E-02	391.69	64.000	1.440E+00	SN113
427.88	4.	160.94	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
477.60	4.	111.19	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
511.86	14.	111.05	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
563.24	1.	404.15	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	158.11	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.204E+00	PA234
					569.70	97.740	1.011E-01	BI207
583.02	2.	208.17	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
600.50	5.	141.20	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	155.72	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	168.97	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.31	1.	594.46	1.32	1.063E-02	609.31	46.090	PBC<MDA	BI214
610.30	5.	192.45	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	202.93	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
618.06	4.	245.73	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
657.76	3.	166.13	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
696.54	5.	98.67	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
735.72	2.	343.42	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
747.16	3.	170.71	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
765.79	3.	146.43	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.819E+01	PA234M
778.92	1.	354.44	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	18.	23.57	1.48	8.503E-03	795.87	85.530	1.375E+00	CS134
810.78	10.	32.91	1.49	8.371E-03	810.78	99.460	6.516E-01	CO58
846.77	1.	979.80	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
873.23	5.	106.88	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	5.	95.05	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
911.07	3.	147.99	1.57	7.591E-03	911.07	29.000	PBC<MDA	AC228
946.02	2.	207.02	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	252.82	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	6.	100.41	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1173.24	1.	349.31	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	1.	796.87	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.50	6.	40.82	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1764.49	-2.	260.97	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	38.	-7.	-0.004	144.07	0.783
TH-227	200.11	50.14	15.	2.	0.001	333.54	0.787
AM-241	237.72	59.54	36.	-14.	-0.008	71.71	0.797s
TH-234	253.06	63.37	23.	13.	0.007	65.28	0.738s
Sn-126	256.71	64.28	53.	-7.	-0.004	151.86	0.802s
BA-133	323.61	80.99	17.	4.	0.002	174.40	0.819s
Np-237	345.63	86.49	108.	-9.	-0.005	165.32	0.825s
EU-155	345.84	86.54	99.	-9.	-0.005	158.52	0.825s
Sn-126	347.43	86.94	90.	-5.	-0.003	280.07	0.825s
Sn-126	349.95	87.57	85.	0.	0.000	1000.00	0.826s
Cd-109	351.83	88.04	85.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	82.	1.	0.001	962.42	0.829s
TH-234	370.59	92.72	30.	6.	0.003	143.73	0.788
AC-228	373.09	93.35	92.	-8.	-0.005	163.65	0.832s
Gd-153	389.70	97.50	33.	-3.	-0.001	309.23	0.836s
Np-239	397.71	99.50	35.	0.	0.000	1000.00	0.838s
Gd-153	412.52	103.20	38.	-6.	-0.003	165.14	0.842s
Np-239	414.52	103.70	44.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	110.	-10.	-0.006	87.34	0.844s
Np-239	424.25	106.13	117.	-10.	-0.005	160.09	0.845s
EU-152	486.88	121.78	29.	-6.	-0.003	133.33	0.861s
CO-57	488.03	122.06	27.	1.	0.001	741.62	0.861s
EU-154	492.18	123.10	38.	-7.	-0.004	124.98	0.862s
CE-144	533.97	133.54	53.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	53.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	60.	-10.	-0.006	113.15	0.876s
Tc-99m	561.88	140.51	40.	5.	0.003	184.39	0.880s
CE-141	581.61	145.44	21.	2.	0.001	383.27	0.885s
Ba-140	650.54	162.66	42.	-8.	-0.005	115.67	0.902s
CE-139	663.32	165.85	25.	5.	0.003	136.50	0.905
Cf-251	706.34	176.60	27.	-9.	-0.005	111.34	0.916s
U-235	742.85	185.72	23.	5.	0.003	189.92	0.925s
TH-229	774.03	193.51	33.	-10.	-0.006	104.83	0.933
U-235	821.35	205.33	13.	2.	0.001	397.49	0.945s
TH-229	843.44	210.85	17.	3.	0.002	224.72	0.950s
Cf-251	908.08	227.00	17.	1.	0.001	551.70	0.966s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	954.64	238.63	51.	-12.	-0.007	71.48	0.978
PB-214	968.10	242.00	55.	-5.	-0.003	230.11	0.981s
EU-152	978.89	244.69	52.	6.	0.004	162.66	0.984
TH-227	1025.11	256.24	11.	5.	0.003	131.91	0.995s
Cd-113m	1054.97	263.70	43.	-10.	-0.005	98.93	1.002s
BI-210M	1063.50	265.83	46.	-6.	-0.004	157.32	1.005s
TL-208	1109.33	277.28	31.	-9.	-0.005	97.14	1.016
I-131	1137.41	284.30	12.	6.	0.003	120.76	1.022s
PB-214	1180.60	295.09	33.	3.	0.002	300.30	1.033s
TL-210	1184.24	296.00	36.	5.	0.003	172.10	1.034s
PB-212	1200.37	300.03	41.	5.	0.003	207.40	1.038
PA-231	1200.53	300.07	46.	5.	0.003	192.91	1.038
PA-233	1200.97	300.18	51.	5.	0.003	202.81	1.038
PA-231	1210.86	302.65	56.	5.	0.003	211.77	1.040s
Ba-140	1219.66	304.85	62.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	62.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	62.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	76.	-6.	-0.004	198.87	1.049s
Ir-192	1266.25	316.49	37.	-9.	-0.005	101.50	1.053s
CR-51	1280.63	320.08	46.	-8.	-0.005	115.17	1.057s
La-140	1315.35	328.76	18.	-2.	-0.001	349.49	1.065s
Cf-249	1334.08	333.44	15.	-5.	-0.003	160.36	1.070s
AC-228	1353.61	338.32	9.	20.	0.011	31.15	1.074s
Cs-136	1362.62	340.57	29.	0.	0.000	1000.00	1.077s
EU-152	1377.49	344.29	29.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	47.	-7.	-0.004	128.76	1.082s
PB-214	1408.09	351.93	18.	1.	0.001	516.22	1.087s
BA-133	1424.36	356.00	18.	5.	0.003	119.89	1.091s
I-131	1458.32	364.48	8.	5.	0.003	110.03	1.099s
BA-133	1535.78	383.84	28.	-2.	-0.001	308.54	1.117s
Cf-249	1552.22	387.95	2.	0.	0.000	1000.00	1.121
SN-113	1567.19	391.69	2.	26.	0.014	21.66	1.125s
SB-125	1711.99	427.88	8.	4.	0.002	160.94	1.158s
AG-108M	1736.25	433.94	12.	-3.	-0.002	182.14	1.164s
pm-146	1816.05	453.88	12.	-3.	-0.002	174.56	1.182
SB-125	1854.01	463.37	22.	-8.	-0.004	81.61	1.191s
BE-7	1910.94	477.59	7.	4.	0.002	111.19	1.204s
HF-181	1928.56	482.00	4.	0.	0.000	1000.00	1.208s
La-140	1948.65	487.02	8.	0.	0.000	1000.00	1.212s
RU-103	1988.80	497.05	16.	-8.	-0.004	104.08	1.221s
RH-106	2048.06	511.86	33.	14.	0.008	111.05	2.485s
Nd-147	2124.62	531.00	8.	0.	0.000	1000.00	1.252s
Ba-140	2149.67	537.26	8.	-1.	-0.001	482.68	1.258s
CS-134	2253.60	563.24	4.	1.	0.001	404.15	1.280s
CS-134	2277.94	569.32	4.	2.	0.001	158.11	1.286s
PA-234	2278.54	569.47	2.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	2.	0.	0.000	1000.00	1.286s
TL-208	2332.76	583.02	4.	2.	0.001	208.17	1.298s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2402.69	600.50	18.	5.	0.003	141.20	1.313s
SB-124	2411.61	602.73	23.	5.	0.003	155.72	1.315s
CS-134	2419.53	604.71	28.	5.	0.003	168.97	1.317s
BI-214	2437.93	609.31	35.	1.	0.001	594.46	1.321s
RU-103	2441.89	610.30	37.	5.	0.003	192.45	1.322s
AG-108M	2457.82	614.28	41.	5.	0.003	202.93	1.325s
PM-144	2472.94	618.06	46.	4.	0.002	245.73	1.328s
I-131	2548.61	636.97	18.	-6.	-0.003	75.76	1.345s
AG-110M	2631.76	657.76	14.	3.	0.002	166.13	1.362s
PM-144	2786.90	696.54	4.	5.	0.003	98.67	1.395s
NB-94	2811.25	702.63	9.	-4.	-0.002	172.01	1.400s
SB-124	2891.88	722.79	14.	-3.	-0.002	169.71	1.417s
AG-108M	2892.48	722.94	18.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	18.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	18.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	25.	-6.	-0.003	121.17	1.421s
pm-146	2943.61	735.72	9.	2.	0.001	343.42	1.428s
pm-146	2989.37	747.16	4.	3.	0.001	170.71	1.437s
AG-110M	3056.50	763.94	9.	-4.	-0.002	124.98	1.451s
NB-95	3063.89	765.79	9.	3.	0.002	146.43	1.453s
EU-152	3116.41	778.92	5.	1.	0.001	354.44	1.463s
BI-212	3142.41	785.42	0.	0.	0.000	1000.00	1.468s
CS-134	3184.19	795.87	0.	18.	0.010	23.57	1.477s
TL-210	3199.12	799.60	18.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	18.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	0.	10.	0.005	32.91	1.489s
Cs-136	3274.72	818.50	0.	0.	0.000	1000.00	1.495s
MN-54	3340.10	834.85	19.	-5.	-0.003	201.78	1.508s
Co-56	3387.78	846.77	9.	1.	0.000	979.80	1.518s
NB-94	3485.08	871.10	18.	-8.	-0.004	86.92	1.537s
EU-154	3493.61	873.23	14.	5.	0.003	106.88	1.539s
PA-234	3522.80	880.53	10.	5.	0.003	95.05	1.544s
PA-234	3533.64	883.24	26.	-3.	-0.002	272.26	1.547s
AG-110M	3539.41	884.68	23.	0.	0.000	1000.00	1.547s
y-88	3592.83	898.04	9.	-1.	-0.001	493.71	1.558s
AC-228	3644.94	911.07	5.	3.	0.002	147.99	1.568s
AG-110M	3750.60	937.49	0.	0.	0.000	1000.00	1.589
PA-234	3784.70	946.02	5.	2.	0.001	207.02	1.595s
EU-152	3857.05	964.11	0.	0.	0.000	1000.00	1.609s
AC-228	3876.48	968.97	8.	-5.	-0.003	93.68	1.612s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s
PA-234M	4004.55	1001.00	17.	2.	0.001	252.82	1.636s
EU-154	4019.65	1004.77	30.	-8.	-0.004	102.64	1.639s
Co-56	4151.87	1037.84	20.	-12.	-0.007	51.15	1.664s
Cs-136	4192.77	1048.07	12.	-6.	-0.003	91.29	1.671s
RH-106	4201.93	1050.36	12.	6.	0.003	100.41	1.673s
BI-207	4255.11	1063.66	15.	-7.	-0.004	127.38	1.682s
Ga-68	4310.04	1077.40	5.	-3.	-0.002	173.74	1.692s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4462.56	1115.55	11.	0.	0.000	1000.00	1.720s
Ta-182	4485.56	1121.30	9.	-1.	-0.001	378.50	1.724s
CO-60	4693.21	1173.24	6.	1.	0.001	349.31	1.760s
Ta-182	4756.42	1189.05	0.	0.	0.000	1000.00	1.771s
Ta-182	4885.79	1221.41	5.	-2.	-0.001	234.30	1.793s
NA-22	5098.13	1274.53	0.	0.	0.000	1000.00	1.828s
EU-154	5098.19	1274.54	0.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	1.	0.000	796.87	1.840s
TL-210	5251.91	1313.00	0.	0.	0.000	1000.00	1.854s
CO-60	5329.85	1332.50	0.	6.	0.003	40.82	1.866s
AG-110M	5536.88	1384.30	11.	-6.	-0.003	137.58	1.899s
EU-152	5631.62	1408.00	11.	-7.	-0.004	117.90	1.914s
K-40	5842.75	1460.83	9.	-5.	-0.003	111.12	1.946s
SB-124	6762.39	1690.98	12.	-10.	-0.005	63.68	2.076s
BI-214	7056.06	1764.49	2.	-2.	-0.001	260.97	2.114s
Co-56	7083.46	1771.35	0.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	6.	-5.	-0.003	126.49	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	1.5536E+00					5.31E+01
			477.60	1.554E+00	?(	6.154E+00	1.11E+02 1.05E+01 G
K-40	N	-5.5435E+00					4.66E+11
			1460.83	-5.543E+00	?(P	1.737E+01	1.11E+02 1.07E+01 G
Sc-46	F	-4.7816E-02					8.38E+01
			889.28	-4.782E-02	%(	1.820E+00	1.04E+03 1.00E+02 G
			1120.55	-2.734E-02	% P	1.601E+00	1.98E+03 1.00E+02 G
CR-51	F	-2.5056E+00					2.77E+01
			320.08	-2.506E+00	?(P	1.056E+01	1.15E+02 9.94E+00 G
MN-54	C	-3.1745E-01					3.12E+02
			834.85	-3.175E-01	?(	1.554E+00	2.02E+02 1.00E+02 G
FE-59	F	3.7519E-02					4.45E+01
			1099.25	-4.959E-02	%(P	1.118E+00	1.86E+03 5.65E+01 G
			1291.60	1.514E-01	?(	3.060E+00	7.97E+02 4.32E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 4.5914E-02					7.73E+01	
		846.77	4.591E-02	?(	1.167E+00	9.80E+02	9.99E+01 G
		1238.28	-3.132E-02	% P	1.057E+00	2.39E+03	6.61E+01 G
		1037.84	-6.804E+00	+ P	1.367E+01	5.11E+01	1.41E+01 G
		1771.35	0.000E+00	-	6.098E+00	1.00E+03	1.55E+01 A
CO-57	C 1.8119E-02					2.72E+02	
		122.06	1.812E-02	?(	4.878E-01	7.42E+02	8.56E+01 G
		136.47	-1.521E+00	+	5.855E+00	1.13E+02	1.07E+01 G
CO-58	C 6.5157E-01					7.09E+01	
		810.78	6.516E-01	?(P	4.918E-01	3.29E+01	9.95E+01 G
CO-60	F 6.0460E-01					1.93E+03	
		1332.50	6.046E-01	?(	7.427E-01	4.08E+01	1.00E+02 G
		1173.24	1.342E-01	- P	1.237E+00	3.49E+02	9.99E+01 G
NB-94	I -2.2047E-01					7.41E+06	
		702.63	-2.205E-01	?(	9.878E-01	1.72E+02	9.79E+01 G
		871.10	-5.292E-01	+	1.567E+00	8.69E+01	9.99E+01 G
ZR-95	I 3.2674E-02					6.40E+01	
		756.73	3.267E-02	%(P	1.894E+00	2.13E+03	5.45E+01 G
		724.20	0.000E+00	-	3.049E+00	1.00E+03	4.42E+01 G
NB-95	I 2.0076E-01					6.40E+01	
		765.79	2.008E-01	?(	1.066E+00	1.46E+02	9.98E+01 G
RU-103	I -3.8795E-01					3.93E+01	
		497.05	-3.879E-01	?(	1.035E+00	1.04E+02	9.09E+01 G
		610.30	4.181E+00	?	2.819E+01	1.92E+02	5.75E+00 GA
RH-106	I 4.4103E+00					3.74E+02	
		621.92	5.353E-01	%(	1.909E+01	1.00E+03	9.93E+00 G
		1050.36	2.908E+01	?(	1.014E+02	1.00E+02	1.56E+00 G
		511.86	3.087E+00	?	6.689E+00	1.11E+02	2.00E+01 GA
AG-108M	C 6.2622E-02					1.53E+05	
		433.94	-1.431E-01	?(P	8.286E-01	1.82E+02	9.05E+01 G
		722.94	0.000E+00	+	1.480E+00	1.00E+03	9.08E+01 G
		614.28	2.698E-01	?(	1.914E+00	2.03E+02	8.98E+01 G
AG-110M	F 1.1097E-01					2.50E+02	
		884.68	0.000E+00	?(	2.462E+00	1.00E+03	7.27E+01 G
		657.76	1.962E-01	?(	1.173E+00	1.66E+02	9.46E+01 G
		937.49	0.000E+00	&	1.608E+00	1.00E+03	3.44E+01 G
		1384.30	-2.427E+00	+	7.679E+00	1.38E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-1.039E+00	+	4.656E+00	1.25E+02	2.23E+01 G
SN-113	F	1.4401E+00					1.15E+02	
			391.69	1.440E+00	?(	5.692E-01	2.17E+01	6.40E+01 G
SB-124	F	2.4096E-01					6.02E+01	
			602.73	2.410E-01	?(	1.322E+00	1.56E+02	9.83E+01 G
			1690.98	-2.474E+00	+ P	4.789E+00	6.37E+01	4.78E+01 G
			722.79	-1.859E+00	+	1.135E+01	1.70E+02	1.08E+01 G
SB-125	I	7.9831E-01					1.01E+03	
			427.88	4.838E-01	?(P	2.123E+00	1.61E+02	2.96E+01 G
			600.50	1.320E+00	?(	6.576E+00	1.41E+02	1.79E+01 G
			635.89	1.254E-01	% P	8.260E+00	1.70E+03	1.13E+01 G
			463.37	-3.000E+00	+ P	9.732E+00	8.16E+01	1.05E+01 G
I-131	I	3.7365E-01					8.02E+00	
			364.48	2.125E-01	?(P	6.496E-01	1.10E+02	8.17E+01 G
			284.30	2.517E+00	(P	8.375E+00	1.21E+02	6.14E+00 G
			636.97	-4.556E+00	+ P	1.701E+01	7.58E+01	7.17E+00 G
Gd-153	F	-1.3804E-01					2.42E+02	
			97.50	-1.380E-01	?(	1.519E+00	3.09E+02	3.00E+01 G
			103.20	-3.881E-01	&	2.231E+00	1.65E+02	2.18E+01 G
Ga-68	C	-8.9618E+00					4.71E-02	
			1077.40	-8.962E+00	?(	3.922E+01	1.74E+02	3.30E+00 G
Tc-99m	I	9.3979E-02					2.51E-01	
			140.51	9.398E-02	?(	6.049E-01	1.84E+02	8.93E+01 G
BA-133	F	2.8871E-01					3.85E+03	
			356.00	2.887E-01	?(	1.210E+00	1.20E+02	6.20E+01 G
			302.85	1.173E-01	%	6.239E+00	1.51E+03	1.83E+01 G
			383.84	-9.939E-01	+	1.097E+01	3.09E+02	8.94E+00 GA
			80.99	2.129E-01	?	1.068E+00	1.74E+02	3.41E+01 GA
CS-134	I	7.5479E-01					7.54E+02	
			604.71	2.435E-01	?(	1.447E+00	1.69E+02	9.76E+01 G
			795.87	1.375E+00	?(	5.630E-01	2.36E+01	8.55E+01 G
			569.32	6.420E-01	?(	3.862E+00	1.58E+02	1.54E+01 G
			801.95	0.000E+00	-	1.701E+01	1.00E+03	8.69E+00 G
			563.24	5.860E-01	?(	7.049E+00	4.04E+02	8.35E+00 G
CS-137	I	1.9581E-02					1.10E+04	
			661.66	1.958E-02	%(P	1.348E+00	1.84E+03	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.2108E-01					1.38E+02	
			165.85	1.211E-01	&(	5.772E-01	1.36E+02	7.99E+01 G
Ba-140	I	-2.4919E-01					1.28E+01	
			537.26	-2.492E-01	?(P	3.111E+00	4.83E+02	2.44E+01 G
			162.66	-2.383E+00	+	9.443E+00	1.16E+02	6.22E+00 G
			304.85	0.000E+00	+	2.696E+01	1.00E+03	4.29E+00 G
La-140	I	-1.5185E-02					1.28E+01	
			1596.21	-1.518E-02	%(P	9.063E-01	4.91E+03	9.54E+01 G
			487.02	0.000E+00	+	1.514E+00	1.00E+03	4.55E+01 G
			328.76	-3.592E-01	+	3.488E+00	3.49E+02	2.03E+01 G
			815.77	-5.737E-02	% P	5.041E+00	1.65E+03	2.33E+01 G
CE-141	I	7.3690E-02					3.25E+01	
			145.44	7.369E-02	?(P	8.253E-01	3.83E+02	4.82E+01 G
PM-144	C	2.4953E-01					3.63E+02	
			696.54	2.863E-01	&(	7.326E-01	9.87E+01	9.90E+01 G
			618.06	2.128E-01	?(	1.831E+00	2.46E+02	9.91E+01 G
EU-152	F	5.1695E-01					4.94E+03	
			344.29	0.000E+00	?(	3.407E+00	1.00E+03	2.65E+01 G
			1112.07	2.114E-01	%	1.137E+01	1.40E+03	1.36E+01 G
			121.78	-3.255E-01	+	1.508E+00	1.33E+02	2.86E+01 G
			778.92	6.612E-01	?(	6.336E+00	3.54E+02	1.29E+01 G
			964.11	0.000E+00	-	3.873E+00	1.00E+03	1.46E+01 G
			244.69	2.078E+00	&(P	1.167E+01	1.63E+02	7.58E+00 G
			1408.00	-3.350E+00	+	9.008E+00	1.18E+02	2.10E+01 GA
EU-154	I	3.6094E+00					3.14E+03	
			873.23	3.079E+00	?(	1.148E+01	1.07E+02	1.23E+01 G
			123.10	-2.794E-01	-	1.202E+00	1.25E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.032E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	6.651E+00	1.00E+03	2.02E+01 G
			1004.77	-3.554E+00	+	1.249E+01	1.03E+02	1.80E+01 G
			996.33	4.224E+00	?(	1.308E+01	8.99E+01	1.06E+01 G
EU-155	I	-7.5463E-01					1.81E+03	
			105.31	-7.546E-01	?(P	3.731E+00	8.73E+01	2.12E+01 G
			86.54	-4.779E-01	+	2.584E+00	1.59E+02	3.07E+01 G
Ta-182	F	-2.9126E-01					1.14E+02	
			1121.30	-2.913E-01	?(	4.199E+00	3.79E+02	3.49E+01 G
			1221.41	-8.091E-01	+	4.672E+00	2.34E+02	2.70E+01 G
			1189.05	0.000E+00	+	4.164E+00	1.00E+03	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-1.1628E-02					4.66E+01	
			279.20	-1.163E-02	%(	9.962E-01	2.37E+03	8.15E+01 G
TL-208	N	1.1919E-01					6.98E+02	
			583.02	1.192E-01	?(	7.170E-01	2.08E+02	8.45E+01 G
			277.28	-3.720E+00	&	1.232E+01	9.71E+01	6.31E+00 G
			860.56	-8.538E-03	% P	4.140E+00	2.19E+04	1.24E+01 G
pm-146	C	4.8948E-01					2.02E+03	
			747.16	4.861E-01	?(	2.262E+00	1.71E+02	3.40E+01 G
			735.72	4.946E-01	?(P	4.576E+00	3.43E+02	2.25E+01 G
			453.88	-2.192E-01	+ P	1.206E+00	1.75E+02	6.50E+01 G
y-88	F	-1.0289E-01					1.07E+02	
			898.04	-1.029E-01	?(	1.308E+00	4.94E+02	9.37E+01 G
			1836.06	-6.655E-01	+	1.880E+00	1.26E+02	9.92E+01 G
Cd-113m		-4.2771E+03					5.33E+03	
			263.70	-4.277E+03	&(	1.438E+04	9.89E+01	6.00E-03 K
Cf-251	T	-9.5208E-01					3.28E+05	
			176.60	-9.521E-01	?(	2.941E+00	1.11E+02	1.70E+01 G
			227.00	4.864E-01	+	7.929E+00	5.52E+02	6.30E+00 GA
Sn-126		-1.4544E+00					3.65E+07	
			87.57	0.000E+00	+	1.959E+00	1.00E+03	3.75E+01 GA
			64.28	-1.454E+00	?(	7.612E+00	1.52E+02	9.70E+00 G
			86.94	-8.658E-01	+	8.368E+00	2.80E+02	9.04E+00 GA
PB-210	N	-4.8668E+00					8.14E+03	
			46.54	-4.867E+00	?(P	2.308E+01	1.44E+02	4.25E+00 G
PB-212	N	-6.8135E-01					6.98E+02	
			238.63	-6.813E-01	?(P	1.991E+00	7.15E+01	4.33E+01 G
			300.03	3.983E+00	? P	2.888E+01	2.07E+02	3.28E+00 GA
PB-214	N	2.0836E-01					5.84E+05	
			351.93	1.050E-01	?(P	1.968E+00	5.16E+02	3.76E+01 G
			295.09	4.098E-01	&(P	4.362E+00	3.00E+02	1.93E+01 G
			242.00	-1.522E+00	+	1.219E+01	2.30E+02	7.43E+00 GA
BI-212	N	-4.9481E+00					6.98E+02	
			727.17	-4.948E+00	?(	2.081E+01	1.21E+02	7.55E+00 G
			785.42	0.000E+00	+	3.721E+01	1.00E+03	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N	1.1376E-01					2.57E+11	
			143.79	-1.559E-01	%(P	5.161E+00	1.01E+03	1.10E+01 G
			205.33	7.037E-01	?(	8.328E+00	3.97E+02	5.01E+00 G
			163.38	-2.446E-01	%	1.261E+01	1.45E+03	5.08E+00 G
			185.72	1.682E-01		9.092E-01	1.90E+02	5.40E+01 GA
BI-214	N	1.6257E-01					5.84E+05	
			609.31	1.626E-01	?(P	3.449E+00	5.94E+02	4.61E+01 G
			1120.29	-1.810E-01	% P	1.060E+01	1.96E+03	1.51E+01 G
			1764.49	-2.073E+00	+ P	8.355E+00	2.61E+02	1.54E+01 G
BI-210M	T	-3.3028E-01					1.10E+09	
			265.83	-3.303E-01	?(	1.798E+00	1.57E+02	5.00E+01 G
			304.90	0.000E+00	+	4.130E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1424E+00					2.10E+03	
			911.07	8.412E-01	?(	3.224E+00	1.48E+02	2.90E+01 G
			968.97	-2.133E+00	+	6.953E+00	9.37E+01	1.75E+01 G
			338.32	5.284E+00	?(	4.481E+00	3.11E+01	1.20E+01 G
			93.35	-2.401E+00	&	1.343E+01	1.64E+02	5.56E+00 XA
TH-227	N	1.2152E+00					7.95E+03	
			50.14	6.904E-01	?(	7.166E+00	3.34E+02	8.00E+00 G
			256.24	1.815E+00	?(	6.594E+00	1.32E+02	7.00E+00 G
TH-229	N	-4.6991E+00					2.68E+06	
			193.51	-4.699E+00	?(	1.356E+01	1.05E+02	4.40E+00 G
			210.85	2.410E+00	&	1.572E+01	2.25E+02	2.99E+00 G
TH-234	N	6.9531E+00					1.63E+12	
			63.29	6.953E+00	@(P	1.349E+01	6.53E+01	3.81E+00 G
			92.59	1.766E+00	- P	7.932E+00	1.44E+02	5.58E+00 G
PA-231	N	5.5641E+00					1.20E+07	
			302.65	5.183E+00	?(	3.811E+01	2.12E+02	2.88E+00 G
			300.07	6.011E+00	?(	4.038E+01	1.93E+02	2.46E+00 G
PA-233	C	-9.7589E-02					7.82E+08	
			312.01	-5.252E-01	?(	3.598E+00	1.99E+02	3.60E+01 G
			300.18	2.386E+00	?(	1.682E+01	2.03E+02	6.20E+00 G
PA-234	N	6.0972E-01					1.63E+12	
			131.29	8.449E-02	%(P	3.195E+00	1.07E+03	1.80E+01 G
			946.02	1.315E+00	?(	7.202E+00	2.07E+02	1.34E+01 G
			569.47	0.000E+00	-	5.601E+00	1.00E+03	8.20E+00 G
			883.24	-2.007E+00	+	1.956E+01	2.72E+02	9.60E+00 G
			880.53	6.363E+00	?	2.097E+01	9.50E+01	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   2.2369E+01                                      1.63E+12
                         1001.00 2.237E+01 &(P 2.055E+02 2.53E+02 8.37E-01 G
                          766.41-7.178E+00 %   3.109E+02 1.08E+03 2.94E-01 G

AM-241   T  -8.7488E-01                                      1.58E+05
                           59.54-8.749E-01 ?(P 1.863E+00 7.17E+01 3.59E+01 G

Np-237   F  -1.1204E+00                                      2.14E+06
                           86.49-1.120E+00  (  6.313E+00 1.65E+02 1.31E+01 G

Ir-192   F  -3.1217E-01                                      7.40E+01
                          316.49-3.122E-01 ?(  1.080E+00 1.01E+02 8.70E+01 G
                          468.06-2.648E-02 %   2.241E+00 2.32E+03 5.18E+01 G
                          308.44 0.000E+00 +   3.678E+00 1.00E+03 3.18E+01 G

Np-239   T  -6.5909E-01                                      2.36E+00
                          103.70 0.000E+00 +   2.154E+00 1.00E+03 2.40E+01 X
                          106.13-6.591E-01  (  3.590E+00 1.60E+02 2.27E+01 G
                           99.50 0.000E+00 &   3.136E+00 1.00E+03 1.50E+01 X

Nd-147       5.1131E-02                                      1.11E+01
                          531.00 0.000E+00 ?(  5.694E+00 1.00E+03 1.30E+01 G
                           91.10 7.462E-02 ?(  2.508E+00 9.62E+02 2.83E+01 G

TL-210   N   8.1827E-02                                      5.84E+05
                          799.60 0.000E+00  (  1.490E+00 1.00E+03 9.90E+01 G
                          296.00 1.843E-01 ?(  1.108E+00 1.72E+02 7.90E+01 G
                         1313.00 0.000E+00 -   3.492E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
```

to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	38.	-7.	-0.004	144.07	-4.867E+00	P
TH-227	50.14	15.	2.	0.001	333.54	6.904E-01	
AM-241	59.54	36.	-14.	-0.008	71.71	-8.749E-01	P
Sn-126	64.28	53.	-7.	-0.004	151.86	-1.454E+00	
BA-133	80.99	17.	4.	0.002	174.40	2.129E-01	
Np-237	86.49	108.	-9.	-0.005	165.32	-1.120E+00	
EU-155	86.54	99.	-9.	-0.005	158.52	-4.779E-01	
Sn-126	86.94	90.	-5.	-0.003	280.07	-8.658E-01	
Nd-147	91.10	82.	1.	0.001	962.42	7.462E-02	
AC-228	93.35	92.	-8.	-0.005	163.65	-2.401E+00	
Gd-153	97.50	33.	-3.	-0.001	309.23	-1.380E-01	
Gd-153	103.20	38.	-6.	-0.003	165.14	-3.881E-01	
EU-155	105.31	110.	-10.	-0.006	87.34	-7.546E-01	P
Np-239	106.13	117.	-10.	-0.005	160.09	-6.591E-01	
EU-152	121.78	29.	-6.	-0.003	133.33	-3.255E-01	
CO-57	122.06	27.	1.	0.001	741.62	1.812E-02	
EU-154	123.10	38.	-7.	-0.004	124.98	-2.794E-01	
CO-57	136.47	60.	-10.	-0.006	113.15	-1.521E+00	
Tc-99m	140.51	40.	5.	0.003	184.39	9.398E-02	
CE-141	145.44	21.	2.	0.001	383.27	7.369E-02	P
Ba-140	162.66	42.	-8.	-0.005	115.67	-2.383E+00	
CE-139	165.85	25.	5.	0.003	136.50	1.211E-01	
Cf-251	176.60	27.	-9.	-0.005	111.34	-9.521E-01	
U-235	185.72	23.	5.	0.003	189.92	1.682E-01	
TH-229	193.51	33.	-10.	-0.006	104.83	-4.699E+00	
U-235	205.33	13.	2.	0.001	397.49	7.037E-01	
TH-229	210.85	17.	3.	0.002	224.72	2.410E+00	
Cf-251	227.00	17.	1.	0.001	551.70	4.864E-01	
PB-212	238.63	51.	-12.	-0.007	71.48	-6.813E-01	P
PB-214	242.00	55.	-5.	-0.003	230.11	-1.522E+00	
EU-152	244.69	52.	6.	0.004	162.66	2.078E+00	P
TH-227	256.24	11.	5.	0.003	131.91	1.815E+00	
Cd-113m	263.70	43.	-10.	-0.005	98.93	-4.277E+03	
BI-210M	265.83	46.	-6.	-0.004	157.32	-3.303E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	277.28	31.	-9.	-0.005	97.14	-3.720E+00	
I-131	284.30	12.	6.	0.003	120.76	2.517E+00	P
PB-214	295.09	33.	3.	0.002	300.30	4.098E-01	P
TL-210	296.00	36.	5.	0.003	172.10	1.843E-01	
PB-212	300.03	41.	5.	0.003	207.40	3.983E+00	P
PA-231	300.07	46.	5.	0.003	192.91	6.011E+00	
PA-233	300.18	51.	5.	0.003	202.81	2.386E+00	
PA-231	302.65	56.	5.	0.003	211.77	5.183E+00	
PA-233	312.01	76.	-6.	-0.004	198.87	-5.252E-01	
Ir-192	316.49	37.	-9.	-0.005	101.50	-3.122E-01	
CR-51	320.08	46.	-8.	-0.005	115.17	-2.506E+00	P
La-140	328.76	18.	-2.	-0.001	349.49	-3.592E-01	
Cf-249	333.44	15.	-5.	-0.003	160.36	-9.512E-01	
AC-228	338.32	9.	20.	0.011	31.15	5.284E+00	
HF-181	345.83	47.	-7.	-0.004	128.76	-1.594E+00	P
PB-214	351.93	18.	1.	0.001	516.22	1.050E-01	P
BA-133	356.00	18.	5.	0.003	119.89	2.887E-01	
I-131	364.48	8.	5.	0.003	110.03	2.125E-01	P
BA-133	383.84	28.	-2.	-0.001	308.54	-9.939E-01	
SB-125	427.88	8.	4.	0.002	160.94	4.838E-01	P
AG-108M	433.94	12.	-3.	-0.002	182.14	-1.431E-01	P
pm-146	453.88	12.	-3.	-0.002	174.56	-2.192E-01	P
SB-125	463.37	22.	-8.	-0.004	81.61	-3.000E+00	P
BE-7	477.59	7.	4.	0.002	111.19	1.554E+00	
RU-103	497.05	16.	-8.	-0.004	104.08	-3.879E-01	
RH-106	511.86	33.	14.	0.008	111.05	3.087E+00	
Ba-140	537.26	8.	-1.	-0.001	482.68	-2.492E-01	P
CS-134	563.24	4.	1.	0.001	404.15	5.860E-01	
CS-134	569.32	4.	2.	0.001	158.11	6.420E-01	
TL-208	583.02	4.	2.	0.001	208.17	1.192E-01	
SB-125	600.50	18.	5.	0.003	141.20	1.320E+00	
SB-124	602.73	23.	5.	0.003	155.72	2.410E-01	
CS-134	604.71	28.	5.	0.003	168.97	2.435E-01	
BI-214	609.31	35.	1.	0.001	594.46	1.626E-01	P
RU-103	610.30	37.	5.	0.003	192.45	4.181E+00	
AG-108M	614.28	41.	5.	0.003	202.93	2.698E-01	
PM-144	618.06	46.	4.	0.002	245.73	2.128E-01	
I-131	636.97	18.	-6.	-0.003	75.76	-4.556E+00	P
AG-110M	657.76	14.	3.	0.002	166.13	1.962E-01	
PM-144	696.54	4.	5.	0.003	98.67	2.863E-01	
NB-94	702.63	9.	-4.	-0.002	172.01	-2.205E-01	
SB-124	722.79	14.	-3.	-0.002	169.71	-1.859E+00	
BI-212	727.17	25.	-6.	-0.003	121.17	-4.948E+00	
pm-146	735.72	9.	2.	0.001	343.42	4.946E-01	P
pm-146	747.16	4.	3.	0.001	170.71	4.861E-01	
AG-110M	763.94	9.	-4.	-0.002	124.98	-1.039E+00	
NB-95	765.79	9.	3.	0.002	146.43	2.008E-01	
EU-152	778.92	5.	1.	0.001	354.44	6.612E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	0.	18.	0.010	23.57	1.375E+00		
MN-54	834.85	19.	-5.	-0.003	201.78	-3.175E-01		
Co-56	846.77	9.	1.	0.000	979.80	4.591E-02		
NB-94	871.10	18.	-8.	-0.004	86.92	-5.292E-01		
EU-154	873.23	14.	5.	0.003	106.88	3.079E+00		
PA-234	880.53	10.	5.	0.003	95.05	6.363E+00		
PA-234	883.24	26.	-3.	-0.002	272.26	-2.007E+00		
y-88	898.04	9.	-1.	-0.001	493.71	-1.029E-01		
AC-228	911.07	5.	3.	0.002	147.99	8.412E-01		
PA-234	946.02	5.	2.	0.001	207.02	1.315E+00		
AC-228	968.97	8.	-5.	-0.003	93.68	-2.133E+00		
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00		
PA-234M	1001.00	17.	2.	0.001	252.82	2.237E+01		P
EU-154	1004.77	30.	-8.	-0.004	102.64	-3.554E+00		
Co-56	1037.84	20.	-12.	-0.007	51.15	-6.804E+00		P
Cs-136	1048.07	12.	-6.	-0.003	91.29	-6.174E-01		
RH-106	1050.36	12.	6.	0.003	100.41	2.908E+01		
BI-207	1063.66	15.	-7.	-0.004	127.38	-7.831E-01		
Ga-68	1077.40	5.	-3.	-0.002	173.74	-8.962E+00		
Ta-182	1121.30	9.	-1.	-0.001	378.50	-2.913E-01		
CO-60	1173.24	6.	1.	0.001	349.31	1.342E-01		P
Ta-182	1221.41	5.	-2.	-0.001	234.30	-8.091E-01		
FE-59	1291.60	5.	1.	0.000	796.87	1.514E-01		
CO-60	1332.50	0.	6.	0.003	40.82	6.046E-01		
AG-110M	1384.30	11.	-6.	-0.003	137.58	-2.427E+00		
EU-152	1408.00	11.	-7.	-0.004	117.90	-3.350E+00		
K-40	1460.83	9.	-5.	-0.003	111.12	-5.543E+00		P
SB-124	1690.98	12.	-10.	-0.005	63.68	-2.474E+00		P
BI-214	1764.49	2.	-2.	-0.001	260.97	-2.073E+00		P
y-88	1836.06	6.	-5.	-0.003	126.49	-6.655E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.5536E+00	1.5536E+00	1.112E+02%	6.15E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.16E-01
K-40	#A	-5.5435E+00	-5.5435E+00	1.111E+02%	1.74E+01
Sc-46	#A	-4.7816E-02	-4.7816E-02	1.039E+03%	1.82E+00
CR-51	#A	-2.5056E+00	-2.5056E+00	1.152E+02%	1.06E+01
MN-54	#A	-3.1745E-01	-3.1745E-01	2.018E+02%	1.55E+00
FE-59	#A	3.7519E-02	3.7519E-02	7.969E+02%	1.12E+00
Co-56	#A	4.5913E-02	4.5914E-02	9.798E+02%	1.17E+00
CO-57	#A	1.8119E-02	1.8119E-02	7.416E+02%	4.88E-01
CO-58	#	6.5157E-01	6.5157E-01	3.291E+01%	4.92E-01

CO-60	#A	6.0460E-01	6.0460E-01	4.082E+01%	7.43E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.11E+00
NB-94	#A	-2.2047E-01	-2.2047E-01	1.720E+02%	9.88E-01
ZR-95	#A	3.2674E-02	3.2674E-02	2.129E+03%	1.89E+00
NB-95	#A	2.0076E-01	2.0076E-01	1.464E+02%	1.07E+00
RU-103	#A	-3.8795E-01	-3.8795E-01	1.041E+02%	1.04E+00
RH-106	#A	4.4103E+00	4.4103E+00	1.004E+02%	1.91E+01
AG-108M	#A	6.2622E-02	6.2622E-02	1.363E+02%	8.29E-01
AG-110M	#A	1.1097E-01	1.1097E-01	1.661E+02%	2.46E+00
SN-113	#	1.4401E+00	1.4401E+00	2.166E+01%	5.69E-01
SB-124	#A	2.4096E-01	2.4096E-01	1.557E+02%	1.32E+00
SB-125	#A	7.9831E-01	7.9831E-01	1.071E+02%	2.12E+00
I-131	#A	3.7364E-01	3.7365E-01	8.169E+01%	6.50E-01
Gd-153	#A	-1.3804E-01	-1.3804E-01	3.092E+02%	1.52E+00
Ga-68	#A	-8.9009E+00	-8.9618E+00	1.737E+02%	3.92E+01
Tc-99m	#A	9.3859E-02	9.3979E-02	1.844E+02%	6.05E-01
BA-133	#A	2.8871E-01	2.8871E-01	1.199E+02%	1.21E+00
CS-134	#A	7.5479E-01	7.5479E-01	2.357E+01%	1.45E+00
CS-137	#A	1.9581E-02	1.9581E-02	1.836E+03%	1.35E+00
CE-139	#A	1.2108E-01	1.2108E-01	1.365E+02%	5.77E-01
Ba-140	#A	-2.4919E-01	-2.4919E-01	4.827E+02%	3.11E+00
La-140	#A	-1.5185E-02	-1.5185E-02	4.909E+03%	9.06E-01
CE-141	#A	7.3689E-02	7.3690E-02	3.833E+02%	8.25E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.26E+00
PM-144	#A	2.4953E-01	2.4953E-01	9.867E+01%	7.33E-01
EU-152	#A	5.1695E-01	5.1695E-01	1.627E+02%	3.41E+00
EU-154	#A	3.6094E+00	3.6094E+00	6.982E+01%	1.15E+01
EU-155	#A	-7.5463E-01	-7.5463E-01	8.734E+01%	3.73E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.32E-01
Ta-182	#A	-2.9126E-01	-2.9126E-01	3.785E+02%	4.20E+00
Hg-203	#A	-1.1628E-02	-1.1628E-02	2.369E+03%	9.96E-01
TL-208	#A	1.1919E-01	1.1919E-01	2.082E+02%	7.17E-01
pm-146	#A	4.8948E-01	4.8948E-01	1.707E+02%	2.26E+00
y-88	#A	-1.0289E-01	-1.0289E-01	4.937E+02%	1.31E+00
Cd-113m	#A	-4.2771E+03	-4.2771E+03	9.893E+01%	1.44E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.93E+01
Cf-251	#A	-9.5208E-01	-9.5208E-01	1.113E+02%	2.94E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.48E-01
Sn-126	#A	-1.4544E+00	-1.4544E+00	1.519E+02%	7.61E+00
PB-210	#A	-4.8668E+00	-4.8668E+00	1.441E+02%	2.31E+01
PB-212	#A	-6.8135E-01	-6.8135E-01	7.148E+01%	1.99E+00
PB-214	#A	2.0836E-01	2.0836E-01	2.986E+02%	1.97E+00
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.70E-01
BI-212	#A	-4.9481E+00	-4.9481E+00	1.212E+02%	2.08E+01
U-235	#A	1.1376E-01	1.1376E-01	3.975E+02%	5.16E+00
BI-214	#A	1.6257E-01	1.6257E-01	5.945E+02%	3.45E+00
BI-210M	#A	-3.3028E-01	-3.3028E-01	1.573E+02%	1.80E+00
AC-228	#A	2.1424E+00	2.1424E+00	3.115E+01%	3.22E+00
TH-227	#A	1.2152E+00	1.2152E+00	1.319E+02%	7.17E+00

TH-229 #A	-4.6991E+00	-4.6991E+00	1.048E+02%	1.36E+01
TH-234 A	6.9531E+00	6.9531E+00	6.528E+01%	1.35E+01
PA-231 #A	5.5641E+00	5.5641E+00	1.432E+02%	3.81E+01
PA-233 #A	-9.7589E-02	-9.7589E-02	1.420E+02%	3.60E+00
PA-234 #A	6.0972E-01	6.0972E-01	2.070E+02%	3.20E+00
PA-234M#A	2.2369E+01	2.2369E+01	2.528E+02%	2.05E+02
AM-241 #A	-8.7488E-01	-8.7488E-01	7.171E+01%	1.86E+00
Np-237 #A	-1.1204E+00	-1.1204E+00	1.653E+02%	6.31E+00
Ir-192 #A	-3.1216E-01	-3.1217E-01	1.015E+02%	1.08E+00
Cs-136 #A	0.0000E+00	0.0000E+00	7.071E+02%	4.93E-01
Np-239 #A	-6.5900E-01	-6.5909E-01	1.601E+02%	3.59E+00
Nd-147 #A	5.1129E-02	5.1131E-02	6.939E+02%	5.69E+00
TL-210 #A	8.1827E-02	8.1827E-02	1.721E+02%	1.49E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 6.953E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 6.9530764E+00 Bq/Sample

Test America St. Louis Spectrum ID: 5_Gamma_20182910

Sample Description: 379959_Gamma_MB 160-379959~1-A
Detector: Detector # 5
Batch ID: 379959
Work Order Number: Gamma
Lot Number: MB 160-379959~1-A

Decay to Time: 8/23/2018 07:50 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:50:40 Real Time: 1810 sec
Analysis Time: 8/28/2018 11:49 Dead Time: 0.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.554E+00	111.2	1.727E+00	1.729E+00	6.154E+00
NA-22	0.000E+00	1.#INF	9.710E-02	9.710E-02	7.156E-01
K-40	-5.543E+00	111.1	6.160E+00	6.166E+00	1.737E+01
Sc-46	-4.782E-02	1039.2	4.969E-01	4.969E-01	1.820E+00
CR-51	-2.506E+00	115.2	2.886E+00	2.889E+00	1.056E+01
MN-54	-3.175E-01	201.8	6.406E-01	6.408E-01	1.554E+00
FE-59	3.752E-02	796.9	2.990E-01	2.990E-01	1.118E+00
Co-56	4.591E-02	979.8	4.499E-01	4.499E-01	1.167E+00
CO-57	-3.020E-03	3972.4	1.200E-01	1.200E-01	4.436E-01
CO-58	4.074E-01	42.3	1.723E-01	1.736E-01	4.918E-01
CO-60	6.046E-01	40.8	2.468E-01	2.487E-01	7.427E-01
ZN-65	5.110E-09	15738424238.8	8.042E-01	8.042E-01	3.114E+00
ZR-95	3.267E-02	2128.8	6.956E-01	6.956E-01	1.894E+00
NB-95	2.008E-01	146.4	2.940E-01	2.941E-01	1.066E+00
RU-103	-3.879E-01	104.1	4.038E-01	4.043E-01	1.035E+00
RH-106	6.041E+00	161.4	9.749E+00	9.754E+00	1.909E+01
AG-108M	6.262E-02	136.3	8.538E-02	8.544E-02	8.286E-01
AG-110M	1.962E-01	166.1	3.259E-01	3.261E-01	1.173E+00
SN-113	1.440E+00	21.7	3.119E-01	3.205E-01	5.692E-01
SB-124	2.410E-01	155.7	3.752E-01	3.754E-01	1.322E+00
SB-125	7.983E-01	107.1	8.546E-01	8.556E-01	2.123E+00
I-131	3.385E-01	87.3	2.954E-01	2.959E-01	7.801E-01
Gd-153	1.506E-01	436.1	6.567E-01	6.568E-01	2.285E+00
Ga-68	-8.962E+00	173.7	1.557E+01	1.558E+01	3.922E+01
Tc-99m	9.966E-02	131.1	1.306E-01	1.308E-01	4.571E-01
BA-133	2.887E-01	119.9	3.461E-01	3.465E-01	1.210E+00
CS-134	1.375E+00	23.6	3.241E-01	3.318E-01	5.630E-01
CS-137	1.958E-02	1836.1	3.595E-01	3.595E-01	1.348E+00
CE-139	1.211E-01	136.5	1.653E-01	1.657E-01	5.772E-01
Ba-140	-2.492E-01	482.7	1.203E+00	1.203E+00	3.111E+00
La-140	-1.518E-02	4909.3	7.455E-01	7.455E-01	9.063E-01
CE-141	-2.951E-02	1197.3	3.533E-01	3.533E-01	1.179E+00
CE-144	0.000E+00	1.#INF	2.032E-01	2.032E-01	5.123E+00

PM-144	6.710E-02	245.7	1.649E-01	1.649E-01	1.272E+00
EU-152	4.880E-01	101.7	4.962E-01	4.969E-01	1.477E+00
EU-154	1.110E+00	60.2	6.678E-01	6.703E-01	1.148E+00
EU-155	2.812E-01	73.6	2.070E-01	2.076E-01	4.527E+00
HF-181	0.000E+00	1.#INF	5.337E-02	5.337E-02	6.316E-01
Ta-182	-1.331E+00	139.4	1.856E+00	1.857E+00	4.416E+00
Hg-203	-1.791E-01	172.1	3.082E-01	3.083E-01	1.074E+00
TL-208	1.192E-01	208.2	2.481E-01	2.482E-01	7.170E-01
PM-146	1.271E-01	117.5	1.493E-01	1.495E-01	1.206E+00
Y-88	-4.237E-02	35.4	1.498E-02	1.518E-02	1.880E+00
Cd-113m	-1.156E+03	237.2	2.743E+03	2.744E+03	9.907E+03
Cd-109	1.217E+00	390.8	4.757E+00	4.758E+00	1.664E+01
Se-75	1.097E-01	219.7	2.410E-01	2.411E-01	1.081E+00
Cf-251	-9.521E-01	111.3	1.060E+00	1.063E+00	2.941E+00
Cf-249	0.000E+00	1.#INF	1.087E-01	1.087E-01	5.475E-01
Sn-126	1.534E+00	117.7	1.804E+00	1.806E+00	6.211E+00
PB-210	-4.867E+00	144.1	7.011E+00	7.017E+00	2.308E+01
PB-212	7.781E-03	6316.1	4.914E-01	4.914E-01	1.757E+00
PB-214	2.084E-01	298.6	6.222E-01	6.223E-01	1.968E+00
BI-207	2.695E-01	125.3	3.378E-01	3.381E-01	1.181E+00
BI-212	-4.948E+00	121.2	5.996E+00	6.001E+00	2.081E+01
BI-214	1.626E-01	594.5	9.664E-01	9.664E-01	3.449E+00
BI-210M	-4.844E-01	100.8	4.884E-01	4.893E-01	1.663E+00
AC-228	2.142E+00	31.1	6.673E-01	6.762E-01	3.224E+00
TH-227	1.179E+00	127.9	1.507E+00	1.509E+00	6.594E+00
TH-229	-4.699E+00	104.8	4.926E+00	4.941E+00	1.356E+01
TH-234	-5.316E+00	68.6	3.647E+00	3.659E+00	1.338E+01
PA-231	5.564E+00	143.2	7.969E+00	7.975E+00	3.811E+01
PA-233	-9.759E-02	142.0	1.386E-01	1.387E-01	3.598E+00
PA-234	2.586E-02	3400.5	8.793E-01	8.793E-01	3.128E+00
PA-234M	2.237E+01	252.8	5.655E+01	5.657E+01	2.055E+02
U-235	1.138E-01	397.5	4.522E-01	4.522E-01	5.161E+00
AM-241	-8.749E-01	71.7	6.274E-01	6.290E-01	1.863E+00
Np-237	1.663E+00	62.7	1.044E+00	1.048E+00	3.432E+00
Ir-192	-3.122E-01	101.5	3.168E-01	3.174E-01	1.080E+00
Cs-136	0.000E+00	1.#INF	2.317E-01	2.317E-01	4.930E-01
Np-239	5.634E-02	2143.8	1.208E+00	1.208E+00	4.158E+00
Nd-147	1.612E+00	124.7	2.011E+00	2.013E+00	7.106E+00
Mo-99	5.534E-01	99.4	5.503E-01	5.511E-01	1.091E+01
Ge-69	1.938E-01	258.3	5.006E-01	5.007E-01	6.810E+00
Br-82	-3.600E-01	113.4	4.082E-01	4.087E-01	1.437E+00
V-48	2.577E-01	37.8	9.738E-02	9.846E-02	1.322E+00
Sr-85	3.401E-01	114.6	3.898E-01	3.903E-01	1.341E+00
Rb-83	-1.986E-01	285.8	5.677E-01	5.678E-01	1.578E+00
Kr-85	7.201E+01	136.7	9.842E+01	9.851E+01	3.399E+02
Cm-247	2.795E-01	80.9	2.261E-01	2.265E-01	9.205E-01
Hf-175	0.000E+00	1.#INF	5.271E-02	5.271E-02	1.036E+00
Lu-172	0.000E+00	1.#INF	1.604E-01	1.604E-01	8.358E-01
Kr-85m	1.558E-02	1295.2	2.018E-01	2.018E-01	5.895E-01
NB-94	-2.004E-02	1808.3	3.624E-01	3.624E-01	1.352E+00
TL-210	8.183E-02	172.1	1.408E-01	1.409E-01	1.490E+00
Total	1.282E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_MB 160-379959~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182910.An1

Acquisition information

Start time:	8/23/2018 7:50:40 AM
Live time:	1800
Real time:	1810
Dead time:	0.55 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_Soil_TunaCan.Clb

5_Soil_TunaCan_90099_032612

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	3/27/2012 5:20:37 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.43 %
Log(Eff):	-2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Extra_Long_Rev7.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01 %

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-7.	144.07	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	333.54	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.29	-6.	149.77	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.28	7.	117.67	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
80.99	6.	97.25	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
84.00	6.	111.78	0.82	3.387E-02	84.00	23.000	PBC<MDA	Cm247
86.49	13.	62.74	0.82	3.435E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.096E-01	EU155
86.54	13.	73.63	0.82	3.436E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.096E-01	EU155
					86.94	9.040	2.405E+00	Sn126
86.94	3.	373.16	0.83	3.443E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	5.124E-01	Sn126
87.57	3.	382.02	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
88.04	3.	390.79	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
89.36	3.	398.98	0.83	3.483E-02	89.36	2.350	PBC<MDA	Hf175
91.10	3.	406.71	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-19.	68.61	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.35	3.	422.26	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
96.73	3.	428.53	0.84	3.571E-02	96.73	3.420	PBC<MDA	Se75
97.50	3.	436.09	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	441.50	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
140.51	5.	131.07	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					140.51	4.520	1.911E+00	Mo99
143.79	-1.	980.27	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
165.85	5.	136.50	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
181.07	6.	99.44	0.92	2.914E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	6.300E-01	Lu172
185.72	5.	189.92	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
205.33	2.	397.49	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	224.72	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	1.	551.70	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
235.97	6.	136.01	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
242.00	6.	144.53	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
256.24	5.	131.91	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
279.54	4.	219.75	1.02	2.034E-02	279.20	81.460	PBC<MDA	Hg203
					279.54	24.790	4.590E-01	Se75
284.30	6.	120.76	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.09	3.	300.30	1.03	1.945E-02	295.09	19.300	PBC<MDA	PB214
296.00	5.	172.10	1.03	1.940E-02	296.00	79.000	PBC<MDA	TL210
300.03	5.	207.40	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	5.	192.91	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
300.18	5.	202.81	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
302.65	5.	211.77	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.148E-01	BA133
338.32	20.	31.15	1.07	1.736E-02	338.32	12.010	5.284E+00	AC228
351.93	1.	516.22	1.09	1.680E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	119.89	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	4.	125.98	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
366.42	4.	186.26	1.10	1.625E-02	366.42	1.190	PBC<MDA	Mo99
391.69	26.	21.66	1.12	1.537E-02	391.69	64.000	1.440E+00	SN113
402.40	4.	116.91	1.13	1.503E-02	402.40	72.000	PBC<MDA	Cm247
427.88	4.	160.94	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
477.60	4.	111.19	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
511.86	12.	81.10	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
513.98	7.	136.68	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
					513.99	99.280	3.119E-01	Sr85
513.99	7.	114.61	1.24	1.226E-02	513.98	0.430	7.853E+01	Kr85
					513.99	99.280	3.401E-01	Sr85
531.00	4.	124.72	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
554.34	1.	648.99	1.27	1.151E-02	554.34	70.600	PBC<MDA	Br82
563.24	1.	404.15	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.70	5.	125.31	1.29	1.125E-02	569.32	15.380	1.712E+00	CS134
					569.47	8.200	3.212E+00	PA234
					569.70	97.740	2.695E-01	BI207

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
574.00	2.	258.33	1.29	1.118E-02	574.00	11.800	PBC<MDA	Ge69
583.02	2.	208.17	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
600.50	5.	141.20	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	155.72	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	168.97	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.31	1.	594.46	1.32	1.063E-02	609.31	46.090	PBC<MDA	BI214
610.30	5.	192.45	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	202.93	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
618.06	4.	245.73	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
657.76	3.	166.13	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
735.72	2.	254.12	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
747.16	3.	170.71	1.44	8.965E-03	747.16	34.000	PBC<MDA	PM146
765.79	3.	146.43	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.819E+01	PA234M
778.92	5.	101.68	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	18.	23.57	1.48	8.503E-03	795.87	85.530	1.375E+00	CS134
810.78	6.	42.30	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
846.77	1.	979.80	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
873.23	5.	106.88	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	5.	95.05	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
898.04	8.	35.36	1.56	7.684E-03	898.04	93.700	6.173E-01	Y88
911.07	3.	147.99	1.57	7.591E-03	911.07	29.000	PBC<MDA	AC228
944.30	7.	37.80	1.59	7.366E-03	944.30	8.000	PBC<MDA	V48
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	252.82	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	8.	161.39	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1112.07	1.	577.58	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1173.24	1.	349.31	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	1.	796.87	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1311.60	5.	44.72	1.85	5.588E-03	1311.60	98.000	PBC<MDA	V48
1332.50	6.	40.82	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1764.49	-2.	260.97	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	38.	-7.	-0.004	144.07	0.783
TH-227	200.11	50.14	15.	2.	0.001	333.54	0.787
AM-241	237.72	59.54	36.	-14.	-0.008	71.71	0.797s
TH-234	252.74	63.29	43.	-6.	-0.003	149.77	0.801s
Sn-126	256.71	64.28	34.	7.	0.004	117.67	0.802s
BA-133	323.61	80.99	16.	6.	0.004	97.25	0.819s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cm-247	335.66	84.00	23.	6.	0.004	111.78	0.822s
Np-237	345.63	86.49	29.	13.	0.007	62.74	0.825s
EU-155	345.84	86.54	42.	13.	0.007	73.63	0.825s
Sn-126	347.43	86.94	56.	3.	0.002	373.16	0.825s
Sn-126	349.95	87.57	59.	3.	0.002	382.02	0.826s
Cd-109	351.83	88.04	62.	3.	0.002	390.79	0.826s
Hf-175	357.12	89.36	65.	3.	0.002	398.98	0.828
Nd-147	364.08	91.10	67.	3.	0.002	406.71	0.829s
TH-234	370.05	92.59	92.	-19.	-0.010	68.61	0.831
AC-228	373.09	93.35	73.	3.	0.002	422.26	0.832s
Se-75	386.62	96.73	76.	3.	0.002	428.53	0.835s
Gd-153	389.70	97.50	79.	3.	0.002	436.09	0.836s
Np-239	397.71	99.50	81.	3.	0.002	441.50	0.838s
Gd-153	412.52	103.20	38.	-6.	-0.003	165.14	0.842s
Np-239	414.52	103.70	44.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	165.	-5.	-0.003	277.66	0.844s
Se-75	484.26	121.12	26.	-2.	-0.001	398.97	0.860s
EU-152	486.90	121.78	28.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	35.	-8.	-0.004	114.46	0.862s
CE-144	533.97	133.54	50.	0.	0.000	1000.00	0.873s
Se-75	543.82	136.00	50.	0.	0.000	1000.00	0.875s
HF-181	545.02	136.30	58.	-6.	-0.004	175.11	0.876s
CO-57	545.72	136.47	64.	-10.	-0.006	116.28	0.876s
Tc-99m	561.88	140.51	22.	5.	0.003	131.07	0.880D
U-235	574.99	143.79	46.	-1.	-0.001	980.27	0.883s
Ba-140	650.54	162.66	42.	-8.	-0.005	115.67	0.902s
CE-139	663.32	165.85	25.	5.	0.003	136.50	0.905
Cf-251	706.34	176.60	27.	-9.	-0.005	111.34	0.916s
Mo-99	724.23	181.07	17.	6.	0.004	99.44	0.921s
Lu-172	725.84	181.47	32.	-6.	-0.003	139.44	0.921s
U-235	742.85	185.72	23.	5.	0.003	189.92	0.925s
TH-229	774.03	193.51	33.	-10.	-0.006	104.83	0.933
U-235	821.35	205.33	13.	2.	0.001	397.49	0.945s
TH-229	843.44	210.85	17.	3.	0.002	224.72	0.950s
Cf-251	908.08	227.00	17.	1.	0.001	551.70	0.966s
TH-227	943.98	235.97	29.	6.	0.003	136.01	0.975s
PB-214	968.10	242.00	33.	6.	0.003	144.53	0.981s
TH-227	1025.11	256.24	11.	5.	0.003	131.91	0.995s
Cd-113m	1054.97	263.70	19.	-3.	-0.001	237.17	1.002s
Se-75	1058.81	264.66	21.	0.	0.000	1000.00	1.003s
BI-210M	1063.50	265.83	39.	-9.	-0.005	100.83	1.005s
TL-208	1109.33	277.28	31.	-9.	-0.005	97.14	1.016
Hg-203	1117.00	279.20	40.	-5.	-0.003	172.07	1.017s
Se-75	1118.37	279.54	40.	4.	0.002	219.75	1.018s
I-131	1137.41	284.30	12.	6.	0.003	120.76	1.022s
PB-214	1180.60	295.09	33.	3.	0.002	300.30	1.033s
TL-210	1184.24	296.00	36.	5.	0.003	172.10	1.034s
PB-212	1200.37	300.03	41.	5.	0.003	207.40	1.038

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1200.53	300.07	46.	5.	0.003	192.91	1.038
PA-233	1200.97	300.18	51.	5.	0.003	202.81	1.038
PA-231	1210.86	302.65	56.	5.	0.003	211.77	1.040s
Kr-85m	1218.14	304.47	62.	0.	0.000	1000.00	1.042s
Ba-140	1219.66	304.85	62.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	62.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	62.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	76.	-6.	-0.004	198.87	1.049s
Ir-192	1266.25	316.49	37.	-9.	-0.005	101.50	1.053s
CR-51	1280.63	320.08	46.	-8.	-0.005	115.17	1.057s
La-140	1315.35	328.76	18.	-2.	-0.001	349.49	1.065s
Cf-249	1334.08	333.44	15.	-5.	-0.003	160.36	1.070s
AC-228	1353.61	338.32	9.	20.	0.011	31.15	1.074s
Cs-136	1362.62	340.57	29.	0.	0.000	1000.00	1.077s
Hf-175	1373.94	343.40	29.	0.	0.000	1000.00	1.079s
EU-152	1377.49	344.29	29.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	47.	-7.	-0.004	128.76	1.082s
PB-214	1408.09	351.93	18.	1.	0.001	516.22	1.087s
BA-133	1424.36	356.00	18.	5.	0.003	119.89	1.091s
I-131	1458.32	364.48	12.	4.	0.002	125.98	1.099s
Mo-99	1466.07	366.42	20.	4.	0.002	186.26	1.101s
BA-133	1535.78	383.84	28.	-2.	-0.001	308.54	1.117s
Cf-249	1552.22	387.95	2.	0.	0.000	1000.00	1.121
SN-113	1567.19	391.69	2.	26.	0.014	21.66	1.125s
Se-75	1603.09	400.66	12.	-1.	-0.001	500.00	1.133s
Cm-247	1610.05	402.40	11.	4.	0.002	116.91	1.135s
SB-125	1711.99	427.88	8.	4.	0.002	160.94	1.158s
AG-108M	1736.25	433.94	12.	-3.	-0.002	182.14	1.164s
PM-146	1816.05	453.88	12.	-3.	-0.002	174.56	1.182
SB-125	1854.01	463.37	22.	-8.	-0.004	81.61	1.191s
BE-7	1910.94	477.59	7.	4.	0.002	111.19	1.204s
HF-181	1928.56	482.00	4.	0.	0.000	1000.00	1.208s
La-140	1948.65	487.02	8.	0.	0.000	1000.00	1.212s
RU-103	1988.80	497.05	16.	-8.	-0.004	104.08	1.221s
RH-106	2048.06	511.86	43.	12.	0.007	81.10	2.485s
Kr-85	2056.53	513.98	40.	7.	0.004	136.68	1.237s
Sr-85	2056.57	513.99	33.	7.	0.004	114.61	1.237s
Rb-83	2082.01	520.35	8.	-2.	-0.001	285.77	1.242s
Rb-83	2118.78	529.54	16.	-4.	-0.002	167.82	1.251s
Nd-147	2124.62	531.00	14.	4.	0.002	124.72	1.252s
Ba-140	2149.67	537.26	8.	-1.	-0.001	482.68	1.258s
Rb-83	2210.65	552.50	28.	-10.	-0.005	81.50	1.271s
Br-82	2218.01	554.34	31.	1.	0.001	648.99	1.273s
CS-134	2253.60	563.24	4.	1.	0.001	404.15	1.280s
CS-134	2277.94	569.32	22.	-8.	-0.004	92.89	1.286s
BI-207	2279.47	569.70	20.	5.	0.003	125.31	1.286s
Ge-69	2296.66	574.00	17.	2.	0.001	258.33	1.290s
TL-208	2332.76	583.02	4.	2.	0.001	208.17	1.298s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2402.69	600.50	18.	5.	0.003	141.20	1.313s
SB-124	2411.61	602.73	23.	5.	0.003	155.72	1.315s
CS-134	2419.53	604.71	28.	5.	0.003	168.97	1.317s
BI-214	2437.93	609.31	35.	1.	0.001	594.46	1.321s
RU-103	2441.89	610.30	37.	5.	0.003	192.45	1.322s
AG-108M	2457.82	614.28	41.	5.	0.003	202.93	1.325s
PM-144	2472.94	618.06	46.	4.	0.002	245.73	1.328s
Br-82	2477.10	619.10	50.	0.	0.000	1000.00	1.329s
I-131	2548.61	636.97	18.	-6.	-0.003	75.76	1.345s
AG-110M	2631.76	657.76	14.	3.	0.002	166.13	1.362s
PM-144	2786.90	696.54	16.	-1.	-0.001	437.32	1.395s
Br-82	2794.17	698.36	18.	0.	0.000	1000.00	1.397s
SB-124	2891.88	722.79	14.	-3.	-0.002	169.71	1.417s
AG-108M	2892.48	722.94	18.	0.	0.000	1000.00	1.417s
EU-154	2894.17	723.36	18.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	18.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	25.	-6.	-0.003	121.17	1.421s
PM-146	2943.61	735.72	14.	2.	0.001	254.12	1.428s
PM-146	2989.37	747.16	4.	3.	0.001	170.71	1.437s
AG-110M	3056.50	763.94	9.	-4.	-0.002	124.98	1.451s
NB-95	3063.89	765.79	9.	3.	0.002	146.43	1.453s
Br-82	3106.73	776.50	12.	-5.	-0.003	113.39	1.461s
Mo-99	3112.41	777.92	16.	0.	0.000	1000.00	1.462s
EU-152	3116.41	778.92	11.	5.	0.003	101.68	1.463s
BI-212	3142.41	785.42	0.	0.	0.000	1000.00	1.468s
CS-134	3184.20	795.87	0.	18.	0.010	23.57	1.477s
TL-210	3199.12	799.60	18.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	18.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	0.	6.	0.003	42.30	1.489s
Cs-136	3274.72	818.50	0.	0.	0.000	1000.00	1.495s
Br-82	3311.87	827.79	14.	-9.	-0.005	93.81	1.503s
MN-54	3340.10	834.85	19.	-5.	-0.003	201.78	1.508s
Co-56	3387.78	846.77	9.	1.	0.000	979.80	1.518s
NB-94	3485.08	871.10	18.	-8.	-0.004	86.92	1.537s
Ge-69	3488.69	872.00	25.	0.	0.000	1000.00	1.538s
EU-154	3493.61	873.23	14.	5.	0.003	106.88	1.539s
PA-234	3522.80	880.53	10.	5.	0.003	95.05	1.544s
PA-234	3533.64	883.24	26.	-3.	-0.002	272.26	1.547s
AG-110M	3539.41	884.68	23.	0.	0.000	1000.00	1.547s
Y-88	3592.83	898.04	0.	8.	0.004	35.36	1.558s
Lu-172	3603.43	900.69	8.	0.	0.000	1000.00	1.560s
AC-228	3644.94	911.07	5.	3.	0.002	147.99	1.568s
AG-110M	3750.60	937.49	0.	0.	0.000	1000.00	1.589
V-48	3777.83	944.30	0.	7.	0.004	37.80	1.594
PA-234	3784.70	946.02	7.	0.	0.000	1000.00	1.595s
EU-152	3857.05	964.11	8.	-5.	-0.003	95.83	1.609s
V-48	3934.58	983.50	9.	-6.	-0.004	109.77	1.623s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	4004.55	1001.00	17.	2.	0.001	252.82	1.636s
EU-154	4019.65	1004.77	30.	-8.	-0.004	102.64	1.639s
Co-56	4151.87	1037.84	52.	-12.	-0.007	51.15	1.664s
Br-82	4176.50	1044.00	63.	-12.	-0.006	101.10	1.668s
Cs-136	4192.77	1048.07	74.	-12.	-0.006	109.10	1.671s
RH-106	4201.93	1050.36	75.	8.	0.004	161.39	1.673s
BI-207	4255.11	1063.66	15.	-7.	-0.004	127.38	1.682s
Ga-68	4310.04	1077.40	5.	-3.	-0.002	173.74	1.692s
Lu-172	4374.98	1093.64	0.	0.	0.000	1000.00	1.704s
EU-152	4448.68	1112.07	11.	1.	0.000	577.58	1.717s
Ta-182	4485.56	1121.30	10.	-5.	-0.003	139.40	1.724s
CO-60	4693.21	1173.24	6.	1.	0.001	349.31	1.760s
Ta-182	4756.42	1189.05	0.	0.	0.000	1000.00	1.771s
Ta-182	4885.79	1221.41	5.	-2.	-0.001	234.30	1.793s
NA-22	5098.13	1274.53	0.	0.	0.000	1000.00	1.828s
EU-154	5098.17	1274.54	0.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	1.	0.000	796.87	1.840s
V-48	5246.31	1311.60	0.	5.	0.003	44.72	1.853s
TL-210	5251.91	1313.00	5.	0.	0.000	1000.00	1.854s
Br-82	5269.61	1317.43	5.	0.	0.000	1000.00	1.857s
CO-60	5329.85	1332.50	0.	6.	0.003	40.82	1.866s
AG-110M	5536.88	1384.30	11.	-6.	-0.003	137.58	1.899s
EU-152	5631.62	1408.00	11.	-7.	-0.004	117.90	1.914s
K-40	5842.75	1460.83	9.	-5.	-0.003	111.12	1.946s
Br-82	5898.89	1474.88	0.	0.	0.000	1000.00	1.954s
SB-124	6762.39	1690.98	12.	-10.	-0.005	63.68	2.076s
BI-214	7056.06	1764.49	2.	-2.	-0.001	260.97	2.114s
Co-56	7083.46	1771.35	0.	0.	0.000	1000.00	2.117s
Y-88	7341.96	1836.06	6.	-5.	-0.003	126.49	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.5536E+00				5.31E+01	
			477.60	1.554E+00	?(	6.154E+00 1.11E+02 1.05E+01	G
K-40	N	-5.5435E+00				4.66E+11	
			1460.83	-5.543E+00	?(P	1.737E+01 1.11E+02 1.07E+01	G
Sc-46	F	-4.7816E-02				8.38E+01	
			889.28	-4.782E-02	%(	1.820E+00 1.04E+03 1.00E+02	G
			1120.55	-2.734E-02	% P	1.601E+00 1.53E+03 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	-2.5056E+00					2.77E+01	
			320.08	-2.506E+00	?(P	1.056E+01	1.15E+02	9.94E+00 G
MN-54	C	-3.1745E-01					3.12E+02	
			834.85	-3.175E-01	?(	1.554E+00	2.02E+02	1.00E+02 G
FE-59	F	3.7519E-02					4.45E+01	
			1099.25	-4.959E-02	%(P	1.118E+00	1.86E+03	5.65E+01 G
			1291.60	1.514E-01	?(	3.060E+00	7.97E+02	4.32E+01 G
Co-56	C	4.5914E-02					7.73E+01	
			846.77	4.591E-02	?(	1.167E+00	9.80E+02	9.99E+01 G
			1238.28	-3.132E-02	% P	1.057E+00	2.39E+03	6.61E+01 G
			1037.84	-6.804E+00	+ P	2.090E+01	5.11E+01	1.41E+01 G
			1771.35	0.000E+00	-	6.098E+00	1.00E+03	1.55E+01 A
CO-57	C	-3.0198E-03					2.72E+02	
			122.06	-3.020E-03	%(	4.436E-01	3.97E+03	8.56E+01 G
			136.47	-1.521E+00	+	6.018E+00	1.16E+02	1.07E+01 G
CO-58	C	4.0735E-01					7.09E+01	
			810.78	4.074E-01	?(P	4.918E-01	4.23E+01	9.95E+01 G
CO-60	F	6.0460E-01					1.93E+03	
			1332.50	6.046E-01	?(	7.427E-01	4.08E+01	1.00E+02 G
			1173.24	1.342E-01	- P	1.237E+00	3.49E+02	9.99E+01 G
ZN-65	F	5.1095E-09					2.44E+02	
			1115.55	5.110E-09	%(	3.114E+00	1.57E+10	5.06E+01 G
ZR-95	I	3.2674E-02					6.40E+01	
			756.73	3.267E-02	%(P	1.894E+00	2.13E+03	5.45E+01 G
			724.20	0.000E+00	-	3.049E+00	1.00E+03	4.42E+01 G
NB-95	I	2.0076E-01					6.40E+01	
			765.79	2.008E-01	?(	1.066E+00	1.46E+02	9.98E+01 G
RU-103	I	-3.8795E-01					3.93E+01	
			497.05	-3.879E-01	?(	1.035E+00	1.04E+02	9.09E+01 G
			610.30	4.181E+00	?	2.819E+01	1.92E+02	5.75E+00 GA
RH-106	I	6.0409E+00					3.74E+02	
			621.92	5.353E-01	%(	1.909E+01	1.00E+03	9.93E+00 G
			1050.36	4.109E+01	?(	2.274E+02	1.61E+02	1.56E+00 G
			511.86	2.760E+00	?	7.514E+00	8.11E+01	2.00E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M C	6.2622E-02					1.53E+05	
		433.94	-1.431E-01	?(P	8.286E-01	1.82E+02	9.05E+01 G
		722.94	0.000E+00	+	1.480E+00	1.00E+03	9.08E+01 G
		614.28	2.698E-01	?(	1.914E+00	2.03E+02	8.98E+01 G
AG-110M F	1.9619E-01					2.50E+02	
		657.76	1.962E-01	?(	1.173E+00	1.66E+02	9.46E+01 G
		884.68	0.000E+00	-	2.462E+00	1.00E+03	7.27E+01 G
		937.49	0.000E+00	&	1.608E+00	1.00E+03	3.44E+01 G
		1384.30	-2.427E+00	+	7.679E+00	1.38E+02	2.43E+01 G
		763.94	-1.039E+00	+	4.656E+00	1.25E+02	2.23E+01 G
SN-113 F	1.4401E+00					1.15E+02	
		391.69	1.440E+00	?(	5.692E-01	2.17E+01	6.40E+01 G
SB-124 F	2.4096E-01					6.02E+01	
		602.73	2.410E-01	?(	1.322E+00	1.56E+02	9.83E+01 G
		1690.98	-2.474E+00	+ P	4.789E+00	6.37E+01	4.78E+01 G
		722.79	-1.859E+00	+	1.135E+01	1.70E+02	1.08E+01 G
SB-125 I	7.9831E-01					1.01E+03	
		427.88	4.838E-01	?(P	2.123E+00	1.61E+02	2.96E+01 G
		600.50	1.320E+00	?(	6.576E+00	1.41E+02	1.79E+01 G
		635.89	1.254E-01	% P	8.260E+00	1.70E+03	1.13E+01 G
		463.37	-3.000E+00	+ P	9.732E+00	8.16E+01	1.05E+01 G
I-131 I	3.3855E-01					8.02E+00	
		364.48	1.748E-01	?(P	7.801E-01	1.26E+02	8.17E+01 G
		284.30	2.517E+00	(P	8.375E+00	1.21E+02	6.14E+00 G
		636.97	-4.556E+00	+ P	1.701E+01	7.58E+01	7.17E+00 G
Gd-153 F	1.5059E-01					2.42E+02	
		97.50	1.506E-01	?(	2.285E+00	4.36E+02	3.00E+01 G
		103.20	-3.881E-01	&	2.231E+00	1.65E+02	2.18E+01 G
Ga-68 C	-8.9618E+00					4.71E-02	
		1077.40	-8.962E+00	?(	3.922E+01	1.74E+02	3.30E+00 G
Tc-99m I	9.9663E-02					2.51E-01	
						Energy duplication	
		140.51	9.966E-02	?(	4.571E-01	1.31E+02	8.93E+01 G
BA-133 F	2.8871E-01					3.85E+03	
		356.00	2.887E-01	?(	1.210E+00	1.20E+02	6.20E+01 G
		302.85	1.173E-01	%	6.239E+00	1.51E+03	1.83E+01 G
		383.84	-9.939E-01	+	1.097E+01	3.09E+02	8.94E+00 GA
		80.99	3.144E-01	?	1.054E+00	9.73E+01	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	1.3751E+00					7.54E+02	
			795.87	1.375E+00	?(	5.630E-01	2.36E+01	8.55E+01 G
			604.71	2.435E-01	-	1.447E+00	1.69E+02	9.76E+01 G
			569.32	-2.486E+00	-	7.886E+00	9.29E+01	1.54E+01 G
			801.95	0.000E+00	-	1.701E+01	1.00E+03	8.69E+00 G
			563.24	5.860E-01	-	7.049E+00	4.04E+02	8.35E+00 G
CS-137	I	1.9581E-02					1.10E+04	
			661.66	1.958E-02	%(P	1.348E+00	1.84E+03	8.52E+01 G
CE-139	F	1.2108E-01					1.38E+02	
			165.85	1.211E-01	&(	5.772E-01	1.36E+02	7.99E+01 G
Ba-140	I	-2.4919E-01					1.28E+01	
			537.26	-2.492E-01	?(P	3.111E+00	4.83E+02	2.44E+01 G
			162.66	-2.383E+00	+	9.443E+00	1.16E+02	6.22E+00 G
			304.85	0.000E+00	+	2.696E+01	1.00E+03	4.29E+00 G
La-140	I	-1.5185E-02					1.28E+01	
			1596.21	-1.518E-02	%(P	9.063E-01	4.91E+03	9.54E+01 G
			487.02	0.000E+00	+	1.514E+00	1.00E+03	4.55E+01 G
			328.76	-3.592E-01	+	3.488E+00	3.49E+02	2.03E+01 G
			815.77	-5.737E-02	% P	4.191E+00	1.34E+03	2.33E+01 G
CE-141	I	-2.9507E-02					3.25E+01	
			145.44	-2.951E-02	%(P	1.179E+00	1.20E+03	4.82E+01 G
PM-144	C	6.7102E-02					3.63E+02	
			696.54	-7.870E-02	&(	1.272E+00	4.37E+02	9.90E+01 G
			618.06	2.128E-01	?(	1.831E+00	2.46E+02	9.91E+01 G
EU-152	F	4.8801E-01					4.94E+03	
			121.78	0.000E+00	?(	1.477E+00	1.00E+03	2.86E+01 G
			344.29	0.000E+00	?(	3.407E+00	1.00E+03	2.65E+01 G
			1112.07	5.285E-01	?(	1.159E+01	5.78E+02	1.36E+01 G
			778.92	2.523E+00	?(	8.950E+00	1.02E+02	1.29E+01 G
			964.11	-2.452E+00	+	8.204E+00	9.58E+01	1.46E+01 G
			244.69	-7.304E-02	& P	7.802E+00	3.94E+03	7.58E+00 G
			1408.00	-3.350E+00	+	9.008E+00	1.18E+02	2.10E+01 GA
EU-154	I	1.1095E+00					3.14E+03	
			123.10	-2.921E-01	?(	1.148E+00	1.14E+02	4.08E+01 G
			1274.54	0.000E+00	+	2.032E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	6.651E+00	1.00E+03	2.02E+01 G
			873.23	3.079E+00	?(	1.148E+01	1.07E+02	1.23E+01 G
			1004.77	-3.554E+00	+	1.249E+01	1.03E+02	1.80E+01 G
			996.33	4.224E+00	?(	1.308E+01	8.99E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.8122E-01					1.81E+03	
			105.31	-3.391E-01	?(P	4.527E+00	2.78E+02	2.12E+01 G
			86.54	7.096E-01	(	1.742E+00	7.36E+01	3.07E+01 G
Ta-182	F	-1.3315E+00					1.14E+02	
			1121.30	-1.331E+00	?(	4.416E+00	1.39E+02	3.49E+01 G
			1221.41	-8.091E-01	+	4.672E+00	2.34E+02	2.70E+01 G
			1189.05	0.000E+00	+	4.164E+00	1.00E+03	1.62E+01 G
Hg-203	F	-1.7909E-01					4.66E+01	
			279.20	-1.791E-01	?(	1.074E+00	1.72E+02	8.15E+01 G
TL-208	N	1.1919E-01					6.98E+02	
			583.02	1.192E-01	?(	7.170E-01	2.08E+02	8.45E+01 G
			277.28	-3.720E+00	&	1.232E+01	9.71E+01	6.31E+00 G
			860.56	-8.538E-03	% P	4.140E+00	1.79E+04	1.24E+01 G
PM-146	C	1.2711E-01					2.02E+03	
			453.88	-2.192E-01	?(P	1.206E+00	1.75E+02	6.50E+01 G
			747.16	4.861E-01	?(	2.262E+00	1.71E+02	3.40E+01 G
			735.72	5.853E-01	?(P	5.452E+00	2.54E+02	2.25E+01 G
Y-88	F	-4.2367E-02					1.07E+02	
			1836.06	-6.655E-01	?(	1.880E+00	1.26E+02	9.92E+01 G
			898.04	6.173E-01	?(	5.687E-01	3.54E+01	9.37E+01 G
Cd-113m		-1.1565E+03					5.33E+03	
			263.70	-1.156E+03	&(	9.907E+03	2.37E+02	6.00E-03 K
Cd-109	F	1.2174E+00					4.53E+02	
			88.04	1.217E+00	?(	1.664E+01	3.91E+02	3.79E+00 G
Se-75		1.0966E-01					1.20E+02	
			264.66	0.000E+00	?(	1.081E+00	1.00E+03	5.85E+01 G
			136.00	0.000E+00	?(	9.817E-01	1.00E+03	5.83E+01 G
			279.54	4.590E-01	?(	3.539E+00	2.20E+02	2.48E+01 G
			121.12	-1.656E-01	+	2.385E+00	3.99E+02	1.71E+01 G
			400.66	-3.239E-01	+	6.107E+00	5.00E+02	1.14E+01 G
			96.73	1.322E+00	?(	1.973E+01	4.29E+02	3.42E+00 G
Cf-251	T	-9.5208E-01					3.28E+05	
			176.60	-9.521E-01	?(	2.941E+00	1.11E+02	1.70E+01 G
			227.00	4.864E-01	+	7.929E+00	5.52E+02	6.30E+00 GA
Sn-126		1.5335E+00					3.65E+07	
			87.57	1.232E-01	-	1.649E+00	3.82E+02	3.75E+01 GA
			64.28	1.534E+00	?(	6.211E+00	1.18E+02	9.70E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          86.94 5.124E-01     6.704E+00 3.73E+02 9.04E+00 GA

PB-210   N  -4.8668E+00                                     8.14E+03
                          46.54-4.867E+00 ?(P 2.308E+01 1.44E+02 4.25E+00 G

PB-212   N   7.7809E-03                                     6.98E+02
                         238.63 7.781E-03 %(P 1.757E+00 6.32E+03 4.33E+01 G
                         300.03 3.983E+00 ? P 2.888E+01 2.07E+02 3.28E+00 GA

PB-214   N   2.0836E-01                                     5.84E+05
                         351.93 1.050E-01 ?(P 1.968E+00 5.16E+02 3.76E+01 G
                         295.09 4.098E-01 &(P 4.362E+00 3.00E+02 1.93E+01 G
                         242.00 1.917E+00 ?   9.631E+00 1.45E+02 7.43E+00 GA

BI-207   C   2.6954E-01                                     1.18E+04
                         569.70 2.695E-01 ?(  1.181E+00 1.25E+02 9.77E+01 G
                        1063.66-7.831E-01 +   2.322E+00 1.27E+02 7.45E+01 G

BI-212   N  -4.9481E+00                                     6.98E+02
                         727.17-4.948E+00 ?(  2.081E+01 1.21E+02 7.55E+00 G
                         785.42 0.000E+00 +   3.721E+01 1.00E+03 1.28E+00 GA

BI-214   N   1.6257E-01                                     5.84E+05
                         609.31 1.626E-01 ?(P 3.449E+00 5.94E+02 4.61E+01 G
                        1120.29 1.119E-02 % P 1.047E+01 2.42E+04 1.51E+01 G
                        1764.49-2.073E+00 + P 8.355E+00 2.61E+02 1.54E+01 G

BI-210M  T  -4.8438E-01                                     1.10E+09
                         265.83-4.844E-01 ?(  1.663E+00 1.01E+02 5.00E+01 G
                         304.90 0.000E+00 +   4.130E+00 1.00E+03 2.80E+01 G

AC-228   N   2.1424E+00                                     2.10E+03
                         911.07 8.412E-01 ?(  3.224E+00 1.48E+02 2.90E+01 G
                         968.97-7.357E-02 %   8.469E+00 3.01E+03 1.75E+01 G
                         338.32 5.284E+00 ?(  4.481E+00 3.11E+01 1.20E+01 G
                          93.35 8.175E-01 ?   1.203E+01 4.22E+02 5.56E+00 XA

TH-227   N   1.1785E+00                                     7.95E+03
                         256.24 1.815E+00 ?(  6.594E+00 1.32E+02 7.00E+00 G
                         235.97 1.134E+00 ?(  5.365E+00 1.36E+02 1.23E+01 G
                          50.14 6.904E-01 ?(  7.166E+00 3.34E+02 8.00E+00 G

TH-229   N  -4.6991E+00                                     2.68E+06
                         193.51-4.699E+00 ?(  1.356E+01 1.05E+02 4.40E+00 G
                         210.85 2.410E+00 &   1.572E+01 2.25E+02 2.99E+00 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234   N  -5.3159E+00                                     1.63E+12
                          92.59-5.316E+00  (P 1.338E+01 6.86E+01 5.58E+00 G
                          63.29-3.248E+00 + P 1.787E+01 1.50E+02 3.81E+00 G

PA-231   N   5.5641E+00                                     1.20E+07
                         302.65 5.183E+00 ?(  3.811E+01 2.12E+02 2.88E+00 G
                         300.07 6.011E+00 ?(  4.038E+01 1.93E+02 2.46E+00 G

PA-233   C  -9.7589E-02                                     7.82E+08
                         312.01-5.252E-01 ?(  3.598E+00 1.99E+02 3.60E+01 G
                         300.18 2.386E+00 ?(  1.682E+01 2.03E+02 6.20E+00 G

PA-234   N   2.5857E-02                                     1.63E+12
                         131.29 2.586E-02 %(P 3.128E+00 3.40E+03 1.80E+01 G
                         946.02 0.000E+00 -   8.477E+00 1.00E+03 1.34E+01 G
                         569.47-1.541E-01 %   1.694E+01 3.02E+03 8.20E+00 G
                         883.24-2.007E+00 +   1.956E+01 2.72E+02 9.60E+00 G
                         880.53 6.363E+00 ?   2.097E+01 9.50E+01 6.00E+00 GA

PA-234M  N   2.2369E+01                                     1.63E+12
                        1001.00 2.237E+01 ?(P 2.055E+02 2.53E+02 8.37E-01 G
                         766.41-7.178E+00 %   3.109E+02 1.08E+03 2.94E-01 G

U-235    N   1.1376E-01                                     2.57E+11
                         143.79-1.559E-01 ?(P 5.161E+00 9.80E+02 1.10E+01 G
                         205.33 7.037E-01 ?(  8.328E+00 3.97E+02 5.01E+00 G
                         163.38-2.446E-01 %   1.261E+01 1.45E+03 5.08E+00 G
                         185.72 1.682E-01     9.092E-01 1.90E+02 5.40E+01 GA

AM-241   T  -8.7488E-01                                     1.58E+05
                          59.54-8.749E-01 ?(P 1.863E+00 7.17E+01 3.59E+01 G

Np-237   F   1.6633E+00                                     2.14E+06
                          86.49 1.663E+00  (  3.432E+00 6.27E+01 1.31E+01 G

Ir-192   F  -3.1217E-01                                     7.40E+01
                         316.49-3.122E-01 ?(  1.080E+00 1.01E+02 8.70E+01 G
                         468.06-2.648E-02 %   2.241E+00 2.32E+03 5.18E+01 G
                         308.44 0.000E+00 +   3.678E+00 1.00E+03 3.18E+01 G

Np-239   T   5.6342E-02                                     2.36E+00
                         103.70 0.000E+00 -   2.154E+00 1.00E+03 2.40E+01 X
                         106.13 5.634E-02 %(  4.158E+00 2.14E+03 2.27E+01 G
                          99.50 3.007E-01 &   4.616E+00 4.41E+02 1.50E+01 X
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147		1.6124E+00					1.11E+01	
			531.00	1.612E+00	?(	7.106E+00	1.25E+02	1.30E+01 G
			91.10	1.615E-01	-	2.293E+00	4.07E+02	2.83E+01 G
Mo-99	I	5.5340E-01					2.75E+00	
			739.50	-1.689E-01	%(	1.091E+01	1.72E+03	1.21E+01 G
			181.07	2.016E+00	?(	6.918E+00	9.94E+01	5.99E+00 G
							Energy	duplication
			140.51	-1.090E-01	%	1.228E+01	3.15E+03	4.52E+00 G
			777.92	0.000E+00	-	3.242E+01	1.00E+03	4.26E+00 G
			366.42	1.006E+01	?	6.692E+01	1.86E+02	1.19E+00 GA
Ge-69	C	1.9377E-01					1.62E+00	
			1106.50	-1.665E-01	%(	6.810E+00	1.09E+03	2.60E+01 G
			574.00	9.875E-01	?(	9.279E+00	2.58E+02	1.18E+01 G
			872.00	0.000E+00	-	1.922E+01	1.00E+03	9.59E+00 G
Br-82	F	-3.5999E-01					1.47E+00	
			776.50	-3.600E-01	?(	1.437E+00	1.13E+02	8.34E+01 G
			554.34	8.361E-02	+	1.957E+00	6.49E+02	7.06E+01 G
			619.10	0.000E+00	+	4.404E+00	1.00E+03	4.31E+01 G
			1044.00	-3.415E+00	+	1.168E+01	1.01E+02	2.80E+01 G
			698.36	0.000E+00	+	4.705E+00	1.00E+03	2.79E+01 G
			1317.43	0.000E+00	+	4.878E+00	1.00E+03	2.70E+01 G
			827.79	-2.538E+00	+	5.651E+00	9.38E+01	2.42E+01 G
			1474.88	0.000E+00	+	4.898E+00	1.00E+03	1.66E+01 G
V-48	C	2.5765E-01					1.61E+01	
			983.50	-4.942E-01	?(	1.322E+00	1.10E+02	1.00E+02 G
			1311.60	5.072E-01	?(	7.477E-01	4.47E+01	9.80E+01 G
			944.30	6.599E+00	?(	6.948E+00	3.78E+01	8.00E+00 G
Sr-85	C	3.4012E-01					6.47E+01	
			513.99	3.401E-01	?(	1.341E+00	1.15E+02	9.93E+01 G
Rb-83	P	-1.9865E-01					8.62E+01	
			520.35	-1.986E-01	?(	1.578E+00	2.86E+02	4.61E+01 G
			529.54	-5.422E-01	+	3.262E+00	1.68E+02	3.00E+01 G
			552.50	-2.919E+00	+	8.019E+00	8.15E+01	1.63E+01 G
Kr-85	I	7.2012E+01					3.92E+03	
			513.98	7.201E+01	?(	3.399E+02	1.37E+02	4.30E-01 G
Cm-247	T	2.7952E-01					5.70E+09	
			402.40	2.225E-01	?(	9.205E-01	1.17E+02	7.20E+01 G
			84.00	4.581E-01	(	1.772E+00	1.12E+02	2.30E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Kr-85m   I   1.5582E-02                                      1.87E-01
                          151.00 1.558E-02 %(  5.895E-01 1.30E+03 7.55E+01 G
                          304.47 0.000E+00 &   8.591E+00 1.00E+03 1.40E+01 G

NB-94    I  -2.0043E-02                                      7.41E+06
                          702.63-2.004E-02 %(  1.352E+00 1.81E+03 9.79E+01 G
                          871.10-5.292E-01 +   1.567E+00 8.69E+01 9.99E+01 G

TL-210   N   8.1827E-02                                      5.84E+05
                          799.60 0.000E+00  (  1.490E+00 1.00E+03 9.90E+01 G
                          296.00 1.843E-01 ?(  1.108E+00 1.72E+02 7.90E+01 G
                         1313.00 0.000E+00 -   6.221E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	38.	-7.	-0.004	144.07	-4.867E+00	P
TH-227	50.14	15.	2.	0.001	333.54	6.904E-01	
AM-241	59.54	36.	-14.	-0.008	71.71	-8.749E-01	P
TH-234	63.29	43.	-6.	-0.003	149.77	-3.248E+00	P
Sn-126	64.28	34.	7.	0.004	117.67	1.534E+00	
BA-133	80.99	16.	6.	0.004	97.25	3.144E-01	
Cm-247	84.00	23.	6.	0.004	111.78	4.581E-01	
Np-237	86.49	29.	13.	0.007	62.74	1.663E+00	
EU-155	86.54	42.	13.	0.007	73.63	7.096E-01	
Sn-126	86.94	56.	3.	0.002	373.16	5.124E-01	
Sn-126	87.57	59.	3.	0.002	382.02	1.232E-01	
Cd-109	88.04	62.	3.	0.002	390.79	1.217E+00	
Hf-175	89.36	65.	3.	0.002	398.98	1.955E+00	
Nd-147	91.10	67.	3.	0.002	406.71	1.615E-01	
TH-234	92.59	92.	-19.	-0.010	68.61	-5.316E+00	P
AC-228	93.35	73.	3.	0.002	422.26	8.175E-01	
Se-75	96.73	76.	3.	0.002	428.53	1.322E+00	
Gd-153	97.50	79.	3.	0.002	436.09	1.506E-01	
Np-239	99.50	81.	3.	0.002	441.50	3.007E-01	
Gd-153	103.20	38.	-6.	-0.003	165.14	-3.881E-01	
EU-155	105.31	165.	-5.	-0.003	277.66	-3.391E-01	P
Se-75	121.12	26.	-2.	-0.001	398.97	-1.656E-01	
EU-154	123.10	35.	-8.	-0.004	114.46	-2.921E-01	
HF-181	136.30	58.	-6.	-0.004	175.11	-1.739E+00	
CO-57	136.47	64.	-10.	-0.006	116.28	-1.521E+00	
Tc-99m	140.51	22.	5.	0.003	131.07	9.966E-02	
U-235	143.79	46.	-1.	-0.001	980.27	-1.559E-01	P
Ba-140	162.66	42.	-8.	-0.005	115.67	-2.383E+00	
CE-139	165.85	25.	5.	0.003	136.50	1.211E-01	
Cf-251	176.60	27.	-9.	-0.005	111.34	-9.521E-01	
Mo-99	181.07	17.	6.	0.004	99.44	2.016E+00	
Lu-172	181.47	32.	-6.	-0.003	139.44	-5.969E-01	
U-235	185.72	23.	5.	0.003	189.92	1.682E-01	
TH-229	193.51	33.	-10.	-0.006	104.83	-4.699E+00	
U-235	205.33	13.	2.	0.001	397.49	7.037E-01	
TH-229	210.85	17.	3.	0.002	224.72	2.410E+00	
Cf-251	227.00	17.	1.	0.001	551.70	4.864E-01	
TH-227	235.97	29.	6.	0.003	136.01	1.134E+00	
PB-214	242.00	33.	6.	0.003	144.53	1.917E+00	
TH-227	256.24	11.	5.	0.003	131.91	1.815E+00	
Cd-113m	263.70	19.	-3.	-0.001	237.17	-1.156E+03	
BI-210M	265.83	39.	-9.	-0.005	100.83	-4.844E-01	
TL-208	277.28	31.	-9.	-0.005	97.14	-3.720E+00	
Hg-203	279.20	40.	-5.	-0.003	172.07	-1.791E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Se-75	279.54	40.	4.	0.002	219.75	4.590E-01	
I-131	284.30	12.	6.	0.003	120.76	2.517E+00	P
PB-214	295.09	33.	3.	0.002	300.30	4.098E-01	P
TL-210	296.00	36.	5.	0.003	172.10	1.843E-01	
PB-212	300.03	41.	5.	0.003	207.40	3.983E+00	P
PA-231	300.07	46.	5.	0.003	192.91	6.011E+00	
PA-233	300.18	51.	5.	0.003	202.81	2.386E+00	
PA-231	302.65	56.	5.	0.003	211.77	5.183E+00	
PA-233	312.01	76.	-6.	-0.004	198.87	-5.252E-01	
Ir-192	316.49	37.	-9.	-0.005	101.50	-3.122E-01	
CR-51	320.08	46.	-8.	-0.005	115.17	-2.506E+00	P
La-140	328.76	18.	-2.	-0.001	349.49	-3.592E-01	
Cf-249	333.44	15.	-5.	-0.003	160.36	-9.512E-01	
AC-228	338.32	9.	20.	0.011	31.15	5.284E+00	
HF-181	345.83	47.	-7.	-0.004	128.76	-1.594E+00	P
PB-214	351.93	18.	1.	0.001	516.22	1.050E-01	P
BA-133	356.00	18.	5.	0.003	119.89	2.887E-01	
I-131	364.48	12.	4.	0.002	125.98	1.748E-01	P
Mo-99	366.42	20.	4.	0.002	186.26	1.006E+01	
BA-133	383.84	28.	-2.	-0.001	308.54	-9.939E-01	
Se-75	400.66	12.	-1.	-0.001	500.00	-3.239E-01	
Cm-247	402.40	11.	4.	0.002	116.91	2.225E-01	
SB-125	427.88	8.	4.	0.002	160.94	4.838E-01	P
AG-108M	433.94	12.	-3.	-0.002	182.14	-1.431E-01	P
PM-146	453.88	12.	-3.	-0.002	174.56	-2.192E-01	P
SB-125	463.37	22.	-8.	-0.004	81.61	-3.000E+00	P
BE-7	477.59	7.	4.	0.002	111.19	1.554E+00	
RU-103	497.05	16.	-8.	-0.004	104.08	-3.879E-01	
RH-106	511.86	43.	12.	0.007	81.10	2.760E+00	
Kr-85	513.98	40.	7.	0.004	136.68	7.201E+01	
Sr-85	513.99	33.	7.	0.004	114.61	3.401E-01	
Rb-83	520.35	8.	-2.	-0.001	285.77	-1.986E-01	
Rb-83	529.54	16.	-4.	-0.002	167.82	-5.422E-01	
Nd-147	531.00	14.	4.	0.002	124.72	1.612E+00	
Ba-140	537.26	8.	-1.	-0.001	482.68	-2.492E-01	P
Rb-83	552.50	28.	-10.	-0.005	81.50	-2.919E+00	
Br-82	554.34	31.	1.	0.001	648.99	8.361E-02	
BI-207	569.70	20.	5.	0.003	125.31	2.695E-01	
Ge-69	574.00	17.	2.	0.001	258.33	9.875E-01	
TL-208	583.02	4.	2.	0.001	208.17	1.192E-01	
SB-125	600.50	18.	5.	0.003	141.20	1.320E+00	
SB-124	602.73	23.	5.	0.003	155.72	2.410E-01	
BI-214	609.31	35.	1.	0.001	594.46	1.626E-01	P
RU-103	610.30	37.	5.	0.003	192.45	4.181E+00	
AG-108M	614.28	41.	5.	0.003	202.93	2.698E-01	
PM-144	618.06	46.	4.	0.002	245.73	2.128E-01	
I-131	636.97	18.	-6.	-0.003	75.76	-4.556E+00	P
AG-110M	657.76	14.	3.	0.002	166.13	1.962E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-144	696.54	16.	-1.	-0.001	437.32	-7.870E-02		
SB-124	722.79	14.	-3.	-0.002	169.71	-1.859E+00		
BI-212	727.17	25.	-6.	-0.003	121.17	-4.948E+00		
PM-146	735.72	14.	2.	0.001	254.12	5.853E-01		P
PM-146	747.16	4.	3.	0.001	170.71	4.861E-01		
AG-110M	763.94	9.	-4.	-0.002	124.98	-1.039E+00		
NB-95	765.79	9.	3.	0.002	146.43	2.008E-01		
Br-82	776.50	12.	-5.	-0.003	113.39	-3.600E-01		
EU-152	778.92	11.	5.	0.003	101.68	2.523E+00		
CO-58	810.78	0.	6.	0.003	42.30	4.074E-01		P
Br-82	827.79	14.	-9.	-0.005	93.81	-2.538E+00		
MN-54	834.85	19.	-5.	-0.003	201.78	-3.175E-01		
Co-56	846.77	9.	1.	0.000	979.80	4.591E-02		
NB-94	871.10	18.	-8.	-0.004	86.92	-5.292E-01		
EU-154	873.23	14.	5.	0.003	106.88	3.079E+00		
PA-234	880.53	10.	5.	0.003	95.05	6.363E+00		
PA-234	883.24	26.	-3.	-0.002	272.26	-2.007E+00		
Y-88	898.04	0.	8.	0.004	35.36	6.173E-01		
AC-228	911.07	5.	3.	0.002	147.99	8.412E-01		
V-48	944.30	0.	7.	0.004	37.80	6.599E+00		
EU-152	964.11	8.	-5.	-0.003	95.83	-2.452E+00		
V-48	983.50	9.	-6.	-0.004	109.77	-4.942E-01		
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00		
PA-234M	1001.00	17.	2.	0.001	252.82	2.237E+01		P
EU-154	1004.77	30.	-8.	-0.004	102.64	-3.554E+00		
Co-56	1037.84	52.	-12.	-0.007	51.15	-6.804E+00		P
Br-82	1044.00	63.	-12.	-0.006	101.10	-3.415E+00		
Cs-136	1048.07	74.	-12.	-0.006	109.10	-1.195E+00		
RH-106	1050.36	75.	8.	0.004	161.39	4.109E+01		
BI-207	1063.66	15.	-7.	-0.004	127.38	-7.831E-01		
Ga-68	1077.40	5.	-3.	-0.002	173.74	-8.962E+00		
EU-152	1112.07	11.	1.	0.000	577.58	5.285E-01		
Ta-182	1121.30	10.	-5.	-0.003	139.40	-1.331E+00		
CO-60	1173.24	6.	1.	0.001	349.31	1.342E-01		P
Ta-182	1221.41	5.	-2.	-0.001	234.30	-8.091E-01		
FE-59	1291.60	5.	1.	0.000	796.87	1.514E-01		
V-48	1311.60	0.	5.	0.003	44.72	5.072E-01		
CO-60	1332.50	0.	6.	0.003	40.82	6.046E-01		
AG-110M	1384.30	11.	-6.	-0.003	137.58	-2.427E+00		
EU-152	1408.00	11.	-7.	-0.004	117.90	-3.350E+00		
K-40	1460.83	9.	-5.	-0.003	111.12	-5.543E+00		P
SB-124	1690.98	12.	-10.	-0.005	63.68	-2.474E+00		P
BI-214	1764.49	2.	-2.	-0.001	260.97	-2.073E+00		P
Y-88	1836.06	6.	-5.	-0.003	126.49	-6.655E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.5536E+00	1.5536E+00	1.112E+02%	6.15E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.16E-01
K-40	#A	-5.5435E+00	-5.5435E+00	1.111E+02%	1.74E+01
Sc-46	#A	-4.7816E-02	-4.7816E-02	1.039E+03%	1.82E+00
CR-51	#A	-2.5056E+00	-2.5056E+00	1.152E+02%	1.06E+01
MN-54	#A	-3.1745E-01	-3.1745E-01	2.018E+02%	1.55E+00
FE-59	#A	3.7519E-02	3.7519E-02	7.969E+02%	1.12E+00
Co-56	#A	4.5913E-02	4.5914E-02	9.798E+02%	1.17E+00
CO-57	#A	-3.0198E-03	-3.0198E-03	3.972E+03%	4.44E-01
CO-58	#A	4.0735E-01	4.0735E-01	4.230E+01%	4.92E-01
CO-60	#A	6.0460E-01	6.0460E-01	4.082E+01%	7.43E-01
ZN-65	#A	5.1095E-09	5.1095E-09	1.574E+10%	3.11E+00
ZR-95	#A	3.2674E-02	3.2674E-02	2.129E+03%	1.89E+00
NB-95	#A	2.0076E-01	2.0076E-01	1.464E+02%	1.07E+00
RU-103	#A	-3.8795E-01	-3.8795E-01	1.041E+02%	1.04E+00
RH-106	#A	6.0409E+00	6.0409E+00	1.614E+02%	1.91E+01
AG-108M	#A	6.2622E-02	6.2622E-02	1.363E+02%	8.29E-01
AG-110M	#A	1.9619E-01	1.9619E-01	1.661E+02%	1.17E+00
SN-113	#	1.4401E+00	1.4401E+00	2.166E+01%	5.69E-01
SB-124	#A	2.4096E-01	2.4096E-01	1.557E+02%	1.32E+00
SB-125	#A	7.9831E-01	7.9831E-01	1.071E+02%	2.12E+00
I-131	#A	3.3853E-01	3.3855E-01	8.725E+01%	7.80E-01
Gd-153	#A	1.5059E-01	1.5059E-01	4.361E+02%	2.28E+00
Ga-68	#A	-8.9009E+00	-8.9618E+00	1.737E+02%	3.92E+01
Tc-99m	#A	9.9536E-02	9.9663E-02	1.311E+02%	4.57E-01
BA-133	#A	2.8871E-01	2.8871E-01	1.199E+02%	1.21E+00
CS-134	#	1.3751E+00	1.3751E+00	2.357E+01%	5.63E-01
CS-137	#A	1.9581E-02	1.9581E-02	1.836E+03%	1.35E+00
CE-139	#A	1.2108E-01	1.2108E-01	1.365E+02%	5.77E-01
Ba-140	#A	-2.4919E-01	-2.4919E-01	4.827E+02%	3.11E+00
La-140	#A	-1.5185E-02	-1.5185E-02	4.909E+03%	9.06E-01
CE-141	#A	-2.9507E-02	-2.9507E-02	1.197E+03%	1.18E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.12E+00
PM-144	#A	6.7102E-02	6.7102E-02	2.457E+02%	1.27E+00
EU-152	#A	4.8801E-01	4.8801E-01	1.017E+02%	1.48E+00
EU-154	#A	1.1095E+00	1.1095E+00	6.018E+01%	1.15E+00
EU-155	#A	2.8122E-01	2.8122E-01	7.363E+01%	4.53E+00
HF-181	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.32E-01
Ta-182	#A	-1.3315E+00	-1.3315E+00	1.394E+02%	4.42E+00
Hg-203	#A	-1.7909E-01	-1.7909E-01	1.721E+02%	1.07E+00
TL-208	#A	1.1919E-01	1.1919E-01	2.082E+02%	7.17E-01
PM-146	#A	1.2711E-01	1.2711E-01	1.175E+02%	1.21E+00
Y-88	#A	-4.2366E-02	-4.2367E-02	3.536E+01%	1.88E+00

Cd-113m#A	-1.1565E+03	-1.1565E+03	2.372E+02%	9.91E+03
Cd-109 #A	1.2174E+00	1.2174E+00	3.908E+02%	1.66E+01
Se-75 #A	1.0966E-01	1.0966E-01	2.197E+02%	1.08E+00
Cf-251 #A	-9.5208E-01	-9.5208E-01	1.113E+02%	2.94E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.48E-01
Sn-126 #A	1.5335E+00	1.5335E+00	1.177E+02%	6.21E+00
PB-210 #A	-4.8668E+00	-4.8668E+00	1.441E+02%	2.31E+01
PB-212 #A	7.7809E-03	7.7809E-03	6.316E+03%	1.76E+00
PB-214 #A	2.0836E-01	2.0836E-01	2.986E+02%	1.97E+00
BI-207 #A	2.6954E-01	2.6954E-01	1.253E+02%	1.18E+00
BI-212 #A	-4.9481E+00	-4.9481E+00	1.212E+02%	2.08E+01
BI-214 #A	1.6257E-01	1.6257E-01	5.945E+02%	3.45E+00
BI-210M#A	-4.8438E-01	-4.8438E-01	1.008E+02%	1.66E+00
AC-228 #A	2.1424E+00	2.1424E+00	3.115E+01%	3.22E+00
TH-227 #A	1.1785E+00	1.1785E+00	1.279E+02%	6.59E+00
TH-229 #A	-4.6991E+00	-4.6991E+00	1.048E+02%	1.36E+01
TH-234 #A	-5.3159E+00	-5.3159E+00	6.861E+01%	1.34E+01
PA-231 #A	5.5641E+00	5.5641E+00	1.432E+02%	3.81E+01
PA-233 #A	-9.7589E-02	-9.7589E-02	1.420E+02%	3.60E+00
PA-234 #A	2.5857E-02	2.5857E-02	3.400E+03%	3.13E+00
PA-234M#A	2.2369E+01	2.2369E+01	2.528E+02%	2.05E+02
U-235 #A	1.1376E-01	1.1376E-01	3.975E+02%	5.16E+00
AM-241 #A	-8.7488E-01	-8.7488E-01	7.171E+01%	1.86E+00
Np-237 #A	1.6633E+00	1.6633E+00	6.274E+01%	3.43E+00
Ir-192 #A	-3.1216E-01	-3.1217E-01	1.015E+02%	1.08E+00
Cs-136 #A	0.0000E+00	0.0000E+00	7.071E+02%	4.93E-01
Np-239 #A	5.6335E-02	5.6342E-02	2.144E+03%	4.16E+00
Nd-147 #A	1.6123E+00	1.6124E+00	1.247E+02%	7.11E+00
Mo-99 #A	5.5334E-01	5.5340E-01	9.944E+01%	1.09E+01
Ge-69 #A	1.9373E-01	1.9377E-01	2.583E+02%	6.81E+00
Br-82 #A	-3.5991E-01	-3.5999E-01	1.134E+02%	1.44E+00
V-48 #A	2.5765E-01	2.5765E-01	3.780E+01%	1.32E+00
Sr-85 #A	3.4012E-01	3.4012E-01	1.146E+02%	1.34E+00
Rb-83 #A	-1.9865E-01	-1.9865E-01	2.858E+02%	1.58E+00
Kr-85 #A	7.2012E+01	7.2012E+01	1.367E+02%	3.40E+02
Cm-247 #A	2.7952E-01	2.7952E-01	8.088E+01%	9.21E-01
Hf-175 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.04E+00
Lu-172 #A	0.0000E+00	0.0000E+00	7.071E+02%	8.36E-01
Kr-85m #A	1.5555E-02	1.5582E-02	1.295E+03%	5.89E-01
NB-94 #A	-2.0043E-02	-2.0043E-02	1.808E+03%	1.35E+00
TL-210 #A	8.1827E-02	8.1827E-02	1.721E+02%	1.49E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   -----------------------------
Total Activity (   37.6 to  2000.8 keV)     0.000E+00  Bq/Sample
Total Decayed Activity (   37.6 to  2000.8 keV) 0.0000000E+00  Bq/Sample


The library has energies which are not separable.
```

Test America St. Louis Spectrum ID: 5_Gamma_20182910

Sample Description: 379959_Gamma_MB 160-379959~1-A
Detector: Detector # 5
Batch ID: 379959
Work Order Number: Gamma
Lot Number: MB 160-379959~1-A

Decay to Time: 8/23/2018 07:50 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:50:40 Real Time: 1810 sec
Analysis Time: 8/28/2018 12:35 Dead Time: 0.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Long_Rev14.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.554E+00	111.2	1.727E+00	1.729E+00	6.154E+00
NA-22	0.000E+00	1.#INF	9.710E-02	9.710E-02	7.156E-01
K-40	-5.543E+00	111.1	6.160E+00	6.166E+00	1.737E+01
Sc-46	-4.782E-02	1039.2	4.969E-01	4.969E-01	1.820E+00
CR-51	-2.506E+00	115.2	2.886E+00	2.889E+00	1.056E+01
MN-54	-3.175E-01	201.8	6.406E-01	6.408E-01	1.554E+00
FE-59	3.752E-02	796.9	2.990E-01	2.990E-01	1.118E+00
Co-56	4.591E-02	979.8	4.499E-01	4.499E-01	1.167E+00
CO-57	1.812E-02	741.6	1.344E-01	1.344E-01	4.878E-01
CO-58	6.516E-01	32.9	2.144E-01	2.170E-01	4.918E-01
CO-60	6.046E-01	40.8	2.468E-01	2.487E-01	7.427E-01
ZN-65	0.000E+00	1.#INF	2.425E-01	2.425E-01	3.114E+00
NB-94	-2.205E-01	172.0	3.792E-01	3.794E-01	9.878E-01
ZR-95	3.267E-02	2128.8	6.956E-01	6.956E-01	1.894E+00
NB-95	2.008E-01	146.4	2.940E-01	2.941E-01	1.066E+00
RU-103	-3.879E-01	104.1	4.038E-01	4.043E-01	1.035E+00
RH-106	4.410E+00	100.4	4.428E+00	4.434E+00	1.909E+01
AG-108M	6.262E-02	136.3	8.538E-02	8.544E-02	8.286E-01
AG-110M	1.110E-01	166.1	1.844E-01	1.844E-01	2.462E+00
SN-113	1.440E+00	21.7	3.119E-01	3.205E-01	5.692E-01
SB-124	2.410E-01	155.7	3.752E-01	3.754E-01	1.322E+00
SB-125	7.983E-01	107.1	8.546E-01	8.556E-01	2.123E+00
I-131	3.737E-01	81.7	3.052E-01	3.058E-01	6.496E-01
Gd-153	-1.380E-01	309.2	4.269E-01	4.270E-01	1.519E+00
Ga-68	-8.962E+00	173.7	1.557E+01	1.558E+01	3.922E+01
Tc-99m	9.398E-02	184.4	1.733E-01	1.734E-01	6.049E-01
BA-133	2.887E-01	119.9	3.461E-01	3.465E-01	1.210E+00
CS-134	7.548E-01	23.6	1.779E-01	1.822E-01	1.447E+00
CS-137	1.958E-02	1836.1	3.595E-01	3.595E-01	1.348E+00
CE-139	1.211E-01	136.5	1.653E-01	1.657E-01	5.772E-01
Ba-140	-2.492E-01	482.7	1.203E+00	1.203E+00	3.111E+00
La-140	-1.518E-02	4909.3	7.455E-01	7.455E-01	9.063E-01
CE-141	7.369E-02	383.3	2.824E-01	2.825E-01	8.253E-01

CE-144	0.000E+00	1.#INF	2.032E-01	2.032E-01	5.263E+00
PM-144	2.495E-01	98.7	2.462E-01	2.465E-01	7.326E-01
EU-152	5.170E-01	162.7	8.409E-01	8.413E-01	3.407E+00
EU-154	3.609E+00	69.8	2.520E+00	2.527E+00	1.148E+01
EU-155	-7.546E-01	87.3	6.591E-01	6.604E-01	3.731E+00
HF-181	0.000E+00	1.#INF	5.337E-02	5.337E-02	6.316E-01
Ta-182	-2.913E-01	378.5	1.102E+00	1.103E+00	4.199E+00
Hg-203	-1.163E-02	2369.1	2.755E-01	2.755E-01	9.962E-01
TL-208	1.192E-01	208.2	2.481E-01	2.482E-01	7.170E-01
pm-146	4.895E-01	170.7	8.356E-01	8.360E-01	2.262E+00
y-88	-1.029E-01	493.7	5.080E-01	5.080E-01	1.308E+00
Cd-113m	-4.277E+03	98.9	4.231E+03	4.240E+03	1.438E+04
Cd-109	0.000E+00	1.#INF	8.469E-01	8.469E-01	1.934E+01
Cf-251	-9.521E-01	111.3	1.060E+00	1.063E+00	2.941E+00
Cf-249	0.000E+00	1.#INF	1.087E-01	1.087E-01	5.475E-01
Sn-126	-1.454E+00	151.9	2.209E+00	2.210E+00	7.612E+00
PB-210	-4.867E+00	144.1	7.011E+00	7.017E+00	2.308E+01
PB-212	-6.813E-01	71.5	4.870E-01	4.890E-01	1.991E+00
PB-214	2.084E-01	298.6	6.222E-01	6.223E-01	1.968E+00
BI-207	0.000E+00	1.#INF	1.011E-01	1.011E-01	4.700E-01
BI-212	-4.948E+00	121.2	5.996E+00	6.001E+00	2.081E+01
U-235	1.138E-01	397.5	4.522E-01	4.522E-01	5.161E+00
BI-214	1.626E-01	594.5	9.664E-01	9.664E-01	3.449E+00
BI-210M	-3.303E-01	157.3	5.196E-01	5.200E-01	1.798E+00
AC-228	2.142E+00	31.1	6.673E-01	6.762E-01	3.224E+00
TH-227	1.215E+00	131.9	1.603E+00	1.604E+00	7.166E+00
TH-229	-4.699E+00	104.8	4.926E+00	4.941E+00	1.356E+01
TH-234	6.953E+00	65.3	4.539E+00	4.554E+00	1.349E+01
PA-231	5.564E+00	143.2	7.969E+00	7.975E+00	3.811E+01
PA-233	-9.759E-02	142.0	1.386E-01	1.387E-01	3.598E+00
PA-234	6.097E-01	207.0	1.262E+00	1.263E+00	3.195E+00
PA-234M	2.237E+01	252.8	5.655E+01	5.657E+01	2.055E+02
AM-241	-8.749E-01	71.7	6.274E-01	6.290E-01	1.863E+00
Np-237	-1.120E+00	165.3	1.852E+00	1.853E+00	6.313E+00
Ir-192	-3.122E-01	101.5	3.168E-01	3.174E-01	1.080E+00
Cs-136	0.000E+00	1.#INF	2.317E-01	2.317E-01	4.930E-01
Np-239	-6.591E-01	160.1	1.055E+00	1.056E+00	3.590E+00
Nd-147	5.113E-02	693.9	3.548E-01	3.548E-01	5.694E+00
TL-210	8.183E-02	172.1	1.408E-01	1.409E-01	1.490E+00
Total	5.639E+01				

Analyst: kody Saulters

TestAmerica Inc Spectrum name: 5_Gamma_20182910.An1

Sample description
379959_Gamma_MB 160-379959~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182910.An1

Acquisition information
Start time: 8/23/2018 7:50:40 AM
Live time: 1800
Real time: 1810
Dead time: 0.55 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1614

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-7.	144.07	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	333.54	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.37	13.	65.28	0.74	2.712E-02	63.29	3.810	PBC<MDA	TH234
80.99	4.	174.40	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
91.10	1.	962.42	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.72	6.	143.73	0.79	3.527E-02	92.59	5.584	PBC<MDA	TH234
122.06	1.	741.62	0.86	3.582E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.812E-02	CO57
140.51	5.	184.39	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m
145.44	2.	383.27	0.88	3.351E-02	145.44	48.200	PBC<MDA	CE141
165.85	5.	136.50	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
185.72	5.	189.92	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
205.33	2.	397.49	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	224.72	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	1.	551.70	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
244.69	6.	162.66	0.98	2.272E-02	244.69	7.580	PBC<MDA	EU152
256.24	5.	131.91	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
284.30	6.	120.76	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.09	3.	300.30	1.03	1.945E-02	295.09	19.300	PBC<MDA	PB214
296.00	5.	172.10	1.03	1.940E-02	296.00	79.000	PBC<MDA	TL210
300.03	5.	207.40	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.18	6.200	PBC<MDA	PA233
300.07	5.	192.91	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
300.18	5.	202.81	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
302.65	5.	211.77	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.148E-01	BA133
338.32	20.	31.15	1.07	1.736E-02	338.32	12.010	5.284E+00	AC228
351.93	1.	516.22	1.09	1.680E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	119.89	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	5.	110.03	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
391.69	26.	21.66	1.12	1.537E-02	391.69	64.000	1.440E+00	SN113
427.88	4.	160.94	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
477.60	4.	111.19	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
511.86	14.	111.05	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
563.24	1.	404.15	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.32	2.	158.11	1.29	1.125E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.204E+00	PA234
					569.70	97.740	1.011E-01	BI207
583.02	2.	208.17	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
600.50	5.	141.20	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	155.72	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	168.97	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.31	1.	594.46	1.32	1.063E-02	609.31	46.090	PBC<MDA	BI214
610.30	5.	192.45	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	202.93	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
618.06	4.	245.73	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
657.76	3.	166.13	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
696.54	5.	98.67	1.40	9.507E-03	696.54	99.000	PBC<MDA	PM144
735.72	2.	343.42	1.43	9.081E-03	735.72	22.500	PBC<MDA	pm146
747.16	3.	170.71	1.44	8.965E-03	747.16	34.000	PBC<MDA	pm146
765.79	3.	146.43	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.819E+01	PA234M
778.92	1.	354.44	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	18.	23.57	1.48	8.503E-03	795.87	85.530	1.375E+00	CS134
810.78	10.	32.91	1.49	8.371E-03	810.78	99.460	6.516E-01	CO58
846.77	1.	979.80	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
873.23	5.	106.88	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	5.	95.05	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
911.07	3.	147.99	1.57	7.591E-03	911.07	29.000	PBC<MDA	AC228
946.02	2.	207.02	1.60	7.355E-03	946.02	13.400	PBC<MDA	PA234
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	252.82	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	6.	100.41	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1173.24	1.	349.31	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	1.	796.87	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.50	6.	40.82	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1764.49	-2.	260.97	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	38.	-7.	-0.004	144.07	0.783
TH-227	200.11	50.14	15.	2.	0.001	333.54	0.787
AM-241	237.72	59.54	36.	-14.	-0.008	71.71	0.797s
TH-234	253.06	63.37	23.	13.	0.007	65.28	0.738s
Sn-126	256.71	64.28	53.	-7.	-0.004	151.86	0.802s
BA-133	323.61	80.99	17.	4.	0.002	174.40	0.819s
Np-237	345.63	86.49	108.	-9.	-0.005	165.32	0.825s
EU-155	345.84	86.54	99.	-9.	-0.005	158.52	0.825s
Sn-126	347.43	86.94	90.	-5.	-0.003	280.07	0.825s
Sn-126	349.95	87.57	85.	0.	0.000	1000.00	0.826s
Cd-109	351.83	88.04	85.	0.	0.000	1000.00	0.826s
Nd-147	364.08	91.10	82.	1.	0.001	962.42	0.829s
TH-234	370.59	92.72	30.	6.	0.003	143.73	0.788
AC-228	373.09	93.35	92.	-8.	-0.005	163.65	0.832s
Gd-153	389.70	97.50	33.	-3.	-0.001	309.23	0.836s
Np-239	397.71	99.50	35.	0.	0.000	1000.00	0.838s
Gd-153	412.52	103.20	38.	-6.	-0.003	165.14	0.842s
Np-239	414.52	103.70	44.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	110.	-10.	-0.006	87.34	0.844s
Np-239	424.25	106.13	117.	-10.	-0.005	160.09	0.845s
EU-152	486.88	121.78	29.	-6.	-0.003	133.33	0.861s
CO-57	488.03	122.06	27.	1.	0.001	741.62	0.861s
EU-154	492.18	123.10	38.	-7.	-0.004	124.98	0.862s
CE-144	533.97	133.54	53.	0.	0.000	1000.00	0.873s
HF-181	545.02	136.30	53.	0.	0.000	1000.00	0.876s
CO-57	545.72	136.47	60.	-10.	-0.006	113.15	0.876s
Tc-99m	561.88	140.51	40.	5.	0.003	184.39	0.880s
CE-141	581.61	145.44	21.	2.	0.001	383.27	0.885s
Ba-140	650.54	162.66	42.	-8.	-0.005	115.67	0.902s
CE-139	663.32	165.85	25.	5.	0.003	136.50	0.905
Cf-251	706.34	176.60	27.	-9.	-0.005	111.34	0.916s
U-235	742.85	185.72	23.	5.	0.003	189.92	0.925s
TH-229	774.03	193.51	33.	-10.	-0.006	104.83	0.933
U-235	821.35	205.33	13.	2.	0.001	397.49	0.945s
TH-229	843.44	210.85	17.	3.	0.002	224.72	0.950s
Cf-251	908.08	227.00	17.	1.	0.001	551.70	0.966s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	954.64	238.63	51.	-12.	-0.007	71.48	0.978
PB-214	968.10	242.00	55.	-5.	-0.003	230.11	0.981s
EU-152	978.89	244.69	52.	6.	0.004	162.66	0.984
TH-227	1025.11	256.24	11.	5.	0.003	131.91	0.995s
Cd-113m	1054.97	263.70	43.	-10.	-0.005	98.93	1.002s
BI-210M	1063.50	265.83	46.	-6.	-0.004	157.32	1.005s
TL-208	1109.33	277.28	31.	-9.	-0.005	97.14	1.016
I-131	1137.41	284.30	12.	6.	0.003	120.76	1.022s
PB-214	1180.60	295.09	33.	3.	0.002	300.30	1.033s
TL-210	1184.24	296.00	36.	5.	0.003	172.10	1.034s
PB-212	1200.37	300.03	41.	5.	0.003	207.40	1.038
PA-231	1200.53	300.07	46.	5.	0.003	192.91	1.038
PA-233	1200.97	300.18	51.	5.	0.003	202.81	1.038
PA-231	1210.86	302.65	56.	5.	0.003	211.77	1.040s
Ba-140	1219.66	304.85	62.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	62.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	62.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	76.	-6.	-0.004	198.87	1.049s
Ir-192	1266.25	316.49	37.	-9.	-0.005	101.50	1.053s
CR-51	1280.63	320.08	46.	-8.	-0.005	115.17	1.057s
La-140	1315.35	328.76	18.	-2.	-0.001	349.49	1.065s
Cf-249	1334.08	333.44	15.	-5.	-0.003	160.36	1.070s
AC-228	1353.61	338.32	9.	20.	0.011	31.15	1.074s
Cs-136	1362.62	340.57	29.	0.	0.000	1000.00	1.077s
EU-152	1377.49	344.29	29.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	47.	-7.	-0.004	128.76	1.082s
PB-214	1408.09	351.93	18.	1.	0.001	516.22	1.087s
BA-133	1424.36	356.00	18.	5.	0.003	119.89	1.091s
I-131	1458.32	364.48	8.	5.	0.003	110.03	1.099s
BA-133	1535.78	383.84	28.	-2.	-0.001	308.54	1.117s
Cf-249	1552.22	387.95	2.	0.	0.000	1000.00	1.121
SN-113	1567.19	391.69	2.	26.	0.014	21.66	1.125s
SB-125	1711.99	427.88	8.	4.	0.002	160.94	1.158s
AG-108M	1736.25	433.94	12.	-3.	-0.002	182.14	1.164s
pm-146	1816.05	453.88	12.	-3.	-0.002	174.56	1.182
SB-125	1854.01	463.37	22.	-8.	-0.004	81.61	1.191s
BE-7	1910.94	477.59	7.	4.	0.002	111.19	1.204s
HF-181	1928.56	482.00	4.	0.	0.000	1000.00	1.208s
La-140	1948.65	487.02	8.	0.	0.000	1000.00	1.212s
RU-103	1988.80	497.05	16.	-8.	-0.004	104.08	1.221s
RH-106	2048.06	511.86	33.	14.	0.008	111.05	2.485s
Nd-147	2124.62	531.00	8.	0.	0.000	1000.00	1.252s
Ba-140	2149.67	537.26	8.	-1.	-0.001	482.68	1.258s
CS-134	2253.60	563.24	4.	1.	0.001	404.15	1.280s
CS-134	2277.94	569.32	4.	2.	0.001	158.11	1.286s
PA-234	2278.54	569.47	2.	0.	0.000	1000.00	1.286s
BI-207	2279.47	569.70	2.	0.	0.000	1000.00	1.286s
TL-208	2332.76	583.02	4.	2.	0.001	208.17	1.298s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2402.69	600.50	18.	5.	0.003	141.20	1.313s
SB-124	2411.61	602.73	23.	5.	0.003	155.72	1.315s
CS-134	2419.53	604.71	28.	5.	0.003	168.97	1.317s
BI-214	2437.93	609.31	35.	1.	0.001	594.46	1.321s
RU-103	2441.89	610.30	37.	5.	0.003	192.45	1.322s
AG-108M	2457.82	614.28	41.	5.	0.003	202.93	1.325s
PM-144	2472.94	618.06	46.	4.	0.002	245.73	1.328s
I-131	2548.61	636.97	18.	-6.	-0.003	75.76	1.345s
AG-110M	2631.76	657.76	14.	3.	0.002	166.13	1.362s
PM-144	2786.90	696.54	4.	5.	0.003	98.67	1.395s
NB-94	2811.25	702.63	9.	-4.	-0.002	172.01	1.400s
SB-124	2891.88	722.79	14.	-3.	-0.002	169.71	1.417s
AG-108M	2892.48	722.94	18.	0.	0.000	1000.00	1.417s
EU-154	2894.16	723.36	18.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	18.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	25.	-6.	-0.003	121.17	1.421s
pm-146	2943.61	735.72	9.	2.	0.001	343.42	1.428s
pm-146	2989.37	747.16	4.	3.	0.001	170.71	1.437s
AG-110M	3056.50	763.94	9.	-4.	-0.002	124.98	1.451s
NB-95	3063.89	765.79	9.	3.	0.002	146.43	1.453s
EU-152	3116.41	778.92	5.	1.	0.001	354.44	1.463s
BI-212	3142.41	785.42	0.	0.	0.000	1000.00	1.468s
CS-134	3184.19	795.87	0.	18.	0.010	23.57	1.477s
TL-210	3199.12	799.60	18.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	18.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	0.	10.	0.005	32.91	1.489s
Cs-136	3274.72	818.50	0.	0.	0.000	1000.00	1.495s
MN-54	3340.10	834.85	19.	-5.	-0.003	201.78	1.508s
Co-56	3387.78	846.77	9.	1.	0.000	979.80	1.518s
NB-94	3485.08	871.10	18.	-8.	-0.004	86.92	1.537s
EU-154	3493.61	873.23	14.	5.	0.003	106.88	1.539s
PA-234	3522.80	880.53	10.	5.	0.003	95.05	1.544s
PA-234	3533.64	883.24	26.	-3.	-0.002	272.26	1.547s
AG-110M	3539.41	884.68	23.	0.	0.000	1000.00	1.547s
y-88	3592.83	898.04	9.	-1.	-0.001	493.71	1.558s
AC-228	3644.94	911.07	5.	3.	0.002	147.99	1.568s
AG-110M	3750.60	937.49	0.	0.	0.000	1000.00	1.589
PA-234	3784.70	946.02	5.	2.	0.001	207.02	1.595s
EU-152	3857.05	964.11	0.	0.	0.000	1000.00	1.609s
AC-228	3876.48	968.97	8.	-5.	-0.003	93.68	1.612s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s
PA-234M	4004.55	1001.00	17.	2.	0.001	252.82	1.636s
EU-154	4019.65	1004.77	30.	-8.	-0.004	102.64	1.639s
Co-56	4151.87	1037.84	20.	-12.	-0.007	51.15	1.664s
Cs-136	4192.77	1048.07	12.	-6.	-0.003	91.29	1.671s
RH-106	4201.93	1050.36	12.	6.	0.003	100.41	1.673s
BI-207	4255.11	1063.66	15.	-7.	-0.004	127.38	1.682s
Ga-68	4310.04	1077.40	5.	-3.	-0.002	173.74	1.692s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZN-65	4462.56	1115.55	11.	0.	0.000	1000.00	1.720s
Ta-182	4485.56	1121.30	9.	-1.	-0.001	378.50	1.724s
CO-60	4693.21	1173.24	6.	1.	0.001	349.31	1.760s
Ta-182	4756.42	1189.05	0.	0.	0.000	1000.00	1.771s
Ta-182	4885.79	1221.41	5.	-2.	-0.001	234.30	1.793s
NA-22	5098.13	1274.53	0.	0.	0.000	1000.00	1.828s
EU-154	5098.19	1274.54	0.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	1.	0.000	796.87	1.840s
TL-210	5251.91	1313.00	0.	0.	0.000	1000.00	1.854s
CO-60	5329.85	1332.50	0.	6.	0.003	40.82	1.866s
AG-110M	5536.88	1384.30	11.	-6.	-0.003	137.58	1.899s
EU-152	5631.62	1408.00	11.	-7.	-0.004	117.90	1.914s
K-40	5842.75	1460.83	9.	-5.	-0.003	111.12	1.946s
SB-124	6762.39	1690.98	12.	-10.	-0.005	63.68	2.076s
BI-214	7056.06	1764.49	2.	-2.	-0.001	260.97	2.114s
Co-56	7083.46	1771.35	0.	0.	0.000	1000.00	2.117s
y-88	7341.96	1836.06	6.	-5.	-0.003	126.49	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	1.5536E+00					5.31E+01
			477.60	1.554E+00	?(	6.154E+00	1.11E+02 1.05E+01 G
K-40	N	-5.5435E+00					4.66E+11
			1460.83	-5.543E+00	?(P	1.737E+01	1.11E+02 1.07E+01 G
Sc-46	F	-4.7816E-02					8.38E+01
			889.28	-4.782E-02	%(	1.820E+00	1.04E+03 1.00E+02 G
			1120.55	-2.734E-02	% P	1.601E+00	1.98E+03 1.00E+02 G
CR-51	F	-2.5056E+00					2.77E+01
			320.08	-2.506E+00	?(P	1.056E+01	1.15E+02 9.94E+00 G
MN-54	C	-3.1745E-01					3.12E+02
			834.85	-3.175E-01	?(	1.554E+00	2.02E+02 1.00E+02 G
FE-59	F	3.7519E-02					4.45E+01
			1099.25	-4.959E-02	%(P	1.118E+00	1.86E+03 5.65E+01 G
			1291.60	1.514E-01	?(	3.060E+00	7.97E+02 4.32E+01 G

Nuclide	Ave activity		Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	4.5914E-02					7.73E+01	
			846.77	4.591E-02	?(	1.167E+00	9.80E+02	9.99E+01 G
			1238.28	-3.132E-02	% P	1.057E+00	2.39E+03	6.61E+01 G
			1037.84	-6.804E+00	+ P	1.367E+01	5.11E+01	1.41E+01 G
			1771.35	0.000E+00	-	6.098E+00	1.00E+03	1.55E+01 A
CO-57	C	1.8119E-02					2.72E+02	
			122.06	1.812E-02	?(	4.878E-01	7.42E+02	8.56E+01 G
			136.47	-1.521E+00	+	5.855E+00	1.13E+02	1.07E+01 G
CO-58	C	6.5157E-01					7.09E+01	
			810.78	6.516E-01	?(P	4.918E-01	3.29E+01	9.95E+01 G
CO-60	F	6.0460E-01					1.93E+03	
			1332.50	6.046E-01	?(	7.427E-01	4.08E+01	1.00E+02 G
			1173.24	1.342E-01	- P	1.237E+00	3.49E+02	9.99E+01 G
NB-94	I	-2.2047E-01					7.41E+06	
			702.63	-2.205E-01	?(	9.878E-01	1.72E+02	9.79E+01 G
			871.10	-5.292E-01	+	1.567E+00	8.69E+01	9.99E+01 G
ZR-95	I	3.2674E-02					6.40E+01	
			756.73	3.267E-02	%(P	1.894E+00	2.13E+03	5.45E+01 G
			724.20	0.000E+00	-	3.049E+00	1.00E+03	4.42E+01 G
NB-95	I	2.0076E-01					6.40E+01	
			765.79	2.008E-01	?(	1.066E+00	1.46E+02	9.98E+01 G
RU-103	I	-3.8795E-01					3.93E+01	
			497.05	-3.879E-01	?(	1.035E+00	1.04E+02	9.09E+01 G
			610.30	4.181E+00	?	2.819E+01	1.92E+02	5.75E+00 GA
RH-106	I	4.4103E+00					3.74E+02	
			621.92	5.353E-01	%(	1.909E+01	1.00E+03	9.93E+00 G
			1050.36	2.908E+01	?(	1.014E+02	1.00E+02	1.56E+00 G
			511.86	3.087E+00	?	6.689E+00	1.11E+02	2.00E+01 GA
AG-108M	C	6.2622E-02					1.53E+05	
			433.94	-1.431E-01	?(P	8.286E-01	1.82E+02	9.05E+01 G
			722.94	0.000E+00	+	1.480E+00	1.00E+03	9.08E+01 G
			614.28	2.698E-01	?(	1.914E+00	2.03E+02	8.98E+01 G
AG-110M	F	1.1097E-01					2.50E+02	
			884.68	0.000E+00	?(	2.462E+00	1.00E+03	7.27E+01 G
			657.76	1.962E-01	?(	1.173E+00	1.66E+02	9.46E+01 G
			937.49	0.000E+00	&	1.608E+00	1.00E+03	3.44E+01 G
			1384.30	-2.427E+00	+	7.679E+00	1.38E+02	2.43E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			763.94	-1.039E+00	+	4.656E+00	1.25E+02	2.23E+01 G
SN-113	F	1.4401E+00					1.15E+02	
			391.69	1.440E+00	?(	5.692E-01	2.17E+01	6.40E+01 G
SB-124	F	2.4096E-01					6.02E+01	
			602.73	2.410E-01	?(	1.322E+00	1.56E+02	9.83E+01 G
			1690.98	-2.474E+00	+ P	4.789E+00	6.37E+01	4.78E+01 G
			722.79	-1.859E+00	+	1.135E+01	1.70E+02	1.08E+01 G
SB-125	I	7.9831E-01					1.01E+03	
			427.88	4.838E-01	?(P	2.123E+00	1.61E+02	2.96E+01 G
			600.50	1.320E+00	?(	6.576E+00	1.41E+02	1.79E+01 G
			635.89	1.254E-01	% P	8.260E+00	1.70E+03	1.13E+01 G
			463.37	-3.000E+00	+ P	9.732E+00	8.16E+01	1.05E+01 G
I-131	I	3.7365E-01					8.02E+00	
			364.48	2.125E-01	?(P	6.496E-01	1.10E+02	8.17E+01 G
			284.30	2.517E+00	(P	8.375E+00	1.21E+02	6.14E+00 G
			636.97	-4.556E+00	+ P	1.701E+01	7.58E+01	7.17E+00 G
Gd-153	F	-1.3804E-01					2.42E+02	
			97.50	-1.380E-01	?(	1.519E+00	3.09E+02	3.00E+01 G
			103.20	-3.881E-01	&	2.231E+00	1.65E+02	2.18E+01 G
Ga-68	C	-8.9618E+00					4.71E-02	
			1077.40	-8.962E+00	?(	3.922E+01	1.74E+02	3.30E+00 G
Tc-99m	I	9.3979E-02					2.51E-01	
			140.51	9.398E-02	?(	6.049E-01	1.84E+02	8.93E+01 G
BA-133	F	2.8871E-01					3.85E+03	
			356.00	2.887E-01	?(	1.210E+00	1.20E+02	6.20E+01 G
			302.85	1.173E-01	%	6.239E+00	1.51E+03	1.83E+01 G
			383.84	-9.939E-01	+	1.097E+01	3.09E+02	8.94E+00 GA
			80.99	2.129E-01	?	1.068E+00	1.74E+02	3.41E+01 GA
CS-134	I	7.5479E-01					7.54E+02	
			604.71	2.435E-01	?(	1.447E+00	1.69E+02	9.76E+01 G
			795.87	1.375E+00	?(	5.630E-01	2.36E+01	8.55E+01 G
			569.32	6.420E-01	?(	3.862E+00	1.58E+02	1.54E+01 G
			801.95	0.000E+00	-	1.701E+01	1.00E+03	8.69E+00 G
			563.24	5.860E-01	?(	7.049E+00	4.04E+02	8.35E+00 G
CS-137	I	1.9581E-02					1.10E+04	
			661.66	1.958E-02	%(P	1.348E+00	1.84E+03	8.52E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	1.2108E-01					1.38E+02	
			165.85	1.211E-01	&(	5.772E-01	1.36E+02	7.99E+01 G
Ba-140	I	-2.4919E-01					1.28E+01	
			537.26	-2.492E-01	?(P	3.111E+00	4.83E+02	2.44E+01 G
			162.66	-2.383E+00	+	9.443E+00	1.16E+02	6.22E+00 G
			304.85	0.000E+00	+	2.696E+01	1.00E+03	4.29E+00 G
La-140	I	-1.5185E-02					1.28E+01	
			1596.21	-1.518E-02	%(P	9.063E-01	4.91E+03	9.54E+01 G
			487.02	0.000E+00	+	1.514E+00	1.00E+03	4.55E+01 G
			328.76	-3.592E-01	+	3.488E+00	3.49E+02	2.03E+01 G
			815.77	-5.737E-02	% P	5.041E+00	1.65E+03	2.33E+01 G
CE-141	I	7.3690E-02					3.25E+01	
			145.44	7.369E-02	?(P	8.253E-01	3.83E+02	4.82E+01 G
PM-144	C	2.4953E-01					3.63E+02	
			696.54	2.863E-01	&(	7.326E-01	9.87E+01	9.90E+01 G
			618.06	2.128E-01	?(	1.831E+00	2.46E+02	9.91E+01 G
EU-152	F	5.1695E-01					4.94E+03	
			344.29	0.000E+00	?(	3.407E+00	1.00E+03	2.65E+01 G
			1112.07	2.114E-01	%	1.137E+01	1.40E+03	1.36E+01 G
			121.78	-3.255E-01	+	1.508E+00	1.33E+02	2.86E+01 G
			778.92	6.612E-01	?(	6.336E+00	3.54E+02	1.29E+01 G
			964.11	0.000E+00	-	3.873E+00	1.00E+03	1.46E+01 G
			244.69	2.078E+00	&(P	1.167E+01	1.63E+02	7.58E+00 G
			1408.00	-3.350E+00	+	9.008E+00	1.18E+02	2.10E+01 GA
EU-154	I	3.6094E+00					3.14E+03	
			873.23	3.079E+00	?(	1.148E+01	1.07E+02	1.23E+01 G
			123.10	-2.794E-01	-	1.202E+00	1.25E+02	4.08E+01 G
			1274.54	0.000E+00	-	2.032E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	6.651E+00	1.00E+03	2.02E+01 G
			1004.77	-3.554E+00	+	1.249E+01	1.03E+02	1.80E+01 G
			996.33	4.224E+00	?(	1.308E+01	8.99E+01	1.06E+01 G
EU-155	I	-7.5463E-01					1.81E+03	
			105.31	-7.546E-01	?(P	3.731E+00	8.73E+01	2.12E+01 G
			86.54	-4.779E-01	+	2.584E+00	1.59E+02	3.07E+01 G
Ta-182	F	-2.9126E-01					1.14E+02	
			1121.30	-2.913E-01	?(	4.199E+00	3.79E+02	3.49E+01 G
			1221.41	-8.091E-01	+	4.672E+00	2.34E+02	2.70E+01 G
			1189.05	0.000E+00	+	4.164E+00	1.00E+03	1.62E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F -1.1628E-02					4.66E+01	
		279.20	-1.163E-02	%(	9.962E-01	2.37E+03	8.15E+01 G
TL-208	N 1.1919E-01					6.98E+02	
		583.02	1.192E-01	?(	7.170E-01	2.08E+02	8.45E+01 G
		277.28	-3.720E+00	&	1.232E+01	9.71E+01	6.31E+00 G
		860.56	-8.538E-03	% P	4.140E+00	2.19E+04	1.24E+01 G
pm-146	C 4.8948E-01					2.02E+03	
		747.16	4.861E-01	?(	2.262E+00	1.71E+02	3.40E+01 G
		735.72	4.946E-01	?(P	4.576E+00	3.43E+02	2.25E+01 G
		453.88	-2.192E-01	+ P	1.206E+00	1.75E+02	6.50E+01 G
y-88	F -1.0289E-01					1.07E+02	
		898.04	-1.029E-01	?(	1.308E+00	4.94E+02	9.37E+01 G
		1836.06	-6.655E-01	+	1.880E+00	1.26E+02	9.92E+01 G
Cd-113m	-4.2771E+03					5.33E+03	
		263.70	-4.277E+03	&(	1.438E+04	9.89E+01	6.00E-03 K
Cf-251	T -9.5208E-01					3.28E+05	
		176.60	-9.521E-01	?(	2.941E+00	1.11E+02	1.70E+01 G
		227.00	4.864E-01	+	7.929E+00	5.52E+02	6.30E+00 GA
Sn-126	-1.4544E+00					3.65E+07	
		87.57	0.000E+00	+	1.959E+00	1.00E+03	3.75E+01 GA
		64.28	-1.454E+00	?(	7.612E+00	1.52E+02	9.70E+00 G
		86.94	-8.658E-01	+	8.368E+00	2.80E+02	9.04E+00 GA
PB-210	N -4.8668E+00					8.14E+03	
		46.54	-4.867E+00	?(P	2.308E+01	1.44E+02	4.25E+00 G
PB-212	N -6.8135E-01					6.98E+02	
		238.63	-6.813E-01	?(P	1.991E+00	7.15E+01	4.33E+01 G
		300.03	3.983E+00	? P	2.888E+01	2.07E+02	3.28E+00 GA
PB-214	N 2.0836E-01					5.84E+05	
		351.93	1.050E-01	?(P	1.968E+00	5.16E+02	3.76E+01 G
		295.09	4.098E-01	&(P	4.362E+00	3.00E+02	1.93E+01 G
		242.00	-1.522E+00	+	1.219E+01	2.30E+02	7.43E+00 GA
BI-212	N -4.9481E+00					6.98E+02	
		727.17	-4.948E+00	?(	2.081E+01	1.21E+02	7.55E+00 G
		785.42	0.000E+00	+	3.721E+01	1.00E+03	1.28E+00 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N 1.1376E-01					2.57E+11	
		143.79	-1.559E-01	%(P	5.161E+00	1.01E+03	1.10E+01 G
		205.33	7.037E-01	?(	8.328E+00	3.97E+02	5.01E+00 G
		163.38	-2.446E-01	%	1.261E+01	1.45E+03	5.08E+00 G
		185.72	1.682E-01		9.092E-01	1.90E+02	5.40E+01 GA
BI-214	N 1.6257E-01					5.84E+05	
		609.31	1.626E-01	?(P	3.449E+00	5.94E+02	4.61E+01 G
		1120.29	-1.810E-01	% P	1.060E+01	1.96E+03	1.51E+01 G
		1764.49	-2.073E+00	+ P	8.355E+00	2.61E+02	1.54E+01 G
BI-210M	T -3.3028E-01					1.10E+09	
		265.83	-3.303E-01	?(	1.798E+00	1.57E+02	5.00E+01 G
		304.90	0.000E+00	+	4.130E+00	1.00E+03	2.80E+01 G
AC-228	N 2.1424E+00					2.10E+03	
		911.07	8.412E-01	?(	3.224E+00	1.48E+02	2.90E+01 G
		968.97	-2.133E+00	+	6.953E+00	9.37E+01	1.75E+01 G
		338.32	5.284E+00	?(	4.481E+00	3.11E+01	1.20E+01 G
		93.35	-2.401E+00	&	1.343E+01	1.64E+02	5.56E+00 XA
TH-227	N 1.2152E+00					7.95E+03	
		50.14	6.904E-01	?(	7.166E+00	3.34E+02	8.00E+00 G
		256.24	1.815E+00	?(	6.594E+00	1.32E+02	7.00E+00 G
TH-229	N -4.6991E+00					2.68E+06	
		193.51	-4.699E+00	?(	1.356E+01	1.05E+02	4.40E+00 G
		210.85	2.410E+00	&	1.572E+01	2.25E+02	2.99E+00 G
TH-234	N 6.9531E+00					1.63E+12	
		63.29	6.953E+00	@(P	1.349E+01	6.53E+01	3.81E+00 G
		92.59	1.766E+00	- P	7.932E+00	1.44E+02	5.58E+00 G
PA-231	N 5.5641E+00					1.20E+07	
		302.65	5.183E+00	?(	3.811E+01	2.12E+02	2.88E+00 G
		300.07	6.011E+00	?(	4.038E+01	1.93E+02	2.46E+00 G
PA-233	C -9.7589E-02					7.82E+08	
		312.01	-5.252E-01	?(	3.598E+00	1.99E+02	3.60E+01 G
		300.18	2.386E+00	?(	1.682E+01	2.03E+02	6.20E+00 G
PA-234	N 6.0972E-01					1.63E+12	
		131.29	8.449E-02	%(P	3.195E+00	1.07E+03	1.80E+01 G
		946.02	1.315E+00	?(	7.202E+00	2.07E+02	1.34E+01 G
		569.47	0.000E+00	-	5.601E+00	1.00E+03	8.20E+00 G
		883.24	-2.007E+00	+	1.956E+01	2.72E+02	9.60E+00 G
		880.53	6.363E+00	?	2.097E+01	9.50E+01	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   2.2369E+01                                      1.63E+12
                         1001.00 2.237E+01 &(P 2.055E+02 2.53E+02 8.37E-01 G
                          766.41-7.178E+00 %   3.109E+02 1.08E+03 2.94E-01 G

AM-241   T  -8.7488E-01                                      1.58E+05
                           59.54-8.749E-01 ?(P 1.863E+00 7.17E+01 3.59E+01 G

Np-237   F  -1.1204E+00                                      2.14E+06
                           86.49-1.120E+00  (  6.313E+00 1.65E+02 1.31E+01 G

Ir-192   F  -3.1217E-01                                      7.40E+01
                          316.49-3.122E-01 ?(  1.080E+00 1.01E+02 8.70E+01 G
                          468.06-2.648E-02 %   2.241E+00 2.32E+03 5.18E+01 G
                          308.44 0.000E+00 +   3.678E+00 1.00E+03 3.18E+01 G

Np-239   T  -6.5909E-01                                      2.36E+00
                          103.70 0.000E+00 +   2.154E+00 1.00E+03 2.40E+01 X
                          106.13-6.591E-01  (  3.590E+00 1.60E+02 2.27E+01 G
                           99.50 0.000E+00 &   3.136E+00 1.00E+03 1.50E+01 X

Nd-147       5.1131E-02                                      1.11E+01
                          531.00 0.000E+00 ?(  5.694E+00 1.00E+03 1.30E+01 G
                           91.10 7.462E-02 ?(  2.508E+00 9.62E+02 2.83E+01 G

TL-210   N   8.1827E-02                                      5.84E+05
                          799.60 0.000E+00  (  1.490E+00 1.00E+03 9.90E+01 G
                          296.00 1.843E-01 ?(  1.108E+00 1.72E+02 7.90E+01 G
                         1313.00 0.000E+00 -   3.492E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
```

to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	38.	-7.	-0.004	144.07	-4.867E+00	P
TH-227	50.14	15.	2.	0.001	333.54	6.904E-01	
AM-241	59.54	36.	-14.	-0.008	71.71	-8.749E-01	P
Sn-126	64.28	53.	-7.	-0.004	151.86	-1.454E+00	
BA-133	80.99	17.	4.	0.002	174.40	2.129E-01	
Np-237	86.49	108.	-9.	-0.005	165.32	-1.120E+00	
EU-155	86.54	99.	-9.	-0.005	158.52	-4.779E-01	
Sn-126	86.94	90.	-5.	-0.003	280.07	-8.658E-01	
Nd-147	91.10	82.	1.	0.001	962.42	7.462E-02	
AC-228	93.35	92.	-8.	-0.005	163.65	-2.401E+00	
Gd-153	97.50	33.	-3.	-0.001	309.23	-1.380E-01	
Gd-153	103.20	38.	-6.	-0.003	165.14	-3.881E-01	
EU-155	105.31	110.	-10.	-0.006	87.34	-7.546E-01	P
Np-239	106.13	117.	-10.	-0.005	160.09	-6.591E-01	
EU-152	121.78	29.	-6.	-0.003	133.33	-3.255E-01	
CO-57	122.06	27.	1.	0.001	741.62	1.812E-02	
EU-154	123.10	38.	-7.	-0.004	124.98	-2.794E-01	
CO-57	136.47	60.	-10.	-0.006	113.15	-1.521E+00	
Tc-99m	140.51	40.	5.	0.003	184.39	9.398E-02	
CE-141	145.44	21.	2.	0.001	383.27	7.369E-02	P
Ba-140	162.66	42.	-8.	-0.005	115.67	-2.383E+00	
CE-139	165.85	25.	5.	0.003	136.50	1.211E-01	
Cf-251	176.60	27.	-9.	-0.005	111.34	-9.521E-01	
U-235	185.72	23.	5.	0.003	189.92	1.682E-01	
TH-229	193.51	33.	-10.	-0.006	104.83	-4.699E+00	
U-235	205.33	13.	2.	0.001	397.49	7.037E-01	
TH-229	210.85	17.	3.	0.002	224.72	2.410E+00	
Cf-251	227.00	17.	1.	0.001	551.70	4.864E-01	
PB-212	238.63	51.	-12.	-0.007	71.48	-6.813E-01	P
PB-214	242.00	55.	-5.	-0.003	230.11	-1.522E+00	
EU-152	244.69	52.	6.	0.004	162.66	2.078E+00	P
TH-227	256.24	11.	5.	0.003	131.91	1.815E+00	
Cd-113m	263.70	43.	-10.	-0.005	98.93	-4.277E+03	
BI-210M	265.83	46.	-6.	-0.004	157.32	-3.303E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	277.28	31.	-9.	-0.005	97.14	-3.720E+00	
I-131	284.30	12.	6.	0.003	120.76	2.517E+00	P
PB-214	295.09	33.	3.	0.002	300.30	4.098E-01	P
TL-210	296.00	36.	5.	0.003	172.10	1.843E-01	
PB-212	300.03	41.	5.	0.003	207.40	3.983E+00	P
PA-231	300.07	46.	5.	0.003	192.91	6.011E+00	
PA-233	300.18	51.	5.	0.003	202.81	2.386E+00	
PA-231	302.65	56.	5.	0.003	211.77	5.183E+00	
PA-233	312.01	76.	-6.	-0.004	198.87	-5.252E-01	
Ir-192	316.49	37.	-9.	-0.005	101.50	-3.122E-01	
CR-51	320.08	46.	-8.	-0.005	115.17	-2.506E+00	P
La-140	328.76	18.	-2.	-0.001	349.49	-3.592E-01	
Cf-249	333.44	15.	-5.	-0.003	160.36	-9.512E-01	
AC-228	338.32	9.	20.	0.011	31.15	5.284E+00	
HF-181	345.83	47.	-7.	-0.004	128.76	-1.594E+00	P
PB-214	351.93	18.	1.	0.001	516.22	1.050E-01	P
BA-133	356.00	18.	5.	0.003	119.89	2.887E-01	
I-131	364.48	8.	5.	0.003	110.03	2.125E-01	P
BA-133	383.84	28.	-2.	-0.001	308.54	-9.939E-01	
SB-125	427.88	8.	4.	0.002	160.94	4.838E-01	P
AG-108M	433.94	12.	-3.	-0.002	182.14	-1.431E-01	P
pm-146	453.88	12.	-3.	-0.002	174.56	-2.192E-01	P
SB-125	463.37	22.	-8.	-0.004	81.61	-3.000E+00	P
BE-7	477.59	7.	4.	0.002	111.19	1.554E+00	
RU-103	497.05	16.	-8.	-0.004	104.08	-3.879E-01	
RH-106	511.86	33.	14.	0.008	111.05	3.087E+00	
Ba-140	537.26	8.	-1.	-0.001	482.68	-2.492E-01	P
CS-134	563.24	4.	1.	0.001	404.15	5.860E-01	
CS-134	569.32	4.	2.	0.001	158.11	6.420E-01	
TL-208	583.02	4.	2.	0.001	208.17	1.192E-01	
SB-125	600.50	18.	5.	0.003	141.20	1.320E+00	
SB-124	602.73	23.	5.	0.003	155.72	2.410E-01	
CS-134	604.71	28.	5.	0.003	168.97	2.435E-01	
BI-214	609.31	35.	1.	0.001	594.46	1.626E-01	P
RU-103	610.30	37.	5.	0.003	192.45	4.181E+00	
AG-108M	614.28	41.	5.	0.003	202.93	2.698E-01	
PM-144	618.06	46.	4.	0.002	245.73	2.128E-01	
I-131	636.97	18.	-6.	-0.003	75.76	-4.556E+00	P
AG-110M	657.76	14.	3.	0.002	166.13	1.962E-01	
PM-144	696.54	4.	5.	0.003	98.67	2.863E-01	
NB-94	702.63	9.	-4.	-0.002	172.01	-2.205E-01	
SB-124	722.79	14.	-3.	-0.002	169.71	-1.859E+00	
BI-212	727.17	25.	-6.	-0.003	121.17	-4.948E+00	
pm-146	735.72	9.	2.	0.001	343.42	4.946E-01	P
pm-146	747.16	4.	3.	0.001	170.71	4.861E-01	
AG-110M	763.94	9.	-4.	-0.002	124.98	-1.039E+00	
NB-95	765.79	9.	3.	0.002	146.43	2.008E-01	
EU-152	778.92	5.	1.	0.001	354.44	6.612E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.87	0.	18.	0.010	23.57	1.375E+00		
MN-54	834.85	19.	-5.	-0.003	201.78	-3.175E-01		
Co-56	846.77	9.	1.	0.000	979.80	4.591E-02		
NB-94	871.10	18.	-8.	-0.004	86.92	-5.292E-01		
EU-154	873.23	14.	5.	0.003	106.88	3.079E+00		
PA-234	880.53	10.	5.	0.003	95.05	6.363E+00		
PA-234	883.24	26.	-3.	-0.002	272.26	-2.007E+00		
y-88	898.04	9.	-1.	-0.001	493.71	-1.029E-01		
AC-228	911.07	5.	3.	0.002	147.99	8.412E-01		
PA-234	946.02	5.	2.	0.001	207.02	1.315E+00		
AC-228	968.97	8.	-5.	-0.003	93.68	-2.133E+00		
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00		
PA-234M	1001.00	17.	2.	0.001	252.82	2.237E+01		P
EU-154	1004.77	30.	-8.	-0.004	102.64	-3.554E+00		
Co-56	1037.84	20.	-12.	-0.007	51.15	-6.804E+00		P
Cs-136	1048.07	12.	-6.	-0.003	91.29	-6.174E-01		
RH-106	1050.36	12.	6.	0.003	100.41	2.908E+01		
BI-207	1063.66	15.	-7.	-0.004	127.38	-7.831E-01		
Ga-68	1077.40	5.	-3.	-0.002	173.74	-8.962E+00		
Ta-182	1121.30	9.	-1.	-0.001	378.50	-2.913E-01		
CO-60	1173.24	6.	1.	0.001	349.31	1.342E-01		P
Ta-182	1221.41	5.	-2.	-0.001	234.30	-8.091E-01		
FE-59	1291.60	5.	1.	0.000	796.87	1.514E-01		
CO-60	1332.50	0.	6.	0.003	40.82	6.046E-01		
AG-110M	1384.30	11.	-6.	-0.003	137.58	-2.427E+00		
EU-152	1408.00	11.	-7.	-0.004	117.90	-3.350E+00		
K-40	1460.83	9.	-5.	-0.003	111.12	-5.543E+00		P
SB-124	1690.98	12.	-10.	-0.005	63.68	-2.474E+00		P
BI-214	1764.49	2.	-2.	-0.001	260.97	-2.073E+00		P
y-88	1836.06	6.	-5.	-0.003	126.49	-6.655E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.5536E+00	1.5536E+00	1.112E+02%	6.15E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.16E-01
K-40	#A	-5.5435E+00	-5.5435E+00	1.111E+02%	1.74E+01
Sc-46	#A	-4.7816E-02	-4.7816E-02	1.039E+03%	1.82E+00
CR-51	#A	-2.5056E+00	-2.5056E+00	1.152E+02%	1.06E+01
MN-54	#A	-3.1745E-01	-3.1745E-01	2.018E+02%	1.55E+00
FE-59	#A	3.7519E-02	3.7519E-02	7.969E+02%	1.12E+00
Co-56	#A	4.5913E-02	4.5914E-02	9.798E+02%	1.17E+00
CO-57	#A	1.8119E-02	1.8119E-02	7.416E+02%	4.88E-01
CO-58	#	6.5157E-01	6.5157E-01	3.291E+01%	4.92E-01

CO-60	#A	6.0460E-01	6.0460E-01	4.082E+01%	7.43E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.11E+00
NB-94	#A	-2.2047E-01	-2.2047E-01	1.720E+02%	9.88E-01
ZR-95	#A	3.2674E-02	3.2674E-02	2.129E+03%	1.89E+00
NB-95	#A	2.0076E-01	2.0076E-01	1.464E+02%	1.07E+00
RU-103	#A	-3.8795E-01	-3.8795E-01	1.041E+02%	1.04E+00
RH-106	#A	4.4103E+00	4.4103E+00	1.004E+02%	1.91E+01
AG-108M	#A	6.2622E-02	6.2622E-02	1.363E+02%	8.29E-01
AG-110M	#A	1.1097E-01	1.1097E-01	1.661E+02%	2.46E+00
SN-113	#	1.4401E+00	1.4401E+00	2.166E+01%	5.69E-01
SB-124	#A	2.4096E-01	2.4096E-01	1.557E+02%	1.32E+00
SB-125	#A	7.9831E-01	7.9831E-01	1.071E+02%	2.12E+00
I-131	#A	3.7364E-01	3.7365E-01	8.169E+01%	6.50E-01
Gd-153	#A	-1.3804E-01	-1.3804E-01	3.092E+02%	1.52E+00
Ga-68	#A	-8.9009E+00	-8.9618E+00	1.737E+02%	3.92E+01
Tc-99m	#A	9.3859E-02	9.3979E-02	1.844E+02%	6.05E-01
BA-133	#A	2.8871E-01	2.8871E-01	1.199E+02%	1.21E+00
CS-134	#A	7.5479E-01	7.5479E-01	2.357E+01%	1.45E+00
CS-137	#A	1.9581E-02	1.9581E-02	1.836E+03%	1.35E+00
CE-139	#A	1.2108E-01	1.2108E-01	1.365E+02%	5.77E-01
Ba-140	#A	-2.4919E-01	-2.4919E-01	4.827E+02%	3.11E+00
La-140	#A	-1.5185E-02	-1.5185E-02	4.909E+03%	9.06E-01
CE-141	#A	7.3689E-02	7.3690E-02	3.833E+02%	8.25E-01
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.26E+00
PM-144	#A	2.4953E-01	2.4953E-01	9.867E+01%	7.33E-01
EU-152	#A	5.1695E-01	5.1695E-01	1.627E+02%	3.41E+00
EU-154	#A	3.6094E+00	3.6094E+00	6.982E+01%	1.15E+01
EU-155	#A	-7.5463E-01	-7.5463E-01	8.734E+01%	3.73E+00
HF-181	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.32E-01
Ta-182	#A	-2.9126E-01	-2.9126E-01	3.785E+02%	4.20E+00
Hg-203	#A	-1.1628E-02	-1.1628E-02	2.369E+03%	9.96E-01
TL-208	#A	1.1919E-01	1.1919E-01	2.082E+02%	7.17E-01
pm-146	#A	4.8948E-01	4.8948E-01	1.707E+02%	2.26E+00
y-88	#A	-1.0289E-01	-1.0289E-01	4.937E+02%	1.31E+00
Cd-113m	#A	-4.2771E+03	-4.2771E+03	9.893E+01%	1.44E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.93E+01
Cf-251	#A	-9.5208E-01	-9.5208E-01	1.113E+02%	2.94E+00
Cf-249	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.48E-01
Sn-126	#A	-1.4544E+00	-1.4544E+00	1.519E+02%	7.61E+00
PB-210	#A	-4.8668E+00	-4.8668E+00	1.441E+02%	2.31E+01
PB-212	#A	-6.8135E-01	-6.8135E-01	7.148E+01%	1.99E+00
PB-214	#A	2.0836E-01	2.0836E-01	2.986E+02%	1.97E+00
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.70E-01
BI-212	#A	-4.9481E+00	-4.9481E+00	1.212E+02%	2.08E+01
U-235	#A	1.1376E-01	1.1376E-01	3.975E+02%	5.16E+00
BI-214	#A	1.6257E-01	1.6257E-01	5.945E+02%	3.45E+00
BI-210M	#A	-3.3028E-01	-3.3028E-01	1.573E+02%	1.80E+00
AC-228	#A	2.1424E+00	2.1424E+00	3.115E+01%	3.22E+00
TH-227	#A	1.2152E+00	1.2152E+00	1.319E+02%	7.17E+00

TH-229	#A	-4.6991E+00	-4.6991E+00	1.048E+02%	1.36E+01
TH-234	A	6.9531E+00	6.9531E+00	6.528E+01%	1.35E+01
PA-231	#A	5.5641E+00	5.5641E+00	1.432E+02%	3.81E+01
PA-233	#A	-9.7589E-02	-9.7589E-02	1.420E+02%	3.60E+00
PA-234	#A	6.0972E-01	6.0972E-01	2.070E+02%	3.20E+00
PA-234M	#A	2.2369E+01	2.2369E+01	2.528E+02%	2.05E+02
AM-241	#A	-8.7488E-01	-8.7488E-01	7.171E+01%	1.86E+00
Np-237	#A	-1.1204E+00	-1.1204E+00	1.653E+02%	6.31E+00
Ir-192	#A	-3.1216E-01	-3.1217E-01	1.015E+02%	1.08E+00
Cs-136	#A	0.0000E+00	0.0000E+00	7.071E+02%	4.93E-01
Np-239	#A	-6.5900E-01	-6.5909E-01	1.601E+02%	3.59E+00
Nd-147	#A	5.1129E-02	5.1131E-02	6.939E+02%	5.69E+00
TL-210	#A	8.1827E-02	8.1827E-02	1.721E+02%	1.49E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 6.953E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 6.9530764E+00 Bq/Sample

Test America St. Louis Spectrum ID: 5_Gamma_20182910

Sample Description: 379959_Gamma_MB 160-379959~1-A
Detector: Detector # 5
Batch ID: 379959
Work Order Number: Gamma
Lot Number: MB 160-379959~1-A

Decay to Time: 8/23/2018 07:50 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:50:40 Real Time: 1810 sec
Analysis Time: 8/28/2018 19:40 Dead Time: 0.55 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 5_Soil_TunaCan.Clb
Efficiency Cal Desc: 5_Soil_TunaCan_90099_032612
Efficiency Cal Date: 3/27/2012 17:20
Energy Cal Date: 2/28/2012 19:35
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 5_2018-08-11_1259.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.554E+00	111.2	1.727E+00	1.729E+00	6.154E+00
NA-22	0.000E+00	1.#INF	9.710E-02	9.710E-02	7.156E-01
K-40	-5.543E+00	111.1	6.160E+00	6.166E+00	1.737E+01
Sc-46	-4.782E-02	1039.2	4.969E-01	4.969E-01	1.820E+00
CR-51	-2.506E+00	115.2	2.886E+00	2.889E+00	1.056E+01
MN-54	-3.175E-01	201.8	6.406E-01	6.408E-01	1.554E+00
FE-59	3.752E-02	796.9	2.990E-01	2.990E-01	1.118E+00
Co-56	4.591E-02	979.8	4.499E-01	4.499E-01	1.167E+00
CO-57	-3.020E-03	3972.4	1.200E-01	1.200E-01	4.436E-01
CO-58	4.074E-01	42.3	1.723E-01	1.736E-01	4.918E-01
CO-60	6.046E-01	40.8	2.468E-01	2.487E-01	7.427E-01
ZN-65	5.110E-09	15738424238.8	8.042E-01	8.042E-01	3.114E+00
ZR-95	3.267E-02	2128.8	6.956E-01	6.956E-01	1.894E+00
NB-95	2.008E-01	146.4	2.940E-01	2.941E-01	1.066E+00
RU-103	-3.879E-01	104.1	4.038E-01	4.043E-01	1.035E+00
RH-106	6.041E+00	161.4	9.749E+00	9.754E+00	1.909E+01
AG-108M	6.262E-02	136.3	8.538E-02	8.544E-02	8.286E-01
AG-110M	1.962E-01	166.1	3.259E-01	3.261E-01	1.173E+00
SN-113	1.440E+00	21.7	3.119E-01	3.205E-01	5.692E-01
SB-124	2.410E-01	155.7	3.752E-01	3.754E-01	1.322E+00
SB-125	7.983E-01	107.1	8.546E-01	8.556E-01	2.123E+00
I-131	3.385E-01	87.3	2.954E-01	2.959E-01	7.801E-01
Gd-153	1.506E-01	436.1	6.567E-01	6.568E-01	2.285E+00
Ga-68	-8.962E+00	173.7	1.557E+01	1.558E+01	3.922E+01
Tc-99m	9.966E-02	131.1	1.306E-01	1.308E-01	4.571E-01
BA-133	2.887E-01	119.9	3.461E-01	3.465E-01	1.210E+00
CS-134	1.375E+00	23.6	3.241E-01	3.318E-01	5.630E-01
CS-137	1.958E-02	1836.1	3.595E-01	3.595E-01	1.348E+00
CE-139	1.211E-01	136.5	1.653E-01	1.657E-01	5.772E-01
Ba-140	-2.492E-01	482.7	1.203E+00	1.203E+00	3.111E+00
La-140	-1.518E-02	4909.3	7.455E-01	7.455E-01	9.063E-01
CE-141	-2.951E-02	1197.3	3.533E-01	3.533E-01	1.179E+00
CE-144	0.000E+00	1.#INF	2.032E-01	2.032E-01	5.123E+00

PM-144	6.710E-02	245.7	1.649E-01	1.649E-01	1.272E+00
EU-152	4.880E-01	101.7	4.962E-01	4.969E-01	1.477E+00
EU-154	1.110E+00	60.2	6.678E-01	6.703E-01	1.148E+00
EU-155	2.812E-01	73.6	2.070E-01	2.076E-01	4.527E+00
HF-181	0.000E+00	1.#INF	5.337E-02	5.337E-02	6.316E-01
Ta-182	-1.331E+00	139.4	1.856E+00	1.857E+00	4.416E+00
Hg-203	-1.791E-01	172.1	3.082E-01	3.083E-01	1.074E+00
TL-208	1.192E-01	208.2	2.481E-01	2.482E-01	7.170E-01
PM-146	1.271E-01	117.5	1.493E-01	1.495E-01	1.206E+00
Y-88	-4.237E-02	35.4	1.498E-02	1.518E-02	1.880E+00
Cd-113m	-1.156E+03	237.2	2.743E+03	2.744E+03	9.907E+03
Cd-109	1.217E+00	390.8	4.757E+00	4.758E+00	1.664E+01
Se-75	1.097E-01	219.7	2.410E-01	2.411E-01	1.081E+00
Cf-251	-9.521E-01	111.3	1.060E+00	1.063E+00	2.941E+00
Cf-249	0.000E+00	1.#INF	1.087E-01	1.087E-01	5.475E-01
Sn-126	1.534E+00	117.7	1.804E+00	1.806E+00	6.211E+00
PB-210	-4.867E+00	144.1	7.011E+00	7.017E+00	2.308E+01
PB-212	7.781E-03	6316.1	4.914E-01	4.914E-01	1.757E+00
PB-214	2.084E-01	298.6	6.222E-01	6.223E-01	1.968E+00
BI-207	2.695E-01	125.3	3.378E-01	3.381E-01	1.181E+00
BI-212	-4.948E+00	121.2	5.996E+00	6.001E+00	2.081E+01
BI-214	1.626E-01	594.5	9.664E-01	9.664E-01	3.449E+00
BI-210M	-4.844E-01	100.8	4.884E-01	4.893E-01	1.663E+00
AC-228	2.142E+00	31.1	6.673E-01	6.762E-01	3.224E+00
TH-227	1.179E+00	127.9	1.507E+00	1.509E+00	6.594E+00
TH-229	-4.699E+00	104.8	4.926E+00	4.941E+00	1.356E+01
TH-234	-5.316E+00	68.6	3.647E+00	3.659E+00	1.338E+01
PA-231	5.564E+00	143.2	7.969E+00	7.975E+00	3.811E+01
PA-233	-9.759E-02	142.0	1.386E-01	1.387E-01	3.598E+00
PA-234	2.586E-02	3400.5	8.793E-01	8.793E-01	3.128E+00
PA-234M	2.237E+01	252.8	5.655E+01	5.657E+01	2.055E+02
U-235	1.138E-01	397.5	4.522E-01	4.522E-01	5.161E+00
AM-241	-8.749E-01	71.7	6.274E-01	6.290E-01	1.863E+00
Np-237	1.663E+00	62.7	1.044E+00	1.048E+00	3.432E+00
Ir-192	-3.122E-01	101.5	3.168E-01	3.174E-01	1.080E+00
Cs-136	0.000E+00	1.#INF	2.317E-01	2.317E-01	4.930E-01
Np-239	5.634E-02	2143.8	1.208E+00	1.208E+00	4.158E+00
Nd-147	1.612E+00	124.7	2.011E+00	2.013E+00	7.106E+00
Mo-99	5.534E-01	99.4	5.503E-01	5.511E-01	1.091E+01
Ge-69	1.938E-01	258.3	5.006E-01	5.007E-01	6.810E+00
Br-82	-3.600E-01	113.4	4.082E-01	4.087E-01	1.437E+00
V-48	2.577E-01	37.8	9.738E-02	9.846E-02	1.322E+00
Sr-85	3.401E-01	114.6	3.898E-01	3.903E-01	1.341E+00
Rb-83	-1.986E-01	285.8	5.677E-01	5.678E-01	1.578E+00
Kr-85	7.201E+01	136.7	9.842E+01	9.851E+01	3.399E+02
Cm-247	2.795E-01	80.9	2.261E-01	2.265E-01	9.205E-01
Hf-175	0.000E+00	1.#INF	5.271E-02	5.271E-02	1.036E+00
Lu-172	0.000E+00	1.#INF	1.604E-01	1.604E-01	8.358E-01
Kr-85m	1.558E-02	1295.2	2.018E-01	2.018E-01	5.895E-01
NB-94	-2.004E-02	1808.3	3.624E-01	3.624E-01	1.352E+00
TL-210	8.183E-02	172.1	1.408E-01	1.409E-01	1.490E+00
Total	1.282E+02				

Analyst: Rachel Mueller

TestAmerica Inc Spectrum name: 5_Gamma_20182910.An1

Sample description
379959_Gamma_MB 160-379959~1-A

Spectrum Filename: C:\User\SPC\Det5\5_Gamma_20182910.An1

Acquisition information
Start time: 8/23/2018 7:50:40 AM
Live time: 1800
Real time: 1810
Dead time: 0.55 %
Detector ID: 5

Detector system
Ge 5 SN/157

Calibration
Filename: 5_Soil_TunaCan.Clb
5_Soil_TunaCan_90099_032612

Energy Calibration
Created: 2/28/2012 7:35:48 PM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: 3.911E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 5:20:37 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.466115E-01 + (-7.830454E-01*Log(E)) + (-4.117504E-03*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.43 %
Log(Eff): -2.462251E+01 + (9.075211E+00*Log(E)) + (-9.664422E-01*Log(E)^2)

Library Files
Main analysis library: Client_Extra_Long_Rev7.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.62keV)
Stop channel: 8000 (2000.81keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:50:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2018-08-11_1259.PBC 8/11/2018 12:59:29 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01 %

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-7.	144.07	0.78	1.788E-02	46.54	4.250	PBC<MDA	PB210
50.14	2.	333.54	0.79	2.012E-02	50.14	8.000	PBC<MDA	TH227
63.29	-6.	149.77	0.80	2.712E-02	63.29	3.810	PBC<MDA	TH234
64.28	7.	117.67	0.80	2.757E-02	64.28	9.700	PBC<MDA	Sn126
80.99	6.	97.25	0.82	3.320E-02	80.99	34.060	PBC<MDA	BA133
84.00	6.	111.78	0.82	3.387E-02	84.00	23.000	PBC<MDA	Cm247
86.49	13.	62.74	0.82	3.435E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.096E-01	EU155
86.54	13.	73.63	0.82	3.436E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.096E-01	EU155
					86.94	9.040	2.405E+00	Sn126
86.94	3.	373.16	0.83	3.443E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	5.124E-01	Sn126
87.57	3.	382.02	0.83	3.454E-02	87.57	37.500	PBC<MDA	Sn126
88.04	3.	390.79	0.83	3.462E-02	88.04	3.790	PBC<MDA	Cd109
89.36	3.	398.98	0.83	3.483E-02	89.36	2.350	PBC<MDA	Hf175
91.10	3.	406.71	0.83	3.508E-02	91.10	28.300	PBC<MDA	Nd147
92.59	-19.	68.61	0.83	3.527E-02	92.59	5.584	PBC<MDA	TH234
93.35	3.	422.26	0.83	3.536E-02	93.35	5.561	PBC<MDA	AC228
96.73	3.	428.53	0.84	3.571E-02	96.73	3.420	PBC<MDA	Se75
97.50	3.	436.09	0.84	3.577E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	441.50	0.84	3.592E-02	99.50	15.000	PBC<MDA	Np239
140.51	5.	131.07	0.88	3.411E-02	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					140.51	4.520	1.911E+00	Mo99
143.79	-1.	980.27	0.88	3.371E-02	143.79	10.960	PBC<MDA	U235
165.85	5.	136.50	0.91	3.133E-02	165.85	79.900	PBC<MDA	CE139
181.07	6.	99.44	0.92	2.914E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	6.300E-01	Lu172
185.72	5.	189.92	0.93	2.854E-02	185.72	54.000	PBC<MDA	U235
205.33	2.	397.49	0.94	2.626E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	224.72	0.95	2.569E-02	210.85	2.990	PBC<MDA	TH229
227.00	1.	551.70	0.97	2.417E-02	227.00	6.300	PBC<MDA	Cf251
235.97	6.	136.01	0.98	2.341E-02	235.97	12.300	PBC<MDA	TH227
242.00	6.	144.53	0.98	2.293E-02	242.00	7.430	PBC<MDA	PB214
256.24	5.	131.91	1.00	2.186E-02	256.24	7.000	PBC<MDA	TH227
279.54	4.	219.75	1.02	2.034E-02	279.20	81.460	PBC<MDA	Hg203
					279.54	24.790	4.590E-01	Se75
284.30	6.	120.76	1.02	2.006E-02	284.30	6.140	PBC<MDA	I131
295.09	3.	300.30	1.03	1.945E-02	295.09	19.300	PBC<MDA	PB214
296.00	5.	172.10	1.03	1.940E-02	296.00	79.000	PBC<MDA	TL210
300.03	5.	207.40	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	5.	192.91	1.04	1.918E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
300.18	5.	202.81	1.04	1.917E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.011E+00	PA231
					300.18	6.200	2.386E+00	PA233
302.65	5.	211.77	1.04	1.904E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	8.148E-01	BA133
338.32	20.	31.15	1.07	1.736E-02	338.32	12.010	5.284E+00	AC228
351.93	1.	516.22	1.09	1.680E-02	351.93	37.600	PBC<MDA	PB214
356.00	5.	119.89	1.09	1.664E-02	356.00	62.050	PBC<MDA	BA133
364.48	4.	125.98	1.10	1.632E-02	364.48	81.700	PBC<MDA	I131
366.42	4.	186.26	1.10	1.625E-02	366.42	1.190	PBC<MDA	Mo99
391.69	26.	21.66	1.12	1.537E-02	391.69	64.000	1.440E+00	SN113
402.40	4.	116.91	1.13	1.503E-02	402.40	72.000	PBC<MDA	Cm247
427.88	4.	160.94	1.16	1.428E-02	427.88	29.600	PBC<MDA	SB125
477.60	4.	111.19	1.20	1.303E-02	477.60	10.520	PBC<MDA	BE7
511.86	12.	81.10	2.48	1.230E-02	511.86	20.000	PBC<MDA	RH106
513.98	7.	136.68	1.24	1.226E-02	513.98	0.430	PBC<MDA	Kr85
					513.99	99.280	3.119E-01	Sr85
513.99	7.	114.61	1.24	1.226E-02	513.98	0.430	7.853E+01	Kr85
					513.99	99.280	3.401E-01	Sr85
531.00	4.	124.72	1.25	1.193E-02	531.00	13.000	PBC<MDA	Nd147
554.34	1.	648.99	1.27	1.151E-02	554.34	70.600	PBC<MDA	Br82
563.24	1.	404.15	1.28	1.135E-02	563.24	8.350	PBC<MDA	CS134
569.70	5.	125.31	1.29	1.125E-02	569.32	15.380	1.712E+00	CS134
					569.47	8.200	3.212E+00	PA234
					569.70	97.740	2.695E-01	BI207

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
574.00	2.	258.33	1.29	1.118E-02	574.00	11.800	PBC<MDA	Ge69
583.02	2.	208.17	1.30	1.103E-02	583.02	84.500	PBC<MDA	TL208
600.50	5.	141.20	1.31	1.076E-02	600.50	17.860	PBC<MDA	SB125
602.73	5.	155.72	1.32	1.073E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	168.97	1.32	1.070E-02	604.71	97.620	PBC<MDA	CS134
609.31	1.	594.46	1.32	1.063E-02	609.31	46.090	PBC<MDA	BI214
610.30	5.	192.45	1.32	1.062E-02	610.30	5.750	PBC<MDA	RU103
614.28	5.	202.93	1.33	1.056E-02	614.28	89.850	PBC<MDA	AG108M
618.06	4.	245.73	1.33	1.051E-02	618.06	99.100	PBC<MDA	PM144
657.76	3.	166.13	1.36	9.974E-03	657.76	94.640	PBC<MDA	AG110M
735.72	2.	254.12	1.43	9.081E-03	735.72	22.500	PBC<MDA	PM146
747.16	3.	170.71	1.44	8.965E-03	747.16	34.000	PBC<MDA	PM146
765.79	3.	146.43	1.45	8.781E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.819E+01	PA234M
778.92	5.	101.68	1.46	8.657E-03	778.92	12.940	PBC<MDA	EU152
795.87	18.	23.57	1.48	8.503E-03	795.87	85.530	1.375E+00	CS134
810.78	6.	42.30	1.49	8.371E-03	810.78	99.460	PBC<MDA	CO58
846.77	1.	979.80	1.52	8.072E-03	846.77	99.935	PBC<MDA	Co56
873.23	5.	106.88	1.54	7.866E-03	873.23	12.270	PBC<MDA	EU154
880.53	5.	95.05	1.54	7.812E-03	880.53	6.000	PBC<MDA	PA234
898.04	8.	35.36	1.56	7.684E-03	898.04	93.700	6.173E-01	Y88
911.07	3.	147.99	1.57	7.591E-03	911.07	29.000	PBC<MDA	AC228
944.30	7.	37.80	1.59	7.366E-03	944.30	8.000	PBC<MDA	V48
996.33	6.	89.86	1.63	7.042E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	252.82	1.64	7.014E-03	1001.00	0.837	PBC<MDA	PA234M
1050.36	8.	161.39	1.67	6.736E-03	1050.36	1.560	PBC<MDA	RH106
1112.07	1.	577.58	1.72	6.421E-03	1112.07	13.644	PBC<MDA	EU152
1173.24	1.	349.31	1.76	6.138E-03	1173.24	99.900	PBC<MDA	CO60
1291.60	1.	796.87	1.84	5.661E-03	1291.60	43.200	PBC<MDA	FE59
1311.60	5.	44.72	1.85	5.588E-03	1311.60	98.000	PBC<MDA	V48
1332.50	6.	40.82	1.87	5.514E-03	1332.50	99.980	PBC<MDA	CO60
1764.49	-2.	260.97	2.11	4.351E-03	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.69	46.54	38.	-7.	-0.004	144.07	0.783
TH-227	200.11	50.14	15.	2.	0.001	333.54	0.787
AM-241	237.72	59.54	36.	-14.	-0.008	71.71	0.797s
TH-234	252.74	63.29	43.	-6.	-0.003	149.77	0.801s
Sn-126	256.71	64.28	34.	7.	0.004	117.67	0.802s
BA-133	323.61	80.99	16.	6.	0.004	97.25	0.819s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cm-247	335.66	84.00	23.	6.	0.004	111.78	0.822s
Np-237	345.63	86.49	29.	13.	0.007	62.74	0.825s
EU-155	345.84	86.54	42.	13.	0.007	73.63	0.825s
Sn-126	347.43	86.94	56.	3.	0.002	373.16	0.825s
Sn-126	349.95	87.57	59.	3.	0.002	382.02	0.826s
Cd-109	351.83	88.04	62.	3.	0.002	390.79	0.826s
Hf-175	357.12	89.36	65.	3.	0.002	398.98	0.828
Nd-147	364.08	91.10	67.	3.	0.002	406.71	0.829s
TH-234	370.05	92.59	92.	-19.	-0.010	68.61	0.831
AC-228	373.09	93.35	73.	3.	0.002	422.26	0.832s
Se-75	386.62	96.73	76.	3.	0.002	428.53	0.835s
Gd-153	389.70	97.50	79.	3.	0.002	436.09	0.836s
Np-239	397.71	99.50	81.	3.	0.002	441.50	0.838s
Gd-153	412.52	103.20	38.	-6.	-0.003	165.14	0.842s
Np-239	414.52	103.70	44.	0.	0.000	1000.00	0.842s
EU-155	420.98	105.31	165.	-5.	-0.003	277.66	0.844s
Se-75	484.26	121.12	26.	-2.	-0.001	398.97	0.860s
EU-152	486.90	121.78	28.	0.	0.000	1000.00	0.861s
EU-154	492.18	123.10	35.	-8.	-0.004	114.46	0.862s
CE-144	533.97	133.54	50.	0.	0.000	1000.00	0.873s
Se-75	543.82	136.00	50.	0.	0.000	1000.00	0.875s
HF-181	545.02	136.30	58.	-6.	-0.004	175.11	0.876s
CO-57	545.72	136.47	64.	-10.	-0.006	116.28	0.876s
Tc-99m	561.88	140.51	22.	5.	0.003	131.07	0.880D
U-235	574.99	143.79	46.	-1.	-0.001	980.27	0.883s
Ba-140	650.54	162.66	42.	-8.	-0.005	115.67	0.902s
CE-139	663.32	165.85	25.	5.	0.003	136.50	0.905
Cf-251	706.34	176.60	27.	-9.	-0.005	111.34	0.916s
Mo-99	724.23	181.07	17.	6.	0.004	99.44	0.921s
Lu-172	725.84	181.47	32.	-6.	-0.003	139.44	0.921s
U-235	742.85	185.72	23.	5.	0.003	189.92	0.925s
TH-229	774.03	193.51	33.	-10.	-0.006	104.83	0.933
U-235	821.35	205.33	13.	2.	0.001	397.49	0.945s
TH-229	843.44	210.85	17.	3.	0.002	224.72	0.950s
Cf-251	908.08	227.00	17.	1.	0.001	551.70	0.966s
TH-227	943.98	235.97	29.	6.	0.003	136.01	0.975s
PB-214	968.10	242.00	33.	6.	0.003	144.53	0.981s
TH-227	1025.11	256.24	11.	5.	0.003	131.91	0.995s
Cd-113m	1054.97	263.70	19.	-3.	-0.001	237.17	1.002s
Se-75	1058.81	264.66	21.	0.	0.000	1000.00	1.003s
BI-210M	1063.50	265.83	39.	-9.	-0.005	100.83	1.005s
TL-208	1109.33	277.28	31.	-9.	-0.005	97.14	1.016
Hg-203	1117.00	279.20	40.	-5.	-0.003	172.07	1.017s
Se-75	1118.37	279.54	40.	4.	0.002	219.75	1.018s
I-131	1137.41	284.30	12.	6.	0.003	120.76	1.022s
PB-214	1180.60	295.09	33.	3.	0.002	300.30	1.033s
TL-210	1184.24	296.00	36.	5.	0.003	172.10	1.034s
PB-212	1200.37	300.03	41.	5.	0.003	207.40	1.038

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1200.53	300.07	46.	5.	0.003	192.91	1.038
PA-233	1200.97	300.18	51.	5.	0.003	202.81	1.038
PA-231	1210.86	302.65	56.	5.	0.003	211.77	1.040s
Kr-85m	1218.14	304.47	62.	0.	0.000	1000.00	1.042s
Ba-140	1219.66	304.85	62.	0.	0.000	1000.00	1.042s
BI-210M	1219.85	304.90	62.	0.	0.000	1000.00	1.042s
Ir-192	1234.03	308.44	62.	0.	0.000	1000.00	1.046s
PA-233	1248.32	312.01	76.	-6.	-0.004	198.87	1.049s
Ir-192	1266.25	316.49	37.	-9.	-0.005	101.50	1.053s
CR-51	1280.63	320.08	46.	-8.	-0.005	115.17	1.057s
La-140	1315.35	328.76	18.	-2.	-0.001	349.49	1.065s
Cf-249	1334.08	333.44	15.	-5.	-0.003	160.36	1.070s
AC-228	1353.61	338.32	9.	20.	0.011	31.15	1.074s
Cs-136	1362.62	340.57	29.	0.	0.000	1000.00	1.077s
Hf-175	1373.94	343.40	29.	0.	0.000	1000.00	1.079s
EU-152	1377.49	344.29	29.	0.	0.000	1000.00	1.080s
HF-181	1383.66	345.83	47.	-7.	-0.004	128.76	1.082s
PB-214	1408.09	351.93	18.	1.	0.001	516.22	1.087s
BA-133	1424.36	356.00	18.	5.	0.003	119.89	1.091s
I-131	1458.32	364.48	12.	4.	0.002	125.98	1.099s
Mo-99	1466.07	366.42	20.	4.	0.002	186.26	1.101s
BA-133	1535.78	383.84	28.	-2.	-0.001	308.54	1.117s
Cf-249	1552.22	387.95	2.	0.	0.000	1000.00	1.121
SN-113	1567.19	391.69	2.	26.	0.014	21.66	1.125s
Se-75	1603.09	400.66	12.	-1.	-0.001	500.00	1.133s
Cm-247	1610.05	402.40	11.	4.	0.002	116.91	1.135s
SB-125	1711.99	427.88	8.	4.	0.002	160.94	1.158s
AG-108M	1736.25	433.94	12.	-3.	-0.002	182.14	1.164s
PM-146	1816.05	453.88	12.	-3.	-0.002	174.56	1.182
SB-125	1854.01	463.37	22.	-8.	-0.004	81.61	1.191s
BE-7	1910.94	477.59	7.	4.	0.002	111.19	1.204s
HF-181	1928.56	482.00	4.	0.	0.000	1000.00	1.208s
La-140	1948.65	487.02	8.	0.	0.000	1000.00	1.212s
RU-103	1988.80	497.05	16.	-8.	-0.004	104.08	1.221s
RH-106	2048.06	511.86	43.	12.	0.007	81.10	2.485s
Kr-85	2056.53	513.98	40.	7.	0.004	136.68	1.237s
Sr-85	2056.57	513.99	33.	7.	0.004	114.61	1.237s
Rb-83	2082.01	520.35	8.	-2.	-0.001	285.77	1.242s
Rb-83	2118.78	529.54	16.	-4.	-0.002	167.82	1.251s
Nd-147	2124.62	531.00	14.	4.	0.002	124.72	1.252s
Ba-140	2149.67	537.26	8.	-1.	-0.001	482.68	1.258s
Rb-83	2210.65	552.50	28.	-10.	-0.005	81.50	1.271s
Br-82	2218.01	554.34	31.	1.	0.001	648.99	1.273s
CS-134	2253.60	563.24	4.	1.	0.001	404.15	1.280s
CS-134	2277.94	569.32	22.	-8.	-0.004	92.89	1.286s
BI-207	2279.47	569.70	20.	5.	0.003	125.31	1.286s
Ge-69	2296.66	574.00	17.	2.	0.001	258.33	1.290s
TL-208	2332.76	583.02	4.	2.	0.001	208.17	1.298s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2402.69	600.50	18.	5.	0.003	141.20	1.313s
SB-124	2411.61	602.73	23.	5.	0.003	155.72	1.315s
CS-134	2419.53	604.71	28.	5.	0.003	168.97	1.317s
BI-214	2437.93	609.31	35.	1.	0.001	594.46	1.321s
RU-103	2441.89	610.30	37.	5.	0.003	192.45	1.322s
AG-108M	2457.82	614.28	41.	5.	0.003	202.93	1.325s
PM-144	2472.94	618.06	46.	4.	0.002	245.73	1.328s
Br-82	2477.10	619.10	50.	0.	0.000	1000.00	1.329s
I-131	2548.61	636.97	18.	-6.	-0.003	75.76	1.345s
AG-110M	2631.76	657.76	14.	3.	0.002	166.13	1.362s
PM-144	2786.90	696.54	16.	-1.	-0.001	437.32	1.395s
Br-82	2794.17	698.36	18.	0.	0.000	1000.00	1.397s
SB-124	2891.88	722.79	14.	-3.	-0.002	169.71	1.417s
AG-108M	2892.48	722.94	18.	0.	0.000	1000.00	1.417s
EU-154	2894.17	723.36	18.	0.	0.000	1000.00	1.418s
ZR-95	2897.53	724.20	18.	0.	0.000	1000.00	1.418s
BI-212	2909.41	727.17	25.	-6.	-0.003	121.17	1.421s
PM-146	2943.61	735.72	14.	2.	0.001	254.12	1.428s
PM-146	2989.37	747.16	4.	3.	0.001	170.71	1.437s
AG-110M	3056.50	763.94	9.	-4.	-0.002	124.98	1.451s
NB-95	3063.89	765.79	9.	3.	0.002	146.43	1.453s
Br-82	3106.73	776.50	12.	-5.	-0.003	113.39	1.461s
Mo-99	3112.41	777.92	16.	0.	0.000	1000.00	1.462s
EU-152	3116.41	778.92	11.	5.	0.003	101.68	1.463s
BI-212	3142.41	785.42	0.	0.	0.000	1000.00	1.468s
CS-134	3184.20	795.87	0.	18.	0.010	23.57	1.477s
TL-210	3199.12	799.60	18.	0.	0.000	1000.00	1.480s
CS-134	3208.53	801.95	18.	0.	0.000	1000.00	1.482s
CO-58	3243.82	810.78	0.	6.	0.003	42.30	1.489s
Cs-136	3274.72	818.50	0.	0.	0.000	1000.00	1.495s
Br-82	3311.87	827.79	14.	-9.	-0.005	93.81	1.503s
MN-54	3340.10	834.85	19.	-5.	-0.003	201.78	1.508s
Co-56	3387.78	846.77	9.	1.	0.000	979.80	1.518s
NB-94	3485.08	871.10	18.	-8.	-0.004	86.92	1.537s
Ge-69	3488.69	872.00	25.	0.	0.000	1000.00	1.538s
EU-154	3493.61	873.23	14.	5.	0.003	106.88	1.539s
PA-234	3522.80	880.53	10.	5.	0.003	95.05	1.544s
PA-234	3533.64	883.24	26.	-3.	-0.002	272.26	1.547s
AG-110M	3539.41	884.68	23.	0.	0.000	1000.00	1.547s
Y-88	3592.83	898.04	0.	8.	0.004	35.36	1.558s
Lu-172	3603.43	900.69	8.	0.	0.000	1000.00	1.560s
AC-228	3644.94	911.07	5.	3.	0.002	147.99	1.568s
AG-110M	3750.60	937.49	0.	0.	0.000	1000.00	1.589
V-48	3777.83	944.30	0.	7.	0.004	37.80	1.594
PA-234	3784.70	946.02	7.	0.	0.000	1000.00	1.595s
EU-152	3857.05	964.11	8.	-5.	-0.003	95.83	1.609s
V-48	3934.58	983.50	9.	-6.	-0.004	109.77	1.623s
EU-154	3985.88	996.33	10.	6.	0.003	89.86	1.633s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	4004.55	1001.00	17.	2.	0.001	252.82	1.636s
EU-154	4019.65	1004.77	30.	-8.	-0.004	102.64	1.639s
Co-56	4151.87	1037.84	52.	-12.	-0.007	51.15	1.664s
Br-82	4176.50	1044.00	63.	-12.	-0.006	101.10	1.668s
Cs-136	4192.77	1048.07	74.	-12.	-0.006	109.10	1.671s
RH-106	4201.93	1050.36	75.	8.	0.004	161.39	1.673s
BI-207	4255.11	1063.66	15.	-7.	-0.004	127.38	1.682s
Ga-68	4310.04	1077.40	5.	-3.	-0.002	173.74	1.692s
Lu-172	4374.98	1093.64	0.	0.	0.000	1000.00	1.704s
EU-152	4448.68	1112.07	11.	1.	0.000	577.58	1.717s
Ta-182	4485.56	1121.30	10.	-5.	-0.003	139.40	1.724s
CO-60	4693.21	1173.24	6.	1.	0.001	349.31	1.760s
Ta-182	4756.42	1189.05	0.	0.	0.000	1000.00	1.771s
Ta-182	4885.79	1221.41	5.	-2.	-0.001	234.30	1.793s
NA-22	5098.13	1274.53	0.	0.	0.000	1000.00	1.828s
EU-154	5098.17	1274.54	0.	0.	0.000	1000.00	1.828s
FE-59	5166.35	1291.60	5.	1.	0.000	796.87	1.840s
V-48	5246.31	1311.60	0.	5.	0.003	44.72	1.853s
TL-210	5251.91	1313.00	5.	0.	0.000	1000.00	1.854s
Br-82	5269.61	1317.43	5.	0.	0.000	1000.00	1.857s
CO-60	5329.85	1332.50	0.	6.	0.003	40.82	1.866s
AG-110M	5536.88	1384.30	11.	-6.	-0.003	137.58	1.899s
EU-152	5631.62	1408.00	11.	-7.	-0.004	117.90	1.914s
K-40	5842.75	1460.83	9.	-5.	-0.003	111.12	1.946s
Br-82	5898.89	1474.88	0.	0.	0.000	1000.00	1.954s
SB-124	6762.39	1690.98	12.	-10.	-0.005	63.68	2.076s
BI-214	7056.06	1764.49	2.	-2.	-0.001	260.97	2.114s
Co-56	7083.46	1771.35	0.	0.	0.000	1000.00	2.117s
Y-88	7341.96	1836.06	6.	-5.	-0.003	126.49	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.5536E+00				5.31E+01	
			477.60	1.554E+00	?(	6.154E+00 1.11E+02 1.05E+01	G
K-40	N	-5.5435E+00				4.66E+11	
			1460.83	-5.543E+00	?(P	1.737E+01 1.11E+02 1.07E+01	G
Sc-46	F	-4.7816E-02				8.38E+01	
			889.28	-4.782E-02	%(	1.820E+00 1.04E+03 1.00E+02	G
			1120.55	-2.734E-02	% P	1.601E+00 1.53E+03 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F -2.5056E+00					2.77E+01	
		320.08	-2.506E+00	?(P	1.056E+01	1.15E+02	9.94E+00 G
MN-54	C -3.1745E-01					3.12E+02	
		834.85	-3.175E-01	?(	1.554E+00	2.02E+02	1.00E+02 G
FE-59	F 3.7519E-02					4.45E+01	
		1099.25	-4.959E-02	%(P	1.118E+00	1.86E+03	5.65E+01 G
		1291.60	1.514E-01	?(	3.060E+00	7.97E+02	4.32E+01 G
Co-56	C 4.5914E-02					7.73E+01	
		846.77	4.591E-02	?(	1.167E+00	9.80E+02	9.99E+01 G
		1238.28	-3.132E-02	% P	1.057E+00	2.39E+03	6.61E+01 G
		1037.84	-6.804E+00	+ P	2.090E+01	5.11E+01	1.41E+01 G
		1771.35	0.000E+00	-	6.098E+00	1.00E+03	1.55E+01 A
CO-57	C -3.0198E-03					2.72E+02	
		122.06	-3.020E-03	%(	4.436E-01	3.97E+03	8.56E+01 G
		136.47	-1.521E+00	+	6.018E+00	1.16E+02	1.07E+01 G
CO-58	C 4.0735E-01					7.09E+01	
		810.78	4.074E-01	?(P	4.918E-01	4.23E+01	9.95E+01 G
CO-60	F 6.0460E-01					1.93E+03	
		1332.50	6.046E-01	?(	7.427E-01	4.08E+01	1.00E+02 G
		1173.24	1.342E-01	- P	1.237E+00	3.49E+02	9.99E+01 G
ZN-65	F 5.1095E-09					2.44E+02	
		1115.55	5.110E-09	%(	3.114E+00	1.57E+10	5.06E+01 G
ZR-95	I 3.2674E-02					6.40E+01	
		756.73	3.267E-02	%(P	1.894E+00	2.13E+03	5.45E+01 G
		724.20	0.000E+00	-	3.049E+00	1.00E+03	4.42E+01 G
NB-95	I 2.0076E-01					6.40E+01	
		765.79	2.008E-01	?(	1.066E+00	1.46E+02	9.98E+01 G
RU-103	I -3.8795E-01					3.93E+01	
		497.05	-3.879E-01	?(	1.035E+00	1.04E+02	9.09E+01 G
		610.30	4.181E+00	?	2.819E+01	1.92E+02	5.75E+00 GA
RH-106	I 6.0409E+00					3.74E+02	
		621.92	5.353E-01	%(	1.909E+01	1.00E+03	9.93E+00 G
		1050.36	4.109E+01	?(	2.274E+02	1.61E+02	1.56E+00 G
		511.86	2.760E+00	?	7.514E+00	8.11E+01	2.00E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-108M	C	6.2622E-02					1.53E+05	
			433.94	-1.431E-01	?(P	8.286E-01	1.82E+02	9.05E+01 G
			722.94	0.000E+00	+	1.480E+00	1.00E+03	9.08E+01 G
			614.28	2.698E-01	?(	1.914E+00	2.03E+02	8.98E+01 G
AG-110M	F	1.9619E-01					2.50E+02	
			657.76	1.962E-01	?(	1.173E+00	1.66E+02	9.46E+01 G
			884.68	0.000E+00	-	2.462E+00	1.00E+03	7.27E+01 G
			937.49	0.000E+00	&	1.608E+00	1.00E+03	3.44E+01 G
			1384.30	-2.427E+00	+	7.679E+00	1.38E+02	2.43E+01 G
			763.94	-1.039E+00	+	4.656E+00	1.25E+02	2.23E+01 G
SN-113	F	1.4401E+00					1.15E+02	
			391.69	1.440E+00	?(	5.692E-01	2.17E+01	6.40E+01 G
SB-124	F	2.4096E-01					6.02E+01	
			602.73	2.410E-01	?(	1.322E+00	1.56E+02	9.83E+01 G
			1690.98	-2.474E+00	+ P	4.789E+00	6.37E+01	4.78E+01 G
			722.79	-1.859E+00	+	1.135E+01	1.70E+02	1.08E+01 G
SB-125	I	7.9831E-01					1.01E+03	
			427.88	4.838E-01	?(P	2.123E+00	1.61E+02	2.96E+01 G
			600.50	1.320E+00	?(	6.576E+00	1.41E+02	1.79E+01 G
			635.89	1.254E-01	% P	8.260E+00	1.70E+03	1.13E+01 G
			463.37	-3.000E+00	+ P	9.732E+00	8.16E+01	1.05E+01 G
I-131	I	3.3855E-01					8.02E+00	
			364.48	1.748E-01	?(P	7.801E-01	1.26E+02	8.17E+01 G
			284.30	2.517E+00	(P	8.375E+00	1.21E+02	6.14E+00 G
			636.97	-4.556E+00	+ P	1.701E+01	7.58E+01	7.17E+00 G
Gd-153	F	1.5059E-01					2.42E+02	
			97.50	1.506E-01	?(	2.285E+00	4.36E+02	3.00E+01 G
			103.20	-3.881E-01	&	2.231E+00	1.65E+02	2.18E+01 G
Ga-68	C	-8.9618E+00					4.71E-02	
			1077.40	-8.962E+00	?(	3.922E+01	1.74E+02	3.30E+00 G
Tc-99m	I	9.9663E-02					2.51E-01	
							Energy duplication	
			140.51	9.966E-02	?(	4.571E-01	1.31E+02	8.93E+01 G
BA-133	F	2.8871E-01					3.85E+03	
			356.00	2.887E-01	?(	1.210E+00	1.20E+02	6.20E+01 G
			302.85	1.173E-01	%	6.239E+00	1.51E+03	1.83E+01 G
			383.84	-9.939E-01	+	1.097E+01	3.09E+02	8.94E+00 GA
			80.99	3.144E-01	?	1.054E+00	9.73E+01	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	1.3751E+00					7.54E+02	
			795.87	1.375E+00	?(	5.630E-01	2.36E+01	8.55E+01 G
			604.71	2.435E-01	-	1.447E+00	1.69E+02	9.76E+01 G
			569.32	-2.486E+00	-	7.886E+00	9.29E+01	1.54E+01 G
			801.95	0.000E+00	-	1.701E+01	1.00E+03	8.69E+00 G
			563.24	5.860E-01	-	7.049E+00	4.04E+02	8.35E+00 G
CS-137	I	1.9581E-02					1.10E+04	
			661.66	1.958E-02	%(P	1.348E+00	1.84E+03	8.52E+01 G
CE-139	F	1.2108E-01					1.38E+02	
			165.85	1.211E-01	&(	5.772E-01	1.36E+02	7.99E+01 G
Ba-140	I	-2.4919E-01					1.28E+01	
			537.26	-2.492E-01	?(P	3.111E+00	4.83E+02	2.44E+01 G
			162.66	-2.383E+00	+	9.443E+00	1.16E+02	6.22E+00 G
			304.85	0.000E+00	+	2.696E+01	1.00E+03	4.29E+00 G
La-140	I	-1.5185E-02					1.28E+01	
			1596.21	-1.518E-02	%(P	9.063E-01	4.91E+03	9.54E+01 G
			487.02	0.000E+00	+	1.514E+00	1.00E+03	4.55E+01 G
			328.76	-3.592E-01	+	3.488E+00	3.49E+02	2.03E+01 G
			815.77	-5.737E-02	% P	4.191E+00	1.34E+03	2.33E+01 G
CE-141	I	-2.9507E-02					3.25E+01	
			145.44	-2.951E-02	%(P	1.179E+00	1.20E+03	4.82E+01 G
PM-144	C	6.7102E-02					3.63E+02	
			696.54	-7.870E-02	&(	1.272E+00	4.37E+02	9.90E+01 G
			618.06	2.128E-01	?(	1.831E+00	2.46E+02	9.91E+01 G
EU-152	F	4.8801E-01					4.94E+03	
			121.78	0.000E+00	?(	1.477E+00	1.00E+03	2.86E+01 G
			344.29	0.000E+00	?(	3.407E+00	1.00E+03	2.65E+01 G
			1112.07	5.285E-01	?(	1.159E+01	5.78E+02	1.36E+01 G
			778.92	2.523E+00	?(	8.950E+00	1.02E+02	1.29E+01 G
			964.11	-2.452E+00	+	8.204E+00	9.58E+01	1.46E+01 G
			244.69	-7.304E-02	& P	7.802E+00	3.94E+03	7.58E+00 G
			1408.00	-3.350E+00	+	9.008E+00	1.18E+02	2.10E+01 GA
EU-154	I	1.1095E+00					3.14E+03	
			123.10	-2.921E-01	?(	1.148E+00	1.14E+02	4.08E+01 G
			1274.54	0.000E+00	+	2.032E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	6.651E+00	1.00E+03	2.02E+01 G
			873.23	3.079E+00	?(	1.148E+01	1.07E+02	1.23E+01 G
			1004.77	-3.554E+00	+	1.249E+01	1.03E+02	1.80E+01 G
			996.33	4.224E+00	?(	1.308E+01	8.99E+01	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	2.8122E-01					1.81E+03	
			105.31	-3.391E-01	?(P	4.527E+00	2.78E+02	2.12E+01 G
			86.54	7.096E-01	(	1.742E+00	7.36E+01	3.07E+01 G
Ta-182	F	-1.3315E+00					1.14E+02	
			1121.30	-1.331E+00	?(	4.416E+00	1.39E+02	3.49E+01 G
			1221.41	-8.091E-01	+	4.672E+00	2.34E+02	2.70E+01 G
			1189.05	0.000E+00	+	4.164E+00	1.00E+03	1.62E+01 G
Hg-203	F	-1.7909E-01					4.66E+01	
			279.20	-1.791E-01	?(	1.074E+00	1.72E+02	8.15E+01 G
TL-208	N	1.1919E-01					6.98E+02	
			583.02	1.192E-01	?(	7.170E-01	2.08E+02	8.45E+01 G
			277.28	-3.720E+00	&	1.232E+01	9.71E+01	6.31E+00 G
			860.56	-8.538E-03	% P	4.140E+00	1.79E+04	1.24E+01 G
PM-146	C	1.2711E-01					2.02E+03	
			453.88	-2.192E-01	?(P	1.206E+00	1.75E+02	6.50E+01 G
			747.16	4.861E-01	?(	2.262E+00	1.71E+02	3.40E+01 G
			735.72	5.853E-01	?(P	5.452E+00	2.54E+02	2.25E+01 G
Y-88	F	-4.2367E-02					1.07E+02	
			1836.06	-6.655E-01	?(	1.880E+00	1.26E+02	9.92E+01 G
			898.04	6.173E-01	?(	5.687E-01	3.54E+01	9.37E+01 G
Cd-113m		-1.1565E+03					5.33E+03	
			263.70	-1.156E+03	&(	9.907E+03	2.37E+02	6.00E-03 K
Cd-109	F	1.2174E+00					4.53E+02	
			88.04	1.217E+00	?(	1.664E+01	3.91E+02	3.79E+00 G
Se-75		1.0966E-01					1.20E+02	
			264.66	0.000E+00	?(	1.081E+00	1.00E+03	5.85E+01 G
			136.00	0.000E+00	?(	9.817E-01	1.00E+03	5.83E+01 G
			279.54	4.590E-01	?(	3.539E+00	2.20E+02	2.48E+01 G
			121.12	-1.656E-01	+	2.385E+00	3.99E+02	1.71E+01 G
			400.66	-3.239E-01	+	6.107E+00	5.00E+02	1.14E+01 G
			96.73	1.322E+00	?(	1.973E+01	4.29E+02	3.42E+00 G
Cf-251	T	-9.5208E-01					3.28E+05	
			176.60	-9.521E-01	?(	2.941E+00	1.11E+02	1.70E+01 G
			227.00	4.864E-01	+	7.929E+00	5.52E+02	6.30E+00 GA
Sn-126		1.5335E+00					3.65E+07	
			87.57	1.232E-01	-	1.649E+00	3.82E+02	3.75E+01 GA
			64.28	1.534E+00	?(	6.211E+00	1.18E+02	9.70E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          86.94 5.124E-01     6.704E+00 3.73E+02 9.04E+00 GA

PB-210   N  -4.8668E+00                                     8.14E+03
                          46.54-4.867E+00 ?(P 2.308E+01 1.44E+02 4.25E+00 G

PB-212   N   7.7809E-03                                     6.98E+02
                         238.63 7.781E-03 %(P 1.757E+00 6.32E+03 4.33E+01 G
                         300.03 3.983E+00 ? P 2.888E+01 2.07E+02 3.28E+00 GA

PB-214   N   2.0836E-01                                     5.84E+05
                         351.93 1.050E-01 ?(P 1.968E+00 5.16E+02 3.76E+01 G
                         295.09 4.098E-01 &(P 4.362E+00 3.00E+02 1.93E+01 G
                         242.00 1.917E+00 ?   9.631E+00 1.45E+02 7.43E+00 GA

BI-207   C   2.6954E-01                                     1.18E+04
                         569.70 2.695E-01 ?(  1.181E+00 1.25E+02 9.77E+01 G
                        1063.66-7.831E-01 +   2.322E+00 1.27E+02 7.45E+01 G

BI-212   N  -4.9481E+00                                     6.98E+02
                         727.17-4.948E+00 ?(  2.081E+01 1.21E+02 7.55E+00 G
                         785.42 0.000E+00 +   3.721E+01 1.00E+03 1.28E+00 GA

BI-214   N   1.6257E-01                                     5.84E+05
                         609.31 1.626E-01 ?(P 3.449E+00 5.94E+02 4.61E+01 G
                        1120.29 1.119E-02 % P 1.047E+01 2.42E+04 1.51E+01 G
                        1764.49-2.073E+00 + P 8.355E+00 2.61E+02 1.54E+01 G

BI-210M  T  -4.8438E-01                                     1.10E+09
                         265.83-4.844E-01 ?(  1.663E+00 1.01E+02 5.00E+01 G
                         304.90 0.000E+00 +   4.130E+00 1.00E+03 2.80E+01 G

AC-228   N   2.1424E+00                                     2.10E+03
                         911.07 8.412E-01 ?(  3.224E+00 1.48E+02 2.90E+01 G
                         968.97-7.357E-02 %   8.469E+00 3.01E+03 1.75E+01 G
                         338.32 5.284E+00 ?(  4.481E+00 3.11E+01 1.20E+01 G
                          93.35 8.175E-01 ?   1.203E+01 4.22E+02 5.56E+00 XA

TH-227   N   1.1785E+00                                     7.95E+03
                         256.24 1.815E+00 ?(  6.594E+00 1.32E+02 7.00E+00 G
                         235.97 1.134E+00 ?(  5.365E+00 1.36E+02 1.23E+01 G
                          50.14 6.904E-01 ?(  7.166E+00 3.34E+02 8.00E+00 G

TH-229   N  -4.6991E+00                                     2.68E+06
                         193.51-4.699E+00 ?(  1.356E+01 1.05E+02 4.40E+00 G
                         210.85 2.410E+00 &   1.572E+01 2.25E+02 2.99E+00 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	-5.3159E+00					1.63E+12	
			92.59	-5.316E+00	(P	1.338E+01	6.86E+01	5.58E+00 G
			63.29	-3.248E+00	+ P	1.787E+01	1.50E+02	3.81E+00 G
PA-231	N	5.5641E+00					1.20E+07	
			302.65	5.183E+00	?(	3.811E+01	2.12E+02	2.88E+00 G
			300.07	6.011E+00	?(	4.038E+01	1.93E+02	2.46E+00 G
PA-233	C	-9.7589E-02					7.82E+08	
			312.01	-5.252E-01	?(	3.598E+00	1.99E+02	3.60E+01 G
			300.18	2.386E+00	?(	1.682E+01	2.03E+02	6.20E+00 G
PA-234	N	2.5857E-02					1.63E+12	
			131.29	2.586E-02	%(P	3.128E+00	3.40E+03	1.80E+01 G
			946.02	0.000E+00	-	8.477E+00	1.00E+03	1.34E+01 G
			569.47	-1.541E-01	%	1.694E+01	3.02E+03	8.20E+00 G
			883.24	-2.007E+00	+	1.956E+01	2.72E+02	9.60E+00 G
			880.53	6.363E+00	?	2.097E+01	9.50E+01	6.00E+00 GA
PA-234M	N	2.2369E+01					1.63E+12	
			1001.00	2.237E+01	?(P	2.055E+02	2.53E+02	8.37E-01 G
			766.41	-7.178E+00	%	3.109E+02	1.08E+03	2.94E-01 G
U-235	N	1.1376E-01					2.57E+11	
			143.79	-1.559E-01	?(P	5.161E+00	9.80E+02	1.10E+01 G
			205.33	7.037E-01	?(	8.328E+00	3.97E+02	5.01E+00 G
			163.38	-2.446E-01	%	1.261E+01	1.45E+03	5.08E+00 G
			185.72	1.682E-01		9.092E-01	1.90E+02	5.40E+01 GA
AM-241	T	-8.7488E-01					1.58E+05	
			59.54	-8.749E-01	?(P	1.863E+00	7.17E+01	3.59E+01 G
Np-237	F	1.6633E+00					2.14E+06	
			86.49	1.663E+00	(	3.432E+00	6.27E+01	1.31E+01 G
Ir-192	F	-3.1217E-01					7.40E+01	
			316.49	-3.122E-01	?(	1.080E+00	1.01E+02	8.70E+01 G
			468.06	-2.648E-02	%	2.241E+00	2.32E+03	5.18E+01 G
			308.44	0.000E+00	+	3.678E+00	1.00E+03	3.18E+01 G
Np-239	T	5.6342E-02					2.36E+00	
			103.70	0.000E+00	-	2.154E+00	1.00E+03	2.40E+01 X
			106.13	5.634E-02	%(	4.158E+00	2.14E+03	2.27E+01 G
			99.50	3.007E-01	&	4.616E+00	4.41E+02	1.50E+01 X

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147		1.6124E+00					1.11E+01	
			531.00	1.612E+00	?(	7.106E+00	1.25E+02	1.30E+01 G
			91.10	1.615E-01	-	2.293E+00	4.07E+02	2.83E+01 G
Mo-99	I	5.5340E-01					2.75E+00	
			739.50	-1.689E-01	%(	1.091E+01	1.72E+03	1.21E+01 G
			181.07	2.016E+00	?(	6.918E+00	9.94E+01	5.99E+00 G
							Energy	duplication
			140.51	-1.090E-01	%	1.228E+01	3.15E+03	4.52E+00 G
			777.92	0.000E+00	-	3.242E+01	1.00E+03	4.26E+00 G
			366.42	1.006E+01	?	6.692E+01	1.86E+02	1.19E+00 GA
Ge-69	C	1.9377E-01					1.62E+00	
			1106.50	-1.665E-01	%(	6.810E+00	1.09E+03	2.60E+01 G
			574.00	9.875E-01	?(	9.279E+00	2.58E+02	1.18E+01 G
			872.00	0.000E+00	-	1.922E+01	1.00E+03	9.59E+00 G
Br-82	F	-3.5999E-01					1.47E+00	
			776.50	-3.600E-01	?(	1.437E+00	1.13E+02	8.34E+01 G
			554.34	8.361E-02	+	1.957E+00	6.49E+02	7.06E+01 G
			619.10	0.000E+00	+	4.404E+00	1.00E+03	4.31E+01 G
			1044.00	-3.415E+00	+	1.168E+01	1.01E+02	2.80E+01 G
			698.36	0.000E+00	+	4.705E+00	1.00E+03	2.79E+01 G
			1317.43	0.000E+00	+	4.878E+00	1.00E+03	2.70E+01 G
			827.79	-2.538E+00	+	5.651E+00	9.38E+01	2.42E+01 G
			1474.88	0.000E+00	+	4.898E+00	1.00E+03	1.66E+01 G
V-48	C	2.5765E-01					1.61E+01	
			983.50	-4.942E-01	?(	1.322E+00	1.10E+02	1.00E+02 G
			1311.60	5.072E-01	?(	7.477E-01	4.47E+01	9.80E+01 G
			944.30	6.599E+00	?(	6.948E+00	3.78E+01	8.00E+00 G
Sr-85	C	3.4012E-01					6.47E+01	
			513.99	3.401E-01	?(	1.341E+00	1.15E+02	9.93E+01 G
Rb-83	P	-1.9865E-01					8.62E+01	
			520.35	-1.986E-01	?(	1.578E+00	2.86E+02	4.61E+01 G
			529.54	-5.422E-01	+	3.262E+00	1.68E+02	3.00E+01 G
			552.50	-2.919E+00	+	8.019E+00	8.15E+01	1.63E+01 G
Kr-85	I	7.2012E+01					3.92E+03	
			513.98	7.201E+01	?(	3.399E+02	1.37E+02	4.30E-01 G
Cm-247	T	2.7952E-01					5.70E+09	
			402.40	2.225E-01	?(	9.205E-01	1.17E+02	7.20E+01 G
			84.00	4.581E-01	(	1.772E+00	1.12E+02	2.30E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Kr-85m   I   1.5582E-02                                      1.87E-01
                          151.00 1.558E-02 %(  5.895E-01 1.30E+03 7.55E+01 G
                          304.47 0.000E+00 &   8.591E+00 1.00E+03 1.40E+01 G

NB-94    I  -2.0043E-02                                      7.41E+06
                          702.63-2.004E-02 %(  1.352E+00 1.81E+03 9.79E+01 G
                          871.10-5.292E-01 +   1.567E+00 8.69E+01 9.99E+01 G

TL-210   N   8.1827E-02                                      5.84E+05
                          799.60 0.000E+00  (  1.490E+00 1.00E+03 9.90E+01 G
                          296.00 1.843E-01 ?(  1.108E+00 1.72E+02 7.90E+01 G
                         1313.00 0.000E+00 -   6.221E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	38.	-7.	-0.004	144.07	-4.867E+00	P
TH-227	50.14	15.	2.	0.001	333.54	6.904E-01	
AM-241	59.54	36.	-14.	-0.008	71.71	-8.749E-01	P
TH-234	63.29	43.	-6.	-0.003	149.77	-3.248E+00	P
Sn-126	64.28	34.	7.	0.004	117.67	1.534E+00	
BA-133	80.99	16.	6.	0.004	97.25	3.144E-01	
Cm-247	84.00	23.	6.	0.004	111.78	4.581E-01	
Np-237	86.49	29.	13.	0.007	62.74	1.663E+00	
EU-155	86.54	42.	13.	0.007	73.63	7.096E-01	
Sn-126	86.94	56.	3.	0.002	373.16	5.124E-01	
Sn-126	87.57	59.	3.	0.002	382.02	1.232E-01	
Cd-109	88.04	62.	3.	0.002	390.79	1.217E+00	
Hf-175	89.36	65.	3.	0.002	398.98	1.955E+00	
Nd-147	91.10	67.	3.	0.002	406.71	1.615E-01	
TH-234	92.59	92.	-19.	-0.010	68.61	-5.316E+00	P
AC-228	93.35	73.	3.	0.002	422.26	8.175E-01	
Se-75	96.73	76.	3.	0.002	428.53	1.322E+00	
Gd-153	97.50	79.	3.	0.002	436.09	1.506E-01	
Np-239	99.50	81.	3.	0.002	441.50	3.007E-01	
Gd-153	103.20	38.	-6.	-0.003	165.14	-3.881E-01	
EU-155	105.31	165.	-5.	-0.003	277.66	-3.391E-01	P
Se-75	121.12	26.	-2.	-0.001	398.97	-1.656E-01	
EU-154	123.10	35.	-8.	-0.004	114.46	-2.921E-01	
HF-181	136.30	58.	-6.	-0.004	175.11	-1.739E+00	
CO-57	136.47	64.	-10.	-0.006	116.28	-1.521E+00	
Tc-99m	140.51	22.	5.	0.003	131.07	9.966E-02	
U-235	143.79	46.	-1.	-0.001	980.27	-1.559E-01	P
Ba-140	162.66	42.	-8.	-0.005	115.67	-2.383E+00	
CE-139	165.85	25.	5.	0.003	136.50	1.211E-01	
Cf-251	176.60	27.	-9.	-0.005	111.34	-9.521E-01	
Mo-99	181.07	17.	6.	0.004	99.44	2.016E+00	
Lu-172	181.47	32.	-6.	-0.003	139.44	-5.969E-01	
U-235	185.72	23.	5.	0.003	189.92	1.682E-01	
TH-229	193.51	33.	-10.	-0.006	104.83	-4.699E+00	
U-235	205.33	13.	2.	0.001	397.49	7.037E-01	
TH-229	210.85	17.	3.	0.002	224.72	2.410E+00	
Cf-251	227.00	17.	1.	0.001	551.70	4.864E-01	
TH-227	235.97	29.	6.	0.003	136.01	1.134E+00	
PB-214	242.00	33.	6.	0.003	144.53	1.917E+00	
TH-227	256.24	11.	5.	0.003	131.91	1.815E+00	
Cd-113m	263.70	19.	-3.	-0.001	237.17	-1.156E+03	
BI-210M	265.83	39.	-9.	-0.005	100.83	-4.844E-01	
TL-208	277.28	31.	-9.	-0.005	97.14	-3.720E+00	
Hg-203	279.20	40.	-5.	-0.003	172.07	-1.791E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Se-75	279.54	40.	4.	0.002	219.75	4.590E-01	
I-131	284.30	12.	6.	0.003	120.76	2.517E+00	P
PB-214	295.09	33.	3.	0.002	300.30	4.098E-01	P
TL-210	296.00	36.	5.	0.003	172.10	1.843E-01	
PB-212	300.03	41.	5.	0.003	207.40	3.983E+00	P
PA-231	300.07	46.	5.	0.003	192.91	6.011E+00	
PA-233	300.18	51.	5.	0.003	202.81	2.386E+00	
PA-231	302.65	56.	5.	0.003	211.77	5.183E+00	
PA-233	312.01	76.	-6.	-0.004	198.87	-5.252E-01	
Ir-192	316.49	37.	-9.	-0.005	101.50	-3.122E-01	
CR-51	320.08	46.	-8.	-0.005	115.17	-2.506E+00	P
La-140	328.76	18.	-2.	-0.001	349.49	-3.592E-01	
Cf-249	333.44	15.	-5.	-0.003	160.36	-9.512E-01	
AC-228	338.32	9.	20.	0.011	31.15	5.284E+00	
HF-181	345.83	47.	-7.	-0.004	128.76	-1.594E+00	P
PB-214	351.93	18.	1.	0.001	516.22	1.050E-01	P
BA-133	356.00	18.	5.	0.003	119.89	2.887E-01	
I-131	364.48	12.	4.	0.002	125.98	1.748E-01	P
Mo-99	366.42	20.	4.	0.002	186.26	1.006E+01	
BA-133	383.84	28.	-2.	-0.001	308.54	-9.939E-01	
Se-75	400.66	12.	-1.	-0.001	500.00	-3.239E-01	
Cm-247	402.40	11.	4.	0.002	116.91	2.225E-01	
SB-125	427.88	8.	4.	0.002	160.94	4.838E-01	P
AG-108M	433.94	12.	-3.	-0.002	182.14	-1.431E-01	P
PM-146	453.88	12.	-3.	-0.002	174.56	-2.192E-01	P
SB-125	463.37	22.	-8.	-0.004	81.61	-3.000E+00	P
BE-7	477.59	7.	4.	0.002	111.19	1.554E+00	
RU-103	497.05	16.	-8.	-0.004	104.08	-3.879E-01	
RH-106	511.86	43.	12.	0.007	81.10	2.760E+00	
Kr-85	513.98	40.	7.	0.004	136.68	7.201E+01	
Sr-85	513.99	33.	7.	0.004	114.61	3.401E-01	
Rb-83	520.35	8.	-2.	-0.001	285.77	-1.986E-01	
Rb-83	529.54	16.	-4.	-0.002	167.82	-5.422E-01	
Nd-147	531.00	14.	4.	0.002	124.72	1.612E+00	
Ba-140	537.26	8.	-1.	-0.001	482.68	-2.492E-01	P
Rb-83	552.50	28.	-10.	-0.005	81.50	-2.919E+00	
Br-82	554.34	31.	1.	0.001	648.99	8.361E-02	
BI-207	569.70	20.	5.	0.003	125.31	2.695E-01	
Ge-69	574.00	17.	2.	0.001	258.33	9.875E-01	
TL-208	583.02	4.	2.	0.001	208.17	1.192E-01	
SB-125	600.50	18.	5.	0.003	141.20	1.320E+00	
SB-124	602.73	23.	5.	0.003	155.72	2.410E-01	
BI-214	609.31	35.	1.	0.001	594.46	1.626E-01	P
RU-103	610.30	37.	5.	0.003	192.45	4.181E+00	
AG-108M	614.28	41.	5.	0.003	202.93	2.698E-01	
PM-144	618.06	46.	4.	0.002	245.73	2.128E-01	
I-131	636.97	18.	-6.	-0.003	75.76	-4.556E+00	P
AG-110M	657.76	14.	3.	0.002	166.13	1.962E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-144	696.54	16.	-1.	-0.001	437.32	-7.870E-02		
SB-124	722.79	14.	-3.	-0.002	169.71	-1.859E+00		
BI-212	727.17	25.	-6.	-0.003	121.17	-4.948E+00		
PM-146	735.72	14.	2.	0.001	254.12	5.853E-01		P
PM-146	747.16	4.	3.	0.001	170.71	4.861E-01		
AG-110M	763.94	9.	-4.	-0.002	124.98	-1.039E+00		
NB-95	765.79	9.	3.	0.002	146.43	2.008E-01		
Br-82	776.50	12.	-5.	-0.003	113.39	-3.600E-01		
EU-152	778.92	11.	5.	0.003	101.68	2.523E+00		
CO-58	810.78	0.	6.	0.003	42.30	4.074E-01		P
Br-82	827.79	14.	-9.	-0.005	93.81	-2.538E+00		
MN-54	834.85	19.	-5.	-0.003	201.78	-3.175E-01		
Co-56	846.77	9.	1.	0.000	979.80	4.591E-02		
NB-94	871.10	18.	-8.	-0.004	86.92	-5.292E-01		
EU-154	873.23	14.	5.	0.003	106.88	3.079E+00		
PA-234	880.53	10.	5.	0.003	95.05	6.363E+00		
PA-234	883.24	26.	-3.	-0.002	272.26	-2.007E+00		
Y-88	898.04	0.	8.	0.004	35.36	6.173E-01		
AC-228	911.07	5.	3.	0.002	147.99	8.412E-01		
V-48	944.30	0.	7.	0.004	37.80	6.599E+00		
EU-152	964.11	8.	-5.	-0.003	95.83	-2.452E+00		
V-48	983.50	9.	-6.	-0.004	109.77	-4.942E-01		
EU-154	996.33	10.	6.	0.003	89.86	4.224E+00		
PA-234M	1001.00	17.	2.	0.001	252.82	2.237E+01		P
EU-154	1004.77	30.	-8.	-0.004	102.64	-3.554E+00		
Co-56	1037.84	52.	-12.	-0.007	51.15	-6.804E+00		P
Br-82	1044.00	63.	-12.	-0.006	101.10	-3.415E+00		
Cs-136	1048.07	74.	-12.	-0.006	109.10	-1.195E+00		
RH-106	1050.36	75.	8.	0.004	161.39	4.109E+01		
BI-207	1063.66	15.	-7.	-0.004	127.38	-7.831E-01		
Ga-68	1077.40	5.	-3.	-0.002	173.74	-8.962E+00		
EU-152	1112.07	11.	1.	0.000	577.58	5.285E-01		
Ta-182	1121.30	10.	-5.	-0.003	139.40	-1.331E+00		
CO-60	1173.24	6.	1.	0.001	349.31	1.342E-01		P
Ta-182	1221.41	5.	-2.	-0.001	234.30	-8.091E-01		
FE-59	1291.60	5.	1.	0.000	796.87	1.514E-01		
V-48	1311.60	0.	5.	0.003	44.72	5.072E-01		
CO-60	1332.50	0.	6.	0.003	40.82	6.046E-01		
AG-110M	1384.30	11.	-6.	-0.003	137.58	-2.427E+00		
EU-152	1408.00	11.	-7.	-0.004	117.90	-3.350E+00		
K-40	1460.83	9.	-5.	-0.003	111.12	-5.543E+00		P
SB-124	1690.98	12.	-10.	-0.005	63.68	-2.474E+00		P
BI-214	1764.49	2.	-2.	-0.001	260.97	-2.073E+00		P
Y-88	1836.06	6.	-5.	-0.003	126.49	-6.655E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.5536E+00	1.5536E+00	1.112E+02%	6.15E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.16E-01
K-40	#A	-5.5435E+00	-5.5435E+00	1.111E+02%	1.74E+01
Sc-46	#A	-4.7816E-02	-4.7816E-02	1.039E+03%	1.82E+00
CR-51	#A	-2.5056E+00	-2.5056E+00	1.152E+02%	1.06E+01
MN-54	#A	-3.1745E-01	-3.1745E-01	2.018E+02%	1.55E+00
FE-59	#A	3.7519E-02	3.7519E-02	7.969E+02%	1.12E+00
Co-56	#A	4.5913E-02	4.5914E-02	9.798E+02%	1.17E+00
CO-57	#A	-3.0198E-03	-3.0198E-03	3.972E+03%	4.44E-01
CO-58	#A	4.0735E-01	4.0735E-01	4.230E+01%	4.92E-01
CO-60	#A	6.0460E-01	6.0460E-01	4.082E+01%	7.43E-01
ZN-65	#A	5.1095E-09	5.1095E-09	1.574E+10%	3.11E+00
ZR-95	#A	3.2674E-02	3.2674E-02	2.129E+03%	1.89E+00
NB-95	#A	2.0076E-01	2.0076E-01	1.464E+02%	1.07E+00
RU-103	#A	-3.8795E-01	-3.8795E-01	1.041E+02%	1.04E+00
RH-106	#A	6.0409E+00	6.0409E+00	1.614E+02%	1.91E+01
AG-108M	#A	6.2622E-02	6.2622E-02	1.363E+02%	8.29E-01
AG-110M	#A	1.9619E-01	1.9619E-01	1.661E+02%	1.17E+00
SN-113	#	1.4401E+00	1.4401E+00	2.166E+01%	5.69E-01
SB-124	#A	2.4096E-01	2.4096E-01	1.557E+02%	1.32E+00
SB-125	#A	7.9831E-01	7.9831E-01	1.071E+02%	2.12E+00
I-131	#A	3.3853E-01	3.3855E-01	8.725E+01%	7.80E-01
Gd-153	#A	1.5059E-01	1.5059E-01	4.361E+02%	2.28E+00
Ga-68	#A	-8.9009E+00	-8.9618E+00	1.737E+02%	3.92E+01
Tc-99m	#A	9.9536E-02	9.9663E-02	1.311E+02%	4.57E-01
BA-133	#A	2.8871E-01	2.8871E-01	1.199E+02%	1.21E+00
CS-134	#	1.3751E+00	1.3751E+00	2.357E+01%	5.63E-01
CS-137	#A	1.9581E-02	1.9581E-02	1.836E+03%	1.35E+00
CE-139	#A	1.2108E-01	1.2108E-01	1.365E+02%	5.77E-01
Ba-140	#A	-2.4919E-01	-2.4919E-01	4.827E+02%	3.11E+00
La-140	#A	-1.5185E-02	-1.5185E-02	4.909E+03%	9.06E-01
CE-141	#A	-2.9507E-02	-2.9507E-02	1.197E+03%	1.18E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.12E+00
PM-144	#A	6.7102E-02	6.7102E-02	2.457E+02%	1.27E+00
EU-152	#A	4.8801E-01	4.8801E-01	1.017E+02%	1.48E+00
EU-154	#A	1.1095E+00	1.1095E+00	6.018E+01%	1.15E+00
EU-155	#A	2.8122E-01	2.8122E-01	7.363E+01%	4.53E+00
HF-181	#A	0.0000E+00	0.0000E+00	1.000E+03%	6.32E-01
Ta-182	#A	-1.3315E+00	-1.3315E+00	1.394E+02%	4.42E+00
Hg-203	#A	-1.7909E-01	-1.7909E-01	1.721E+02%	1.07E+00
TL-208	#A	1.1919E-01	1.1919E-01	2.082E+02%	7.17E-01
PM-146	#A	1.2711E-01	1.2711E-01	1.175E+02%	1.21E+00
Y-88	#A	-4.2366E-02	-4.2367E-02	3.536E+01%	1.88E+00

Cd-113m#A	-1.1565E+03	-1.1565E+03	2.372E+02%	9.91E+03
Cd-109 #A	1.2174E+00	1.2174E+00	3.908E+02%	1.66E+01
Se-75 #A	1.0966E-01	1.0966E-01	2.197E+02%	1.08E+00
Cf-251 #A	-9.5208E-01	-9.5208E-01	1.113E+02%	2.94E+00
Cf-249 #A	0.0000E+00	0.0000E+00	1.000E+03%	5.48E-01
Sn-126 #A	1.5335E+00	1.5335E+00	1.177E+02%	6.21E+00
PB-210 #A	-4.8668E+00	-4.8668E+00	1.441E+02%	2.31E+01
PB-212 #A	7.7809E-03	7.7809E-03	6.316E+03%	1.76E+00
PB-214 #A	2.0836E-01	2.0836E-01	2.986E+02%	1.97E+00
BI-207 #A	2.6954E-01	2.6954E-01	1.253E+02%	1.18E+00
BI-212 #A	-4.9481E+00	-4.9481E+00	1.212E+02%	2.08E+01
BI-214 #A	1.6257E-01	1.6257E-01	5.945E+02%	3.45E+00
BI-210M#A	-4.8438E-01	-4.8438E-01	1.008E+02%	1.66E+00
AC-228 #A	2.1424E+00	2.1424E+00	3.115E+01%	3.22E+00
TH-227 #A	1.1785E+00	1.1785E+00	1.279E+02%	6.59E+00
TH-229 #A	-4.6991E+00	-4.6991E+00	1.048E+02%	1.36E+01
TH-234 #A	-5.3159E+00	-5.3159E+00	6.861E+01%	1.34E+01
PA-231 #A	5.5641E+00	5.5641E+00	1.432E+02%	3.81E+01
PA-233 #A	-9.7589E-02	-9.7589E-02	1.420E+02%	3.60E+00
PA-234 #A	2.5857E-02	2.5857E-02	3.400E+03%	3.13E+00
PA-234M#A	2.2369E+01	2.2369E+01	2.528E+02%	2.05E+02
U-235 #A	1.1376E-01	1.1376E-01	3.975E+02%	5.16E+00
AM-241 #A	-8.7488E-01	-8.7488E-01	7.171E+01%	1.86E+00
Np-237 #A	1.6633E+00	1.6633E+00	6.274E+01%	3.43E+00
Ir-192 #A	-3.1216E-01	-3.1217E-01	1.015E+02%	1.08E+00
Cs-136 #A	0.0000E+00	0.0000E+00	7.071E+02%	4.93E-01
Np-239 #A	5.6335E-02	5.6342E-02	2.144E+03%	4.16E+00
Nd-147 #A	1.6123E+00	1.6124E+00	1.247E+02%	7.11E+00
Mo-99 #A	5.5334E-01	5.5340E-01	9.944E+01%	1.09E+01
Ge-69 #A	1.9373E-01	1.9377E-01	2.583E+02%	6.81E+00
Br-82 #A	-3.5991E-01	-3.5999E-01	1.134E+02%	1.44E+00
V-48 #A	2.5765E-01	2.5765E-01	3.780E+01%	1.32E+00
Sr-85 #A	3.4012E-01	3.4012E-01	1.146E+02%	1.34E+00
Rb-83 #A	-1.9865E-01	-1.9865E-01	2.858E+02%	1.58E+00
Kr-85 #A	7.2012E+01	7.2012E+01	1.367E+02%	3.40E+02
Cm-247 #A	2.7952E-01	2.7952E-01	8.088E+01%	9.21E-01
Hf-175 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.04E+00
Lu-172 #A	0.0000E+00	0.0000E+00	7.071E+02%	8.36E-01
Kr-85m #A	1.5555E-02	1.5582E-02	1.295E+03%	5.89E-01
NB-94 #A	-2.0043E-02	-2.0043E-02	1.808E+03%	1.35E+00
TL-210 #A	8.1827E-02	8.1827E-02	1.721E+02%	1.49E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

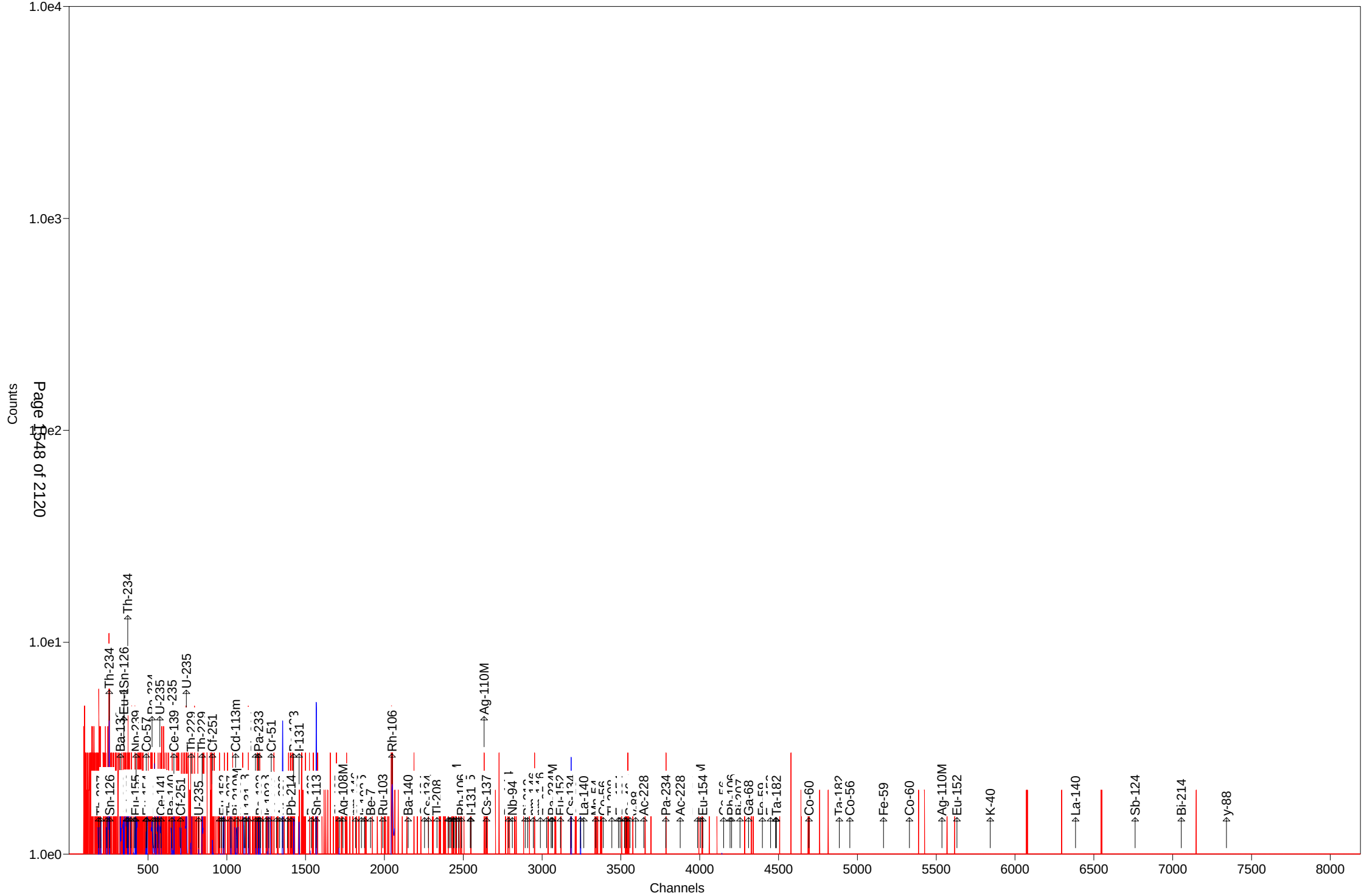
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

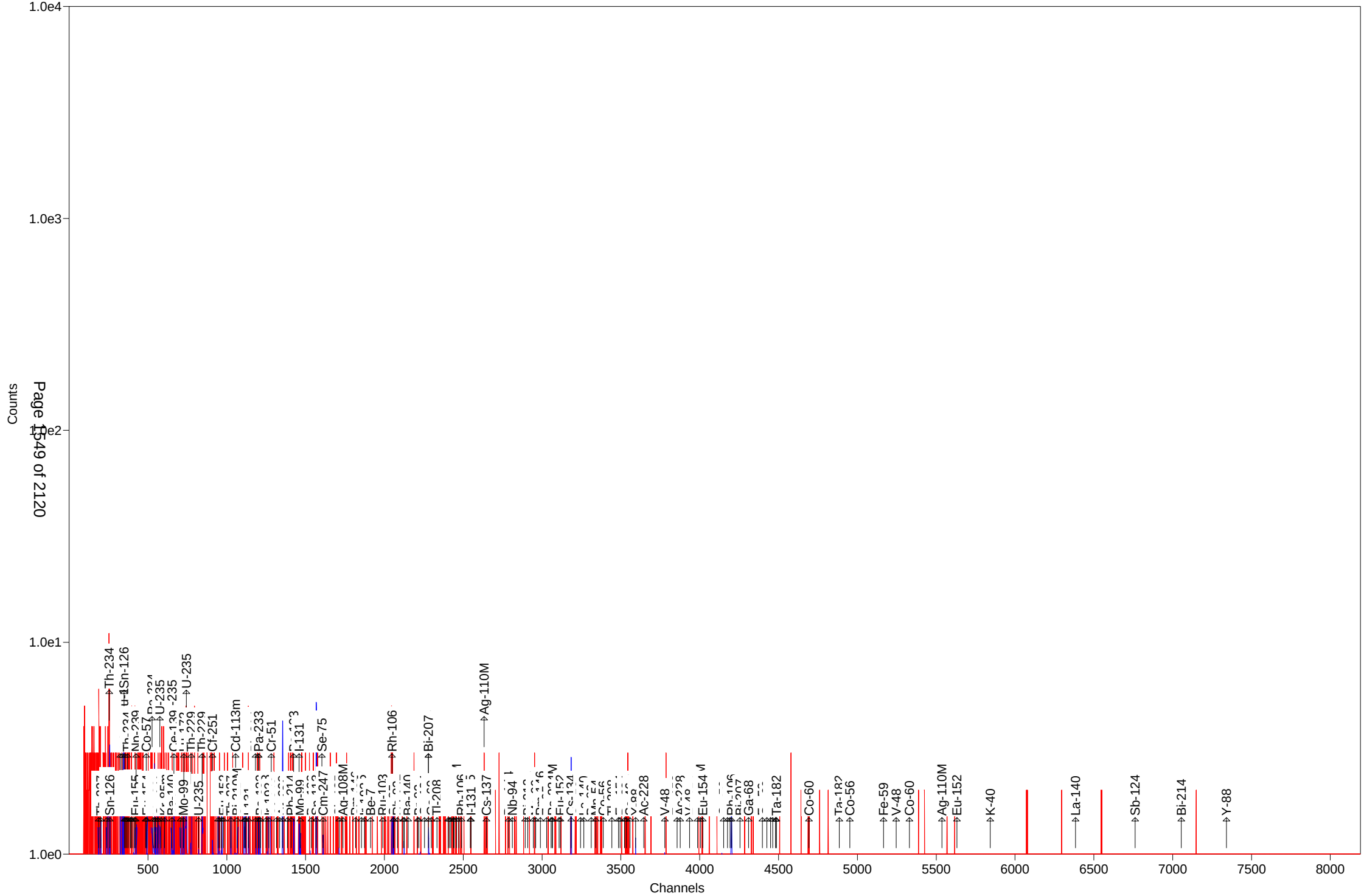
Total Activity (37.6 to 2000.8 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.8 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.

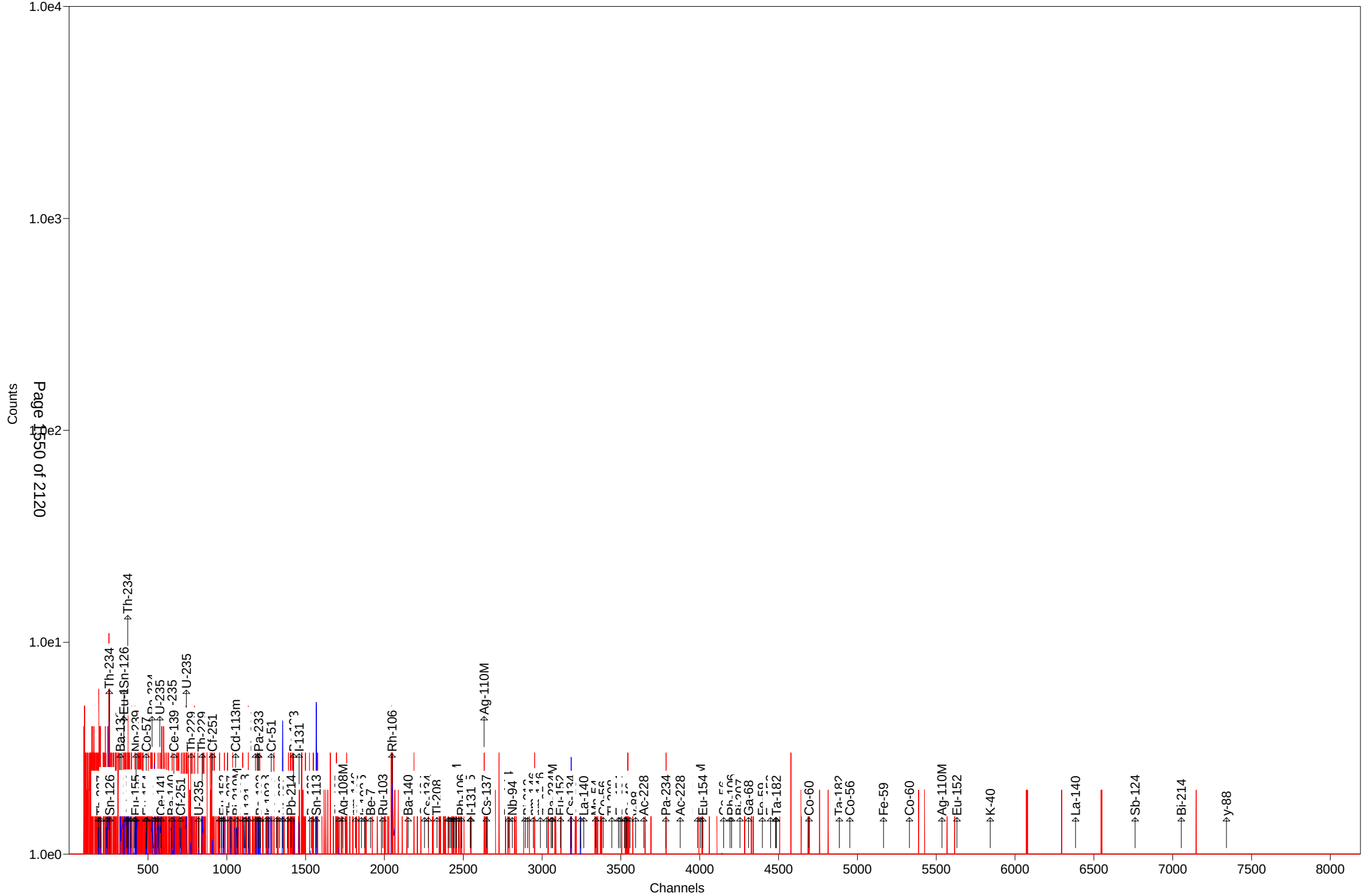
379959_Gamma_MB 160-379959~1-A. 5_Gamma_20182910.spc.



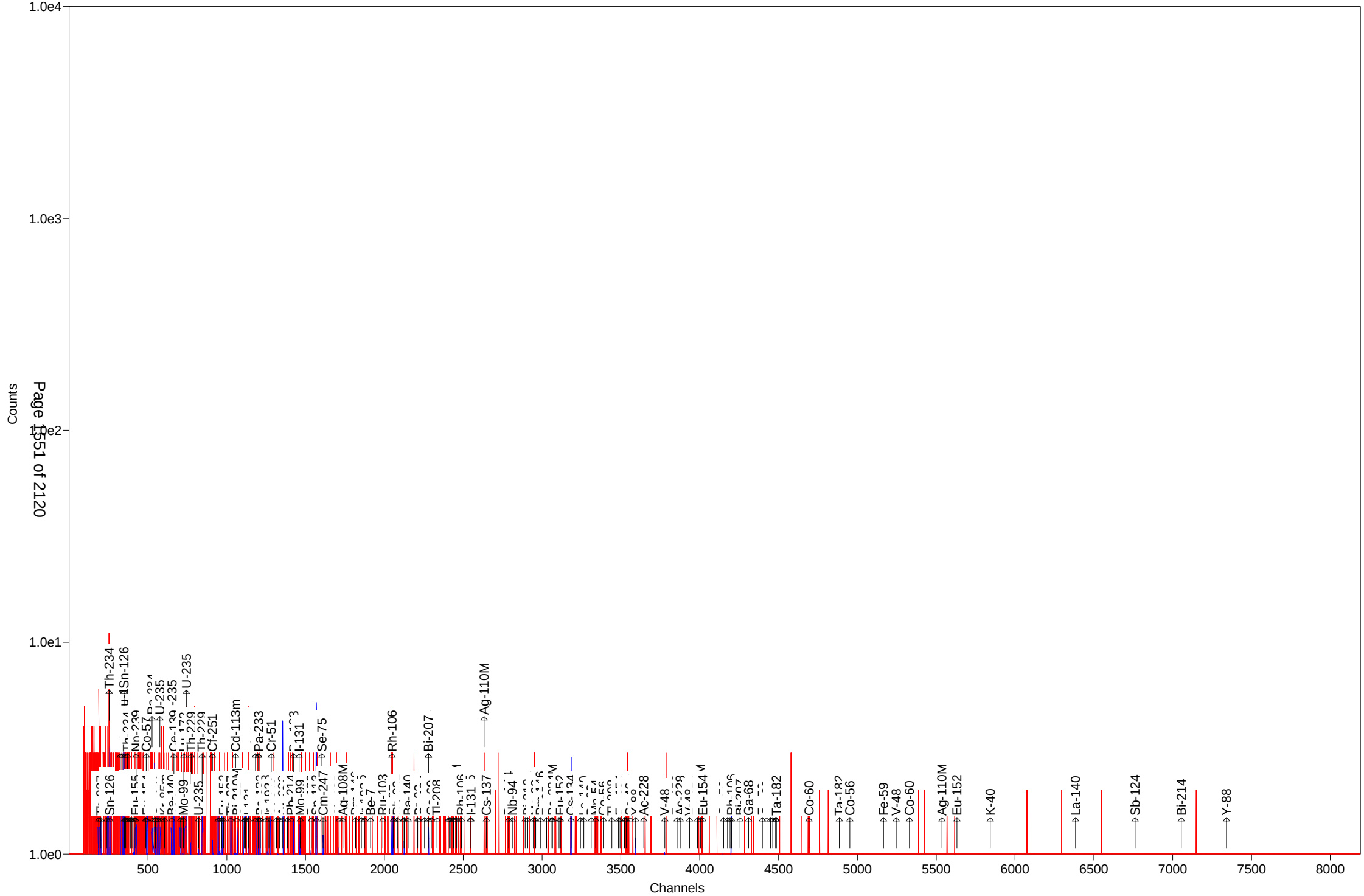
379959_Gamma_MB 160-379959~1-A. 5_Gamma_20182910.spc.



379959_Gamma_MB 160-379959~1-A. 5_Gamma_20182910.spc.



379959_Gamma_MB 160-379959~1-A. 5_Gamma_20182910.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20181614

Sample Description: 379959_Gamma_LCS 160-379959~2-A
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: LCS 160-379959~2-A

Decay to Time: 8/23/2018 07:45 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:48:07 Real Time: 1807 sec
Analysis Time: 8/23/2018 08:18 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.147E+00	389.0	1.613E+01	1.613E+01	5.401E+01
NA-22	-3.874E-01	163.2	6.323E-01	6.326E-01	2.223E+00
K-40	-4.358E+00	203.9	8.887E+00	8.890E+00	2.257E+01
Sc-46	1.834E+00	89.6	1.642E+00	1.645E+00	5.465E+00
CR-51	2.520E+00	516.7	1.302E+01	1.302E+01	4.360E+01
MN-54	7.514E-01	163.0	1.225E+00	1.225E+00	2.813E+00
FE-59	5.681E-01	619.6	3.520E+00	3.520E+00	7.549E+00
Co-56	-2.893E-01	72.1	2.087E-01	2.092E-01	3.863E+00
CO-57	0.000E+00	1.#INF	3.921E-01	3.922E-01	3.031E+00
CO-58	-1.722E+00	89.3	1.538E+00	1.540E+00	5.117E+00
CO-60	1.739E+02	1.7	2.944E+00	9.147E+00	2.409E+00
ZN-65	-2.878E-01	1300.4	3.742E+00	3.742E+00	1.219E+01
NB-94	-1.508E+00	81.7	1.232E+00	1.235E+00	3.433E+00
ZR-95	-3.186E+00	73.4	2.338E+00	2.344E+00	6.164E+00
NB-95	0.000E+00	1.#INF	3.003E-01	3.003E-01	4.002E+00
RU-103	1.625E+00	94.2	1.530E+00	1.532E+00	3.560E+00
RH-106	1.306E+01	79.3	1.035E+01	1.037E+01	3.439E+01
AG-108M	-1.119E+00	156.2	1.749E+00	1.750E+00	4.124E+00
AG-110M	1.717E+00	51.4	8.820E-01	8.863E-01	7.710E+00
SN-113	1.130E+00	201.7	2.279E+00	2.280E+00	7.609E+00
SB-124	-1.516E+00	132.3	2.005E+00	2.007E+00	6.677E+00
SB-125	4.464E+00	89.9	4.012E+00	4.019E+00	1.191E+01
I-131	2.965E-01	123.1	3.651E-01	3.654E-01	4.140E+00
Gd-153	-3.082E+00	171.6	5.288E+00	5.291E+00	1.752E+01
Ga-68	-9.946E+01	81.4	8.094E+01	8.113E+01	1.753E+02
Tc-99m	9.809E-01	149.7	1.468E+00	1.469E+00	4.869E+00
BA-133	-1.808E+00	109.6	1.982E+00	1.984E+00	6.592E+00
CS-134	-9.557E-01	129.2	1.235E+00	1.236E+00	6.587E+00
CS-137	3.828E+02	1.3	5.152E+00	2.021E+01	3.878E+00
CE-139	-4.403E-01	237.0	1.044E+00	1.044E+00	3.485E+00
Ba-140	4.242E+00	99.7	4.229E+00	4.235E+00	1.296E+01
La-140	-2.581E-01	70.7	1.826E-01	1.831E-01	2.695E+00
CE-141	-1.128E+00	160.0	1.806E+00	1.806E+00	4.566E+00

CE-144	-2.877E+00	384.5	1.106E+01	1.106E+01	3.679E+01
PM-144	1.048E-01	298.7	3.130E-01	3.131E-01	2.934E+00
EU-152	2.250E+00	87.0	1.958E+00	1.961E+00	2.412E+01
EU-154	6.993E+00	116.8	8.165E+00	8.173E+00	3.354E+01
EU-155	7.549E-01	126.8	9.568E-01	9.577E-01	2.443E+01
HF-181	0.000E+00	1.#INF	4.091E-01	4.092E-01	7.151E+00
Ta-182	4.971E+00	52.7	2.619E+00	2.631E+00	1.190E+01
Hg-203	1.251E+00	83.4	1.043E+00	1.045E+00	3.458E+00
TL-208	4.694E+00	41.3	1.939E+00	1.953E+00	3.589E+00
pm-146	1.800E+00	118.0	2.124E+00	2.126E+00	8.532E+00
y-88	-1.437E+00	88.2	1.267E+00	1.270E+00	4.733E+00
Cd-113m	1.685E+04	80.9	1.363E+04	1.366E+04	4.517E+04
Cd-109	-2.423E+01	179.0	4.337E+01	4.339E+01	1.437E+02
Cf-251	4.872E+00	99.2	4.834E+00	4.841E+00	1.220E+01
Cf-249	3.104E+00	85.5	2.654E+00	2.659E+00	6.541E+00
Sn-126	-2.265E+01	217.2	4.920E+01	4.922E+01	1.625E+02
PB-210	1.137E+04	1.2	1.385E+02	7.232E+02	2.411E+02
PB-212	5.892E+00	23.2	1.367E+00	1.401E+00	4.246E+00
PB-214	2.395E+00	172.3	4.127E+00	4.128E+00	9.841E+00
BI-207	6.005E-01	194.7	1.169E+00	1.169E+00	3.421E+00
BI-212	-2.218E-01	7406.8	1.643E+01	1.643E+01	5.785E+01
U-235	1.664E+00	331.2	5.512E+00	5.513E+00	3.782E+01
BI-214	8.528E+00	19.8	1.684E+00	1.739E+00	4.862E+00
BI-210M	-1.585E+00	115.9	1.838E+00	1.840E+00	6.119E+00
AC-228	5.630E+00	114.8	6.462E+00	6.469E+00	1.486E+01
TH-227	-4.490E+01	171.2	7.686E+01	7.691E+01	2.539E+02
TH-229	2.195E+01	98.2	2.155E+01	2.158E+01	5.432E+01
TH-234	-6.898E+01	138.6	9.561E+01	9.569E+01	4.147E+02
PA-231	3.026E+01	165.7	5.014E+01	5.016E+01	2.156E+02
PA-233	3.213E+00	167.2	5.372E+00	5.375E+00	1.216E+01
PA-234	7.838E+00	65.1	5.103E+00	5.119E+00	2.288E+01
PA-234M	-2.887E+01	851.9	2.460E+02	2.460E+02	7.169E+02
AM-241	1.249E+03	0.9	1.127E+01	7.359E+01	1.645E+01
Np-237	7.251E+00	125.3	9.089E+00	9.098E+00	3.013E+01
Ir-192	5.469E-01	207.2	1.133E+00	1.133E+00	5.108E+00
Cs-136	3.815E+00	21.9	8.344E-01	8.620E-01	5.458E+00
Np-239	-4.153E+00	170.4	7.077E+00	7.081E+00	2.344E+01
Nd-147	1.010E+01	76.1	7.678E+00	7.699E+00	2.547E+01
TL-210	7.032E-01	163.1	1.147E+00	1.148E+00	4.576E+00
Total	3.020E+04				

Analyst: kody Saulters

Sample description
379959_Gamma_LCS 160-379959~2-A

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181614.An1

Acquisition information

Start time:	8/23/2018 7:48:07 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1604

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
39.53	60.	74.34	0.73	1.234E-02				
46.70	14864.	1.22	0.91	1.723E-02	46.54	4.250	1.137E+04	PB210
59.69	21095.	0.90	0.88	2.620E-02	59.54	35.900	1.249E+03	AM241
86.49	56.	125.35	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.093E+00	EU155
					86.94	9.040	1.049E+01	Sn126
86.54	56.	126.75	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.093E+00	EU155
					86.94	9.040	1.049E+01	Sn126
86.94	33.	219.90	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.799E+00	EU155
					86.94	9.040	6.099E+00	Sn126
103.70	49.	199.29	0.99	3.426E-02	103.70	24.000	PBC<MDA	Np239
121.78	12.	393.70	1.00	3.401E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.291E-01	CO57
132.58	25.	74.73	0.45	3.339E-02	133.02	43.300	9.614E-01	HF181
					133.54	11.090	3.758E+00	CE144
140.61	50.	149.67	1.02	3.280E-02	140.51	89.300	PBC<MDA	Tc99m
162.66	46.	99.69	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
163.38	14.	331.23	1.04	3.076E-02	163.38	5.080	PBC<MDA	U235
176.60	44.	99.22	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
186.10	52.	71.58	0.53	2.860E-02	185.72	54.000	1.855E+00	U235
193.51	49.	98.19	1.07	2.792E-02	193.51	4.400	PBC<MDA	TH229
198.03	64.	49.11	0.42	2.750E-02				
227.00	29.	147.89	1.10	2.503E-02	227.00	6.300	PBC<MDA	Cf251
231.24	40.	61.91	1.04	2.470E-02				
238.89	111.	23.20	1.11	2.413E-02	238.63	43.300	5.892E+00	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	46.	101.21	1.11	2.369E-02	244.69	7.580	PBC<MDA	EU152
264.09	41.	80.87	1.13	2.238E-02	263.70	0.006	PBC<MDA	Cd113m
278.08	36.	64.25	1.50	2.148E-02	277.28	6.310	PBC<MDA	TL208
					279.20	81.460	1.152E+00	Hg203
284.30	30.	135.92	1.15	2.111E-02	284.30	6.140	PBC<MDA	I131
295.20	36.	185.65	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	40.	163.15	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	39.	167.42	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	40.	165.70	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.475E+01	PA231
					300.18	6.200	1.776E+01	PA233
300.18	40.	167.19	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.475E+01	PA231
					300.18	6.200	1.776E+01	PA233
302.65	19.	362.12	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.811E+00	BA133
307.05	19.	85.14	0.52	1.987E-02				
312.01	9.	513.16	1.17	1.962E-02	312.01	36.000	PBC<MDA	PA233
320.08	9.	516.70	1.18	1.922E-02	320.08	9.940	PBC<MDA	CR51
328.76	39.	143.16	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	40.	139.95	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
338.32	40.	142.57	1.19	1.839E-02	338.32	12.010	PBC<MDA	AC228
340.64	34.	171.26	1.19	1.830E-02	340.57	46.900	PBC<MDA	Cs136
351.30	12.	290.39	1.20	1.782E-02	351.93	37.600	PBC<MDA	PB214
362.19	20.	65.57	0.33	1.742E-02				
387.95	39.	98.30	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
390.40	21.	201.72	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
420.33	21.	65.12	0.30	1.548E-02				
453.88	36.	118.01	1.29	1.458E-02	453.88	65.000	PBC<MDA	pm146
463.37	46.	89.88	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	19.	207.19	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	389.00	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	36.	94.18	1.33	1.358E-02	497.05	90.900	PBC<MDA	RU103
511.86	71.	74.13	2.59	1.328E-02	511.86	20.000	PBC<MDA	RH106
527.98	23.	51.78	0.48	1.297E-02				
531.00	30.	76.05	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	11.	287.80	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
569.70	11.	204.11	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.905E+00	PA234
					569.70	97.740	4.955E-01	BI207
583.02	26.	105.30	1.40	1.202E-02	583.02	84.500	PBC<MDA	TL208
606.80	17.	54.46	0.41	1.167E-02				
609.54	82.	19.75	1.42	1.163E-02	609.31	46.090	8.528E+00	BI214
618.06	8.	298.71	1.42	1.151E-02	618.06	99.100	PBC<MDA	PM144
621.92	27.	79.27	1.43	1.145E-02	621.92	9.930	PBC<MDA	RH106
636.97	6.	330.07	1.44	1.125E-02	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
657.76	22.	529.08	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
661.85	6419.	1.35	1.41	1.093E-02	661.66	85.210	3.828E+02	CS137
747.16	7.	306.10	1.53	9.989E-03	747.16	34.000	PBC<MDA	pm146
778.92	9.	286.76	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
799.60	3.	802.64	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	8.	282.03	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
834.85	12.	162.99	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
860.56	54.	41.29	1.61	9.000E-03	860.56	12.420	2.678E+01	TL208
871.10	28.	66.00	1.62	8.920E-03	871.10	99.890	PBC<MDA	NB94
873.23	17.	116.76	1.62	8.903E-03	873.23	12.270	PBC<MDA	EU154
880.61	30.	87.50	1.63	8.849E-03	880.53	6.000	PBC<MDA	PA234
883.32	28.	87.95	1.63	8.829E-03	883.24	9.600	PBC<MDA	PA234
889.28	29.	89.55	1.63	8.785E-03	889.28	99.984	PBC<MDA	Sc46
911.07	17.	179.90	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
937.49	53.	51.35	1.67	8.448E-03	937.49	34.360	PBC<MDA	AG110M
946.02	34.	87.26	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234
964.11	18.	117.62	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
996.33	8.	315.73	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-4.	851.94	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1047.95	111.	21.87	2.06	7.775E-03	1048.07	80.000	9.916E+00	Cs136
1063.66	8.	331.59	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	4.	619.55	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1121.30	27.	62.09	1.80	7.389E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.029E+00	Sc46
					1121.30	34.900	5.817E+00	Ta182
1173.42	2298.	2.40	1.88	7.137E-03	1173.24	99.900	1.790E+02	CO60
1221.41	13.	85.14	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1238.28	9.	88.09	1.89	6.848E-03	1238.28	66.070	PBC<MDA	Co56
1313.00	10.	84.39	1.94	6.541E-03	1313.00	21.000	PBC<MDA	TL210
1332.79	1963.	2.39	1.99	6.464E-03	1332.50	99.980	1.688E+02	CO60
1460.83	-5.	203.94	2.03	6.004E-03	1460.83	10.670	PBC<MDA	K40
1690.98	1.	600.00	2.18	5.307E-03	1690.98	47.790	PBC<MDA	SB124
1764.76	4.	157.08	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214
1836.06	8.	35.36	2.26	4.933E-03	1836.06	99.200	9.082E-01	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
157.28	39.53	901.	60.	4.889E+03	74.34	0.730	-	c
529.19	132.58	295.	34.	1.033E+03	72.50	1.012	-	c
743.16	186.10	399.	52.	1.806E+03	71.58	0.525	-	s
790.88	198.03	308.	64.	2.327E+03	49.11	0.419	-	s
923.62	231.24	215.	40.	1.619E+03	61.91	1.042	-	s
1110.88	278.08	195.	23.	1.081E+03	87.48	1.140	-	sc
1226.71	307.05	112.	19.	9.563E+02	85.14	0.517	-	sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1447.20	362.19	76.	20.	1.148E+03	65.57	0.331	- sc
1679.67	420.33	83.	21.	1.356E+03	65.12	0.302	- sc
2110.15	527.98	49.	23.	1.748E+03	51.78	0.484	- sM
2426.32	606.80	70.	25.	2.139E+03	51.50	1.416	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.70	4498.	14864.	8.258	1.22	0.910
TH-227	199.70	50.14	25652.	-132.	-0.074	171.18	0.938
AM-241	237.88	59.69	3483.	21095.	11.719	0.90	0.881
TH-234	252.25	63.29	28252.	-131.	-0.073	138.62	0.950s
Sn-126	256.21	64.28	28852.	-111.	-0.062	217.19	0.951s
BA-133	323.00	80.99	1033.	-59.	-0.033	97.71	0.966s
Np-237	344.99	86.49	2473.	56.	0.031	125.35	0.971s
EU-155	345.20	86.54	2530.	56.	0.031	126.75	0.971s
Sn-126	346.79	86.94	2586.	33.	0.018	219.90	0.971s
Sn-126	349.31	87.57	4851.	-55.	-0.030	180.11	0.972s
Cd-109	351.19	88.04	4796.	-55.	-0.030	179.01	0.972s
Nd-147	363.42	91.10	4741.	-21.	-0.012	455.50	0.975s
TH-234	369.37	92.59	4747.	-27.	-0.015	675.91	0.976s
AC-228	372.41	93.35	4744.	-56.	-0.031	173.29	0.977s
Gd-153	389.00	97.50	4688.	-57.	-0.031	171.59	0.981s
Np-239	396.99	99.50	4603.	-57.	-0.032	169.74	0.982s
Np-239	413.78	103.70	4718.	49.	0.027	199.29	0.986
EU-155	420.23	105.31	4627.	-34.	-0.019	526.77	0.988s
Np-239	423.49	106.13	4884.	-58.	-0.032	170.41	0.988
EU-152	486.04	121.78	1110.	12.	0.007	393.70	1.002s
CO-57	487.18	122.06	1122.	0.	0.000	1000.00	1.003s
EU-154	491.33	123.10	1065.	-53.	-0.029	88.16	1.004s
PA-234	524.09	131.29	2774.	-50.	-0.028	151.00	1.011s
HF-181	531.00	133.02	2725.	-50.	-0.028	149.43	1.013s
CE-144	533.06	133.54	2698.	-19.	-0.011	384.49	1.013
HF-181	544.09	136.30	2717.	0.	0.000	1000.00	1.015s
CO-57	544.79	136.47	2717.	0.	0.000	1000.00	1.016s
Tc-99m	560.92	140.51	2770.	50.	0.028	149.67	1.019s
CE-141	580.63	145.44	727.	-32.	-0.018	160.03	1.024s
Ba-140	649.47	162.66	1039.	46.	0.026	99.69	1.039s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	652.34	163.38	1085.	14.	0.008	331.23	1.040
CE-139	662.23	165.85	1040.	-19.	-0.011	237.03	1.042s
Cf-251	705.19	176.60	532.	44.	0.024	99.22	1.051s
U-235	741.65	185.72	803.	-52.	-0.029	78.02	1.060s
TH-229	772.79	193.51	635.	49.	0.027	98.19	1.066s
U-235	820.06	205.33	672.	-26.	-0.014	183.12	1.077s
TH-229	842.11	210.85	708.	-52.	-0.029	90.93	1.082
Cf-251	906.68	227.00	884.	29.	0.016	147.89	1.096s
PB-212	953.18	238.63	274.	111.	0.062	23.20	1.106D
PB-214	966.63	242.00	1581.	-51.	-0.028	112.16	1.109s
EU-152	977.41	244.69	1084.	46.	0.026	101.21	1.111
TH-227	1023.58	256.24	510.	-6.	-0.003	418.48	1.122
Cd-113m	1053.40	263.70	522.	41.	0.023	80.87	1.128s
BI-210M	1061.92	265.83	661.	-32.	-0.018	115.94	1.130s
TL-208	1107.70	277.28	482.	-14.	-0.008	188.43	1.140s
Hg-203	1115.37	279.20	516.	39.	0.022	83.37	1.141s
I-131	1135.76	284.30	428.	30.	0.017	135.92	1.146s
PB-214	1178.90	295.09	2246.	36.	0.020	185.65	1.155s
TL-210	1182.54	296.00	2106.	40.	0.022	163.15	1.156
PB-212	1198.65	300.03	2147.	39.	0.022	167.42	1.159
PA-231	1198.81	300.07	2186.	40.	0.022	165.70	1.159s
PA-233	1199.25	300.18	2226.	40.	0.022	167.19	1.159s
PA-231	1209.13	302.65	2266.	19.	0.010	362.12	1.162s
PA-233	1246.56	312.01	1062.	9.	0.005	513.16	1.170s
Ir-192	1264.46	316.49	1071.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	998.	9.	0.005	516.70	1.177s
La-140	1313.52	328.76	1543.	39.	0.022	143.16	1.184s
Cf-249	1332.23	333.44	1582.	40.	0.022	139.95	1.188s
AC-228	1351.74	338.32	1623.	40.	0.022	142.57	1.192s
Cs-136	1360.74	340.57	1641.	34.	0.019	171.26	1.194s
EU-152	1375.60	344.29	1954.	-47.	-0.026	121.73	1.197s
HF-181	1381.77	345.83	1811.	-44.	-0.024	137.93	1.199
PB-214	1406.17	351.93	620.	12.	0.007	290.39	1.204s
BA-133	1422.43	356.00	747.	-36.	-0.020	109.63	1.207s
I-131	1456.35	364.48	487.	-26.	-0.014	123.14	1.215
BA-133	1533.76	383.84	869.	-45.	-0.025	79.56	1.231s
Cf-249	1550.19	387.95	725.	39.	0.022	98.30	1.235s
SN-113	1565.14	391.69	913.	21.	0.012	201.72	1.238s
AG-108M	1734.08	433.94	449.	-28.	-0.015	156.24	1.273
pm-146	1813.83	453.88	460.	36.	0.020	118.01	1.290s
SB-125	1851.76	463.37	840.	46.	0.026	89.88	1.298s
Ir-192	1870.53	468.06	802.	19.	0.011	207.19	1.302s
BE-7	1908.66	477.60	910.	11.	0.006	389.00	1.310s
HF-181	1926.26	482.00	921.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	925.	-42.	-0.023	104.77	1.317s
RU-103	1986.48	497.05	269.	36.	0.020	94.18	1.326
RH-106	2045.71	511.86	420.	71.	0.040	74.13	2.588s
Nd-147	2122.23	531.00	254.	30.	0.017	76.05	1.354s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	2147.27	537.26	226.	11.	0.006	287.80	1.359s
CS-134	2251.16	563.24	195.	-4.	-0.002	751.55	1.380s
PA-234	2276.09	569.47	230.	-6.	-0.003	360.04	1.385
BI-207	2277.02	569.70	232.	11.	0.006	204.11	1.385s
TL-208	2330.29	583.02	182.	26.	0.015	105.30	1.396s
SB-125	2400.20	600.50	880.	-31.	-0.017	134.85	1.410s
SB-124	2409.12	602.73	849.	-31.	-0.017	132.29	1.412s
CS-134	2417.03	604.71	810.	-31.	-0.017	129.19	1.414s
BI-214	2435.44	609.31	90.	82.	0.046	19.75	1.417D
RU-103	2439.39	610.30	779.	-12.	-0.007	331.34	1.418
PM-144	2470.44	618.06	252.	8.	0.004	298.71	1.424s
RH-106	2485.86	621.92	211.	27.	0.015	79.27	1.427
SB-125	2541.74	635.89	174.	-26.	-0.014	88.62	1.439s
I-131	2546.08	636.97	215.	6.	0.004	330.07	1.440s
AG-110M	2629.23	657.76	6661.	22.	0.012	529.08	1.456s
CS-137	2645.57	661.85	179.	6419.	3.566	1.35	1.405
PM-144	2784.35	696.54	126.	-3.	-0.002	795.82	1.487
NB-94	2808.70	702.63	169.	-28.	-0.015	81.69	1.492
SB-124	2889.33	722.79	245.	-30.	-0.016	76.95	1.507s
EU-154	2891.61	723.36	276.	0.	0.000	1000.00	1.508s
pm-146	2941.07	735.72	140.	-5.	-0.003	440.22	1.518s
pm-146	2986.83	747.16	113.	7.	0.004	306.10	1.526s
ZR-95	3025.11	756.73	150.	-31.	-0.017	73.40	1.534s
AG-110M	3053.97	763.94	198.	-15.	-0.008	150.17	1.539s
NB-95	3061.35	765.79	212.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	224.	-7.	-0.004	317.52	1.541s
EU-152	3113.88	778.92	135.	9.	0.005	286.76	1.551s
CS-134	3181.68	795.87	280.	-5.	-0.003	491.77	1.564
TL-210	3196.61	799.60	257.	3.	0.002	802.64	1.567s
CS-134	3206.02	801.95	261.	8.	0.005	282.03	1.569s
CO-58	3241.32	810.78	321.	-29.	-0.016	89.32	1.575s
La-140	3261.30	815.77	278.	-12.	-0.006	206.74	1.579s
Cs-136	3272.22	818.50	365.	-5.	-0.003	542.22	1.581s
MN-54	3337.63	834.85	89.	12.	0.007	162.99	1.594s
Co-56	3385.32	846.77	169.	-20.	-0.011	114.29	1.603
TL-208	3440.51	860.56	98.	54.	0.030	41.29	1.614s
NB-94	3482.65	871.10	158.	28.	0.016	66.00	1.621s
EU-154	3491.19	873.23	184.	17.	0.009	116.76	1.623
PA-234	3520.39	880.53	329.	30.	0.017	87.50	1.628s
PA-234	3531.23	883.24	297.	28.	0.016	87.95	1.630s
AG-110M	3537.01	884.68	342.	-17.	-0.010	151.63	1.632s
Sc-46	3555.40	889.28	322.	29.	0.016	89.55	1.635s
y-88	3590.45	898.04	206.	-21.	-0.012	88.17	1.642s
AC-228	3642.58	911.07	190.	17.	0.009	179.90	1.651s
AG-110M	3748.30	937.49	140.	53.	0.029	51.35	1.671s
PA-234	3782.42	946.02	175.	34.	0.019	87.26	1.677
EU-152	3854.81	964.11	228.	18.	0.010	117.62	1.691s
AC-228	3874.26	968.97	337.	-32.	-0.018	83.03	1.694s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3983.73	996.33	315.	8.	0.004	315.73	1.714s
PA-234M	4002.41	1001.00	326.	-4.	-0.002	851.94	1.718s
EU-154	4017.53	1004.77	403.	-36.	-0.020	79.70	1.721s
Co-56	4149.84	1037.84	160.	-24.	-0.014	122.27	1.745
Cs-136	4190.32	1047.95	70.	111.	0.062	21.87	2.059s
RH-106	4199.94	1050.36	250.	-27.	-0.015	111.64	1.754s
BI-207	4253.17	1063.66	130.	8.	0.004	331.59	1.763s
Ga-68	4308.15	1077.40	185.	-38.	-0.021	81.37	1.773
FE-59	4395.60	1099.25	139.	4.	0.002	619.55	1.789s
EU-152	4446.92	1112.07	313.	-32.	-0.018	78.21	1.798s
BI-214	4479.78	1120.29	288.	-6.	-0.003	199.29	1.803s
Ta-182	4483.84	1121.30	127.	27.	0.015	62.09	1.804s
CO-60	4692.44	1173.42	98.	2298.	1.276	2.40	1.883s
Ta-182	4884.51	1221.41	21.	13.	0.007	85.14	1.874s
Co-56	4952.04	1238.28	11.	9.	0.005	88.09	1.886s
NA-22	5097.14	1274.53	27.	-5.	-0.003	163.20	1.910
EU-154	5097.19	1274.54	31.	0.	0.000	1000.00	1.910
FE-59	5165.45	1291.60	21.	-3.	-0.002	319.69	1.922s
TL-210	5251.13	1313.00	11.	10.	0.005	84.39	1.936s
CO-60	5330.35	1332.79	30.	1963.	1.091	2.39	1.988
AG-110M	5536.55	1384.30	17.	-3.	-0.002	327.45	1.984s
K-40	5842.95	1460.83	25.	-5.	-0.003	203.94	2.033s
La-140	6385.01	1596.21	25.	-15.	-0.008	70.74	2.119s
SB-124	6764.54	1690.98	6.	1.	0.001	600.00	2.176s
BI-214	7058.94	1764.49	13.	4.	0.002	157.08	2.219s
y-88	7345.60	1836.06	0.	8.	0.004	35.36	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.1467E+00				5.31E+01	
			477.60	4.147E+00	?(	5.401E+01 3.89E+02 1.05E+01	G
NA-22	C	-3.8745E-01				9.50E+02	
			1274.53	-3.874E-01	?(	2.223E+00 1.63E+02 9.99E+01	G
K-40	N	-4.3575E+00				4.66E+11	
			1460.83	-4.358E+00	&(P	2.257E+01 2.04E+02 1.07E+01	G
Sc-46	F	1.8338E+00				8.38E+01	
			889.28	1.834E+00	?(	5.465E+00 8.96E+01 1.00E+02	G
			1120.55	7.168E-08	%	6.199E+00 2.54E+09 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CR-51	F	2.5200E+00					2.77E+01	
			320.08	2.520E+00	?(	4.360E+01	5.17E+02	9.94E+00 G
MN-54	C	7.5136E-01					3.12E+02	
			834.85	7.514E-01	?(	2.813E+00	1.63E+02	1.00E+02 G
FE-59	F	5.6808E-01					4.45E+01	
			1099.25	5.681E-01	?(	7.549E+00	6.20E+02	5.65E+01 G
			1291.60	-6.470E-01	+	4.703E+00	3.20E+02	4.32E+01 G
Co-56	C	-2.8929E-01					7.73E+01	
			846.77	-1.222E+00	?(P	3.863E+00	1.14E+02	9.99E+01 G
			1238.28	1.121E+00	?(P	2.215E+00	8.81E+01	6.61E+01 G
			1037.84	-1.225E+01	+ P	3.099E+01	1.22E+02	1.41E+01 G
			1771.35	-3.522E-01	%	1.564E+01	1.19E+03	1.55E+01 A
CO-58	C	-1.7217E+00					7.09E+01	
			810.78	-1.722E+00	?(	5.117E+00	8.93E+01	9.95E+01 G
CO-60	F	1.7387E+02					1.93E+03	
			1332.50	1.688E+02	(P	2.409E+00	2.39E+00	1.00E+02 G
			1173.24	1.790E+02	@(	3.796E+00	2.40E+00	9.99E+01 G
ZN-65	F	-2.8775E-01					2.44E+02	
			1115.55	-2.878E-01	%(P	1.219E+01	1.30E+03	5.06E+01 G
NB-94	I	-1.5084E+00					7.41E+06	
			702.63	-1.508E+00	?(P	3.433E+00	8.17E+01	9.79E+01 G
			871.10	1.755E+00	+ P	3.826E+00	6.60E+01	9.99E+01 G
ZR-95	I	-3.1857E+00					6.40E+01	
			756.73	-3.186E+00	?(P	6.164E+00	7.34E+01	5.45E+01 G
			724.20	-7.061E-02	% P	9.867E+00	3.96E+03	4.42E+01 G
RU-103	I	1.6246E+00					3.93E+01	
			497.05	1.625E+00	&(P	3.560E+00	9.42E+01	9.09E+01 G
			610.30	-9.947E+00	&	1.104E+02	3.31E+02	5.75E+00 GA
RH-106	I	1.3056E+01					3.74E+02	
			621.92	1.306E+01	(	3.439E+01	7.93E+01	9.93E+00 G
			1050.36	-1.227E+02	+ P	3.504E+02	1.12E+02	1.56E+00 G
			511.86	1.494E+01	?	2.055E+01	7.41E+01	2.00E+01 GA
AG-108M	C	-1.1192E+00					1.53E+05	
			433.94	-1.119E+00	&(P	4.124E+00	1.56E+02	9.05E+01 G
			722.94	-4.115E-02	&	4.779E+00	3.41E+03	9.08E+01 G
			614.28	1.020E-07	&	7.049E+00	2.05E+09	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	1.7174E+00					2.50E+02	
			884.68	-1.515E+00	&(	7.710E+00	1.52E+02	7.27E+01 G
			657.76	1.167E+00	?(	2.048E+01	5.29E+02	9.46E+01 G
			937.49	1.007E+01	&(P	1.109E+01	5.14E+01	3.44E+01 G
			1384.30	-1.094E+00	+	7.995E+00	3.27E+02	2.43E+01 G
			763.94	-3.840E+00	+ P	1.733E+01	1.50E+02	2.23E+01 G
SN-113	F	1.1297E+00					1.15E+02	
			391.69	1.130E+00	&(P	7.609E+00	2.02E+02	6.40E+01 G
SB-124	F	-1.5156E+00					6.02E+01	
			602.73	-1.516E+00	?(	6.677E+00	1.32E+02	9.83E+01 G
			1690.98	2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
			722.79	-1.488E+01	&	3.800E+01	7.69E+01	1.08E+01 G
SB-125	I	4.4642E+00					1.01E+03	
			427.88	-5.718E-03	%(P	1.191E+01	9.24E+04	2.96E+01 G
			600.50	-8.304E+00	+	3.729E+01	1.35E+02	1.79E+01 G
			635.89	-1.115E+01	& P	2.796E+01	8.86E+01	1.13E+01 G
			463.37	1.710E+01	&(	5.097E+01	8.99E+01	1.05E+01 G
I-131	I	2.9649E-01					8.02E+00	
			364.48	-1.007E+00	(	4.140E+00	1.23E+02	8.17E+01 G
			284.30	1.289E+01	*(	4.249E+01	1.36E+02	6.14E+00 G
			636.97	4.364E+00	?(	4.898E+01	3.30E+02	7.17E+00 G
Gd-153	F	-3.0818E+00					2.42E+02	
			97.50	-3.082E+00	&(	1.752E+01	1.72E+02	3.00E+01 G
			103.20	-6.689E-01	%	2.387E+01	1.07E+03	2.18E+01 G
Ga-68	C	-9.9464E+01					4.71E-02	
			1077.40	-9.946E+01	?(	1.753E+02	8.14E+01	3.30E+00 G
Tc-99m	I	9.8089E-01					2.51E-01	
			140.51	9.809E-01	?(	4.869E+00	1.50E+02	8.93E+01 G
BA-133	F	-1.8080E+00					3.85E+03	
			356.00	-1.808E+00	?(	6.592E+00	1.10E+02	6.20E+01 G
			302.85	-2.303E-06	%	3.402E+01	4.43E+08	1.83E+01 G
			383.84	-1.663E+01	& P	5.233E+01	7.96E+01	8.94E+00 GA
			80.99	-2.994E+00	&	7.730E+00	9.77E+01	3.41E+01 GA
CS-134	I	-9.5574E-01					7.54E+02	
			604.71	-1.531E+00	(	6.587E+00	1.29E+02	9.76E+01 G
			795.87	-3.162E-01	+ P	5.494E+00	4.92E+02	8.55E+01 G
			569.32	-1.967E-01	%	2.104E+01	3.12E+03	1.54E+01 G
			801.95	5.507E+00	(	5.261E+01	2.82E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-2.214E+00	& P	3.655E+01	7.52E+02	8.35E+00 G
CS-137	I	3.8281E+02					1.10E+04	
			661.66	3.828E+02	(	3.878E+00	1.35E+00	8.52E+01 G
CE-139	F	-4.4033E-01					1.38E+02	
			165.85	-4.403E-01	(	3.485E+00	2.37E+02	7.99E+01 G
Ba-140	I	4.2421E+00					1.28E+01	
			537.26	1.909E+00	*(P	1.296E+01	2.88E+02	2.44E+01 G
			162.66	1.339E+01	&(	4.430E+01	9.97E+01	6.22E+00 G
			304.85	9.891E-06	%	1.461E+02	4.43E+08	4.29E+00 G
La-140	I	-2.5815E-01					1.28E+01	
			1596.21	-1.522E+00	?(P	2.695E+00	7.07E+01	9.54E+01 G
			487.02	-3.673E+00	+	1.278E+01	1.05E+02	4.55E+01 G
			328.76	5.680E+00	?(P	2.702E+01	1.43E+02	2.03E+01 G
			815.77	-2.935E+00	+	2.048E+01	2.07E+02	2.33E+01 G
CE-141	I	-1.1283E+00					3.25E+01	
			145.44	-1.128E+00	&(	4.566E+00	1.60E+02	4.82E+01 G
CE-144	I	-2.8767E+00					2.85E+02	
			133.54	-2.877E+00	(	3.679E+01	3.84E+02	1.11E+01 G
PM-144	C	1.0480E-01					3.63E+02	
			696.54	-1.600E-01	&(	2.934E+00	7.96E+02	9.90E+01 G
			618.06	3.693E-01	&(P	3.740E+00	2.99E+02	9.91E+01 G
EU-152	F	2.2505E+00					4.94E+03	
			344.29	-5.444E+00	@(P	2.412E+01	1.22E+02	2.65E+01 G
			1112.07	-1.768E+01	+ P	4.661E+01	7.82E+01	1.36E+01 G
			121.78	6.858E-01	+	9.028E+00	3.94E+02	2.86E+01 G
			778.92	3.841E+00	?(	2.523E+01	2.87E+02	1.29E+01 G
			964.11	8.505E+00	&(	3.356E+01	1.18E+02	1.46E+01 G
			244.69	1.439E+01	?(	4.831E+01	1.01E+02	7.58E+00 G
			1408.00	-1.903E-01	% P	9.480E+00	1.06E+04	2.10E+01 GA
EU-154	I	6.9927E+00					3.14E+03	
			873.23	8.548E+00	&(	3.354E+01	1.17E+02	1.23E+01 G
			123.10	-2.126E+00	-	6.209E+00	8.82E+01	4.08E+01 G
			1274.54	0.000E+00	-	6.790E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	2.150E+01	1.00E+03	2.02E+01 G
			1004.77	-1.399E+01	+	3.699E+01	7.97E+01	1.80E+01 G
			996.33	5.193E+00	?(	5.544E+01	3.16E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	7.5487E-01					1.81E+03	
			105.31	-2.631E+00	&(P	2.443E+01	5.27E+02	2.12E+01 G
			86.54	3.093E+00	?(	1.300E+01	1.27E+02	3.07E+01 G
Ta-182	F	4.9707E+00					1.14E+02	
			1121.30	5.817E+00	?(	1.190E+01	6.21E+01	3.49E+01 G
			1221.41	3.877E+00	&(	7.205E+00	8.51E+01	2.70E+01 G
			1189.05	-3.236E-01	&	1.864E+01	2.61E+03	1.62E+01 G
Hg-203	F	1.2506E+00					4.66E+01	
			279.20	1.251E+00	&(	3.458E+00	8.34E+01	8.15E+01 G
TL-208	N	4.6945E+00					6.98E+02	
			583.02	1.448E+00	(P	3.589E+00	1.05E+02	8.45E+01 G
			277.28	-5.590E+00	+ P	4.294E+01	1.88E+02	6.31E+00 G
			860.56	2.678E+01	(P	2.429E+01	4.13E+01	1.24E+01 G
pm-146	C	1.7995E+00					2.02E+03	
			747.16	1.210E+00	@(P	8.532E+00	3.06E+02	3.40E+01 G
			735.72	-1.264E+00	+ P	1.414E+01	4.40E+02	2.25E+01 G
			453.88	2.108E+00	&(P	6.020E+00	1.18E+02	6.50E+01 G
y-88	F	-1.4375E+00					1.07E+02	
			898.04	-1.437E+00	?(P	4.733E+00	8.82E+01	9.37E+01 G
			1836.06	9.082E-01	+	8.367E-01	3.54E+01	9.92E+01 G
Cd-113m		1.6850E+04					5.33E+03	
			263.70	1.685E+04	?(	4.517E+04	8.09E+01	6.00E-03 K
Cd-109	F	-2.4229E+01					4.53E+02	
			88.04	-2.423E+01	*(	1.437E+02	1.79E+02	3.79E+00 G
Cf-251	T	4.8721E+00					3.28E+05	
			176.60	4.872E+00	*(	1.220E+01	9.92E+01	1.70E+01 G
			227.00	1.010E+01	&	4.977E+01	1.48E+02	6.30E+00 GA
Cf-249	T	3.1038E+00					1.28E+05	
			387.95	2.003E+00	(	6.541E+00	9.83E+01	6.60E+01 G
			333.44	7.787E+00	*(	3.620E+01	1.40E+02	1.55E+01 G
Sn-126		-2.2653E+01					3.65E+07	
			87.57	-2.452E+00	+	1.463E+01	1.80E+02	3.75E+01 GA
			64.28	-2.265E+01	&(	1.625E+02	2.17E+02	9.70E+00 G
			86.94	6.099E+00	&	4.455E+01	2.20E+02	9.04E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.1370E+04					8.14E+03	
			46.54	1.137E+04	(P	2.411E+02	1.22E+00	4.25E+00 G
PB-212	N	5.8916E+00					6.98E+02	
			238.63	5.892E+00	(P	4.246E+00	2.32E+01	4.33E+01 G
			300.03	3.291E+01	+ P	1.830E+02	1.67E+02	3.28E+00 GA
PB-214	N	2.3946E+00					5.84E+05	
			351.93	1.011E+00	&(P	9.841E+00	2.90E+02	3.76E+01 G
			295.09	5.091E+00	?(P	3.139E+01	1.86E+02	1.93E+01 G
			242.00	-1.582E+01	+	5.886E+01	1.12E+02	7.43E+00 GA
BI-207	C	6.0045E-01					1.18E+04	
			569.70	4.955E-01	?(	3.421E+00	2.04E+02	9.77E+01 G
			1063.66	7.381E-01	&(P	5.423E+00	3.32E+02	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	5.785E+01	7.41E+03	7.55E+00 G
			785.42	-4.962E+00	% P	2.696E+02	2.07E+03	1.28E+00 GA
U-235	N	1.6642E+00					2.57E+11	
			143.79	1.108E-01	&(	3.782E+01	1.02E+04	1.10E+01 G
			205.33	-1.075E+01	+ P	5.101E+01	1.83E+02	5.01E+00 G
			163.38	5.015E+00	?(	5.553E+01	3.31E+02	5.08E+00 G
			185.72	-1.875E+00	+	4.841E+00	7.80E+01	5.40E+01 GA
BI-214	N	8.5283E+00					5.84E+05	
			609.31	8.528E+00	(P	4.862E+00	1.98E+01	4.61E+01 G
			1120.29	-3.110E+00	- P	4.071E+01	1.99E+02	1.51E+01 G
			1764.49	2.490E+00	- P	1.398E+01	1.57E+02	1.54E+01 G
BI-210M	T	-1.5850E+00					1.10E+09	
			265.83	-1.585E+00	(	6.119E+00	1.16E+02	5.00E+01 G
			304.90	-1.515E-06	&	2.239E+01	4.43E+08	2.80E+01 G
AC-228	N	5.6304E+00					2.10E+03	
			911.07	3.774E+00	(	1.486E+01	1.80E+02	2.90E+01 G
			968.97	-1.235E+01	&	3.407E+01	8.30E+01	1.75E+01 G
			338.32	1.011E+01	(P	4.790E+01	1.43E+02	1.20E+01 G
			93.35	-1.670E+01	&	9.588E+01	1.73E+02	5.56E+00 XA
TH-227	N	-4.4903E+01					7.95E+03	
			50.14	-4.490E+01	&(	2.539E+02	1.71E+02	8.00E+00 G
			256.24	-2.134E+00	+ P	3.746E+01	4.18E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	2.1946E+01					2.68E+06	
			193.51	2.195E+01	&(P	5.432E+01	9.82E+01	4.40E+00 G
			210.85	-3.695E+01	+ P	8.927E+01	9.09E+01	2.99E+00 G
TH-234	N	-6.8975E+01					1.63E+12	
			63.29	-6.898E+01	?(P	4.147E+02	1.39E+02	3.81E+00 G
			92.59	-7.931E+00	+ P	9.570E+01	6.76E+02	5.58E+00 G
PA-231	N	3.0260E+01					1.20E+07	
			302.65	1.788E+01	?(	2.156E+02	3.62E+02	2.88E+00 G
			300.07	4.475E+01	?(	2.462E+02	1.66E+02	2.46E+00 G
PA-233	C	3.2133E+00					7.82E+08	
			312.01	7.080E-01	?(	1.216E+01	5.13E+02	3.60E+01 G
			300.18	1.776E+01	?(	9.861E+01	1.67E+02	6.20E+00 G
PA-234	N	7.8381E+00					1.63E+12	
			131.29	-4.568E+00	&(	2.288E+01	1.51E+02	1.80E+01 G
			946.02	1.681E+01	(P	3.184E+01	8.73E+01	1.34E+01 G
			569.47	-3.321E+00	+	4.065E+01	3.60E+02	8.20E+00 G
			883.24	1.858E+01	?(	5.438E+01	8.79E+01	9.60E+00 G
			880.53	3.135E+01	&	9.124E+01	8.75E+01	6.00E+00 GA
PA-234M	N	-2.8871E+01					1.63E+12	
			1001.00	-2.887E+01	&(P	7.169E+02	8.52E+02	8.37E-01 G
			766.41	-1.381E+02	+ P	1.396E+03	3.18E+02	2.94E-01 G
AM-241	T	1.2492E+03					1.58E+05	
			59.54	1.249E+03	(	1.645E+01	9.02E-01	3.59E+01 G
Np-237	F	7.2507E+00					2.14E+06	
			86.49	7.251E+00	?(	3.013E+01	1.25E+02	1.31E+01 G
Ir-192	F	5.4686E-01					7.40E+01	
			316.49	0.000E+00	?(	5.108E+00	1.00E+03	8.70E+01 G
			468.06	1.467E+00	&(	1.016E+01	2.07E+02	5.18E+01 G
			308.44	1.349E-06	&	1.993E+01	4.43E+08	3.18E+01 G
Cs-136	F	3.8150E+00					1.30E+01	
			818.50	-2.975E-01	&(	5.458E+00	5.42E+02	1.00E+02 G
			1048.07	9.916E+00	*(	3.725E+00	2.19E+01	8.00E+01 G
			340.57	2.177E+00	?(	1.240E+01	1.71E+02	4.69E+01 G
Np-239	T	-4.1529E+00					2.36E+00	
			103.70	3.304E+00	&	2.183E+01	1.99E+02	2.40E+01 X
			106.13	-4.153E+00	?(	2.344E+01	1.70E+02	2.27E+01 G
			99.50	-6.160E+00	&	3.464E+01	1.70E+02	1.50E+01 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147	1.0096E+01					1.11E+01	
		531.00	1.010E+01	*(	2.547E+01	7.61E+01	1.30E+01 G
		91.10	-1.253E+00	-	1.895E+01	4.56E+02	2.83E+01 G
TL-210 N	7.0321E-01					5.84E+05	
		799.60	1.674E-01	?(	4.576E+00	8.03E+02	9.90E+01 G
		296.00	1.374E+00	&(	7.447E+00	1.63E+02	7.90E+01 G
		1313.00	3.853E+00	?	7.252E+00	8.44E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	25652.	-132.	-0.074	171.18	-4.490E+01	
TH-234	63.29	28252.	-131.	-0.073	138.62	-6.898E+01	P
Sn-126	64.28	28852.	-111.	-0.062	217.19	-2.265E+01	
BA-133	80.99	1033.	-59.	-0.033	97.71	-2.994E+00	
Np-237	86.49	2473.	56.	0.031	125.35	7.251E+00	
EU-155	86.54	2530.	56.	0.031	126.75	3.093E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Sn-126	86.94	2586.	33.	0.018	219.90	6.099E+00		
Sn-126	87.57	4851.	-55.	-0.030	180.11	-2.452E+00		
Cd-109	88.04	4796.	-55.	-0.030	179.01	-2.423E+01		
Nd-147	91.10	4741.	-21.	-0.012	455.50	-1.253E+00		
TH-234	92.59	4747.	-27.	-0.015	675.91	-7.931E+00		P
AC-228	93.35	4744.	-56.	-0.031	173.29	-1.670E+01		
Gd-153	97.50	4688.	-57.	-0.031	171.59	-3.082E+00		
EU-155	105.31	4627.	-34.	-0.019	526.77	-2.631E+00		P
EU-152	121.78	1110.	12.	0.007	393.70	6.858E-01		
EU-154	123.10	1065.	-53.	-0.029	88.16	-2.126E+00		
HF-181	133.02	2725.	-50.	-0.028	149.43	-1.908E+00		
CE-144	133.54	2698.	-19.	-0.011	384.49	-2.877E+00		
CE-141	145.44	727.	-32.	-0.018	160.03	-1.128E+00		
Ba-140	162.66	1039.	46.	0.026	99.69	1.339E+01		
U-235	163.38	1085.	14.	0.008	331.23	5.015E+00		
CE-139	165.85	1040.	-19.	-0.011	237.03	-4.403E-01		
Cf-251	176.60	532.	44.	0.024	99.22	4.872E+00		
U-235	185.72	803.	-52.	-0.029	78.02	-1.875E+00		
TH-229	193.51	635.	49.	0.027	98.19	2.195E+01		P
U-235	205.33	672.	-26.	-0.014	183.12	-1.075E+01		P
TH-229	210.85	708.	-52.	-0.029	90.93	-3.695E+01		P
Cf-251	227.00	884.	29.	0.016	147.89	1.010E+01		
EU-152	244.69	1084.	46.	0.026	101.21	1.439E+01		
TH-227	256.24	510.	-6.	-0.003	418.48	-2.134E+00		P
BI-210M	265.83	661.	-32.	-0.018	115.94	-1.585E+00		
I-131	284.30	428.	30.	0.017	135.92	1.289E+01		
TL-210	296.00	2106.	40.	0.022	163.15	1.374E+00		
PA-231	300.07	2186.	40.	0.022	165.70	4.475E+01		
PA-233	300.18	2226.	40.	0.022	167.19	1.776E+01		
PA-231	302.65	2266.	19.	0.010	362.12	1.788E+01		
PA-233	312.01	1062.	9.	0.005	513.16	7.080E-01		
CR-51	320.08	998.	9.	0.005	516.70	2.520E+00		
La-140	328.76	1543.	39.	0.022	143.16	5.680E+00		P
Cf-249	333.44	1582.	40.	0.022	139.95	7.787E+00		
AC-228	338.32	1623.	40.	0.022	142.57	1.011E+01		P
EU-152	344.29	1954.	-47.	-0.026	121.73	-5.444E+00		P
HF-181	345.83	1811.	-44.	-0.024	137.93	-8.952E+00		
BA-133	356.00	747.	-36.	-0.020	109.63	-1.808E+00		
I-131	364.48	487.	-26.	-0.014	123.14	-1.007E+00		
BA-133	383.84	869.	-45.	-0.025	79.56	-1.663E+01		P
Cf-249	387.95	725.	39.	0.022	98.30	2.003E+00		
AG-108M	433.94	449.	-28.	-0.015	156.24	-1.119E+00		P
pm-146	453.88	460.	36.	0.020	118.01	2.108E+00		P
SB-125	463.37	840.	46.	0.026	89.88	1.710E+01		
Ir-192	468.06	802.	19.	0.011	207.19	1.467E+00		
BE-7	477.60	910.	11.	0.006	389.00	4.147E+00		
La-140	487.02	925.	-42.	-0.023	104.77	-3.673E+00		
RU-103	497.05	269.	36.	0.020	94.18	1.625E+00		P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	511.86	420.	71.	0.040	74.13	1.494E+01	
Nd-147	531.00	254.	30.	0.017	76.05	1.010E+01	
Ba-140	537.26	226.	11.	0.006	287.80	1.909E+00	P
CS-134	563.24	195.	-4.	-0.002	751.55	-2.214E+00	P
BI-207	569.70	232.	11.	0.006	204.11	4.955E-01	
SB-125	600.50	880.	-31.	-0.017	134.85	-8.304E+00	
SB-124	602.73	849.	-31.	-0.017	132.29	-1.516E+00	
CS-134	604.71	810.	-31.	-0.017	129.19	-1.531E+00	
RU-103	610.30	779.	-12.	-0.007	331.34	-9.947E+00	
PM-144	618.06	252.	8.	0.004	298.71	3.693E-01	P
RH-106	621.92	211.	27.	0.015	79.27	1.306E+01	
SB-125	635.89	174.	-26.	-0.014	88.62	-1.115E+01	P
I-131	636.97	215.	6.	0.004	330.07	4.364E+00	
AG-110M	657.76	6661.	22.	0.012	529.08	1.167E+00	
PM-144	696.54	126.	-3.	-0.002	795.82	-1.600E-01	
NB-94	702.63	169.	-28.	-0.015	81.69	-1.508E+00	P
SB-124	722.79	245.	-30.	-0.016	76.95	-1.488E+01	
pm-146	735.72	140.	-5.	-0.003	440.22	-1.264E+00	P
pm-146	747.16	113.	7.	0.004	306.10	1.210E+00	P
ZR-95	756.73	150.	-31.	-0.017	73.40	-3.186E+00	P
AG-110M	763.94	198.	-15.	-0.008	150.17	-3.840E+00	P
PA-234M	766.41	224.	-7.	-0.004	317.52	-1.381E+02	P
EU-152	778.92	135.	9.	0.005	286.76	3.841E+00	
CS-134	795.87	280.	-5.	-0.003	491.77	-3.162E-01	P
TL-210	799.60	257.	3.	0.002	802.64	1.674E-01	
CS-134	801.95	261.	8.	0.005	282.03	5.507E+00	
CO-58	810.78	321.	-29.	-0.016	89.32	-1.722E+00	
La-140	815.77	278.	-12.	-0.006	206.74	-2.935E+00	
MN-54	834.85	89.	12.	0.007	162.99	7.514E-01	
Co-56	846.77	169.	-20.	-0.011	114.29	-1.222E+00	P
NB-94	871.10	158.	28.	0.016	66.00	1.755E+00	P
EU-154	873.23	184.	17.	0.009	116.76	8.548E+00	
AG-110M	884.68	342.	-17.	-0.010	151.63	-1.515E+00	
Sc-46	889.28	322.	29.	0.016	89.55	1.834E+00	
y-88	898.04	206.	-21.	-0.012	88.17	-1.437E+00	P
AC-228	911.07	190.	17.	0.009	179.90	3.774E+00	
AG-110M	937.49	140.	53.	0.029	51.35	1.007E+01	P
EU-152	964.11	228.	18.	0.010	117.62	8.505E+00	
AC-228	968.97	337.	-32.	-0.018	83.03	-1.235E+01	
EU-154	996.33	315.	8.	0.004	315.73	5.193E+00	
PA-234M	1001.00	326.	-4.	-0.002	851.94	-2.887E+01	P
EU-154	1004.77	403.	-36.	-0.020	79.70	-1.399E+01	
Co-56	1037.84	160.	-24.	-0.014	122.27	-1.225E+01	P
RH-106	1050.36	250.	-27.	-0.015	111.64	-1.227E+02	P
BI-207	1063.66	130.	8.	0.004	331.59	7.381E-01	P
Ga-68	1077.40	185.	-38.	-0.021	81.37	-9.946E+01	
FE-59	1099.25	139.	4.	0.002	619.55	5.681E-01	
EU-152	1112.07	313.	-32.	-0.018	78.21	-1.768E+01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Ta-182	1121.30	127.	27.	0.015	62.09	5.817E+00		
Ta-182	1221.41	21.	13.	0.007	85.14	3.877E+00		
Co-56	1238.28	11.	9.	0.005	88.09	1.121E+00		P
NA-22	1274.53	27.	-5.	-0.003	163.20	-3.874E-01		
FE-59	1291.60	21.	-3.	-0.002	319.69	-6.470E-01		
TL-210	1313.00	11.	10.	0.005	84.39	3.853E+00		
AG-110M	1384.30	17.	-3.	-0.002	327.45	-1.094E+00		
K-40	1460.83	25.	-5.	-0.003	203.94	-4.358E+00		P
La-140	1596.21	25.	-15.	-0.008	70.74	-1.522E+00		P
SB-124	1690.98	6.	1.	0.001	600.00	2.190E-01		
y-88	1836.06	0.	8.	0.004	35.36	9.082E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	4.1466E+00	4.1467E+00	3.890E+02%	5.40E+01
NA-22	#A	-3.8745E-01	-3.8745E-01	1.632E+02%	2.22E+00
K-40	#A	-4.3575E+00	-4.3575E+00	2.039E+02%	2.26E+01
Sc-46	#A	1.8337E+00	1.8338E+00	8.955E+01%	5.46E+00
CR-51	#A	2.5198E+00	2.5200E+00	5.167E+02%	4.36E+01
MN-54	#A	7.5136E-01	7.5136E-01	1.630E+02%	2.81E+00
FE-59	#A	5.6806E-01	5.6808E-01	6.196E+02%	7.55E+00
Co-56	#A	-2.8929E-01	-2.8929E-01	7.215E+01%	3.86E+00
CO-57	#A	0.0000E+00	0.0000E+00	7.071E+02%	3.03E+00
CO-58	#A	-1.7216E+00	-1.7217E+00	8.932E+01%	5.12E+00
CO-60		1.7387E+02	1.7387E+02	1.693E+00%	2.41E+00
ZN-65	#A	-2.8775E-01	-2.8775E-01	1.300E+03%	1.22E+01
NB-94	#A	-1.5084E+00	-1.5084E+00	8.169E+01%	3.43E+00
ZR-95	#A	-3.1857E+00	-3.1857E+00	7.340E+01%	6.16E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.00E+00
RU-103	#A	1.6245E+00	1.6246E+00	9.418E+01%	3.56E+00
RH-106	#A	1.3056E+01	1.3056E+01	7.927E+01%	3.44E+01
AG-108M	#A	-1.1192E+00	-1.1192E+00	1.562E+02%	4.12E+00
AG-110M	#A	1.7174E+00	1.7174E+00	5.135E+01%	7.71E+00
SN-113	#A	1.1297E+00	1.1297E+00	2.017E+02%	7.61E+00
SB-124	#A	-1.5156E+00	-1.5156E+00	1.323E+02%	6.68E+00
SB-125	#A	4.4642E+00	4.4642E+00	8.988E+01%	1.19E+01
I-131	#A	2.9643E-01	2.9649E-01	1.231E+02%	4.14E+00
Gd-153	#A	-3.0818E+00	-3.0818E+00	1.716E+02%	1.75E+01
Ga-68	#A	-9.6345E+01	-9.9464E+01	8.137E+01%	1.75E+02
Tc-99m	#A	9.7504E-01	9.8089E-01	1.497E+02%	4.87E+00
BA-133	#A	-1.8080E+00	-1.8080E+00	1.096E+02%	6.59E+00
CS-134	#A	-9.5574E-01	-9.5574E-01	1.292E+02%	6.59E+00
CS-137		3.8281E+02	3.8281E+02	1.346E+00%	3.88E+00

CE-139 #A	-4.4033E-01	-4.4033E-01	2.370E+02%		3.49E+00
Ba-140 #A	4.2416E+00	4.2421E+00	9.969E+01%		1.30E+01
La-140 #A	-2.5812E-01	-2.5815E-01	7.074E+01%		2.70E+00
CE-141 #A	-1.1282E+00	-1.1283E+00	1.600E+02%		4.57E+00
CE-144 #A	-2.8767E+00	-2.8767E+00	3.845E+02%		3.68E+01
PM-144 #A	1.0480E-01	1.0480E-01	2.987E+02%		2.93E+00
EU-152 #A	2.2505E+00	2.2505E+00	8.701E+01%		2.41E+01
EU-154 #A	6.9927E+00	6.9927E+00	1.168E+02%		3.35E+01
EU-155 #A	7.5487E-01	7.5487E-01	1.268E+02%		2.44E+01
HF-181 #A	0.0000E+00	0.0000E+00	7.071E+02%		7.15E+00
Ta-182 #A	4.9706E+00	4.9707E+00	5.269E+01%		1.19E+01
Hg-203 A	1.2506E+00	1.2506E+00	8.337E+01%		3.46E+00
TL-208 #C	4.6944E+00	4.6945E+00	4.129E+01%		3.59E+00
pm-146 #A	1.7995E+00	1.7995E+00	1.180E+02%		8.53E+00
y-88 #A	-1.4375E+00	-1.4375E+00	8.817E+01%		4.73E+00
Cd-113m#A	1.6850E+04	1.6850E+04	8.087E+01%		4.52E+04
Cd-109 #A	-2.4229E+01	-2.4229E+01	1.790E+02%		1.44E+02
Cf-251 #A	4.8721E+00	4.8721E+00	9.922E+01%		1.22E+01
Cf-249 #A	3.1038E+00	3.1038E+00	8.551E+01%		6.54E+00
Sn-126 #A	-2.2653E+01	-2.2653E+01	2.172E+02%		1.63E+02
PB-210	1.1370E+04	1.1370E+04	1.218E+00%		2.41E+02
PB-212	5.8916E+00	5.8916E+00	2.320E+01%		4.25E+00
PB-214 #A	2.3946E+00	2.3946E+00	1.723E+02%		9.84E+00
BI-207 #A	6.0045E-01	6.0045E-01	1.947E+02%		3.42E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	7.407E+03%		5.78E+01
U-235 #A	1.6642E+00	1.6642E+00	3.312E+02%		3.78E+01
BI-214	8.5283E+00	8.5283E+00	1.975E+01%		4.86E+00
BI-210M#A	-1.5850E+00	-1.5850E+00	1.159E+02%		6.12E+00
AC-228 #A	5.6304E+00	5.6304E+00	1.148E+02%		1.49E+01
TH-227 #A	-4.4903E+01	-4.4903E+01	1.712E+02%		2.54E+02
TH-229 #A	2.1946E+01	2.1946E+01	9.819E+01%		5.43E+01
TH-234 #A	-6.8975E+01	-6.8975E+01	1.386E+02%		4.15E+02
PA-231 #A	3.0260E+01	3.0260E+01	1.657E+02%		2.16E+02
PA-233 #A	3.2133E+00	3.2133E+00	1.672E+02%		1.22E+01
PA-234 A	7.8381E+00	7.8381E+00	6.511E+01%		2.29E+01
PA-234M#A	-2.8871E+01	-2.8871E+01	8.519E+02%		7.17E+02
AM-241	1.2492E+03	1.2492E+03	9.018E-01%		1.64E+01
Np-237 #A	7.2507E+00	7.2507E+00	1.253E+02%		3.01E+01
Ir-192 #A	5.4685E-01	5.4686E-01	2.072E+02%		5.11E+00
Cs-136 #A	3.8145E+00	3.8150E+00	2.187E+01%		5.46E+00
Np-239 #A	-4.1503E+00	-4.1529E+00	1.704E+02%		2.34E+01
Nd-147 #A	1.0095E+01	1.0096E+01	7.605E+01%		2.55E+01
TL-210 #A	7.0321E-01	7.0321E-01	1.631E+02%		4.58E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.319E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 1.3189968E+04 Bq/Sample

Test America St. Louis Spectrum ID: 19_Gamma_20181614

Sample Description: 379959_Gamma_LCS 160-379959~2-A
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: LCS 160-379959~2-A

Decay to Time: 8/23/2018 07:45 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:48:07 Real Time: 1807 sec
Analysis Time: 8/28/2018 19:27 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.147E+00	389.0	1.613E+01	1.613E+01	5.401E+01
NA-22	-3.874E-01	163.2	6.323E-01	6.326E-01	2.223E+00
K-40	-4.358E+00	203.9	8.887E+00	8.890E+00	2.257E+01
Sc-46	1.549E+00	68.0	1.053E+00	1.056E+00	5.465E+00
CR-51	2.520E+00	516.7	1.302E+01	1.302E+01	4.360E+01
MN-54	7.514E-01	163.0	1.225E+00	1.225E+00	2.813E+00
FE-59	-9.832E-01	324.0	3.186E+00	3.186E+00	1.079E+01
Co-56	-2.893E-01	72.1	2.087E-01	2.092E-01	3.863E+00
CO-57	4.295E-01	206.2	8.854E-01	8.857E-01	2.954E+00
CO-58	-1.722E+00	89.3	1.538E+00	1.540E+00	5.117E+00
CO-60	1.739E+02	1.7	2.944E+00	9.147E+00	2.409E+00
ZN-65	-7.326E-02	5107.6	3.742E+00	3.742E+00	1.510E+01
ZR-95	-3.186E+00	73.4	2.338E+00	2.344E+00	6.164E+00
NB-95	0.000E+00	1.#INF	3.003E-01	3.003E-01	4.002E+00
RU-103	1.625E+00	94.2	1.530E+00	1.532E+00	3.560E+00
RH-106	1.010E+01	107.5	1.085E+01	1.086E+01	3.632E+01
AG-108M	-1.119E+00	156.2	1.749E+00	1.750E+00	4.124E+00
AG-110M	3.539E+00	51.4	1.817E+00	1.826E+00	2.048E+01
SN-113	1.130E+00	201.7	2.279E+00	2.280E+00	7.609E+00
SB-124	-1.516E+00	132.3	2.005E+00	2.007E+00	6.677E+00
SB-125	4.464E+00	89.9	4.012E+00	4.019E+00	1.191E+01
I-131	2.731E+00	80.8	2.206E+00	2.210E+00	3.993E+00
Gd-153	-3.082E+00	173.7	5.352E+00	5.355E+00	1.773E+01
Ga-68	-9.946E+01	81.4	8.094E+01	8.113E+01	1.753E+02
Tc-99m	-9.858E-01	110.3	1.087E+00	1.089E+00	3.606E+00
BA-133	-1.808E+00	109.6	1.982E+00	1.984E+00	6.592E+00
CS-134	7.834E-01	187.2	1.466E+00	1.467E+00	5.494E+00
CS-137	3.828E+02	1.3	5.152E+00	2.021E+01	3.878E+00
CE-139	-4.403E-01	237.0	1.044E+00	1.044E+00	3.485E+00
Ba-140	4.242E+00	99.7	4.229E+00	4.235E+00	1.296E+01
La-140	-2.581E-01	70.7	1.826E-01	1.831E-01	2.695E+00
CE-141	1.726E+00	108.3	1.869E+00	1.871E+00	6.201E+00
CE-144	-1.238E+00	883.8	1.094E+01	1.094E+01	3.643E+01

PM-144	1.347E+00	56.7	7.646E-01	7.676E-01	3.694E+00
EU-152	3.633E+00	117.6	4.273E+00	4.277E+00	9.526E+00
EU-154	9.596E-01	315.7	3.030E+00	3.030E+00	6.355E+00
EU-155	6.849E-01	185.4	1.270E+00	1.271E+00	2.443E+01
HF-181	0.000E+00	1.#INF	4.091E-01	4.092E-01	7.151E+00
Ta-182	3.695E+00	65.1	2.404E+00	2.411E+00	1.174E+01
Hg-203	0.000E+00	1.#INF	1.064E+00	1.064E+00	3.594E+00
TL-208	4.995E+00	41.3	2.063E+00	2.078E+00	3.589E+00
PM-146	1.800E+00	118.0	2.124E+00	2.125E+00	6.020E+00
Y-88	1.046E+00	35.4	3.697E-01	3.745E-01	8.367E-01
Cd-113m	1.283E+04	108.8	1.395E+04	1.397E+04	4.646E+04
Cd-109	0.000E+00	1.#INF	1.896E+01	1.896E+01	1.480E+02
Se-75	3.357E+00	66.8	2.241E+00	2.250E+00	4.779E+00
Cf-251	4.872E+00	99.2	4.834E+00	4.841E+00	1.220E+01
Cf-249	3.104E+00	85.5	2.654E+00	2.659E+00	6.541E+00
Sn-126	-2.265E+01	217.2	4.920E+01	4.922E+01	1.625E+02
PB-210	1.137E+04	1.2	1.385E+02	7.232E+02	2.411E+02
PB-212	5.892E+00	23.2	1.367E+00	1.401E+00	4.246E+00
PB-214	2.395E+00	172.3	4.127E+00	4.128E+00	9.841E+00
BI-207	-1.595E+00	75.7	1.207E+00	1.210E+00	4.001E+00
BI-212	-2.218E-01	7065.1	1.567E+01	1.567E+01	5.785E+01
BI-214	8.528E+00	19.8	1.684E+00	1.739E+00	4.862E+00
BI-210M	-2.148E+00	87.2	1.874E+00	1.877E+00	6.215E+00
AC-228	5.630E+00	114.8	6.462E+00	6.469E+00	1.486E+01
TH-227	4.689E+00	125.5	5.887E+00	5.892E+00	3.746E+01
TH-229	2.195E+01	98.2	2.155E+01	2.158E+01	5.432E+01
TH-234	-7.931E+00	675.9	5.361E+01	5.361E+01	9.936E+01
PA-231	3.026E+01	165.7	5.014E+01	5.016E+01	2.156E+02
PA-233	3.213E+00	167.2	5.372E+00	5.375E+00	1.216E+01
PA-234	1.276E+01	41.4	5.277E+00	5.317E+00	2.255E+01
PA-234M	-2.887E+01	766.4	2.213E+02	2.213E+02	7.169E+02
U-235	1.588E+00	331.2	5.261E+00	5.262E+00	2.911E+01
AM-241	1.249E+03	0.9	1.127E+01	7.359E+01	1.645E+01
Np-237	6.974E+00	184.5	1.286E+01	1.287E+01	4.262E+01
Ir-192	5.469E-01	207.2	1.133E+00	1.133E+00	5.108E+00
Cs-136	3.815E+00	21.9	8.344E-01	8.620E-01	5.458E+00
Np-239	-4.153E+00	170.4	7.077E+00	7.081E+00	2.344E+01
Nd-147	1.010E+01	72.8	7.350E+00	7.372E+00	2.435E+01
Mo-99	1.250E+01	78.8	9.854E+00	9.874E+00	3.274E+01
Ge-69	-2.932E+00	62.2	1.825E+00	1.832E+00	2.929E+01
Br-82	8.150E-01	94.5	7.704E-01	7.718E-01	4.546E+00
V-48	6.885E-01	115.4	7.948E-01	7.958E-01	3.942E+00
Sr-85	-1.670E+00	86.2	1.440E+00	1.443E+00	4.779E+00
Rb-83	1.133E+00	259.4	2.940E+00	2.940E+00	6.920E+00
Kr-85	0.000E+00	1.#INF	1.837E+02	1.837E+02	1.065E+03
Cm-247	1.866E+00	79.3	1.481E+00	1.484E+00	4.909E+00
Hf-175	0.000E+00	1.#INF	5.778E-01	5.778E-01	6.802E+00
Lu-172	-2.109E+00	105.5	2.225E+00	2.228E+00	7.441E+00
Kr-85m	-1.119E+00	109.5	1.226E+00	1.228E+00	3.091E+00
NB-94	-1.660E+00	70.8	1.175E+00	1.178E+00	4.681E+00
TL-210	7.032E-01	163.1	1.147E+00	1.148E+00	4.576E+00
Total	2.621E+04				

Analyst: Rachel Mueller

Sample description
379959_Gamma_LCS 160-379959~2-A

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181614.An1

Acquisition information
Start time: 8/23/2018 7:48:07 AM
Live time: 1800
Real time: 1807
Dead time: 0.38 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/16/2018 12:11:21 PM
Type: Polynomial
Uncertainty: 0.841 %
Coefficients: -0.371612 -4.869309 0.466742
-0.049787 0.002234 -0.000039

Library Files
Main analysis library: Client_Extra_Long_Rev7.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.71keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:45:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1648

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
39.53	60.	74.34	0.73	1.234E-02				
46.70	14864.	1.22	0.91	1.723E-02	46.54	4.250	1.137E+04	PB210
59.69	21095.	0.90	0.88	2.620E-02	59.54	35.900	1.249E+03	AM241
80.99	47.	224.00	0.97	3.218E-02	80.99	34.060	PBC<MDA	BA133
86.49	54.	184.45	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.975E+00	EU155
					86.94	9.040	1.009E+01	Sn126
86.54	54.	185.45	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.975E+00	EU155
					86.94	9.040	1.009E+01	Sn126
96.73	18.	153.05	0.98	3.397E-02	96.73	3.420	PBC<MDA	Se75
122.06	22.	206.15	1.00	3.400E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.295E-01	CO57
132.58	25.	74.73	0.45	3.339E-02	133.02	43.300	9.614E-01	HF181
					133.54	11.090	3.758E+00	CE144
135.87	9.	793.28	1.02	3.315E-02	136.00	58.300	PBC<MDA	Se75
					136.30	5.850	2.639E+00	HF181
145.44	49.	108.29	1.02	3.240E-02	145.44	48.200	PBC<MDA	CE141
162.66	46.	99.69	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
163.38	14.	331.23	1.04	3.076E-02	163.38	5.080	PBC<MDA	U235
176.60	44.	99.22	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
186.10	52.	71.58	0.53	2.860E-02	185.72	54.000	1.855E+00	U235
193.51	49.	98.19	1.07	2.792E-02	193.51	4.400	PBC<MDA	TH229
198.03	64.	49.11	0.42	2.750E-02				
227.00	29.	147.89	1.10	2.503E-02	227.00	6.300	PBC<MDA	Cf251
231.24	40.	61.91	1.04	2.470E-02				
235.97	46.	125.53	1.10	2.434E-02	235.97	12.300	PBC<MDA	TH227

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.89	111.	23.20	1.11	2.413E-02	238.63	43.300	5.892E+00	PB212
242.26	46.	125.18	1.11	2.388E-02	242.00	7.430	PBC<MDA	PB214
244.69	29.	194.83	1.11	2.369E-02	244.69	7.580	PBC<MDA	EU152
263.92	31.	108.77	1.13	2.238E-02	263.70	0.006	PBC<MDA	Cd113m
266.15	31.	108.77	1.13	2.232E-02	264.66	58.500	PBC<MDA	Se75
					265.83	50.000	1.549E+00	BI210M
278.08	36.	64.25	1.50	2.148E-02	277.28	6.310	PBC<MDA	TL208
					279.20	81.460	1.152E+00	Hg203
279.54	6.	372.59	1.14	2.139E-02	279.20	81.460	PBC<MDA	Hg203
					279.54	24.790	6.758E-01	Se75
284.30	40.	109.27	1.15	2.111E-02	284.30	6.140	PBC<MDA	I131
295.20	36.	185.65	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	40.	163.15	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	39.	167.42	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	40.	165.70	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.475E+01	PA231
					300.18	6.200	1.776E+01	PA233
300.18	40.	167.19	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	4.475E+01	PA231
					300.18	6.200	1.776E+01	PA233
302.65	19.	362.12	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	2.811E+00	BA133
307.05	19.	85.14	0.52	1.987E-02				
312.01	9.	513.16	1.17	1.962E-02	312.01	36.000	PBC<MDA	PA233
320.08	9.	516.70	1.18	1.922E-02	320.08	9.940	PBC<MDA	CR51
328.76	39.	143.16	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	40.	139.95	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
338.32	40.	142.57	1.19	1.839E-02	338.32	12.010	PBC<MDA	AC228
340.64	34.	171.26	1.19	1.830E-02	340.57	46.900	PBC<MDA	Cs136
351.30	12.	290.39	1.20	1.782E-02	351.93	37.600	PBC<MDA	PB214
362.19	20.	65.57	0.33	1.742E-02				
364.48	38.	80.79	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	39.	98.30	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
390.40	21.	201.72	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
400.66	40.	69.83	1.25	1.608E-02	400.66	11.370	PBC<MDA	Se75
402.40	39.	79.35	1.25	1.602E-02	402.40	72.000	PBC<MDA	Cm247
420.33	21.	65.12	0.30	1.548E-02				
453.88	36.	118.01	1.29	1.458E-02	453.88	65.000	PBC<MDA	PM146
463.37	46.	89.88	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	19.	207.19	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	11.	389.00	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	36.	94.18	1.33	1.358E-02	497.05	90.900	PBC<MDA	RU103
511.86	69.	75.64	2.59	1.328E-02	511.86	20.000	PBC<MDA	RH106
520.35	12.	259.39	1.35	1.311E-02	520.35	46.110	PBC<MDA	Rb83
527.98	23.	51.78	0.48	1.297E-02				
531.00	30.	72.80	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
537.26	11.	287.80	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
554.34	24.	94.52	1.37	1.249E-02	554.34	70.600	PBC<MDA	Br82
569.32	14.	187.16	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.934E+00	PA234
					569.70	97.740	6.659E-01	BI207
574.00	8.	353.11	1.39	1.217E-02	574.00	11.800	PBC<MDA	Ge69
583.02	26.	105.30	1.40	1.202E-02	583.02	84.500	PBC<MDA	TL208
606.80	17.	54.46	0.41	1.167E-02				
609.54	82.	19.75	1.42	1.163E-02	609.31	46.090	8.528E+00	BI214
618.06	28.	78.25	1.42	1.151E-02	618.06	99.100	PBC<MDA	PM144
619.10	5.	419.31	1.43	1.149E-02	619.10	43.100	PBC<MDA	Br82
621.92	21.	107.47	1.43	1.145E-02	621.92	9.930	PBC<MDA	RH106
636.97	6.	330.07	1.44	1.125E-02	636.97	7.170	PBC<MDA	I131
657.76	22.	529.08	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
661.85	6419.	1.35	1.41	1.093E-02	661.66	85.210	3.828E+02	CS137
696.54	25.	82.21	1.49	1.052E-02	696.54	99.000	PBC<MDA	PM144
698.36	4.	584.45	1.49	1.050E-02	698.36	27.900	PBC<MDA	Br82
739.50	27.	78.80	1.52	1.007E-02	739.50	12.130	PBC<MDA	Mo99
747.16	7.	306.10	1.53	9.989E-03	747.16	34.000	PBC<MDA	PM146
778.92	7.	254.35	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
799.60	3.	802.64	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	8.	282.03	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
834.85	12.	162.99	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
860.56	54.	41.29	1.61	9.000E-03	860.56	12.420	2.678E+01	TL208
871.10	28.	66.00	1.62	8.920E-03	871.10	99.890	PBC<MDA	NB94
872.00	23.	84.83	1.62	8.913E-03	872.00	9.590	PBC<MDA	Ge69
880.61	30.	87.50	1.63	8.849E-03	880.53	6.000	PBC<MDA	PA234
883.32	28.	87.95	1.63	8.829E-03	883.24	9.600	PBC<MDA	PA234
889.28	29.	89.55	1.63	8.785E-03	889.28	99.984	PBC<MDA	Sc46
898.04	18.	125.89	1.64	8.721E-03	898.04	93.700	PBC<MDA	Y88
911.07	17.	179.90	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
937.49	53.	51.35	1.67	8.448E-03	937.49	34.360	PBC<MDA	AG110M
944.30	2.	942.53	1.68	8.403E-03	944.30	8.000	PBC<MDA	V48
945.99	65.	41.35	1.96	8.392E-03	946.02	13.400	3.187E+01	PA234
964.11	18.	117.62	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
982.98	9.	290.95	1.70	8.153E-03	983.50	100.000	PBC<MDA	V48
996.33	8.	315.73	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1001.00	-4.	766.43	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1047.95	111.	21.87	2.06	7.775E-03	1048.07	80.000	9.916E+00	Cs136
1063.66	8.	331.59	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1120.55	17.	102.29	1.80	7.393E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.265E+00	Sc46
					1121.30	34.900	3.627E+00	Ta182
1121.30	16.	98.38	1.80	7.389E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.240E+00	Sc46
					1121.30	34.900	3.555E+00	Ta182
1173.42	2298.	2.40	1.88	7.137E-03	1173.24	99.900	1.790E+02	CO60
1221.41	13.	85.14	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1238.28	9.	88.09	1.89	6.848E-03	1238.28	66.070	PBC<MDA	Co56
1312.78	8.	115.44	1.94	6.547E-03	1311.60	98.000	PBC<MDA	V48
					1313.00	21.000	3.101E+00	TL210
1332.79	1963.	2.39	1.99	6.464E-03	1332.50	99.980	1.688E+02	CO60
1460.83	-5.	203.94	2.03	6.004E-03	1460.83	10.670	PBC<MDA	K40
1474.88	4.	137.50	2.04	5.957E-03	1474.88	16.600	PBC<MDA	Br82
1690.98	1.	600.00	2.18	5.307E-03	1690.98	47.790	PBC<MDA	SB124
1764.76	4.	157.08	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214
1836.31	8.	35.36	2.26	4.933E-03	1836.06	99.200	9.082E-01	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
157.28	39.53	901.	60.	4.889E+03	74.34	0.730	- c
528.72	132.58	400.	12.	3.505E+02	243.47	1.012	- c
743.16	186.10	399.	52.	1.806E+03	71.58	0.525	- s
790.88	198.03	308.	64.	2.327E+03	49.11	0.419	- s
923.62	231.24	215.	40.	1.619E+03	61.91	1.042	- s
1110.88	278.08	215.	22.	1.012E+03	97.82	1.140	- sc
1226.71	307.05	112.	19.	9.563E+02	85.14	0.517	- sc
1447.20	362.19	76.	20.	1.148E+03	65.57	0.331	- sc
1679.67	420.33	83.	21.	1.356E+03	65.12	0.302	- sc
2110.15	527.98	49.	23.	1.748E+03	51.78	0.484	- sM
2426.32	606.80	70.	25.	2.139E+03	51.50	1.416	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.96	46.70	4498.	14864.	8.258	1.22	0.910
TH-227	199.70	50.14	25652.	-132.	-0.074	171.18	0.938s
AM-241	237.88	59.69	3483.	21095.	11.719	0.90	0.881
TH-234	252.25	63.29	28252.	-131.	-0.073	138.62	0.950s
Sn-126	256.21	64.28	28852.	-111.	-0.062	217.19	0.951s
BA-133	323.00	80.99	5537.	47.	0.026	224.00	0.966s
Np-237	344.99	86.49	4983.	54.	0.030	184.45	0.971s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	345.20	86.54	5038.	54.	0.030	185.45	0.971s
Sn-126	349.31	87.57	5093.	0.	0.000	1000.00	0.972s
Cd-109	351.19	88.04	5093.	0.	0.000	1000.00	0.972s
Hf-175	356.46	89.36	5093.	0.	0.000	1000.00	0.973s
Nd-147	363.42	91.10	5093.	0.	0.000	1000.00	0.975s
TH-234	369.37	92.59	5120.	-27.	-0.015	675.91	0.976s
AC-228	372.41	93.35	4858.	-56.	-0.031	175.35	0.977s
Se-75	385.92	96.73	389.	18.	0.010	153.05	0.980D
Gd-153	389.00	97.50	4802.	-57.	-0.031	173.66	0.981s
Np-239	396.99	99.50	4710.	-57.	-0.032	171.69	0.982s
Gd-153	411.78	103.20	4654.	-57.	-0.032	170.07	0.986s
Np-239	413.78	103.70	4652.	-17.	-0.009	572.92	0.986
EU-155	420.23	105.31	4627.	-34.	-0.019	526.77	0.988s
Np-239	423.49	106.13	4884.	-58.	-0.032	170.41	0.988
Se-75	483.41	121.12	1232.	-6.	-0.003	828.32	1.002s
EU-152	486.05	121.78	1238.	0.	0.000	1000.00	1.002s
CO-57	487.18	122.06	1064.	22.	0.013	206.15	1.003s
PA-234	524.09	131.29	2694.	-50.	-0.028	148.83	1.011s
HF-181	531.00	133.02	2645.	-50.	-0.028	147.24	1.013s
CE-144	533.06	133.54	2645.	-8.	-0.005	883.76	1.013
Se-75	542.89	136.00	2663.	9.	0.005	793.28	1.015s
Tc-99m	560.92	140.51	1508.	-50.	-0.028	110.27	1.019D
U-235	574.02	143.79	1561.	0.	0.000	1000.00	1.022s
CE-141	580.63	145.44	1356.	49.	0.027	108.29	1.024s
Kr-85m	602.86	151.00	722.	-46.	-0.026	109.51	1.029s
Ba-140	649.47	162.66	1039.	46.	0.026	99.69	1.039s
U-235	652.34	163.38	1085.	14.	0.008	331.23	1.040
CE-139	662.23	165.85	1040.	-19.	-0.011	237.03	1.042s
Cf-251	705.19	176.60	532.	44.	0.024	99.22	1.051s
Mo-99	723.06	181.07	1219.	-15.	-0.009	323.07	1.055s
Lu-172	724.66	181.47	1204.	0.	0.000	1000.00	1.056s
U-235	741.65	185.72	1246.	-10.	-0.005	526.58	1.060s
TH-229	772.79	193.51	635.	49.	0.027	98.19	1.066s
U-235	820.06	205.33	672.	-26.	-0.014	183.12	1.077s
TH-229	842.11	210.85	708.	-52.	-0.029	90.93	1.082
Cf-251	906.68	227.00	884.	29.	0.016	147.89	1.096s
TH-227	942.54	235.97	1658.	46.	0.026	125.53	1.104s
PB-212	953.18	238.63	274.	111.	0.062	23.20	1.106D
PB-214	966.63	242.00	1664.	46.	0.026	125.18	1.109s
EU-152	977.41	244.69	1537.	29.	0.016	194.83	1.111
TH-227	1023.57	256.24	510.	-6.	-0.003	418.48	1.122
Cd-113m	1053.40	263.70	553.	31.	0.017	108.77	1.128s
Se-75	1057.24	264.66	553.	31.	0.017	108.77	1.129s
BI-210M	1061.92	265.83	682.	-43.	-0.024	87.22	1.130s
TL-208	1107.70	277.28	554.	23.	0.013	143.15	1.140s
Hg-203	1115.37	279.20	558.	0.	0.000	1000.00	1.141A
Se-75	1116.73	279.54	644.	6.	0.004	372.59	1.142D
I-131	1135.76	284.30	955.	40.	0.022	109.27	1.146s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1178.90	295.09	2246.	36.	0.020	185.65	1.155s
TL-210	1182.54	296.00	2106.	40.	0.022	163.15	1.156
PB-212	1198.65	300.03	2147.	39.	0.022	167.42	1.159
PA-231	1198.81	300.07	2186.	40.	0.022	165.70	1.159s
PA-233	1199.25	300.18	2226.	40.	0.022	167.19	1.159s
PA-231	1209.13	302.65	2266.	19.	0.010	362.12	1.162s
PA-233	1246.56	312.01	1062.	9.	0.005	513.16	1.170s
Ir-192	1264.46	316.49	1071.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	998.	9.	0.005	516.70	1.177s
La-140	1313.52	328.76	1543.	39.	0.022	143.16	1.184s
Cf-249	1332.23	333.44	1582.	40.	0.022	139.95	1.188s
AC-228	1351.74	338.32	1623.	40.	0.022	142.57	1.192s
Cs-136	1360.74	340.57	1641.	34.	0.019	171.26	1.194s
Hf-175	1372.06	343.40	1675.	0.	0.000	1000.00	1.197s
EU-152	1375.60	344.29	1954.	-47.	-0.026	121.73	1.197s
HF-181	1381.77	345.83	1811.	-44.	-0.024	137.93	1.199
PB-214	1406.17	351.93	620.	12.	0.007	290.39	1.204s
BA-133	1422.43	356.00	747.	-36.	-0.020	109.63	1.207s
I-131	1456.35	364.48	452.	38.	0.021	80.79	1.215
Mo-99	1464.10	366.42	604.	-40.	-0.022	88.34	1.216s
BA-133	1533.76	383.84	869.	-45.	-0.025	79.56	1.231s
Cf-249	1550.19	387.95	725.	39.	0.022	98.30	1.235s
SN-113	1565.14	391.69	913.	21.	0.012	201.72	1.238s
Se-75	1601.01	400.66	373.	40.	0.022	69.83	1.245
Cm-247	1607.97	402.40	453.	39.	0.022	79.35	1.247s
AG-108M	1734.08	433.94	449.	-28.	-0.015	156.24	1.273
PM-146	1813.83	453.88	460.	36.	0.020	118.01	1.290s
SB-125	1851.76	463.37	840.	46.	0.026	89.88	1.298s
Ir-192	1870.53	468.06	802.	19.	0.011	207.19	1.302s
BE-7	1908.66	477.60	910.	11.	0.006	389.00	1.310s
HF-181	1926.26	482.00	921.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	925.	-42.	-0.023	104.77	1.317s
RU-103	1986.48	497.05	269.	36.	0.020	94.18	1.326
RH-106	2045.71	511.86	1308.	69.	0.038	75.64	2.588s
Kr-85	2054.17	513.98	521.	0.	0.000	1000.00	1.340s
Sr-85	2054.21	513.99	561.	-40.	-0.022	86.22	1.340s
Rb-83	2079.64	520.35	243.	12.	0.007	259.39	1.345s
Rb-83	2116.40	529.54	332.	-23.	-0.013	114.75	1.352s
Nd-147	2122.23	531.00	231.	30.	0.017	72.80	1.354s
Ba-140	2147.27	537.26	226.	11.	0.006	287.80	1.359s
Rb-83	2208.22	552.50	266.	-14.	-0.008	163.17	1.371s
Br-82	2215.58	554.34	252.	24.	0.014	94.52	1.373s
CS-134	2251.16	563.24	195.	-4.	-0.002	751.55	1.380s
CS-134	2275.49	569.32	353.	14.	0.008	187.16	1.385s
PA-234	2276.09	569.47	367.	0.	0.000	1000.00	1.385
BI-207	2277.02	569.70	320.	-34.	-0.019	75.67	1.385s
Ge-69	2294.21	574.00	395.	8.	0.004	353.11	1.389s
TL-208	2330.29	583.02	182.	26.	0.015	105.30	1.396s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	2400.20	600.50	880.	-31.	-0.017	134.85	1.410s
SB-124	2409.12	602.73	849.	-31.	-0.017	132.29	1.412s
CS-134	2417.03	604.71	810.	-31.	-0.017	129.19	1.414s
BI-214	2435.44	609.31	90.	82.	0.046	19.75	1.417D
RU-103	2439.39	610.30	779.	-12.	-0.007	331.34	1.418
PM-144	2470.44	618.06	219.	28.	0.015	78.25	1.424s
Br-82	2474.59	619.10	247.	5.	0.003	419.31	1.425s
RH-106	2485.86	621.92	236.	21.	0.011	107.47	1.427
SB-125	2541.74	635.89	174.	-26.	-0.014	84.49	1.439s
I-131	2546.08	636.97	215.	6.	0.004	330.07	1.440s
AG-110M	2629.22	657.76	6661.	22.	0.012	529.08	1.456s
CS-137	2645.57	661.85	179.	6419.	3.566	1.35	1.405
PM-144	2784.35	696.54	204.	25.	0.014	82.21	1.487
Br-82	2791.62	698.36	229.	4.	0.002	584.45	1.488s
NB-94	2808.70	702.63	321.	-31.	-0.017	70.80	1.492
SB-124	2889.33	722.79	245.	-30.	-0.016	76.95	1.507s
EU-154	2891.62	723.36	276.	0.	0.000	1000.00	1.508s
PM-146	2941.07	735.72	238.	-27.	-0.015	79.93	1.518s
Mo-99	2956.19	739.50	220.	27.	0.015	78.80	1.520s
PM-146	2986.83	747.16	113.	7.	0.004	306.10	1.526s
ZR-95	3025.11	756.73	150.	-31.	-0.017	73.40	1.534s
AG-110M	3053.97	763.94	198.	-15.	-0.008	150.17	1.539s
NB-95	3061.35	765.79	212.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	224.	-7.	-0.004	317.52	1.541s
Mo-99	3109.88	777.92	184.	0.	0.000	1000.00	1.550s
EU-152	3113.88	778.92	155.	7.	0.004	254.35	1.551s
CS-134	3181.69	795.87	280.	-5.	-0.003	491.77	1.564
TL-210	3196.61	799.60	257.	3.	0.002	802.64	1.567s
CS-134	3206.02	801.95	261.	8.	0.005	282.03	1.569s
CO-58	3241.32	810.78	321.	-29.	-0.016	89.32	1.575s
La-140	3261.30	815.77	278.	-12.	-0.006	206.74	1.579s
Cs-136	3272.22	818.50	365.	-5.	-0.003	542.22	1.581s
Br-82	3309.39	827.79	196.	-30.	-0.017	100.66	1.589s
MN-54	3337.63	834.85	89.	12.	0.007	162.99	1.594s
Co-56	3385.32	846.77	169.	-20.	-0.011	114.29	1.603
TL-208	3440.51	860.56	98.	54.	0.030	41.29	1.614s
NB-94	3482.65	871.10	158.	28.	0.016	66.00	1.621s
Ge-69	3486.26	872.00	187.	23.	0.013	84.83	1.622s
EU-154	3491.19	873.23	208.	-7.	-0.004	308.14	1.623
PA-234	3520.39	880.53	329.	30.	0.017	87.50	1.628s
PA-234	3531.23	883.24	297.	28.	0.016	87.95	1.630s
AG-110M	3537.01	884.68	342.	-17.	-0.010	151.63	1.632s
Sc-46	3555.40	889.28	322.	29.	0.016	89.55	1.635s
Y-88	3590.45	898.04	234.	18.	0.010	125.89	1.642
Lu-172	3601.05	900.69	265.	-10.	-0.005	240.17	1.644s
AC-228	3642.58	911.07	190.	17.	0.009	179.90	1.651s
AG-110M	3748.30	937.49	140.	53.	0.029	51.35	1.671s
V-48	3775.54	944.30	241.	2.	0.001	942.53	1.676

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3782.30	945.99	125.	65.	0.036	41.35	1.960s
EU-152	3854.81	964.11	228.	18.	0.010	117.62	1.691s
AC-228	3874.26	968.97	337.	-32.	-0.018	83.03	1.694s
V-48	3932.40	983.50	140.	9.	0.005	290.95	1.705s
EU-154	3983.73	996.33	315.	8.	0.004	315.73	1.714s
PA-234M	4002.41	1001.00	326.	-4.	-0.002	766.43	1.718s
EU-154	4017.53	1004.77	403.	-36.	-0.020	79.70	1.721s
Co-56	4149.84	1037.84	625.	-38.	-0.021	70.10	1.745
Br-82	4174.49	1044.00	386.	-30.	-0.016	95.58	1.749s
Cs-136	4190.32	1047.95	70.	111.	0.062	21.87	2.059s
RH-106	4199.94	1050.36	404.	-22.	-0.012	120.13	1.754s
BI-207	4253.17	1063.66	130.	8.	0.004	331.59	1.763s
Ga-68	4308.15	1077.40	185.	-38.	-0.021	81.37	1.773
Lu-172	4373.14	1093.64	246.	-22.	-0.012	105.50	1.785
FE-59	4395.60	1099.25	292.	-8.	-0.004	324.00	1.789s
Ge-69	4424.61	1106.50	452.	-34.	-0.019	91.10	1.794s
EU-152	4446.92	1112.07	433.	-21.	-0.012	117.61	1.798s
BI-214	4479.78	1120.29	226.	-14.	-0.008	88.76	1.803s
Sc-46	4480.84	1120.55	140.	17.	0.009	102.29	1.804s
Ta-182	4483.84	1121.30	124.	16.	0.009	98.38	1.804s
CO-60	4692.44	1173.42	98.	2298.	1.276	2.40	1.883s
Ta-182	4884.51	1221.41	21.	13.	0.007	85.14	1.874s
Co-56	4952.04	1238.28	11.	9.	0.005	88.09	1.886s
NA-22	5097.14	1274.53	27.	-5.	-0.003	163.20	1.910
EU-154	5097.18	1274.54	31.	0.	0.000	1000.00	1.910
FE-59	5165.45	1291.60	21.	-3.	-0.002	319.69	1.922s
V-48	5245.52	1311.60	35.	8.	0.004	115.44	1.935s
TL-210	5251.13	1313.00	43.	0.	0.000	1000.00	1.936s
Br-82	5268.86	1317.43	72.	-18.	-0.010	71.20	1.939s
CO-60	5330.35	1332.79	30.	1963.	1.091	2.39	1.988
AG-110M	5536.55	1384.30	17.	-3.	-0.002	327.45	1.984s
K-40	5842.95	1460.83	25.	-5.	-0.003	203.94	2.033s
Br-82	5899.20	1474.88	6.	4.	0.002	137.50	2.042s
La-140	6385.01	1596.21	25.	-15.	-0.008	70.74	2.119s
SB-124	6764.54	1690.98	6.	1.	0.001	600.00	2.176s
BI-214	7058.94	1764.49	13.	4.	0.002	157.08	2.219s
Y-88	7345.60	1836.06	0.	8.	0.004	35.36	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.1467E+00				5.31E+01	
			477.60	4.147E+00	?(	5.401E+01 3.89E+02 1.05E+01	G
NA-22	C	-3.8745E-01				9.50E+02	
			1274.53	-3.874E-01	?(	2.223E+00 1.63E+02 9.99E+01	G
K-40	N	-4.3575E+00				4.66E+11	
			1460.83	-4.358E+00	&(P	2.257E+01 2.04E+02 1.07E+01	G
Sc-46	F	1.5495E+00				8.38E+01	
			889.28	1.834E+00	?(	5.465E+00 8.96E+01 1.00E+02	G
			1120.55	1.265E+00	?(	4.345E+00 1.02E+02 1.00E+02	G
CR-51	F	2.5200E+00				2.77E+01	
			320.08	2.520E+00	?(	4.360E+01 5.17E+02 9.94E+00	G
MN-54	C	7.5136E-01				3.12E+02	
			834.85	7.514E-01	?(	2.813E+00 1.63E+02 1.00E+02	G
FE-59	F	-9.8322E-01				4.45E+01	
			1099.25	-9.832E-01	?(	1.079E+01 3.24E+02 5.65E+01	G
			1291.60	-6.470E-01	+	4.703E+00 3.20E+02 4.32E+01	G
Co-56	C	-2.8929E-01				7.73E+01	
			846.77	-1.222E+00	?(P	3.863E+00 1.14E+02 9.99E+01	G
			1238.28	1.121E+00	?(P	2.215E+00 8.81E+01 6.61E+01	G
			1037.84	-1.922E+01	+ P	5.984E+01 7.01E+01 1.41E+01	G
			1771.35	-3.522E-01	%	1.564E+01 1.19E+03 1.55E+01	A
CO-57	C	4.2951E-01				2.72E+02	
			122.06	4.295E-01	?(	2.954E+00 2.06E+02 8.56E+01	G
			136.47	-1.198E-06	&	3.813E+01 9.55E+08 1.07E+01	G
CO-58	C	-1.7217E+00				7.09E+01	
			810.78	-1.722E+00	?(	5.117E+00 8.93E+01 9.95E+01	G
CO-60	F	1.7387E+02				1.93E+03	
			1332.50	1.688E+02	(P	2.409E+00 2.39E+00 1.00E+02	G
			1173.24	1.790E+02	@(	3.796E+00 2.40E+00 9.99E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F -7.3261E-02					2.44E+02	
		1115.55	-7.326E-02	%(P	1.510E+01	5.11E+03	5.06E+01 G
ZR-95	I -3.1857E+00					6.40E+01	
		756.73	-3.186E+00	?(P	6.164E+00	7.34E+01	5.45E+01 G
		724.20	-7.061E-02	% P	9.867E+00	3.78E+03	4.42E+01 G
RU-103	I 1.6246E+00					3.93E+01	
		497.05	1.625E+00	&(P	3.560E+00	9.42E+01	9.09E+01 G
		610.30	-9.947E+00	&	1.104E+02	3.31E+02	5.75E+00 GA
RH-106	I 1.0097E+01					3.74E+02	
		621.92	1.010E+01	(	3.632E+01	1.07E+02	9.93E+00 G
		1050.36	-1.027E+02	+ P	4.424E+02	1.20E+02	1.56E+00 G
		511.86	1.433E+01	?	3.583E+01	7.56E+01	2.00E+01 GA
AG-108M	C -1.1192E+00					1.53E+05	
		433.94	-1.119E+00	&(P	4.124E+00	1.56E+02	9.05E+01 G
		722.94	-4.115E-02	&	4.779E+00	3.41E+03	9.08E+01 G
		614.28	1.020E-07	&	7.049E+00	2.05E+09	8.98E+01 G
AG-110M	F 3.5387E+00					2.50E+02	
		657.76	1.167E+00	?(	2.048E+01	5.29E+02	9.46E+01 G
		884.68	-1.515E+00	&	7.710E+00	1.52E+02	7.27E+01 G
		937.49	1.007E+01	&(P	1.109E+01	5.14E+01	3.44E+01 G
		1384.30	-1.094E+00	+	7.995E+00	3.27E+02	2.43E+01 G
		763.94	-3.840E+00	+ P	1.733E+01	1.50E+02	2.23E+01 G
SN-113	F 1.1297E+00					1.15E+02	
		391.69	1.130E+00	&(P	7.609E+00	2.02E+02	6.40E+01 G
SB-124	F -1.5156E+00					6.02E+01	
		602.73	-1.516E+00	?(	6.677E+00	1.32E+02	9.83E+01 G
		1690.98	2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
		722.79	-1.488E+01	&	3.800E+01	7.69E+01	1.08E+01 G
SB-125	I 4.4642E+00					1.01E+03	
		427.88	-5.718E-03	%(P	1.191E+01	9.24E+04	2.96E+01 G
		600.50	-8.304E+00	+	3.729E+01	1.35E+02	1.79E+01 G
		635.89	-1.115E+01	& P	2.796E+01	8.45E+01	1.13E+01 G
		463.37	1.710E+01	&(	5.097E+01	8.99E+01	1.05E+01 G
I-131	I 2.7305E+00					8.02E+00	
		364.48	1.490E+00	(	3.993E+00	8.08E+01	8.17E+01 G
		284.30	1.732E+01	*(	6.289E+01	1.09E+02	6.14E+00 G
		636.97	4.364E+00	?(	4.898E+01	3.30E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	-3.0818E+00					2.42E+02	
			97.50	-3.082E+00	&(	1.773E+01	1.74E+02	3.00E+01 G
			103.20	-4.234E+00	+	2.386E+01	1.70E+02	2.18E+01 G
Ga-68	C	-9.9464E+01					4.71E-02	
			1077.40	-9.946E+01	?(	1.753E+02	8.14E+01	3.30E+00 G
Tc-99m	I	-9.8581E-01					2.51E-01	
								Energy duplication
			140.51	-9.858E-01	?(	3.606E+00	1.10E+02	8.93E+01 G
BA-133	F	-1.8080E+00					3.85E+03	
			356.00	-1.808E+00	?(	6.592E+00	1.10E+02	6.20E+01 G
			302.85	-2.303E-06	%	3.402E+01	4.43E+08	1.83E+01 G
			383.84	-1.663E+01	& P	5.233E+01	7.96E+01	8.94E+00 GA
			80.99	2.386E+00	&	1.771E+01	2.24E+02	3.41E+01 GA
CS-134	I	7.8339E-01					7.54E+02	
			795.87	-3.162E-01	?(P	5.494E+00	4.92E+02	8.55E+01 G
			604.71	-1.531E+00	+	6.587E+00	1.29E+02	9.76E+01 G
			569.32	4.229E+00	?(	2.662E+01	1.87E+02	1.54E+01 G
			801.95	5.507E+00	(	5.261E+01	2.82E+02	8.69E+00 G
			563.24	-2.214E+00	& P	3.655E+01	7.52E+02	8.35E+00 G
CS-137	I	3.8281E+02					1.10E+04	
			661.66	3.828E+02	(	3.878E+00	1.35E+00	8.52E+01 G
CE-139	F	-4.4033E-01					1.38E+02	
			165.85	-4.403E-01	(	3.485E+00	2.37E+02	7.99E+01 G
Ba-140	I	4.2421E+00					1.28E+01	
			537.26	1.909E+00	*(P	1.296E+01	2.88E+02	2.44E+01 G
			162.66	1.339E+01	&(	4.430E+01	9.97E+01	6.22E+00 G
			304.85	-9.891E-06	%	1.461E+02	4.43E+08	4.29E+00 G
La-140	I	-2.5815E-01					1.28E+01	
			1596.21	-1.522E+00	?(P	2.695E+00	7.07E+01	9.54E+01 G
			487.02	-3.673E+00	+	1.278E+01	1.05E+02	4.55E+01 G
			328.76	5.680E+00	?(P	2.702E+01	1.43E+02	2.03E+01 G
			815.77	-2.935E+00	+	2.048E+01	2.07E+02	2.33E+01 G
CE-141	I	1.7259E+00					3.25E+01	
			145.44	1.726E+00	&(	6.201E+00	1.08E+02	4.82E+01 G
CE-144	I	-1.2380E+00					2.85E+02	
			133.54	-1.238E+00	(	3.643E+01	8.84E+02	1.11E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	1.3473E+00					3.63E+02	
			696.54	1.350E+00	&(	3.694E+00	8.22E+01	9.90E+01 G
			618.06	1.344E+00	&(P	3.493E+00	7.82E+01	9.91E+01 G
EU-152	F	3.6327E+00					4.94E+03	
			121.78	0.000E+00	?(	9.526E+00	1.00E+03	2.86E+01 G
			344.29	-5.444E+00	+ P	2.412E+01	1.22E+02	2.65E+01 G
			1112.07	-1.176E+01	+ P	5.459E+01	1.18E+02	1.36E+01 G
			778.92	3.102E+00	?(	2.691E+01	2.54E+02	1.29E+01 G
			964.11	8.505E+00	&(	3.356E+01	1.18E+02	1.46E+01 G
			244.69	8.847E+00	?(	5.737E+01	1.95E+02	7.58E+00 G
			1408.00	-1.903E-01	% P	9.480E+00	1.06E+04	2.10E+01 GA
EU-154	I	9.5962E-01					3.14E+03	
			123.10	-1.404E-01	%(	6.355E+00	1.35E+03	4.08E+01 G
			1274.54	0.000E+00	+	6.790E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	2.150E+01	1.00E+03	2.02E+01 G
			873.23	-3.390E+00	&	3.553E+01	3.08E+02	1.23E+01 G
			1004.77	-1.399E+01	+	3.699E+01	7.97E+01	1.80E+01 G
			996.33	5.193E+00	?(	5.544E+01	3.16E+02	1.06E+01 G
EU-155	I	6.8492E-01					1.81E+03	
			105.31	-2.631E+00	&(P	2.443E+01	5.27E+02	2.12E+01 G
			86.54	2.975E+00	?(	1.828E+01	1.85E+02	3.07E+01 G
Ta-182	F	3.6952E+00					1.14E+02	
			1121.30	3.555E+00	?(	1.174E+01	9.84E+01	3.49E+01 G
			1221.41	3.877E+00	&(	7.205E+00	8.51E+01	2.70E+01 G
			1189.05	-3.236E-01	&	1.864E+01	2.61E+03	1.62E+01 G
TL-208	N	4.9948E+00					6.98E+02	
			583.02	1.448E+00	(P	3.589E+00	1.05E+02	8.45E+01 G
			277.28	9.608E+00	(P	4.595E+01	1.43E+02	6.31E+00 G
			860.56	2.678E+01	(P	2.429E+01	4.13E+01	1.24E+01 G
PM-146	C	1.7995E+00					2.02E+03	
			453.88	2.108E+00	&(P	6.020E+00	1.18E+02	6.50E+01 G
			747.16	1.210E+00	@(P	8.532E+00	3.06E+02	3.40E+01 G
			735.72	-6.640E+00	+ P	1.824E+01	7.99E+01	2.25E+01 G
Y-88	F	1.0457E+00					1.07E+02	
			1836.06	9.082E-01	?(	8.367E-01	3.54E+01	9.92E+01 G
			898.04	1.191E+00	(P	5.036E+00	1.26E+02	9.37E+01 G
Cd-113m		1.2826E+04					5.33E+03	
			263.70	1.283E+04	?(	4.646E+04	1.09E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Se-75		3.3565E+00					1.20E+02	
			264.66	1.319E+00	&(	4.779E+00	1.09E+02	5.85E+01 G
			136.00	2.647E-01	&	6.990E+00	7.93E+02	5.83E+01 G
			279.54	6.758E-01	}	1.267E+01	3.73E+02	2.48E+01 G
			121.12	-5.713E-01	-	1.583E+01	8.28E+02	1.71E+01 G
			400.66	1.220E+01	(	2.816E+01	6.98E+01	1.14E+01 G
			96.73	8.817E+00	(	4.524E+01	1.53E+02	3.42E+00 G
Cf-251	T	4.8721E+00					3.28E+05	
			176.60	4.872E+00	*(	1.220E+01	9.92E+01	1.70E+01 G
			227.00	1.010E+01	&	4.977E+01	1.48E+02	6.30E+00 GA
Cf-249	T	3.1038E+00					1.28E+05	
			387.95	2.003E+00	(	6.541E+00	9.83E+01	6.60E+01 G
			333.44	7.787E+00	*(	3.620E+01	1.40E+02	1.55E+01 G
Sn-126		-2.2653E+01					3.65E+07	
			87.57	0.000E+00	+	1.499E+01	1.00E+03	3.75E+01 GA
			64.28	-2.265E+01	&(	1.625E+02	2.17E+02	9.70E+00 G
			86.94	2.232E-01	&	6.231E+01	8.40E+03	9.04E+00 GA
PB-210	N	1.1370E+04					8.14E+03	
			46.54	1.137E+04	(P	2.411E+02	1.22E+00	4.25E+00 G
PB-212	N	5.8916E+00					6.98E+02	
			238.63	5.892E+00	(P	4.246E+00	2.32E+01	4.33E+01 G
			300.03	3.291E+01	+ P	1.830E+02	1.67E+02	3.28E+00 GA
PB-214	N	2.3946E+00					5.84E+05	
			351.93	1.011E+00	&(P	9.841E+00	2.90E+02	3.76E+01 G
			295.09	5.091E+00	?(P	3.139E+01	1.86E+02	1.93E+01 G
			242.00	1.453E+01	?	6.036E+01	1.25E+02	7.43E+00 GA
BI-207	C	-1.5950E+00					1.18E+04	
			569.70	-1.595E+00	?(	4.001E+00	7.57E+01	9.77E+01 G
			1063.66	7.381E-01	& P	5.423E+00	3.32E+02	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	5.785E+01	7.07E+03	7.55E+00 G
			785.42	-4.962E+00	% P	2.696E+02	2.07E+03	1.28E+00 GA
BI-214	N	8.5283E+00					5.84E+05	
			609.31	8.528E+00	(P	4.862E+00	1.98E+01	4.61E+01 G
			1120.29	-6.983E+00	- P	3.621E+01	8.88E+01	1.51E+01 G
			1764.49	2.490E+00	- P	1.398E+01	1.57E+02	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	-2.1484E+00					1.10E+09	
			265.83	-2.148E+00	(	6.215E+00	8.72E+01	5.00E+01 G
			304.90	1.515E-06	&	2.239E+01	4.43E+08	2.80E+01 G
AC-228	N	5.6304E+00					2.10E+03	
			911.07	3.774E+00	(	1.486E+01	1.80E+02	2.90E+01 G
			968.97	-1.235E+01	&	3.407E+01	8.30E+01	1.75E+01 G
			338.32	1.011E+01	(P	4.790E+01	1.43E+02	1.20E+01 G
			93.35	-1.670E+01	&	9.702E+01	1.75E+02	5.56E+00 XA
TH-227	N	4.6892E+00					7.95E+03	
			256.24	-2.134E+00	&(P	3.746E+01	4.18E+02	7.00E+00 G
			235.97	8.572E+00	(	3.572E+01	1.26E+02	1.23E+01 G
			50.14	-4.490E+01	&	2.539E+02	1.71E+02	8.00E+00 G
TH-229	N	2.1946E+01					2.68E+06	
			193.51	2.195E+01	&(P	5.432E+01	9.82E+01	4.40E+00 G
			210.85	-3.695E+01	+ P	8.927E+01	9.09E+01	2.99E+00 G
TH-234	N	-7.9314E+00					1.63E+12	
			92.59	-7.931E+00	?(P	9.936E+01	6.76E+02	5.58E+00 G
			63.29	-6.898E+01	+ P	4.147E+02	1.39E+02	3.81E+00 G
PA-231	N	3.0260E+01					1.20E+07	
			302.65	1.788E+01	?(	2.156E+02	3.62E+02	2.88E+00 G
			300.07	4.475E+01	?(	2.462E+02	1.66E+02	2.46E+00 G
PA-233	C	3.2133E+00					7.82E+08	
			312.01	7.080E-01	?(	1.216E+01	5.13E+02	3.60E+01 G
			300.18	1.776E+01	?(	9.861E+01	1.67E+02	6.20E+00 G
PA-234	N	1.2762E+01					1.63E+12	
			131.29	-4.568E+00	&(	2.255E+01	1.49E+02	1.80E+01 G
			946.02	3.187E+01	@(P	2.713E+01	4.14E+01	1.34E+01 G
			569.47	0.000E+00	-	5.092E+01	1.00E+03	8.20E+00 G
			883.24	1.858E+01	?(	5.438E+01	8.79E+01	9.60E+00 G
			880.53	3.135E+01	&	9.124E+01	8.75E+01	6.00E+00 GA
PA-234M	N	-2.8871E+01					1.63E+12	
			1001.00	-2.887E+01	&(P	7.169E+02	7.66E+02	8.37E-01 G
			766.41	-1.381E+02	+ P	1.396E+03	3.18E+02	2.94E-01 G
U-235	N	1.5884E+00					2.57E+11	
			143.79	0.000E+00	&(	2.911E+01	1.00E+03	1.10E+01 G
			205.33	-1.075E+01	+ P	5.101E+01	1.83E+02	5.01E+00 G
			163.38	5.015E+00	?(	5.553E+01	3.31E+02	5.08E+00 G
			185.72	-3.413E-01	+	6.008E+00	5.27E+02	5.40E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T	1.2492E+03					1.58E+05	
			59.54	1.249E+03	(	1.645E+01	9.02E-01	3.59E+01 G
Np-237	F	6.9735E+00					2.14E+06	
			86.49	6.974E+00	?(	4.262E+01	1.84E+02	1.31E+01 G
Ir-192	F	5.4686E-01					7.40E+01	
			316.49	0.000E+00	?(	5.108E+00	1.00E+03	8.70E+01 G
			468.06	1.467E+00	&(	1.016E+01	2.07E+02	5.18E+01 G
			308.44	-1.349E-06	&	1.993E+01	4.43E+08	3.18E+01 G
Cs-136	F	3.8150E+00					1.30E+01	
			818.50	-2.975E-01	&(	5.458E+00	5.42E+02	1.00E+02 G
			1048.07	9.916E+00	*(	3.725E+00	2.19E+01	8.00E+01 G
			340.57	2.177E+00	?(	1.240E+01	1.71E+02	4.69E+01 G
Np-239	T	-4.1529E+00					2.36E+00	
			103.70	-1.139E+00	&	2.167E+01	5.73E+02	2.40E+01 X
			106.13	-4.153E+00	?(	2.344E+01	1.70E+02	2.27E+01 G
			99.50	-6.160E+00	&	3.504E+01	1.72E+02	1.50E+01 X
Nd-147		1.0096E+01					1.11E+01	
			531.00	1.010E+01	*(	2.435E+01	7.28E+01	1.30E+01 G
			91.10	0.000E+00	-	1.964E+01	1.00E+03	2.83E+01 G
Mo-99	I	1.2505E+01					2.75E+00	
			739.50	1.250E+01	?(	3.274E+01	7.88E+01	1.21E+01 G
			181.07	-4.893E+00	&	5.279E+01	3.23E+02	5.99E+00 G
								Energy duplication
			140.51	-1.235E+00	%	6.997E+01	1.70E+03	4.52E+00 G
			777.92	0.000E+00	-	8.871E+01	1.00E+03	4.26E+00 G
			366.42	-1.082E+02	&	3.172E+02	8.83E+01	1.19E+00 GA
Ge-69	C	-2.9317E+00					1.62E+00	
			1106.50	-9.671E+00	(	2.929E+01	9.11E+01	2.60E+01 G
			574.00	3.113E+00	+	3.709E+01	3.53E+02	1.18E+01 G
			872.00	1.534E+01	(	4.336E+01	8.48E+01	9.59E+00 G
Br-82	F	8.1503E-01					1.47E+00	
			776.50	2.301E-02	%(	4.546E+00	5.75E+03	8.34E+01 G
			554.34	1.542E+00	(	4.862E+00	9.45E+01	7.06E+01 G
			619.10	6.010E-01	?(	8.565E+00	4.19E+02	4.31E+01 G
			1044.00	-7.579E+00	+	2.412E+01	9.56E+01	2.80E+01 G
			698.36	7.017E-01	?(	1.398E+01	5.84E+02	2.79E+01 G
			1317.43	-5.664E+00	+	1.339E+01	7.12E+01	2.70E+01 G
			827.79	-7.481E+00	+	1.694E+01	1.01E+02	2.42E+01 G
			1474.88	2.449E+00	?(	7.801E+00	1.37E+02	1.66E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

V-48     C   6.8849E-01                                      1.61E+01
                          983.50 6.133E-01 ?(  3.942E+00 2.91E+02 1.00E+02 G
                         1311.60 6.640E-01 &(  2.634E+00 1.15E+02 9.80E+01 G
                          944.30 1.929E+00  (  6.199E+01 9.43E+02 8.00E+00 G

Sr-85    C  -1.6704E+00                                      6.47E+01
                          513.99-1.670E+00 *(  4.779E+00 8.62E+01 9.93E+01 G

Rb-83    P   1.1334E+00                                      8.62E+01
                          520.35 1.133E+00 &(  6.920E+00 2.59E+02 4.61E+01 G
                          529.54-3.269E+00 +   1.254E+01 1.15E+02 3.00E+01 G
                          552.50-3.901E+00 &   2.143E+01 1.63E+02 1.63E+01 G

Cm-247   T   1.8662E+00                                      5.70E+09
                          402.40 1.866E+00 ?(  4.909E+00 7.93E+01 7.20E+01 G
                           84.00-1.128E-06 %   2.595E+01 6.93E+08 2.30E+01 G

Lu-172      -2.1086E+00                                      7.00E+01
                         1093.64-2.109E+00 &(  7.441E+00 1.06E+02 7.52E+01 G
                          900.69-2.227E+00 +   1.809E+01 2.40E+02 2.77E+01 G
                          181.47 0.000E+00 +   1.638E+01 1.00E+03 1.92E+01 G

Kr-85m   I  -1.1194E+00                                      1.87E-01
                          151.00-1.119E+00 ?(  3.091E+00 1.10E+02 7.55E+01 G
                          304.47 3.172E-06 %   4.687E+01 4.43E+08 1.40E+01 G

NB-94    I  -1.6599E+00                                      7.41E+06
                          702.63-1.660E+00 ?(P 4.681E+00 7.08E+01 9.79E+01 G
                          871.10 1.755E+00 + P 3.826E+00 6.60E+01 9.99E+01 G

TL-210   N   7.0321E-01                                      5.84E+05
                          799.60 1.674E-01 ?(  4.576E+00 8.03E+02 9.90E+01 G
                          296.00 1.374E+00 &(  7.447E+00 1.63E+02 7.90E+01 G
                         1313.00 0.000E+00 -   1.346E+01 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	25652.	-132.	-0.074	171.18	-4.490E+01	
TH-234	63.29	28252.	-131.	-0.073	138.62	-6.898E+01	P
Sn-126	64.28	28852.	-111.	-0.062	217.19	-2.265E+01	
BA-133	80.99	5537.	47.	0.026	224.00	2.386E+00	
Np-237	86.49	4983.	54.	0.030	184.45	6.974E+00	
EU-155	86.54	5038.	54.	0.030	185.45	2.975E+00	
TH-234	92.59	5120.	-27.	-0.015	675.91	-7.931E+00	P
AC-228	93.35	4858.	-56.	-0.031	175.35	-1.670E+01	
Gd-153	97.50	4802.	-57.	-0.031	173.66	-3.082E+00	
Np-239	99.50	4710.	-57.	-0.032	171.69	-6.160E+00	
Gd-153	103.20	4654.	-57.	-0.032	170.07	-4.234E+00	
Np-239	103.70	4652.	-17.	-0.009	572.92	-1.139E+00	
EU-155	105.31	4627.	-34.	-0.019	526.77	-2.631E+00	P
Np-239	106.13	4884.	-58.	-0.032	170.41	-4.153E+00	
CO-57	122.06	1064.	22.	0.013	206.15	4.295E-01	
HF-181	133.02	2645.	-50.	-0.028	147.24	-1.908E+00	
CE-144	133.54	2645.	-8.	-0.005	883.76	-1.238E+00	
Tc-99m	140.51	1508.	-50.	-0.028	110.27	-9.858E-01	
CE-141	145.44	1356.	49.	0.027	108.29	1.726E+00	
Kr-85m	151.00	722.	-46.	-0.026	109.51	-1.119E+00	
Ba-140	162.66	1039.	46.	0.026	99.69	1.339E+01	
U-235	163.38	1085.	14.	0.008	331.23	5.015E+00	
CE-139	165.85	1040.	-19.	-0.011	237.03	-4.403E-01	
Cf-251	176.60	532.	44.	0.024	99.22	4.872E+00	
Mo-99	181.07	1219.	-15.	-0.009	323.07	-4.893E+00	
U-235	185.72	1246.	-10.	-0.005	526.58	-3.413E-01	
TH-229	193.51	635.	49.	0.027	98.19	2.195E+01	P
U-235	205.33	672.	-26.	-0.014	183.12	-1.075E+01	P
TH-229	210.85	708.	-52.	-0.029	90.93	-3.695E+01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Cf-251	227.00	884.	29.	0.016	147.89	1.010E+01	
TH-227	235.97	1658.	46.	0.026	125.53	8.572E+00	
EU-152	244.69	1537.	29.	0.016	194.83	8.847E+00	
TH-227	256.24	510.	-6.	-0.003	418.48	-2.134E+00	P
BI-210M	265.83	682.	-43.	-0.024	87.22	-2.148E+00	
I-131	284.30	955.	40.	0.022	109.27	1.732E+01	
TL-210	296.00	2106.	40.	0.022	163.15	1.374E+00	
PA-231	300.07	2186.	40.	0.022	165.70	4.475E+01	
PA-233	300.18	2226.	40.	0.022	167.19	1.776E+01	
PA-231	302.65	2266.	19.	0.010	362.12	1.788E+01	
PA-233	312.01	1062.	9.	0.005	513.16	7.080E-01	
CR-51	320.08	998.	9.	0.005	516.70	2.520E+00	
La-140	328.76	1543.	39.	0.022	143.16	5.680E+00	P
Cf-249	333.44	1582.	40.	0.022	139.95	7.787E+00	
AC-228	338.32	1623.	40.	0.022	142.57	1.011E+01	P
EU-152	344.29	1954.	-47.	-0.026	121.73	-5.444E+00	P
HF-181	345.83	1811.	-44.	-0.024	137.93	-8.952E+00	
BA-133	356.00	747.	-36.	-0.020	109.63	-1.808E+00	
I-131	364.48	452.	38.	0.021	80.79	1.490E+00	
Mo-99	366.42	604.	-40.	-0.022	88.34	-1.082E+02	
BA-133	383.84	869.	-45.	-0.025	79.56	-1.663E+01	P
Cf-249	387.95	725.	39.	0.022	98.30	2.003E+00	
Cm-247	402.40	453.	39.	0.022	79.35	1.866E+00	
AG-108M	433.94	449.	-28.	-0.015	156.24	-1.119E+00	P
PM-146	453.88	460.	36.	0.020	118.01	2.108E+00	P
SB-125	463.37	840.	46.	0.026	89.88	1.710E+01	
Ir-192	468.06	802.	19.	0.011	207.19	1.467E+00	
BE-7	477.60	910.	11.	0.006	389.00	4.147E+00	
La-140	487.02	925.	-42.	-0.023	104.77	-3.673E+00	
RU-103	497.05	269.	36.	0.020	94.18	1.625E+00	P
RH-106	511.86	1308.	69.	0.038	75.64	1.433E+01	
Sr-85	513.99	561.	-40.	-0.022	86.22	-1.670E+00	
Rb-83	520.35	243.	12.	0.007	259.39	1.133E+00	
Rb-83	529.54	332.	-23.	-0.013	114.75	-3.269E+00	
Nd-147	531.00	231.	30.	0.017	72.80	1.010E+01	
Ba-140	537.26	226.	11.	0.006	287.80	1.909E+00	P
Rb-83	552.50	266.	-14.	-0.008	163.17	-3.901E+00	
Br-82	554.34	252.	24.	0.014	94.52	1.542E+00	
CS-134	563.24	195.	-4.	-0.002	751.55	-2.214E+00	P
CS-134	569.32	353.	14.	0.008	187.16	4.229E+00	
BI-207	569.70	320.	-34.	-0.019	75.67	-1.595E+00	
Ge-69	574.00	395.	8.	0.004	353.11	3.113E+00	
SB-125	600.50	880.	-31.	-0.017	134.85	-8.304E+00	
SB-124	602.73	849.	-31.	-0.017	132.29	-1.516E+00	
CS-134	604.71	810.	-31.	-0.017	129.19	-1.531E+00	
RU-103	610.30	779.	-12.	-0.007	331.34	-9.947E+00	
PM-144	618.06	219.	28.	0.015	78.25	1.344E+00	P
Br-82	619.10	247.	5.	0.003	419.31	6.010E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
RH-106	621.92	236.	21.	0.011	107.47	1.010E+01	
SB-125	635.89	174.	-26.	-0.014	84.49	-1.115E+01	P
I-131	636.97	215.	6.	0.004	330.07	4.364E+00	
AG-110M	657.76	6661.	22.	0.012	529.08	1.167E+00	
PM-144	696.54	204.	25.	0.014	82.21	1.350E+00	
Br-82	698.36	229.	4.	0.002	584.45	7.017E-01	
NB-94	702.63	321.	-31.	-0.017	70.80	-1.660E+00	P
SB-124	722.79	245.	-30.	-0.016	76.95	-1.488E+01	
PM-146	735.72	238.	-27.	-0.015	79.93	-6.640E+00	P
Mo-99	739.50	220.	27.	0.015	78.80	1.250E+01	
PM-146	747.16	113.	7.	0.004	306.10	1.210E+00	P
ZR-95	756.73	150.	-31.	-0.017	73.40	-3.186E+00	P
AG-110M	763.94	198.	-15.	-0.008	150.17	-3.840E+00	P
PA-234M	766.41	224.	-7.	-0.004	317.52	-1.381E+02	P
EU-152	778.92	155.	7.	0.004	254.35	3.102E+00	
CS-134	795.87	280.	-5.	-0.003	491.77	-3.162E-01	P
TL-210	799.60	257.	3.	0.002	802.64	1.674E-01	
CS-134	801.95	261.	8.	0.005	282.03	5.507E+00	
CO-58	810.78	321.	-29.	-0.016	89.32	-1.722E+00	
La-140	815.77	278.	-12.	-0.006	206.74	-2.935E+00	
Br-82	827.79	196.	-30.	-0.017	100.66	-7.481E+00	
MN-54	834.85	89.	12.	0.007	162.99	7.514E-01	
Co-56	846.77	169.	-20.	-0.011	114.29	-1.222E+00	P
NB-94	871.10	158.	28.	0.016	66.00	1.755E+00	P
Ge-69	872.00	187.	23.	0.013	84.83	1.534E+01	
EU-154	873.23	208.	-7.	-0.004	308.14	-3.390E+00	
AG-110M	884.68	342.	-17.	-0.010	151.63	-1.515E+00	
Sc-46	889.28	322.	29.	0.016	89.55	1.834E+00	
Lu-172	900.69	265.	-10.	-0.005	240.17	-2.227E+00	
AC-228	911.07	190.	17.	0.009	179.90	3.774E+00	
AG-110M	937.49	140.	53.	0.029	51.35	1.007E+01	P
EU-152	964.11	228.	18.	0.010	117.62	8.505E+00	
AC-228	968.97	337.	-32.	-0.018	83.03	-1.235E+01	
EU-154	996.33	315.	8.	0.004	315.73	5.193E+00	
PA-234M	1001.00	326.	-4.	-0.002	766.43	-2.887E+01	P
EU-154	1004.77	403.	-36.	-0.020	79.70	-1.399E+01	
Co-56	1037.84	625.	-38.	-0.021	70.10	-1.922E+01	P
Br-82	1044.00	386.	-30.	-0.016	95.58	-7.579E+00	
RH-106	1050.36	404.	-22.	-0.012	120.13	-1.027E+02	P
BI-207	1063.66	130.	8.	0.004	331.59	7.381E-01	P
Ga-68	1077.40	185.	-38.	-0.021	81.37	-9.946E+01	
Lu-172	1093.64	246.	-22.	-0.012	105.50	-2.109E+00	
FE-59	1099.25	292.	-8.	-0.004	324.00	-9.832E-01	
Ge-69	1106.50	452.	-34.	-0.019	91.10	-9.671E+00	
EU-152	1112.07	433.	-21.	-0.012	117.61	-1.176E+01	P
Sc-46	1120.55	140.	17.	0.009	102.29	1.265E+00	
Ta-182	1121.30	124.	16.	0.009	98.38	3.555E+00	
Ta-182	1221.41	21.	13.	0.007	85.14	3.877E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	1238.28	11.	9.	0.005	88.09	1.121E+00	P
NA-22	1274.53	27.	-5.	-0.003	163.20	-3.874E-01	
FE-59	1291.60	21.	-3.	-0.002	319.69	-6.470E-01	
Br-82	1317.43	72.	-18.	-0.010	71.20	-5.664E+00	
AG-110M	1384.30	17.	-3.	-0.002	327.45	-1.094E+00	
K-40	1460.83	25.	-5.	-0.003	203.94	-4.358E+00	P
Br-82	1474.88	6.	4.	0.002	137.50	2.449E+00	
La-140	1596.21	25.	-15.	-0.008	70.74	-1.522E+00	P
SB-124	1690.98	6.	1.	0.001	600.00	2.190E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.1466E+00	4.1467E+00	3.890E+02%	5.40E+01
NA-22	#A	-3.8745E-01	-3.8745E-01	1.632E+02%	2.22E+00
K-40	#A	-4.3575E+00	-4.3575E+00	2.039E+02%	2.26E+01
Sc-46	#A	1.5495E+00	1.5495E+00	6.798E+01%	5.46E+00
CR-51	#A	2.5198E+00	2.5200E+00	5.167E+02%	4.36E+01
MN-54	#A	7.5136E-01	7.5136E-01	1.630E+02%	2.81E+00
FE-59	#A	-9.8319E-01	-9.8322E-01	3.240E+02%	1.08E+01
Co-56	#A	-2.8929E-01	-2.8929E-01	7.215E+01%	3.86E+00
CO-57	#A	4.2950E-01	4.2951E-01	2.062E+02%	2.95E+00
CO-58	#A	-1.7216E+00	-1.7217E+00	8.932E+01%	5.12E+00
CO-60		1.7387E+02	1.7387E+02	1.693E+00%	2.41E+00
ZN-65	#A	-7.3260E-02	-7.3261E-02	5.108E+03%	1.51E+01
ZR-95	#A	-3.1857E+00	-3.1857E+00	7.340E+01%	6.16E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.00E+00
RU-103	#A	1.6245E+00	1.6246E+00	9.418E+01%	3.56E+00
RH-106	#A	1.0097E+01	1.0097E+01	1.075E+02%	3.63E+01
AG-108M	#A	-1.1192E+00	-1.1192E+00	1.562E+02%	4.12E+00
AG-110M	#A	3.5387E+00	3.5387E+00	5.135E+01%	2.05E+01
SN-113	#A	1.1297E+00	1.1297E+00	2.017E+02%	7.61E+00
SB-124	#A	-1.5156E+00	-1.5156E+00	1.323E+02%	6.68E+00
SB-125	#A	4.4642E+00	4.4642E+00	8.988E+01%	1.19E+01
I-131	#A	2.7300E+00	2.7305E+00	8.079E+01%	3.99E+00
Gd-153	#A	-3.0818E+00	-3.0818E+00	1.737E+02%	1.77E+01
Ga-68	#A	-9.6345E+01	-9.9464E+01	8.137E+01%	1.75E+02
Tc-99m	#A	-9.7993E-01	-9.8581E-01	1.103E+02%	3.61E+00
BA-133	#A	-1.8080E+00	-1.8080E+00	1.096E+02%	6.59E+00
CS-134	#A	7.8339E-01	7.8339E-01	1.872E+02%	5.49E+00
CS-137		3.8281E+02	3.8281E+02	1.346E+00%	3.88E+00
CE-139	#A	-4.4033E-01	-4.4033E-01	2.370E+02%	3.49E+00
Ba-140	#A	4.2416E+00	4.2421E+00	9.969E+01%	1.30E+01
La-140	#A	-2.5812E-01	-2.5815E-01	7.074E+01%	2.70E+00

CE-141 #A	1.7258E+00	1.7259E+00	1.083E+02%	6.20E+00
CE-144 #A	-1.2380E+00	-1.2380E+00	8.838E+02%	3.64E+01
PM-144 #A	1.3473E+00	1.3473E+00	5.675E+01%	3.69E+00
EU-152 #A	3.6327E+00	3.6327E+00	1.176E+02%	9.53E+00
EU-154 #A	9.5962E-01	9.5962E-01	3.157E+02%	6.36E+00
EU-155 #A	6.8492E-01	6.8492E-01	1.854E+02%	2.44E+01
HF-181 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.15E+00
Ta-182 #A	3.6952E+00	3.6952E+00	6.505E+01%	1.17E+01
Hg-203 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.59E+00
TL-208 #C	4.9948E+00	4.9948E+00	4.129E+01%	3.59E+00
PM-146 #A	1.7995E+00	1.7995E+00	1.180E+02%	6.02E+00
Y-88	1.0457E+00	1.0457E+00	3.536E+01%	8.37E-01
Cd-113m#A	1.2826E+04	1.2826E+04	1.088E+02%	4.65E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.48E+02
Se-75 A	3.3565E+00	3.3565E+00	6.678E+01%	4.78E+00
Cf-251 #A	4.8721E+00	4.8721E+00	9.922E+01%	1.22E+01
Cf-249 #A	3.1038E+00	3.1038E+00	8.551E+01%	6.54E+00
Sn-126 #A	-2.2653E+01	-2.2653E+01	2.172E+02%	1.63E+02
PB-210	1.1370E+04	1.1370E+04	1.218E+00%	2.41E+02
PB-212	5.8916E+00	5.8916E+00	2.320E+01%	4.25E+00
PB-214 #A	2.3946E+00	2.3946E+00	1.723E+02%	9.84E+00
BI-207 #A	-1.5950E+00	-1.5950E+00	7.567E+01%	4.00E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	7.065E+03%	5.78E+01
BI-214	8.5283E+00	8.5283E+00	1.975E+01%	4.86E+00
BI-210M#A	-2.1484E+00	-2.1484E+00	8.722E+01%	6.22E+00
AC-228 #A	5.6304E+00	5.6304E+00	1.148E+02%	1.49E+01
TH-227 #A	4.6892E+00	4.6892E+00	1.255E+02%	3.75E+01
TH-229 #A	2.1946E+01	2.1946E+01	9.819E+01%	5.43E+01
TH-234 #A	-7.9314E+00	-7.9314E+00	6.759E+02%	9.94E+01
PA-231 #A	3.0260E+01	3.0260E+01	1.657E+02%	2.16E+02
PA-233 #A	3.2133E+00	3.2133E+00	1.672E+02%	1.22E+01
PA-234 #A	1.2762E+01	1.2762E+01	4.135E+01%	2.25E+01
PA-234M#A	-2.8871E+01	-2.8871E+01	7.664E+02%	7.17E+02
U-235 #A	1.5884E+00	1.5884E+00	3.312E+02%	2.91E+01
AM-241	1.2492E+03	1.2492E+03	9.018E-01%	1.64E+01
Np-237 #A	6.9735E+00	6.9735E+00	1.845E+02%	4.26E+01
Ir-192 #A	5.4685E-01	5.4686E-01	2.072E+02%	5.11E+00
Cs-136 #A	3.8145E+00	3.8150E+00	2.187E+01%	5.46E+00
Np-239 #A	-4.1503E+00	-4.1529E+00	1.704E+02%	2.34E+01
Nd-147 #A	1.0095E+01	1.0096E+01	7.280E+01%	2.44E+01
Mo-99 #A	1.2498E+01	1.2505E+01	7.880E+01%	3.27E+01
Ge-69 #A	-2.9290E+00	-2.9317E+00	6.224E+01%	2.93E+01
Br-82 #A	8.1420E-01	8.1503E-01	9.452E+01%	4.55E+00
V-48 A	6.8843E-01	6.8849E-01	1.154E+02%	3.94E+00
Sr-85 #A	-1.6704E+00	-1.6704E+00	8.622E+01%	4.78E+00
Rb-83 #A	1.1333E+00	1.1334E+00	2.594E+02%	6.92E+00
Kr-85 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.06E+03
Cm-247 #A	1.8662E+00	1.8662E+00	7.935E+01%	4.91E+00
Hf-175 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.80E+00

Lu-172	#A	-2.1086E+00	-2.1086E+00	1.055E+02%	7.44E+00
Kr-85m	#A	-1.1104E+00	-1.1194E+00	1.095E+02%	3.09E+00
NB-94	#A	-1.6599E+00	-1.6599E+00	7.080E+01%	4.68E+00
TL-210	#A	7.0321E-01	7.0321E-01	1.631E+02%	4.58E+00

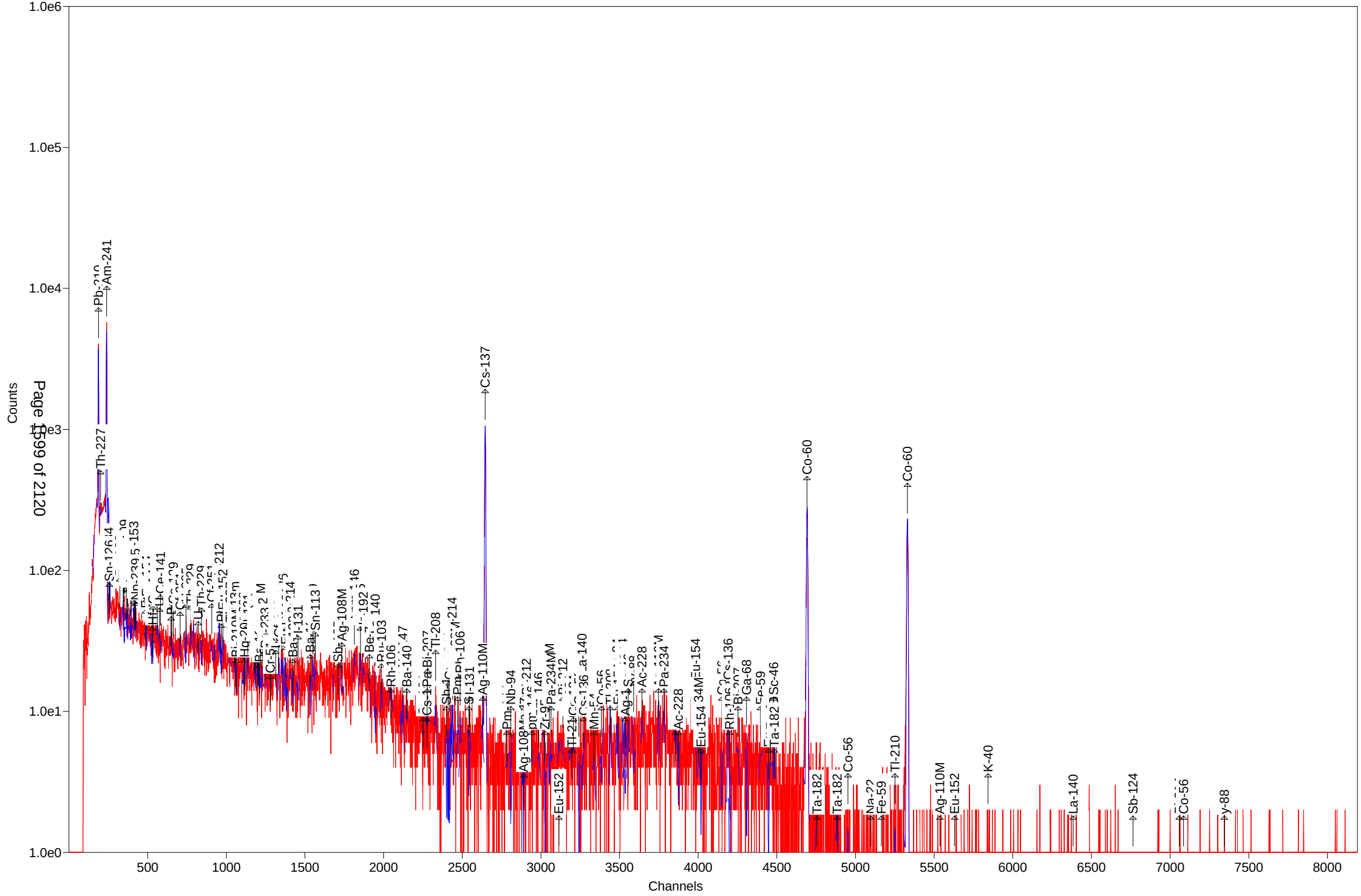
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

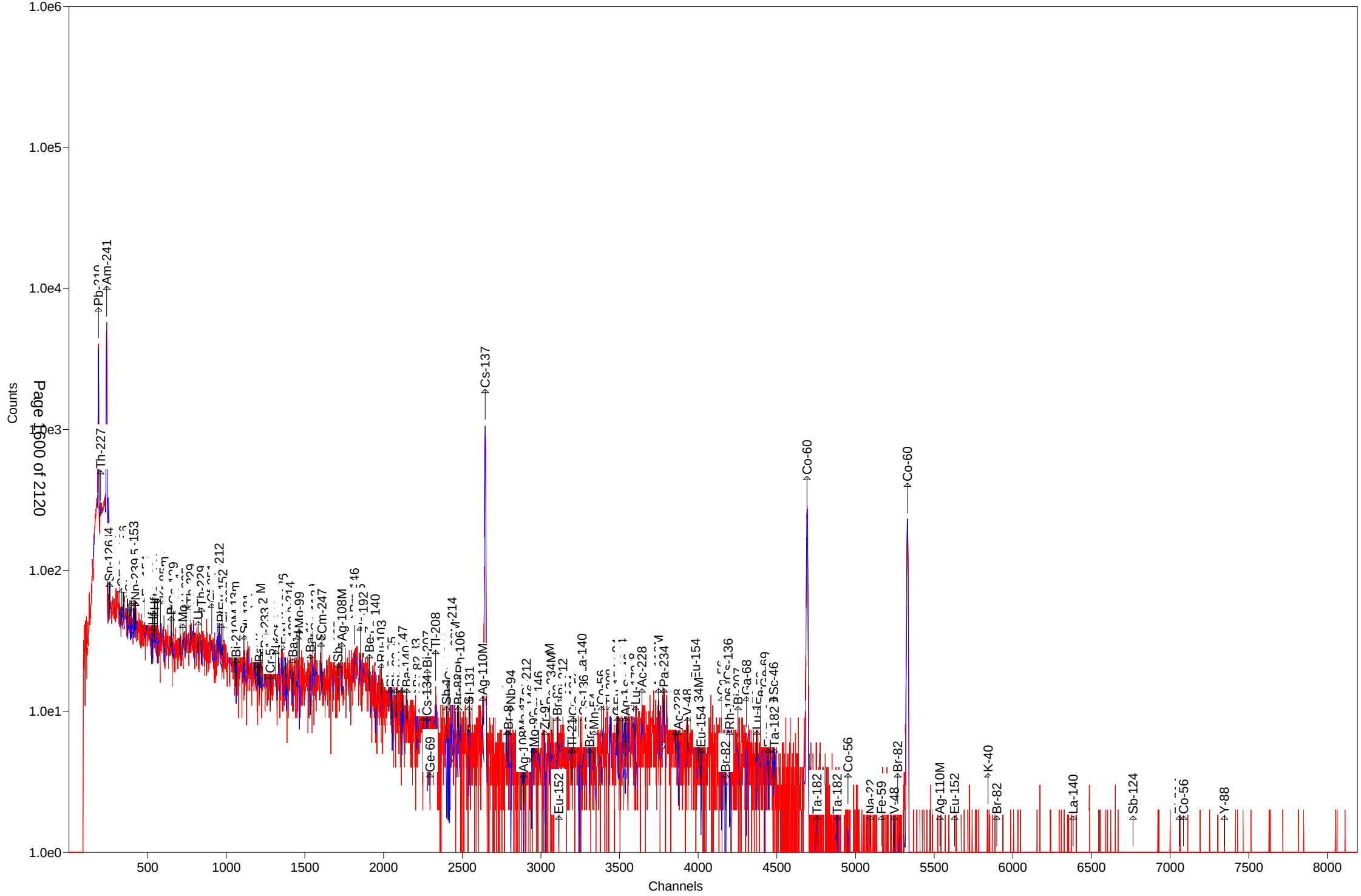
Total Activity (37.7 to 1999.4 keV) 1.319E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 1.3191014E+04 Bq/Sample

The library has energies which are not separable.

379959_Gamma_LCS 160-379959~2-A. 19_Gamma_20181614.spc.



379959_Gamma_LCS 160-379959~2-A. 19_Gamma_20181614.spc.


Counts
Channels
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Pb-210
Am-241
Th-227
Cs-137
Co-60
Co-60
Ta-182
Ta-182
Co-56
Na-22
Fe-59
V-48
Br-82
Br-82
Ag-110M
Eu-152
K-40
Br-82
La-140
Sb-124
Co-56
Y-88
Eu-152
Ag-110M
Br-82
Eu-154
Ac-228
Pa-234
Ga-68
Bi-207
Sc-46
Ge-69
Cs-134
Bi-207
Tl-208
Sb-124
Br-88
Ph-106
Bi-214
I-131
Br-82
Nb-94
Ag-108M
Mo-99
Zr-95
Br-82
Tl-208
Co-56
Mn-54
Co-56
Ac-228
Lu-176
Pa-234M
Eu-154
Rh-106
Cs-136
Ta-182
Sc-46
Ag-108M
Mo-99
Cm-247
Sb
Ag-108M
Be-7
Ru-103
140
Cr-51
Th-229
U
Th-229
Mn-99
Sn-126
Sn-126
Mn-229
Sn-153
Bi-210M
Sn-121
Bi-212
Bi-212
Pb-212
Mo-99
Th-229
Th-229
Ra-140
47
Ra-82
83
Cs-134
Bi-207
Tl-208
Sb-124
Br-88
Ph-106
Bi-214
I-131
Ag-110M

Test America St. Louis Spectrum ID: 19_Gamma_20181616

Sample Description: 379959_Gamma_160-29881-A-37-B
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-B

Decay to Time: 8/23/2018 18:46 Live Time: 1800 sec
Acquisition Time: 8/23/2018 18:46:17 Real Time: 1802 sec
Analysis Time: 8/23/2018 19:16 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.016E+00	144.7	4.364E+00	4.366E+00	1.496E+01
NA-22	5.812E-01	37.8	2.197E-01	2.216E-01	6.119E-01
K-40	2.012E+02	6.8	1.367E+01	1.703E+01	1.380E+01
Sc-46	-7.072E-01	107.1	7.577E-01	7.585E-01	2.569E+00
CR-51	0.000E+00	1.#INF	1.539E+00	1.539E+00	2.178E+01
MN-54	7.446E-01	46.8	3.486E-01	3.506E-01	7.714E-01
FE-59	1.311E+00	96.3	1.262E+00	1.264E+00	2.799E+00
Co-56	-6.189E-02	674.4	4.174E-01	4.174E-01	1.268E+00
CO-57	-1.909E-01	156.2	2.982E-01	2.983E-01	1.014E+00
CO-58	1.307E+00	29.5	3.849E-01	3.906E-01	1.036E+00
CO-60	1.836E-01	272.1	4.996E-01	4.997E-01	1.203E+00
ZN-65	-7.326E-02	1552.9	1.138E+00	1.138E+00	4.950E+00
NB-94	3.147E-01	30.5	9.594E-02	9.728E-02	1.389E+00
ZR-95	4.739E-01	113.5	5.377E-01	5.383E-01	1.396E+00
NB-95	0.000E+00	1.#INF	1.135E-01	1.135E-01	1.537E+00
RU-103	6.969E-01	37.7	2.628E-01	2.651E-01	5.674E-01
RH-106	-7.273E+00	110.0	8.000E+00	8.008E+00	2.694E+01
AG-108M	2.519E-01	99.4	2.502E-01	2.506E-01	9.687E-01
AG-110M	9.836E-01	101.0	9.934E-01	9.947E-01	3.364E+00
SN-113	5.210E-01	114.4	5.962E-01	5.968E-01	2.029E+00
SB-124	-1.536E-01	84.7	1.301E-01	1.303E-01	2.957E+00
SB-125	1.643E+00	63.9	1.050E+00	1.054E+00	2.322E+00
I-131	3.138E-01	104.1	3.266E-01	3.270E-01	8.375E-01
Gd-153	0.000E+00	1.#INF	4.809E-01	4.809E-01	6.258E+00
Ga-68	-4.201E+01	83.5	3.507E+01	3.515E+01	7.796E+01
Tc-99m	0.000E+00	1.#INF	1.634E-01	1.634E-01	1.713E+00
BA-133	-1.250E-01	120.5	1.506E-01	1.508E-01	3.097E+00
CS-134	4.283E-01	94.6	4.051E-01	4.057E-01	2.873E+00
CS-137	0.000E+00	1.#INF	1.886E-01	1.886E-01	1.404E+00
CE-139	2.657E-01	121.9	3.240E-01	3.243E-01	1.098E+00
Ba-140	1.169E+00	198.1	2.317E+00	2.318E+00	4.030E+00
La-140	7.783E-01	43.0	3.344E-01	3.368E-01	7.695E-01
CE-141	-7.269E-01	147.4	1.072E+00	1.072E+00	3.588E+00

CE-144	0.000E+00	1.#INF	1.633E+00	1.633E+00	1.319E+01
PM-144	1.778E-02	2755.0	4.898E-01	4.898E-01	1.218E+00
EU-152	-1.750E+00	94.5	1.654E+00	1.656E+00	5.655E+00
EU-154	-1.161E-01	67.7	7.852E-02	7.874E-02	1.274E+01
EU-155	5.129E-01	179.5	9.207E-01	9.211E-01	8.795E+00
HF-181	2.767E-01	118.0	3.264E-01	3.267E-01	2.083E+00
Ta-182	1.660E+00	103.7	1.721E+00	1.723E+00	5.508E+00
Hg-203	2.825E-01	102.7	2.901E-01	2.905E-01	9.897E-01
TL-208	2.100E+00	20.3	4.260E-01	4.392E-01	8.507E-01
pm-146	-9.709E-01	114.4	1.111E+00	1.112E+00	4.173E+00
y-88	8.060E-01	52.3	4.215E-01	4.235E-01	9.695E-01
Cd-113m	-8.964E+02	527.2	4.726E+03	4.727E+03	1.657E+04
Cd-109	7.604E+00	189.0	1.437E+01	1.437E+01	4.815E+01
Cf-251	1.618E+00	101.5	1.643E+00	1.645E+00	4.254E+00
Cf-249	7.732E-01	106.0	8.192E-01	8.202E-01	2.063E+00
Sn-126	-4.273E+00	111.6	4.768E+00	4.774E+00	1.596E+01
PB-210	-2.009E+01	71.6	1.438E+01	1.444E+01	5.098E+01
PB-212	5.451E+00	12.3	6.705E-01	7.283E-01	1.442E+00
PB-214	6.647E+00	14.6	9.717E-01	1.029E+00	1.760E+00
BI-207	4.203E-01	99.1	4.164E-01	4.170E-01	1.098E+00
BI-212	-2.218E-01	2160.8	4.792E+00	4.793E+00	1.749E+01
U-235	0.000E+00	1.#INF	1.494E+00	1.494E+00	1.367E+01
BI-214	5.344E+00	17.3	9.219E-01	9.612E-01	1.834E+00
BI-210M	-7.596E-01	86.9	6.600E-01	6.612E-01	2.213E+00
AC-228	2.208E+00	91.3	2.016E+00	2.019E+00	4.609E+00
TH-227	4.651E+00	75.4	3.505E+00	3.515E+00	2.068E+01
TH-229	1.171E+00	164.0	1.920E+00	1.921E+00	1.885E+01
TH-234	-4.911E+00	240.8	1.183E+01	1.183E+01	4.059E+01
PA-231	1.101E+01	130.0	1.432E+01	1.433E+01	6.553E+01
PA-233	6.938E-01	184.1	1.277E+00	1.278E+00	5.892E+00
PA-234	1.426E+00	163.0	2.324E+00	2.325E+00	7.982E+00
PA-234M	3.946E+01	100.8	3.977E+01	3.982E+01	1.934E+02
AM-241	-6.909E-01	204.5	1.413E+00	1.413E+00	4.767E+00
Np-237	2.209E+00	176.3	3.894E+00	3.896E+00	1.306E+01
Ir-192	2.205E-01	106.7	2.351E-01	2.355E-01	2.465E+00
Cs-136	7.382E-02	69.6	5.140E-02	5.157E-02	1.951E+00
Np-239	-1.296E+00	190.7	2.473E+00	2.474E+00	8.279E+00
Nd-147	1.596E+00	103.8	1.656E+00	1.659E+00	7.320E+00
TL-210	4.154E-01	98.0	4.069E-01	4.076E-01	1.556E+00
Total	3.148E+02				

Analyst: conrad.reuscher

Sample description
379959_Gamma_160-29881-A-37-B

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181616.An1

Acquisition information
Start time: 8/23/2018 6:46:17 PM
Live time: 1800
Real time: 1802
Dead time: 0.10 %
Detector ID: 19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration
Created: 4/16/2018 11:22:57 AM
Zero offset: 0.177 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/16/2018 12:11:21 PM
Type: Polynomial
Uncertainty: 0.841 %
Coefficients: -0.371612 -4.869309 0.466742
-0.049787 0.002234 -0.000039

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.71keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1415

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-26.	71.58	0.93	1.709E-02	46.54	4.250	PBC<MDA	PB210
49.55	16.	111.40	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
63.41	-9.	240.82	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
77.22	57.	23.16	0.91	3.148E-02				
86.49	17.	176.25	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.426E-01	EU155
					86.94	9.040	3.196E+00	Sn126
86.54	17.	179.52	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.426E-01	EU155
					86.94	9.040	3.196E+00	Sn126
86.94	18.	175.12	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.435E+00	Sn126
87.57	17.	185.95	0.97	3.314E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	7.600E+00	Cd109
88.04	17.	188.96	0.97	3.320E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	7.604E+00	Cd109
91.10	17.	191.48	0.97	3.352E-02	91.10	28.300	PBC<MDA	Nd147
92.49	-10.	356.61	0.98	3.366E-02	92.59	5.584	PBC<MDA	TH234
93.35	7.	454.23	0.98	3.372E-02	93.35	5.561	PBC<MDA	AC228
131.29	9.	284.80	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
162.66	2.	758.29	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	121.92	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	15.	101.50	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
185.72	41.	34.91	1.06	2.864E-02	185.72	54.000	1.485E+00	U235
210.85	8.	164.03	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229
238.36	106.	15.32	0.96	2.415E-02	238.63	43.300	5.192E+00	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.78	29.	29.79	1.11	2.388E-02	242.00	7.430	9.096E+00	PB214
257.35	11.	101.51	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
277.28	11.	84.31	1.14	2.153E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	102.70	1.14	2.141E-02	279.20	81.460	PBC<MDA	Hg203
294.74	6.	304.77	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	11.	168.63	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	10.	187.39	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	178.93	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
300.18	11.	184.10	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
302.65	11.	188.78	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
302.85	11.	193.64	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
304.85	11.	198.12	1.16	1.998E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.062E+00	BI210M
304.90	10.	215.81	1.16	1.998E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	9.976E-01	BI210M
328.76	9.	161.09	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	179.14	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
345.83	12.	117.98	1.20	1.808E-02	345.83	15.070	PBC<MDA	HF181
351.67	80.	14.62	1.24	1.782E-02	351.93	37.600	6.647E+00	PB214
364.48	8.	104.08	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	11.	113.22	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	114.45	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	96.79	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	1.	602.93	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	104.96	1.29	1.458E-02	453.88	65.000	PBC<MDA	pm146
463.37	9.	84.67	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.66	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	144.70	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	15.	37.71	1.33	1.358E-02	497.05	90.900	6.969E-01	RU103
511.86	57.	21.13	2.59	1.328E-02	511.86	20.000	1.185E+01	RH106
531.00	9.	103.77	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	2.	507.13	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
563.24	2.	551.91	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	112.07	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.137E+00	PA234
					569.70	97.740	2.633E-01	BI207
569.70	4.	173.37	1.39	1.224E-02	569.32	15.380	1.131E+00	CS134
					569.47	8.200	2.122E+00	PA234
					569.70	97.740	1.781E-01	BI207
583.18	38.	20.29	1.14	1.202E-02	583.02	84.500	2.100E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.65	52.	17.25	1.39	1.163E-02	609.31	46.090	5.354E+00	BI214
					610.30	5.750	4.297E+01	RU103
635.89	4.	142.27	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	6.	97.18	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
722.79	7.	84.71	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.428E-01	AG108M
					723.36	20.220	1.990E+00	EU154
722.94	7.	99.36	1.51	1.024E-02	722.79	10.810	3.721E+00	SB124
					722.94	90.840	4.429E-01	AG108M
					723.36	20.220	1.990E+00	EU154
723.36	6.	133.33	1.51	1.023E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.690E-01	AG108M
					723.36	20.220	1.659E+00	EU154
756.73	5.	113.48	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
766.41	5.	100.79	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	2.	403.11	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
785.42	14.	44.37	1.56	9.628E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	94.57	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
799.60	8.	99.76	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	3.	253.53	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
810.78	22.	29.46	1.58	9.404E-03	810.78	99.460	1.307E+00	CO58
834.85	12.	46.81	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
861.30	8.	106.97	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
871.10	11.	30.48	1.62	8.920E-03	871.10	99.890	6.830E-01	NB94
884.68	11.	101.00	1.63	8.818E-03	884.68	72.680	PBC<MDA	AG110M
898.04	12.	52.29	1.64	8.721E-03	898.04	93.700	PBC<MDA	y88
911.07	10.	91.28	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	5.	163.03	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234
964.11	4.	173.21	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
996.33	6.	86.55	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	263.91	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	119.56	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1048.07	8.	69.63	1.75	7.775E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	1.	853.07	1.75	7.762E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	99.08	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	10.	96.26	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1119.86	4.	166.57	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.87	4.	177.94	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.746E-01	Ta182
1218.85	9.	106.38	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	37.80	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.651E+00	EU154
1332.50	2.	272.09	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	204.86	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1461.02	232.	6.80	1.97	6.004E-03	1460.83	10.670	2.012E+02	K40
1596.21	6.	42.96	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.61	8.	50.98	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.93	77.22	43.	57.	1.800E+03	23.16	0.906	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.30	46.54	188.	-26.	-0.015	71.58	0.934s
TH-227	199.70	50.14	157.	16.	0.009	111.40	0.938s
AM-241	237.25	59.54	279.	-12.	-0.006	204.46	0.946s
TH-234	252.25	63.29	254.	-9.	-0.005	240.82	0.950
Sn-126	256.21	64.28	261.	-21.	-0.012	111.57	0.951s
BA-133	323.00	80.99	271.	-16.	-0.009	146.18	0.966s
Np-237	344.99	86.49	451.	17.	0.010	176.25	0.971s
EU-155	345.20	86.54	468.	17.	0.010	179.52	0.971s
Sn-126	346.79	86.94	514.	18.	0.010	175.12	0.971s
Sn-126	349.31	87.57	504.	17.	0.010	185.95	0.972s
Cd-109	351.19	88.04	521.	17.	0.010	188.96	0.972s
Nd-147	363.42	91.10	538.	17.	0.010	191.48	0.975
TH-234	369.37	92.59	582.	-10.	-0.005	356.61	0.976
AC-228	372.41	93.35	573.	7.	0.004	454.23	0.977s
Gd-153	389.00	97.50	580.	0.	0.000	1000.00	0.981s
Np-239	396.99	99.50	580.	0.	0.000	1000.00	0.982s
Gd-153	411.78	103.20	580.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	580.	0.	0.000	1000.00	0.986s
Np-239	423.49	106.13	591.	-18.	-0.010	190.73	0.988s
EU-152	486.04	121.78	120.	0.	0.000	1000.00	1.002s
CO-57	487.18	122.06	117.	-10.	-0.006	156.21	1.003s
EU-154	491.33	123.10	127.	0.	0.000	1000.00	1.004s
PA-234	524.09	131.29	324.	9.	0.005	284.80	1.011
HF-181	531.00	133.02	333.	0.	0.000	1000.00	1.013s
CE-144	533.06	133.54	333.	0.	0.000	1000.00	1.013s
HF-181	544.09	136.30	333.	0.	0.000	1000.00	1.015s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	544.79	136.47	333.	0.	0.000	1000.00	1.016s
Tc-99m	560.92	140.51	333.	0.	0.000	1000.00	1.019s
U-235	574.02	143.79	333.	0.	0.000	1000.00	1.022s
CE-141	580.63	145.44	444.	-20.	-0.011	147.43	1.024s
Ba-140	649.47	162.66	114.	2.	0.001	758.29	1.039s
U-235	652.34	163.38	116.	0.	0.000	1000.00	1.040s
CE-139	662.23	165.85	95.	12.	0.006	121.92	1.042s
Cf-251	705.19	176.60	59.	15.	0.008	101.50	1.051s
U-235	741.65	185.72	48.	41.	0.023	34.91	1.060s
TH-229	772.79	193.51	70.	-4.	-0.002	878.55	1.066s
TH-229	842.11	210.85	44.	8.	0.004	164.03	1.082s
Cf-251	906.68	227.00	62.	-11.	-0.006	133.67	1.096s
PB-212	953.18	238.63	27.	103.	0.057	12.30	1.106D
PB-214	966.63	242.00	23.	29.	0.016	29.79	1.109D
EU-152	977.41	244.69	251.	-14.	-0.008	163.07	1.111s
TH-227	1023.58	256.24	30.	11.	0.006	101.51	1.122s
Cd-113m	1053.40	263.70	64.	-2.	-0.001	527.25	1.128s
BI-210M	1061.92	265.83	80.	-15.	-0.008	86.89	1.130
TL-208	1107.70	277.28	38.	11.	0.006	84.31	1.140
Hg-203	1115.37	279.20	37.	9.	0.005	102.70	1.141s
I-131	1135.76	284.30	44.	-6.	-0.003	220.27	1.146s
PB-214	1178.90	295.09	150.	6.	0.003	304.77	1.155
TL-210	1182.54	296.00	155.	11.	0.006	168.63	1.156s
PB-212	1198.65	300.03	167.	10.	0.005	187.39	1.159
PA-231	1198.81	300.07	177.	11.	0.006	178.93	1.159s
PA-233	1199.25	300.18	187.	11.	0.006	184.10	1.159s
PA-231	1209.13	302.65	198.	11.	0.006	188.78	1.162s
BA-133	1209.93	302.85	209.	11.	0.006	193.64	1.162s
Ba-140	1217.92	304.85	219.	11.	0.006	198.12	1.164s
BI-210M	1218.11	304.90	230.	10.	0.006	215.81	1.164s
Ir-192	1232.27	308.44	240.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	240.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	240.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	240.	0.	0.000	1000.00	1.177
La-140	1313.52	328.76	96.	9.	0.005	161.09	1.184s
Cf-249	1332.23	333.44	133.	9.	0.005	179.14	1.188s
Cs-136	1360.74	340.57	75.	-13.	-0.007	97.31	1.194s
EU-152	1375.60	344.29	98.	-15.	-0.008	94.50	1.197s
HF-181	1381.77	345.83	102.	12.	0.007	117.98	1.199s
PB-214	1405.13	351.67	16.	80.	0.045	14.62	1.235s
BA-133	1422.43	356.00	157.	-13.	-0.007	143.57	1.207s
I-131	1456.35	364.48	16.	8.	0.004	104.08	1.215s
BA-133	1533.76	383.84	99.	-14.	-0.008	85.30	1.231s
Cf-249	1550.19	387.95	66.	11.	0.006	113.22	1.235s
SN-113	1565.14	391.69	58.	10.	0.005	114.45	1.238
SB-125	1709.84	427.88	12.	8.	0.004	96.79	1.268s
AG-108M	1734.08	433.94	21.	1.	0.001	602.93	1.273s
pm-146	1813.83	453.88	16.	8.	0.004	104.96	1.290s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1851.76	463.37	25.	9.	0.005	84.67	1.298s
Ir-192	1870.53	468.06	31.	8.	0.004	106.66	1.302s
BE-7	1908.66	477.60	63.	8.	0.004	144.70	1.310s
HF-181	1926.26	482.00	71.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	71.	0.	0.000	1000.00	1.317s
RU-103	1986.48	497.05	5.	15.	0.009	37.71	1.326s
RH-106	2045.71	511.86	13.	57.	0.031	21.13	2.588s
Nd-147	2122.23	531.00	17.	9.	0.005	103.77	1.354s
Ba-140	2147.27	537.26	18.	2.	0.001	507.13	1.359s
CS-134	2251.16	563.24	17.	2.	0.001	551.91	1.380s
CS-134	2275.49	569.32	17.	6.	0.003	112.07	1.385s
PA-234	2276.09	569.47	28.	-4.	-0.002	186.68	1.385s
BI-207	2277.02	569.70	20.	4.	0.002	173.37	1.385s
TL-208	2330.93	583.18	8.	38.	0.021	20.29	1.141
SB-125	2400.20	600.50	170.	-12.	-0.007	156.32	1.410s
SB-124	2409.12	602.73	158.	-12.	-0.007	150.71	1.412s
BI-214	2436.77	609.65	10.	52.	0.029	17.25	1.386
RU-103	2439.39	610.30	162.	-14.	-0.008	131.73	1.418s
AG-108M	2455.31	614.28	148.	-14.	-0.008	125.89	1.421s
PM-144	2470.44	618.06	134.	-14.	-0.008	62.25	1.424s
RH-106	2485.86	621.92	127.	-15.	-0.008	109.99	1.427s
SB-125	2541.74	635.89	18.	4.	0.002	142.27	1.439s
I-131	2546.08	636.97	35.	-9.	-0.005	101.90	1.440s
AG-110M	2629.23	657.76	14.	6.	0.003	97.18	1.456s
CS-137	2644.82	661.66	20.	0.	0.000	1000.00	1.459s
NB-94	2808.70	702.63	24.	-1.	-0.001	574.56	1.492s
SB-124	2889.33	722.79	16.	7.	0.004	84.71	1.507s
AG-108M	2889.93	722.94	23.	7.	0.004	99.36	1.507s
EU-154	2891.61	723.36	31.	6.	0.003	133.33	1.508s
pm-146	2941.07	735.72	19.	-7.	-0.004	97.71	1.518s
pm-146	2986.83	747.16	24.	-6.	-0.003	114.40	1.526s
ZR-95	3025.11	756.73	5.	5.	0.003	113.48	1.534s
AG-110M	3053.97	763.94	25.	-3.	-0.002	155.60	1.539s
NB-95	3061.35	765.79	27.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	9.	5.	0.003	100.79	1.541s
EU-152	3113.88	778.92	14.	2.	0.001	403.11	1.551s
BI-212	3139.88	785.42	5.	14.	0.008	44.37	1.556s
CS-134	3181.68	795.87	19.	7.	0.004	94.57	1.564s
TL-210	3196.61	799.60	26.	8.	0.004	99.76	1.567s
CS-134	3206.02	801.95	33.	3.	0.002	253.53	1.569s
CO-58	3241.32	810.78	10.	22.	0.012	29.46	1.575s
La-140	3261.30	815.77	32.	0.	0.000	1000.00	1.579s
Cs-136	3272.22	818.50	42.	-8.	-0.004	122.75	1.581s
MN-54	3337.63	834.85	5.	12.	0.007	46.81	1.594
Co-56	3385.32	846.77	15.	-1.	-0.001	674.43	1.603s
TL-208	3440.51	860.56	14.	8.	0.004	106.97	1.614
NB-94	3482.65	871.10	0.	11.	0.006	30.48	1.621s
EU-154	3491.19	873.23	23.	-7.	-0.004	104.00	1.623s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3520.39	880.53	53.	-13.	-0.007	86.27	1.628s
PA-234	3531.23	883.24	66.	-11.	-0.006	111.93	1.630s
AG-110M	3537.01	884.68	60.	11.	0.006	101.00	1.632s
Sc-46	3555.40	889.28	66.	-11.	-0.006	107.13	1.635s
y-88	3590.45	898.04	6.	12.	0.007	52.29	1.642s
AC-228	3642.58	911.07	15.	10.	0.006	91.28	1.651s
AG-110M	3748.30	937.49	35.	-15.	-0.009	40.85	1.671s
PA-234	3782.42	946.02	10.	5.	0.003	163.03	1.677s
EU-152	3854.81	964.11	22.	4.	0.002	173.21	1.691s
AC-228	3874.26	968.97	61.	-16.	-0.009	75.33	1.694s
EU-154	3983.73	996.33	10.	6.	0.003	86.55	1.714s
PA-234M	4002.41	1001.00	20.	2.	0.001	263.91	1.718s
EU-154	4017.53	1004.77	23.	6.	0.003	119.56	1.721s
Co-56	4149.84	1037.84	20.	-4.	-0.002	150.14	1.745s
Cs-136	4190.78	1048.07	13.	8.	0.005	69.63	1.752s
RH-106	4199.94	1050.36	22.	1.	0.000	853.07	1.754s
BI-207	4253.17	1063.66	10.	8.	0.004	99.08	1.763s
Ga-68	4308.15	1077.40	35.	-16.	-0.009	83.47	1.773s
FE-59	4395.60	1099.25	16.	10.	0.006	96.26	1.789s
EU-152	4446.92	1112.07	53.	-10.	-0.005	77.99	1.798s
BI-214	4479.78	1120.29	23.	4.	0.002	166.57	1.803
Sc-46	4480.84	1120.55	32.	-5.	-0.003	166.13	1.804s
Ta-182	4483.84	1121.30	24.	4.	0.002	177.94	1.804s
CO-60	4691.70	1173.24	32.	-15.	-0.008	89.53	1.841s
Ta-182	4884.51	1221.41	16.	9.	0.005	106.38	1.874s
Co-56	4952.04	1238.28	43.	-8.	-0.004	90.87	1.886s
NA-22	5097.14	1274.53	0.	7.	0.004	37.80	1.910s
EU-154	5097.19	1274.54	7.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	21.	-8.	-0.005	130.66	1.922s
TL-210	5251.13	1313.00	16.	0.	0.000	1000.00	1.936s
CO-60	5329.19	1332.50	6.	2.	0.001	272.09	1.949s
EU-152	5631.44	1408.00	6.	3.	0.002	204.86	1.999s
K-40	5843.72	1461.02	8.	232.	0.129	6.80	1.973
La-140	6385.01	1596.21	1.	6.	0.004	42.96	2.119s
SB-124	6764.54	1690.98	6.	-1.	-0.001	600.00	2.176s
BI-214	7058.94	1764.49	3.	8.	0.004	50.98	2.219s
Co-56	7086.41	1771.35	11.	0.	0.000	1000.00	2.223s
y-88	7345.60	1836.06	6.	-2.	-0.001	304.14	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.0157E+00					5.31E+01	
			477.60	3.016E+00	?(	1.496E+01	1.45E+02 1.05E+01	G
NA-22	C	5.8117E-01					9.50E+02	
			1274.53	5.812E-01	?(	6.119E-01	3.78E+01 9.99E+01	G
K-40	N	2.0116E+02					4.66E+11	
			1460.83	2.012E+02	(P	1.380E+01	6.80E+00 1.07E+01	G
Sc-46	F	-7.0722E-01					8.38E+01	
			889.28	-7.072E-01	?(	2.569E+00	1.07E+02 1.00E+02	G
			1120.55	-3.758E-01	+	2.185E+00	1.66E+02 1.00E+02	G
MN-54	C	7.4462E-01					3.12E+02	
			834.85	7.446E-01	&(	7.714E-01	4.68E+01 1.00E+02	G
FE-59	F	1.3109E+00					4.45E+01	
			1099.25	1.311E+00	?(	2.799E+00	9.63E+01 5.65E+01	G
			1291.60	-1.617E+00	+	4.703E+00	1.31E+02 4.32E+01	G
Co-56	C	-6.1893E-02					7.73E+01	
			846.77	-6.189E-02	?(P	1.268E+00	6.74E+02 9.99E+01	G
			1238.28	-9.597E-01	+ P	4.077E+00	9.09E+01 6.61E+01	G
			1037.84	-2.210E+00	+ P	1.193E+01	1.50E+02 1.41E+01	G
			1771.35	0.000E+00	+	1.280E+01	1.00E+03 1.55E+01	A
CO-57	C	-1.9089E-01					2.72E+02	
			122.06	-1.909E-01	?(	1.014E+00	1.56E+02 8.56E+01	G
			136.47	0.000E+00	+	1.378E+01	1.00E+03 1.07E+01	G
CO-58	C	1.3067E+00					7.09E+01	
			810.78	1.307E+00	?(	1.036E+00	2.95E+01 9.95E+01	G
CO-60	F	1.8362E-01					1.93E+03	
			1332.50	1.836E-01	?(P	1.203E+00	2.72E+02 1.00E+02	G
			1173.24	-1.169E+00	+	2.265E+00	8.95E+01 9.99E+01	G
ZN-65	F	-7.3260E-02					2.44E+02	
			1115.55	-7.326E-02	%(P	4.950E+00	1.55E+03 5.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	3.1472E-01					7.41E+06	
			702.63	-6.100E-02	?(P	1.389E+00	5.75E+02	9.79E+01 G
			871.10	6.830E-01	&(P	4.595E-01	3.05E+01	9.99E+01 G
ZR-95	I	4.7386E-01					6.40E+01	
			756.73	4.739E-01	?(P	1.396E+00	1.13E+02	5.45E+01 G
			724.20	-7.061E-02	% P	3.850E+00	1.14E+03	4.42E+01 G
RU-103	I	6.9686E-01					3.93E+01	
			497.05	6.969E-01	?(P	5.674E-01	3.77E+01	9.09E+01 G
			610.30	-1.160E+01	-	5.155E+01	1.32E+02	5.75E+00 GA
RH-106	I	-7.2731E+00					3.74E+02	
			621.92	-7.273E+00	?(	2.694E+01	1.10E+02	9.93E+00 G
			1050.36	3.621E+00	+ P	1.132E+02	8.53E+02	1.56E+00 G
			511.86	1.185E+01	?	4.127E+00	2.11E+01	2.00E+01 GA
AG-108M	C	2.5186E-01					1.53E+05	
			433.94	6.012E-02	(P	9.687E-01	6.03E+02	9.05E+01 G
			722.94	4.429E-01	?(	1.509E+00	9.94E+01	9.08E+01 G
			614.28	-7.475E-01	&	3.175E+00	1.26E+02	8.98E+01 G
AG-110M	F	9.8363E-01					2.50E+02	
			884.68	9.836E-01	?(	3.364E+00	1.01E+02	7.27E+01 G
			657.76	3.207E-01	-	1.077E+00	9.72E+01	9.46E+01 G
			937.49	-2.944E+00	+ P	5.824E+00	4.08E+01	3.44E+01 G
			1384.30	-1.216E-01	%	6.709E+00	2.37E+03	2.43E+01 G
			763.94	-8.793E-01	- P	6.655E+00	1.56E+02	2.23E+01 G
SN-113	F	5.2097E-01					1.15E+02	
			391.69	5.210E-01	?(P	2.029E+00	1.14E+02	6.40E+01 G
SB-124	F	-1.5359E-01					6.02E+01	
			602.73	-5.798E-01	?(	2.957E+00	1.51E+02	9.83E+01 G
			1690.98	-2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
			722.79	3.720E+00	?(	1.072E+01	8.47E+01	1.08E+01 G
SB-125	I	1.6430E+00					1.01E+03	
			427.88	9.329E-01	?(P	2.322E+00	9.68E+01	2.96E+01 G
			600.50	-3.177E+00	&	1.680E+01	1.56E+02	1.79E+01 G
			635.89	1.933E+00	(P	9.701E+00	1.42E+02	1.13E+01 G
			463.37	3.338E+00	(	9.565E+00	8.47E+01	1.05E+01 G
I-131	I	3.1383E-01					8.02E+00	
			364.48	3.138E-01	(	8.375E-01	1.04E+02	8.17E+01 G
			284.30	-2.572E+00	+	1.441E+01	2.20E+02	6.14E+00 G
			636.97	-5.970E+00	&	2.077E+01	1.02E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-4.2011E+01					4.71E-02	
			1077.40	-4.201E+01	?(	7.796E+01	8.35E+01	3.30E+00 G
BA-133	F	-1.2497E-01					3.85E+03	
			356.00	-6.381E-01	?(	3.097E+00	1.44E+02	6.20E+01 G
			302.85	1.612E+00	?(	1.056E+01	1.94E+02	1.83E+01 G
			383.84	-5.149E+00	+ P	1.830E+01	8.53E+01	8.94E+00 GA
			80.99	-8.194E-01	&	4.027E+00	1.46E+02	3.41E+01 GA
CS-134	I	4.2834E-01					7.54E+02	
			604.71	-6.622E-03	%(	2.873E+00	1.26E+04	9.76E+01 G
			795.87	4.803E-01	?(P	1.555E+00	9.46E+01	8.55E+01 G
			569.32	1.672E+00	?(	6.525E+00	1.12E+02	1.54E+01 G
			801.95	2.205E+00	?(	1.980E+01	2.54E+02	8.69E+00 G
			563.24	8.413E-01	?(P	1.195E+01	5.52E+02	8.35E+00 G
CE-139	F	2.6571E-01					1.38E+02	
			165.85	2.657E-01	?(	1.098E+00	1.22E+02	7.99E+01 G
Ba-140	I	1.1694E+00					1.28E+01	
			537.26	3.061E-01	&(P	4.030E+00	5.07E+02	2.44E+01 G
			162.66	5.794E-01	?(	1.520E+01	7.58E+02	6.22E+00 G
			304.85	6.933E+00	&(	4.648E+01	1.98E+02	4.29E+00 G
La-140	I	7.7827E-01					1.28E+01	
			1596.21	6.711E-01	?(P	7.695E-01	4.30E+01	9.54E+01 G
			487.02	0.000E+00	-	3.714E+00	1.00E+03	4.55E+01 G
			328.76	1.282E+00	?(P	7.043E+00	1.61E+02	2.03E+01 G
			815.77	0.000E+00	-	7.410E+00	1.00E+03	2.33E+01 G
CE-141	I	-7.2695E-01					3.25E+01	
			145.44	-7.269E-01	&(	3.588E+00	1.47E+02	4.82E+01 G
PM-144	C	1.7777E-02					3.63E+02	
			696.54	1.778E-02	%(	1.218E+00	2.75E+03	9.90E+01 G
			618.06	-7.028E-01	+ P	2.762E+00	6.23E+01	9.91E+01 G
EU-152	F	-1.7502E+00					4.94E+03	
			344.29	-1.750E+00	?(P	5.655E+00	9.45E+01	2.65E+01 G
			1112.07	-5.342E+00	+ P	2.002E+01	7.80E+01	1.36E+01 G
			121.78	0.000E+00	+	3.072E+00	1.00E+03	2.86E+01 G
			778.92	8.864E-01	+	8.929E+00	4.03E+02	1.29E+01 G
			964.11	1.839E+00	+	1.129E+01	1.73E+02	1.46E+01 G
			244.69	-4.308E+00	&	2.367E+01	1.63E+02	7.58E+00 G
			1408.00	1.235E+00	+ P	6.084E+00	2.05E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	-1.1607E-01					3.14E+03	
			873.23	-3.560E+00	?(	1.274E+01	1.04E+02	1.23E+01 G
			123.10	0.000E+00	&	2.215E+00	1.00E+03	4.08E+01 G
			1274.54	0.000E+00	+	3.546E+00	1.00E+03	3.52E+01 G
			723.36	1.659E+00	&	7.675E+00	1.33E+02	2.02E+01 G
			1004.77	2.301E+00	+	9.559E+00	1.20E+02	1.80E+01 G
			996.33	3.870E+00	?(	1.148E+01	8.65E+01	1.06E+01 G
EU-155	I	5.1287E-01					1.81E+03	
			105.31	-1.095E-01	%(P	8.795E+00	2.38E+03	2.12E+01 G
			86.54	9.426E-01	?(	5.674E+00	1.80E+02	3.07E+01 G
HF-181	F	2.7666E-01					4.24E+01	
			482.00	0.000E+00	&(	2.083E+00	1.00E+03	8.05E+01 G
			133.02	0.000E+00	?(	3.374E+00	1.00E+03	4.33E+01 G
			345.83	2.549E+00	?(	1.018E+01	1.18E+02	1.51E+01 G
			136.30	0.000E+00	-	2.515E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.6602E+00					1.14E+02	
			1121.30	8.746E-01	?(	5.508E+00	1.78E+02	3.49E+01 G
			1221.41	2.676E+00	&(	6.348E+00	1.06E+02	2.70E+01 G
			1189.05	-1.618E-01	%	1.176E+01	3.15E+03	1.62E+01 G
Hg-203	F	2.8247E-01					4.66E+01	
			279.20	2.825E-01	?(	9.897E-01	1.03E+02	8.15E+01 G
TL-208	N	2.0999E+00					6.98E+02	
			583.02	2.100E+00	(P	8.507E-01	2.03E+01	8.45E+01 G
			277.28	4.508E+00	+ P	1.278E+01	8.43E+01	6.31E+00 G
			860.56	3.922E+00	+ P	1.005E+01	1.07E+02	1.24E+01 G
pm-146	C	-9.7094E-01					2.02E+03	
			747.16	-9.709E-01	?(P	4.173E+00	1.14E+02	3.40E+01 G
			735.72	-1.671E+00	+ P	5.605E+00	9.77E+01	2.25E+01 G
			453.88	4.661E-01	+ P	1.254E+00	1.05E+02	6.50E+01 G
y-88	F	8.0605E-01					1.07E+02	
			898.04	8.060E-01	&(P	9.695E-01	5.23E+01	9.37E+01 G
			1836.06	-2.271E-01	-	1.604E+00	3.04E+02	9.92E+01 G
Cd-113m		-8.9644E+02					5.33E+03	
			263.70	-8.964E+02	&(	1.657E+04	5.27E+02	6.00E-03 K
Cd-109	F	7.6037E+00					4.53E+02	
			88.04	7.604E+00	&(	4.815E+01	1.89E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.6184E+00					3.28E+05	
			176.60	1.618E+00	(	4.254E+00	1.02E+02	1.70E+01 G
			227.00	-3.992E+00	+	1.392E+01	1.34E+02	6.30E+00 GA
Cf-249	T	7.7315E-01					1.28E+05	
			387.95	5.363E-01	?(	2.063E+00	1.13E+02	6.60E+01 G
			333.44	1.781E+00	?(	1.086E+01	1.79E+02	1.55E+01 G
Sn-126		-4.2735E+00					3.65E+07	
			87.57	7.694E-01	+	4.796E+00	1.86E+02	3.75E+01 GA
			64.28	-4.273E+00	?(	1.596E+01	1.12E+02	9.70E+00 G
			86.94	3.435E+00	&	2.015E+01	1.75E+02	9.04E+00 GA
PB-210	N	-2.0092E+01					8.14E+03	
			46.54	-2.009E+01	*(P	5.098E+01	7.16E+01	4.25E+00 G
PB-212	N	5.4508E+00					6.98E+02	
			238.63	5.451E+00	(P	1.442E+00	1.23E+01	4.33E+01 G
			300.03	8.279E+00	+ P	5.263E+01	1.87E+02	3.28E+00 GA
PB-214	N	6.6472E+00					5.84E+05	
			351.93	6.647E+00	*(P	1.760E+00	1.46E+01	3.76E+01 G
			295.09	8.067E-01	- P	8.382E+00	3.05E+02	1.93E+01 G
			242.00	9.096E+00		7.836E+00	2.98E+01	7.43E+00 GA
BI-207	C	4.2031E-01					1.18E+04	
			569.70	1.781E-01	?(	1.098E+00	1.73E+02	9.77E+01 G
			1063.66	7.381E-01	?(P	1.720E+00	9.91E+01	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	1.749E+01	2.16E+03	7.55E+00 G
			785.42	6.116E+01	? P	6.119E+01	4.44E+01	1.28E+00 GA
BI-214	N	5.3437E+00					5.84E+05	
			609.31	5.354E+00	(P	1.834E+00	1.73E+01	4.61E+01 G
			1120.29	2.110E+00	- P	1.241E+01	1.67E+02	1.51E+01 G
			1764.49	5.313E+00	?(P	8.038E+00	5.10E+01	1.54E+01 G
BI-210M	T	-7.5958E-01					1.10E+09	
			265.83	-7.596E-01	?(	2.213E+00	8.69E+01	5.00E+01 G
			304.90	9.976E-01	&	7.287E+00	2.16E+02	2.80E+01 G
AC-228	N	2.2084E+00					2.10E+03	
			911.07	2.208E+00	?(	4.609E+00	9.13E+01	2.90E+01 G
			968.97	-6.017E+00	+	1.511E+01	7.53E+01	1.75E+01 G
			338.32	-9.768E-02	% P	1.467E+01	3.67E+03	1.20E+01 G
			93.35	2.214E+00	*	3.383E+01	4.54E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	4.6506E+00					7.95E+03	
			50.14	5.521E+00	&(	2.068E+01	1.11E+02	8.00E+00 G
			256.24	3.656E+00	&(P	9.768E+00	1.02E+02	7.00E+00 G
TH-229	N	1.1706E+00					2.68E+06	
			193.51	-1.756E+00	?(P	1.885E+01	8.79E+02	4.40E+00 G
			210.85	5.477E+00	?(P	2.375E+01	1.64E+02	2.99E+00 G
TH-234	N	-4.9115E+00					1.63E+12	
			63.29	-4.911E+00	(P	4.059E+01	2.41E+02	3.81E+00 G
			92.59	-2.820E+00	+ P	3.403E+01	3.57E+02	5.58E+00 G
PA-231	N	1.1011E+01					1.20E+07	
			302.65	1.025E+01	?(	6.553E+01	1.89E+02	2.88E+00 G
			300.07	1.190E+01	?(	7.214E+01	1.79E+02	2.46E+00 G
PA-233	C	6.9384E-01					7.82E+08	
			312.01	0.000E+00	?(	5.892E+00	1.00E+03	3.60E+01 G
			300.18	4.723E+00	?(	2.945E+01	1.84E+02	6.20E+00 G
PA-234	N	1.4257E+00					1.63E+12	
			131.29	8.297E-01	?(	7.982E+00	2.85E+02	1.80E+01 G
			946.02	2.226E+00	?(P	8.797E+00	1.63E+02	1.34E+01 G
			569.47	-2.307E+00	+	1.519E+01	1.87E+02	8.20E+00 G
			883.24	-6.995E+00	&	2.659E+01	1.12E+02	9.60E+00 G
			880.53	-1.325E+01	+	3.845E+01	8.63E+01	6.00E+00 GA
PA-234M	N	3.9456E+01					1.63E+12	
			1001.00	2.041E+01	?(P	1.934E+02	2.64E+02	8.37E-01 G
			766.41	9.369E+01	?(P	3.291E+02	1.01E+02	2.94E-01 G
AM-241	T	-6.9088E-01					1.58E+05	
			59.54	-6.909E-01	(	4.767E+00	2.04E+02	3.59E+01 G
Np-237	F	2.2095E+00					2.14E+06	
			86.49	2.209E+00	?(	1.306E+01	1.76E+02	1.31E+01 G
Ir-192	F	2.2045E-01					7.40E+01	
			316.49	0.000E+00	?(	2.465E+00	1.00E+03	8.70E+01 G
			468.06	5.912E-01	?(	2.162E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	6.620E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.3818E-02					1.30E+01	
			818.50	-4.626E-01	?(	1.951E+00	1.23E+02	1.00E+02 G
			1048.07	7.443E-01	?(	1.723E+00	6.96E+01	8.00E+01 G
			340.57	-8.497E-01	+	2.788E+00	9.73E+01	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -1.2964E+00                                      2.36E+00
                          103.70 0.000E+00 &   7.767E+00 1.00E+03 2.40E+01 X
                          106.13-1.296E+00 ?(  8.279E+00 1.91E+02 2.27E+01 G
                           99.50 0.000E+00 +   1.248E+01 1.00E+03 1.50E+01 X

Nd-147       1.5960E+00                                      1.11E+01
                          531.00 2.869E+00 ?(  7.320E+00 1.04E+02 1.30E+01 G
                           91.10 1.011E+00 &(  6.488E+00 1.91E+02 2.83E+01 G

TL-210   N   4.1541E-01                                      5.84E+05
                          799.60 4.553E-01 &(  1.556E+00 9.98E+01 9.90E+01 G
                          296.00 3.655E-01 ?(  2.090E+00 1.69E+02 7.90E+01 G
                         1313.00 0.000E+00 -   8.635E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	188.	-26.	-0.015	71.58	-2.009E+01	P
AM-241	59.54	279.	-12.	-0.006	204.46	-6.909E-01	
TH-234	63.29	254.	-9.	-0.005	240.82	-4.911E+00	P
Sn-126	64.28	261.	-21.	-0.012	111.57	-4.273E+00	
BA-133	80.99	271.	-16.	-0.009	146.18	-8.194E-01	
Np-237	86.49	451.	17.	0.010	176.25	2.209E+00	
EU-155	86.54	468.	17.	0.010	179.52	9.426E-01	
Sn-126	86.94	514.	18.	0.010	175.12	3.435E+00	
Sn-126	87.57	504.	17.	0.010	185.95	7.694E-01	
Cd-109	88.04	521.	17.	0.010	188.96	7.604E+00	
Nd-147	91.10	538.	17.	0.010	191.48	1.011E+00	
TH-234	92.59	582.	-10.	-0.005	356.61	-2.820E+00	P
AC-228	93.35	573.	7.	0.004	454.23	2.214E+00	
Np-239	106.13	591.	-18.	-0.010	190.73	-1.296E+00	
CO-57	122.06	117.	-10.	-0.006	156.21	-1.909E-01	
PA-234	131.29	324.	9.	0.005	284.80	8.297E-01	
CE-141	145.44	444.	-20.	-0.011	147.43	-7.269E-01	
Ba-140	162.66	114.	2.	0.001	758.29	5.794E-01	
CE-139	165.85	95.	12.	0.006	121.92	2.657E-01	
Cf-251	176.60	59.	15.	0.008	101.50	1.618E+00	
U-235	185.72	48.	41.	0.023	34.91	1.485E+00	
TH-229	193.51	70.	-4.	-0.002	878.55	-1.756E+00	P
TH-229	210.85	44.	8.	0.004	164.03	5.477E+00	P
Cf-251	227.00	62.	-11.	-0.006	133.67	-3.992E+00	
EU-152	244.69	251.	-14.	-0.008	163.07	-4.308E+00	
Cd-113m	263.70	64.	-2.	-0.001	527.25	-8.964E+02	
BI-210M	265.83	80.	-15.	-0.008	86.89	-7.596E-01	
Hg-203	279.20	37.	9.	0.005	102.70	2.825E-01	
I-131	284.30	44.	-6.	-0.003	220.27	-2.572E+00	
TL-210	296.00	155.	11.	0.006	168.63	3.655E-01	
PA-231	300.07	177.	11.	0.006	178.93	1.190E+01	
PA-233	300.18	187.	11.	0.006	184.10	4.723E+00	
PA-231	302.65	198.	11.	0.006	188.78	1.025E+01	
BA-133	302.85	209.	11.	0.006	193.64	1.612E+00	
Ba-140	304.85	219.	11.	0.006	198.12	6.933E+00	
BI-210M	304.90	230.	10.	0.006	215.81	9.976E-01	
Cf-249	333.44	133.	9.	0.005	179.14	1.781E+00	
Cs-136	340.57	75.	-13.	-0.007	97.31	-8.497E-01	
EU-152	344.29	98.	-15.	-0.008	94.50	-1.750E+00	P
HF-181	345.83	102.	12.	0.007	117.98	2.549E+00	
BA-133	356.00	157.	-13.	-0.007	143.57	-6.381E-01	
I-131	364.48	16.	8.	0.004	104.08	3.138E-01	
BA-133	383.84	99.	-14.	-0.008	85.30	-5.149E+00	P
Cf-249	387.95	66.	11.	0.006	113.22	5.363E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	58.	10.	0.005	114.45	5.210E-01	P
SB-125	427.88	12.	8.	0.004	96.79	9.329E-01	P
AG-108M	433.94	21.	1.	0.001	602.93	6.012E-02	P
pm-146	453.88	16.	8.	0.004	104.96	4.661E-01	P
SB-125	463.37	25.	9.	0.005	84.67	3.338E+00	
Ir-192	468.06	31.	8.	0.004	106.66	5.912E-01	
BE-7	477.60	63.	8.	0.004	144.70	3.016E+00	
RH-106	511.86	13.	57.	0.031	21.13	1.185E+01	
Nd-147	531.00	17.	9.	0.005	103.77	2.869E+00	
Ba-140	537.26	18.	2.	0.001	507.13	3.061E-01	P
CS-134	563.24	17.	2.	0.001	551.91	8.413E-01	P
CS-134	569.32	17.	6.	0.003	112.07	1.672E+00	
PA-234	569.47	28.	-4.	-0.002	186.68	-2.307E+00	
BI-207	569.70	20.	4.	0.002	173.37	1.781E-01	
SB-125	600.50	170.	-12.	-0.007	156.32	-3.177E+00	
SB-124	602.73	158.	-12.	-0.007	150.71	-5.798E-01	
AG-108M	614.28	148.	-14.	-0.008	125.89	-7.475E-01	
PM-144	618.06	134.	-14.	-0.008	62.25	-7.028E-01	P
RH-106	621.92	127.	-15.	-0.008	109.99	-7.273E+00	
SB-125	635.89	18.	4.	0.002	142.27	1.933E+00	P
I-131	636.97	35.	-9.	-0.005	101.90	-5.970E+00	
AG-110M	657.76	14.	6.	0.003	97.18	3.207E-01	
NB-94	702.63	24.	-1.	-0.001	574.56	-6.100E-02	P
SB-124	722.79	16.	7.	0.004	84.71	3.720E+00	
AG-108M	722.94	23.	7.	0.004	99.36	4.429E-01	
EU-154	723.36	31.	6.	0.003	133.33	1.659E+00	
pm-146	735.72	19.	-7.	-0.004	97.71	-1.671E+00	P
pm-146	747.16	24.	-6.	-0.003	114.40	-9.709E-01	P
ZR-95	756.73	5.	5.	0.003	113.48	4.739E-01	P
AG-110M	763.94	25.	-3.	-0.002	155.60	-8.793E-01	P
PA-234M	766.41	9.	5.	0.003	100.79	9.369E+01	P
EU-152	778.92	14.	2.	0.001	403.11	8.864E-01	
BI-212	785.42	5.	14.	0.008	44.37	6.116E+01	P
CS-134	795.87	19.	7.	0.004	94.57	4.803E-01	P
TL-210	799.60	26.	8.	0.004	99.76	4.553E-01	
CS-134	801.95	33.	3.	0.002	253.53	2.205E+00	
Cs-136	818.50	42.	-8.	-0.004	122.75	-4.626E-01	
MN-54	834.85	5.	12.	0.007	46.81	7.446E-01	
Co-56	846.77	15.	-1.	-0.001	674.43	-6.189E-02	P
NB-94	871.10	0.	11.	0.006	30.48	6.830E-01	P
EU-154	873.23	23.	-7.	-0.004	104.00	-3.560E+00	
PA-234	880.53	53.	-13.	-0.007	86.27	-1.325E+01	
PA-234	883.24	66.	-11.	-0.006	111.93	-6.995E+00	
AG-110M	884.68	60.	11.	0.006	101.00	9.836E-01	
Sc-46	889.28	66.	-11.	-0.006	107.13	-7.072E-01	
y-88	898.04	6.	12.	0.007	52.29	8.060E-01	P
AC-228	911.07	15.	10.	0.006	91.28	2.208E+00	
AG-110M	937.49	35.	-15.	-0.009	40.85	-2.944E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	946.02	10.	5.	0.003	163.03	2.226E+00		P
EU-152	964.11	22.	4.	0.002	173.21	1.839E+00		
AC-228	968.97	61.	-16.	-0.009	75.33	-6.017E+00		
EU-154	996.33	10.	6.	0.003	86.55	3.870E+00		
PA-234M	1001.00	20.	2.	0.001	263.91	2.041E+01		P
EU-154	1004.77	23.	6.	0.003	119.56	2.301E+00		
Co-56	1037.84	20.	-4.	-0.002	150.14	-2.210E+00		P
Cs-136	1048.07	13.	8.	0.005	69.63	7.443E-01		
RH-106	1050.36	22.	1.	0.000	853.07	3.621E+00		P
BI-207	1063.66	10.	8.	0.004	99.08	7.381E-01		P
Ga-68	1077.40	35.	-16.	-0.009	83.47	-4.201E+01		
FE-59	1099.25	16.	10.	0.006	96.26	1.311E+00		
EU-152	1112.07	53.	-10.	-0.005	77.99	-5.342E+00		P
Sc-46	1120.55	32.	-5.	-0.003	166.13	-3.758E-01		
CO-60	1173.24	32.	-15.	-0.008	89.53	-1.169E+00		
Co-56	1238.28	43.	-8.	-0.004	90.87	-9.597E-01		P
NA-22	1274.53	0.	7.	0.004	37.80	5.812E-01		
FE-59	1291.60	21.	-8.	-0.005	130.66	-1.617E+00		
CO-60	1332.50	6.	2.	0.001	272.09	1.836E-01		P
EU-152	1408.00	6.	3.	0.002	204.86	1.235E+00		P
SB-124	1690.98	6.	-1.	-0.001	600.00	-2.190E-01		
y-88	1836.06	6.	-2.	-0.001	304.14	-2.271E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.0157E+00	3.0157E+00	1.447E+02%	1.50E+01
NA-22	#A	5.8117E-01	5.8117E-01	3.780E+01%	6.12E-01
K-40		2.0116E+02	2.0116E+02	6.796E+00%	1.38E+01
Sc-46	#A	-7.0722E-01	-7.0722E-01	1.071E+02%	2.57E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+01
MN-54	#A	7.4462E-01	7.4462E-01	4.681E+01%	7.71E-01
FE-59	#A	1.3109E+00	1.3109E+00	9.626E+01%	2.80E+00
Co-56	#A	-6.1893E-02	-6.1893E-02	6.744E+02%	1.27E+00
CO-57	#A	-1.9089E-01	-1.9089E-01	1.562E+02%	1.01E+00
CO-58	#	1.3067E+00	1.3067E+00	2.946E+01%	1.04E+00
CO-60	#A	1.8362E-01	1.8362E-01	2.721E+02%	1.20E+00
ZN-65	#A	-7.3260E-02	-7.3260E-02	1.553E+03%	4.95E+00
NB-94	#A	3.1472E-01	3.1472E-01	3.048E+01%	1.39E+00
ZR-95	#A	4.7386E-01	4.7386E-01	1.135E+02%	1.40E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.54E+00
RU-103	#	6.9686E-01	6.9686E-01	3.771E+01%	5.67E-01
RH-106	#A	-7.2731E+00	-7.2731E+00	1.100E+02%	2.69E+01
AG-108M	#A	2.5186E-01	2.5186E-01	9.936E+01%	9.69E-01

AG-110M#A	9.8363E-01	9.8363E-01	1.010E+02%	3.36E+00
SN-113 #A	5.2097E-01	5.2097E-01	1.144E+02%	2.03E+00
SB-124 #A	-1.5359E-01	-1.5359E-01	8.471E+01%	2.96E+00
SB-125 #A	1.6430E+00	1.6430E+00	6.393E+01%	2.32E+00
I-131 #A	3.1382E-01	3.1383E-01	1.041E+02%	8.38E-01
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.26E+00
Ga-68 #A	-4.1889E+01	-4.2011E+01	8.347E+01%	7.80E+01
Tc-99m #A	0.0000E+00	0.0000E+00	1.000E+03%	1.71E+00
BA-133 #A	-1.2497E-01	-1.2497E-01	1.205E+02%	3.10E+00
CS-134 #A	4.2834E-01	4.2834E-01	9.457E+01%	2.87E+00
CS-137 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+00
CE-139 #A	2.6571E-01	2.6571E-01	1.219E+02%	1.10E+00
Ba-140 #A	1.1694E+00	1.1694E+00	1.981E+02%	4.03E+00
La-140 #	7.7826E-01	7.7827E-01	4.296E+01%	7.70E-01
CE-141 #A	-7.2694E-01	-7.2695E-01	1.474E+02%	3.59E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144 #A	1.7777E-02	1.7777E-02	2.755E+03%	1.22E+00
EU-152 #A	-1.7502E+00	-1.7502E+00	9.450E+01%	5.66E+00
EU-154 #A	-1.1607E-01	-1.1607E-01	6.765E+01%	1.27E+01
EU-155 #A	5.1287E-01	5.1287E-01	1.795E+02%	8.79E+00
HF-181 #A	2.7666E-01	2.7666E-01	1.180E+02%	2.08E+00
Ta-182 #A	1.6602E+00	1.6602E+00	1.037E+02%	5.51E+00
Hg-203 #A	2.8247E-01	2.8247E-01	1.027E+02%	9.90E-01
TL-208	2.0999E+00	2.0999E+00	2.029E+01%	8.51E-01
pm-146 #A	-9.7094E-01	-9.7094E-01	1.144E+02%	4.17E+00
y-88 #A	8.0604E-01	8.0605E-01	5.229E+01%	9.70E-01
Cd-113m#A	-8.9644E+02	-8.9644E+02	5.272E+02%	1.66E+04
Cd-109 #A	7.6037E+00	7.6037E+00	1.890E+02%	4.82E+01
Cf-251 #A	1.6184E+00	1.6184E+00	1.015E+02%	4.25E+00
Cf-249 #A	7.7315E-01	7.7315E-01	1.060E+02%	2.06E+00
Sn-126 #A	-4.2735E+00	-4.2735E+00	1.116E+02%	1.60E+01
PB-210 #A	-2.0092E+01	-2.0092E+01	7.158E+01%	5.10E+01
PB-212	5.4508E+00	5.4508E+00	1.230E+01%	1.44E+00
PB-214	6.6472E+00	6.6472E+00	1.462E+01%	1.76E+00
BI-207 #A	4.2031E-01	4.2031E-01	9.908E+01%	1.10E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	2.161E+03%	1.75E+01
U-235 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.37E+01
BI-214	5.3437E+00	5.3437E+00	1.725E+01%	1.83E+00
BI-210M#A	-7.5958E-01	-7.5958E-01	8.689E+01%	2.21E+00
AC-228 #A	2.2084E+00	2.2084E+00	9.128E+01%	4.61E+00
TH-227 A	4.6506E+00	4.6506E+00	7.536E+01%	2.07E+01
TH-229 #A	1.1706E+00	1.1706E+00	1.640E+02%	1.88E+01
TH-234 #A	-4.9115E+00	-4.9115E+00	2.408E+02%	4.06E+01
PA-231 #A	1.1011E+01	1.1011E+01	1.300E+02%	6.55E+01
PA-233 #A	6.9384E-01	6.9384E-01	1.841E+02%	5.89E+00
PA-234 #A	1.4257E+00	1.4257E+00	1.630E+02%	7.98E+00
PA-234M#A	3.9456E+01	3.9456E+01	1.008E+02%	1.93E+02
AM-241 #A	-6.9088E-01	-6.9088E-01	2.045E+02%	4.77E+00
Np-237 #A	2.2095E+00	2.2095E+00	1.763E+02%	1.31E+01

Ir-192 #A	2.2045E-01	2.2045E-01	1.067E+02%		2.46E+00
Cs-136 #A	7.3817E-02	7.3818E-02	6.963E+01%		1.95E+00
Np-239 #A	-1.2963E+00	-1.2964E+00	1.907E+02%		8.28E+00
Nd-147 #A	1.5960E+00	1.5960E+00	1.038E+02%		7.32E+00
TL-210 #A	4.1541E-01	4.1541E-01	9.796E+01%		1.56E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 2.207E+02 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 2.2070389E+02 Bq/Sample

Test America St. Louis Spectrum ID: 19_Gamma_20181616

Sample Description: 379959_Gamma_160-29881-A-37-B
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-B

Decay to Time: 8/23/2018 18:46 Live Time: 1800 sec
Acquisition Time: 8/23/2018 18:46:17 Real Time: 1802 sec
Analysis Time: 8/28/2018 11:55 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.016E+00	144.7	4.364E+00	4.366E+00	1.496E+01
NA-22	5.812E-01	37.8	2.197E-01	2.216E-01	6.119E-01
K-40	2.012E+02	6.8	1.367E+01	1.703E+01	1.380E+01
Sc-46	-7.072E-01	107.1	7.577E-01	7.585E-01	2.569E+00
CR-51	0.000E+00	1.#INF	1.539E+00	1.539E+00	2.178E+01
MN-54	7.446E-01	46.8	3.486E-01	3.506E-01	7.714E-01
FE-59	8.156E-01	124.3	1.014E+00	1.014E+00	3.516E+00
Co-56	4.516E-02	438.8	1.981E-01	1.982E-01	1.268E+00
CO-57	0.000E+00	1.#INF	1.479E-01	1.479E-01	1.070E+00
CO-58	1.307E+00	29.5	3.849E-01	3.906E-01	1.036E+00
CO-60	1.836E-01	272.1	4.996E-01	4.997E-01	1.203E+00
ZN-65	8.536E-01	137.5	1.174E+00	1.175E+00	4.084E+00
ZR-95	4.739E-01	113.5	5.377E-01	5.383E-01	1.396E+00
NB-95	-6.799E-01	75.2	5.115E-01	5.127E-01	1.710E+00
RU-103	6.969E-01	37.7	2.628E-01	2.651E-01	5.674E-01
RH-106	-2.517E-01	78.7	1.980E-01	1.984E-01	2.775E+01
AG-108M	2.519E-01	99.4	2.502E-01	2.506E-01	9.687E-01
AG-110M	6.762E-01	55.1	3.727E-01	3.743E-01	1.077E+00
SN-113	5.210E-01	114.4	5.962E-01	5.968E-01	2.029E+00
SB-124	-1.536E-01	84.7	1.301E-01	1.303E-01	2.957E+00
SB-125	1.643E+00	63.9	1.050E+00	1.054E+00	2.322E+00
I-131	3.138E-01	79.1	2.481E-01	2.486E-01	8.375E-01
Gd-153	0.000E+00	1.#INF	4.809E-01	4.809E-01	7.418E+00
Ga-68	-4.201E+01	83.5	3.507E+01	3.515E+01	7.796E+01
Tc-99m	-3.972E-01	148.4	5.897E-01	5.901E-01	1.974E+00
BA-133	-1.250E-01	120.5	1.506E-01	1.508E-01	3.097E+00
CS-134	8.911E-01	88.4	7.878E-01	7.891E-01	1.555E+00
CS-137	0.000E+00	1.#INF	1.886E-01	1.886E-01	1.404E+00
CE-139	2.657E-01	121.9	3.240E-01	3.243E-01	1.098E+00
Ba-140	1.118E+00	215.7	2.411E+00	2.412E+00	4.030E+00
La-140	7.783E-01	43.0	3.344E-01	3.368E-01	7.695E-01
CE-141	-7.269E-01	157.4	1.144E+00	1.145E+00	3.829E+00
CE-144	0.000E+00	1.#INF	1.633E+00	1.633E+00	1.319E+01

PM-144	2.813E-01	89.5	2.517E-01	2.521E-01	8.691E-01
EU-152	1.581E+00	94.6	1.495E+00	1.498E+00	3.203E+00
EU-154	1.380E+00	64.3	8.875E-01	8.903E-01	2.281E+00
EU-155	5.542E-01	216.0	1.197E+00	1.198E+00	1.042E+01
HF-181	0.000E+00	1.#INF	3.508E-01	3.508E-01	2.083E+00
Ta-182	1.929E+00	82.3	1.589E+00	1.592E+00	5.894E+00
Hg-203	0.000E+00	1.#INF	1.802E-01	1.802E-01	1.207E+00
TL-208	2.100E+00	20.3	4.260E-01	4.392E-01	8.507E-01
PM-146	5.868E-01	92.8	5.443E-01	5.451E-01	1.254E+00
Y-88	1.121E-01	86.6	9.705E-02	9.726E-02	1.604E+00
Cd-113m	-8.964E+02	527.2	4.726E+03	4.727E+03	1.657E+04
Cd-109	0.000E+00	1.#INF	5.655E+00	5.655E+00	6.016E+01
Se-75	1.951E-01	158.7	3.098E-01	3.100E-01	1.730E+00
Cf-251	1.618E+00	101.5	1.643E+00	1.645E+00	4.254E+00
Cf-249	7.732E-01	106.0	8.192E-01	8.202E-01	2.063E+00
Sn-126	-4.273E+00	111.6	4.768E+00	4.774E+00	1.596E+01
PB-210	-1.535E+01	90.1	1.383E+01	1.387E+01	4.881E+01
PB-212	5.451E+00	12.3	6.705E-01	7.283E-01	1.442E+00
PB-214	6.647E+00	14.6	9.717E-01	1.029E+00	1.760E+00
BI-207	8.309E-03	66.0	5.483E-03	5.500E-03	1.610E+00
BI-212	-2.218E-01	2873.4	6.373E+00	6.373E+00	1.749E+01
BI-214	5.344E+00	17.3	9.219E-01	9.612E-01	1.834E+00
BI-210M	-7.596E-01	86.9	6.600E-01	6.612E-01	2.213E+00
AC-228	2.208E+00	91.3	2.016E+00	2.019E+00	4.609E+00
TH-227	4.651E+00	76.1	3.540E+00	3.549E+00	9.768E+00
TH-229	1.171E+00	164.0	1.920E+00	1.921E+00	1.885E+01
TH-234	-7.931E+00	88.4	7.012E+00	7.025E+00	4.091E+01
PA-231	1.101E+01	130.0	1.432E+01	1.433E+01	6.553E+01
PA-233	6.938E-01	184.1	1.277E+00	1.278E+00	5.892E+00
PA-234	1.268E+00	159.0	2.017E+00	2.018E+00	7.982E+00
PA-234M	2.477E+01	115.8	2.869E+01	2.872E+01	2.429E+02
U-235	-3.178E+00	154.5	4.910E+00	4.913E+00	1.643E+01
AM-241	-6.909E-01	204.5	1.413E+00	1.413E+00	4.767E+00
Np-237	2.373E+00	213.5	5.068E+00	5.069E+00	1.695E+01
Ir-192	2.205E-01	106.7	2.351E-01	2.355E-01	2.465E+00
Cs-136	-4.626E-01	122.7	5.678E-01	5.684E-01	1.951E+00
Np-239	1.319E+00	216.7	2.859E+00	2.860E+00	9.561E+00
Nd-147	2.207E+00	120.6	2.662E+00	2.665E+00	9.205E+00
Mo-99	3.031E+00	70.5	2.137E+00	2.142E+00	8.319E+00
Ge-69	1.485E+00	90.8	1.348E+00	1.351E+00	1.013E+01
Br-82	-9.826E-01	71.2	6.995E-01	7.017E-01	2.326E+00
V-48	9.677E-02	134.4	1.300E-01	1.302E-01	1.415E+00
Sr-85	5.264E-02	946.0	4.980E-01	4.980E-01	1.748E+00
Rb-83	8.280E-01	66.6	5.514E-01	5.534E-01	1.510E+00
Kr-85	0.000E+00	1.#INF	1.380E+01	1.380E+01	4.070E+02
Cm-247	6.645E-01	86.5	5.746E-01	5.756E-01	1.293E+00
Hf-175	-6.595E-02	711.6	4.693E-01	4.693E-01	1.634E+00
Lu-172	9.520E-01	70.5	6.710E-01	6.731E-01	2.150E+00
Kr-85m	1.429E-01	133.3	1.904E-01	1.906E-01	1.113E+00
NB-94	4.446E-01	106.1	4.718E-01	4.723E-01	1.613E+00
TL-210	4.154E-01	98.0	4.069E-01	4.076E-01	1.556E+00
Total	3.049E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-37-B

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181616.An1

Acquisition information

Start time:	8/23/2018 6:46:17 PM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Extra_Long_Rev7.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1415

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-20.	90.12	0.93	1.709E-02	46.54	4.250	PBC<MDA	PB210
50.14	16.	113.48	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
63.29	-9.	240.82	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
77.22	57.	23.16	0.91	3.148E-02				
80.99	18.	209.48	0.97	3.218E-02	80.99	34.060	PBC<MDA	BA133
84.00	18.	211.47	0.97	3.266E-02	84.00	23.000	PBC<MDA	Cm247
86.49	18.	213.52	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.433E+00	Sn126
86.54	18.	216.04	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.433E+00	Sn126
86.94	16.	258.71	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.545E-01	EU155
					86.94	9.040	2.898E+00	Sn126
106.13	18.	216.73	0.99	3.430E-02	106.13	22.700	PBC<MDA	Np239
121.12	10.	158.75	1.00	3.404E-02	121.12	17.140	PBC<MDA	Se75
131.29	9.	284.80	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
162.66	2.	758.29	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	121.92	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	15.	101.50	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
181.07	13.	99.99	1.06	2.908E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	1.342E+00	Lu172
181.47	13.	113.40	1.06	2.904E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	1.266E+00	Lu172
185.72	11.	144.80	1.06	2.864E-02	185.72	54.000	PBC<MDA	U235
210.85	8.	164.03	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.36	106.	15.32	0.96	2.415E-02	238.63	43.300	5.192E+00	PB212
241.78	29.	29.79	1.11	2.388E-02	242.00	7.430	9.096E+00	PB214
256.24	11.	101.51	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
277.28	34.	26.21	1.14	2.153E-02	277.28	6.310	1.397E+01	TL208
279.54	5.	200.05	1.14	2.139E-02	279.20	81.460	PBC<MDA	Hg203
					279.54	24.790	5.413E-01	Se75
294.74	6.	304.77	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	11.	168.63	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	10.	187.39	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	178.93	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
300.18	11.	184.10	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
302.65	11.	188.78	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
302.85	11.	193.64	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
304.47	11.	198.19	1.16	2.000E-02	304.47	14.000	PBC<MDA	Kr85m
					304.85	4.290	6.931E+00	Ba140
					304.90	28.000	1.062E+00	BI210M
304.85	10.	215.73	1.16	1.998E-02	304.47	14.000	PBC<MDA	Kr85m
					304.85	4.290	6.513E+00	Ba140
					304.90	28.000	9.980E-01	BI210M
328.76	9.	161.09	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	179.14	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
351.67	80.	14.62	1.24	1.782E-02	351.93	37.600	6.647E+00	PB214
364.48	8.	79.06	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	11.	113.22	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	114.45	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
400.66	1.	754.98	1.25	1.608E-02	400.66	11.370	PBC<MDA	Se75
402.40	9.	86.47	1.25	1.602E-02	402.40	72.000	PBC<MDA	Cm247
427.88	8.	96.79	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	1.	602.93	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	104.96	1.29	1.458E-02	453.88	65.000	PBC<MDA	PM146
463.37	9.	84.67	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.66	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	144.70	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	15.	37.71	1.33	1.358E-02	497.05	90.900	6.969E-01	RU103
511.86	55.	13.47	2.59	1.328E-02	511.86	20.000	1.152E+01	RH106
513.99	1.	946.01	1.34	1.324E-02	513.98	0.430	1.215E+01	Kr85
					513.99	99.280	5.264E-02	Sr85
520.35	7.	98.86	1.35	1.311E-02	520.35	46.110	PBC<MDA	Rb83
531.00	7.	120.62	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	2.	507.13	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
552.50	5.	89.27	1.37	1.252E-02	552.50	16.300	PBC<MDA	Rb83
554.34	2.	255.95	1.37	1.249E-02	554.34	70.600	PBC<MDA	Br82
563.24	2.	551.91	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	88.41	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.616E+00	PA234
					569.70	97.740	3.874E-01	BI207
569.47	3.	303.66	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.474E+00	PA234
					569.70	97.740	1.237E-01	BI207
574.00	7.	90.79	1.39	1.217E-02	574.00	11.800	PBC<MDA	Ge69
583.18	38.	20.29	1.14	1.202E-02	583.02	84.500	2.100E+00	TL208
609.65	52.	17.25	1.39	1.163E-02	609.31	46.090	5.354E+00	BI214
					610.30	5.750	4.297E+01	RU103
619.10	13.	106.83	1.43	1.149E-02	619.10	43.100	PBC<MDA	Br82
635.89	4.	142.27	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	6.	97.18	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
696.54	5.	89.47	1.49	1.052E-02	696.54	99.000	PBC<MDA	PM144
702.63	8.	106.11	1.49	1.045E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	84.71	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.428E-01	AG108M
					723.36	20.220	1.990E+00	EU154
722.94	7.	99.36	1.51	1.024E-02	722.79	10.810	3.721E+00	SB124
					722.94	90.840	4.429E-01	AG108M
					723.36	20.220	1.990E+00	EU154
723.36	6.	133.33	1.51	1.023E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.690E-01	AG108M
					723.36	20.220	1.659E+00	EU154
735.72	4.	152.96	1.52	1.010E-02	735.72	22.500	PBC<MDA	PM146
739.50	5.	99.42	1.52	1.007E-02	739.50	12.130	PBC<MDA	Mo99
756.73	5.	113.48	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
763.94	5.	87.68	1.54	9.827E-03	763.94	22.280	PBC<MDA	AG110M
766.41	5.	115.84	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	94.61	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
785.42	14.	44.37	1.56	9.628E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	94.57	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
799.60	8.	99.76	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	3.	253.53	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
810.78	22.	29.46	1.58	9.404E-03	810.78	99.460	1.307E+00	CO58
827.79	2.	398.21	1.59	9.262E-03	827.79	24.200	PBC<MDA	Br82
834.85	12.	46.81	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
861.30	8.	106.97	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
873.23	8.	85.58	1.62	8.903E-03	873.23	12.270	PBC<MDA	EU154
884.68	11.	101.00	1.63	8.818E-03	884.68	72.680	PBC<MDA	AG110M
898.04	7.	86.61	1.64	8.721E-03	898.04	93.700	PBC<MDA	Y88
900.69	4.	162.18	1.64	8.702E-03	900.69	27.710	PBC<MDA	Lu172
911.07	10.	91.28	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	4.	232.82	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
964.11	4.	173.21	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
996.33	8.	84.22	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1004.77	3.	242.03	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	561.50	1.74	7.832E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	10.	109.22	1.75	7.762E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	99.08	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1093.64	9.	74.51	1.78	7.530E-03	1093.64	75.230	PBC<MDA	Lu172
1099.25	6.	124.27	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1106.50	3.	302.22	1.79	7.464E-03	1106.50	26.000	PBC<MDA	Ge69
1115.55	6.	137.52	1.80	7.418E-03	1115.55	50.600	PBC<MDA	ZN65
1119.86	6.	123.13	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	122.22	1.80	7.393E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.716E-01	Sc46
					1121.30	34.900	1.352E+00	Ta182
1120.87	6.	125.70	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.352E+00	Ta182
1218.85	9.	106.38	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	37.80	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.651E+00	EU154
1311.60	5.	134.39	1.94	6.547E-03	1311.60	98.000	PBC<MDA	V48
1317.43	7.	86.95	1.94	6.524E-03	1317.43	27.000	PBC<MDA	Br82
1332.50	2.	272.09	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	204.86	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1461.02	232.	6.80	1.97	6.004E-03	1460.83	10.670	2.012E+02	K40
1596.21	6.	42.96	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140
1764.61	8.	50.98	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.93	77.22	43.	57.	1.800E+03	23.16	0.906	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.30	46.54	172.	-20.	-0.011	90.12	0.934s
TH-227	199.70	50.14	163.	16.	0.009	113.48	0.938s
AM-241	237.25	59.54	279.	-12.	-0.006	204.46	0.946s
TH-234	252.25	63.29	254.	-9.	-0.005	240.82	0.950
Sn-126	256.21	64.28	261.	-21.	-0.012	111.57	0.951s
BA-133	323.00	80.99	732.	18.	0.010	209.48	0.966s
Cm-247	335.04	84.00	750.	18.	0.010	211.47	0.968s
Np-237	344.99	86.49	768.	18.	0.010	213.52	0.971s
EU-155	345.20	86.54	787.	18.	0.010	216.04	0.971s
Sn-126	346.79	86.94	805.	16.	0.009	258.71	0.971s
Sn-126	349.31	87.57	821.	0.	0.000	1000.00	0.972s
Cd-109	351.19	88.04	821.	0.	0.000	1000.00	0.972s
Hf-175	356.46	89.36	821.	0.	0.000	1000.00	0.973s
Nd-147	363.42	91.10	821.	0.	0.000	1000.00	0.975
TH-234	369.37	92.59	848.	-27.	-0.015	88.40	0.976s
AC-228	372.41	93.35	821.	0.	0.000	1000.00	0.977s
Se-75	385.92	96.73	821.	0.	0.000	1000.00	0.980s
Gd-153	389.00	97.50	821.	0.	0.000	1000.00	0.981s
Np-239	396.99	99.50	821.	0.	0.000	1000.00	0.982s
Gd-153	411.78	103.20	821.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	821.	0.	0.000	1000.00	0.986s
Np-239	423.49	106.13	794.	18.	0.010	216.73	0.988s
Se-75	483.41	121.12	121.	10.	0.006	158.75	1.002s
EU-152	486.05	121.78	131.	0.	0.000	1000.00	1.002s
CO-57	487.18	122.06	131.	0.	0.000	1000.00	1.003s
EU-154	491.33	123.10	135.	-15.	-0.008	112.55	1.004s
PA-234	524.09	131.29	324.	9.	0.005	284.80	1.011
HF-181	531.00	133.02	333.	0.	0.000	1000.00	1.013s
CE-144	533.06	133.54	333.	0.	0.000	1000.00	1.013s
Se-75	542.89	136.00	333.	0.	0.000	1000.00	1.015s
HF-181	544.09	136.30	333.	0.	0.000	1000.00	1.015s
CO-57	544.79	136.47	444.	-20.	-0.011	148.59	1.016s
Tc-99m	560.92	140.51	446.	-20.	-0.011	148.44	1.019D
Mo-99	560.92	140.51	466.	-20.	-0.011	151.72	1.019D
U-235	574.02	143.79	486.	-20.	-0.011	154.49	1.022s
CE-141	580.63	145.44	507.	-20.	-0.011	157.39	1.024s
Kr-85m	602.86	151.00	88.	-10.	-0.006	178.33	1.029
Ba-140	649.47	162.66	114.	2.	0.001	758.29	1.039s
U-235	652.34	163.38	116.	0.	0.000	1000.00	1.040s
CE-139	662.23	165.85	95.	12.	0.006	121.92	1.042s
Cf-251	705.19	176.60	59.	15.	0.008	101.50	1.051s
Mo-99	723.06	181.07	84.	13.	0.007	99.99	1.055s
Lu-172	724.66	181.47	97.	13.	0.007	113.40	1.056s
U-235	741.65	185.72	129.	11.	0.006	144.80	1.060s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	772.79	193.51	70.	-4.	-0.002	613.90	1.066s
TH-229	842.11	210.85	44.	8.	0.004	164.03	1.082s
Cf-251	906.68	227.00	62.	-11.	-0.006	133.67	1.096s
TH-227	942.54	235.97	275.	-14.	-0.008	171.58	1.104s
PB-212	953.18	238.63	27.	103.	0.057	12.30	1.106D
PB-214	966.63	242.00	23.	29.	0.016	29.79	1.109D
EU-152	977.41	244.69	248.	-4.	-0.002	595.14	1.111s
TH-227	1023.57	256.24	30.	11.	0.006	101.51	1.122s
Cd-113m	1053.40	263.70	64.	-2.	-0.001	527.25	1.128s
Se-75	1057.24	264.66	66.	0.	0.000	1000.00	1.129s
BI-210M	1061.92	265.83	80.	-15.	-0.008	86.89	1.130
TL-208	1107.70	277.28	23.	34.	0.019	26.21	1.140
Hg-203	1115.37	279.20	57.	0.	0.000	1000.00	1.141s
Se-75	1116.73	279.54	51.	5.	0.003	200.05	1.142s
I-131	1135.76	284.30	126.	-13.	-0.007	129.27	1.146s
PB-214	1178.90	295.09	150.	6.	0.003	304.77	1.155
TL-210	1182.54	296.00	155.	11.	0.006	168.63	1.156s
PB-212	1198.65	300.03	167.	10.	0.005	187.39	1.159
PA-231	1198.81	300.07	177.	11.	0.006	178.93	1.159s
PA-233	1199.25	300.18	187.	11.	0.006	184.10	1.159s
PA-231	1209.13	302.65	198.	11.	0.006	188.78	1.162s
BA-133	1209.93	302.85	209.	11.	0.006	193.64	1.162s
Kr-85m	1216.40	304.47	219.	11.	0.006	198.19	1.163s
Ba-140	1217.92	304.85	230.	10.	0.006	215.73	1.164s
BI-210M	1218.11	304.90	240.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	240.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	240.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	240.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	240.	0.	0.000	1000.00	1.177
La-140	1313.52	328.76	96.	9.	0.005	161.09	1.184s
Cf-249	1332.23	333.44	133.	9.	0.005	179.14	1.188s
Cs-136	1360.74	340.57	75.	-13.	-0.007	97.31	1.194s
Hf-175	1372.06	343.40	88.	-2.	-0.001	711.62	1.197s
HF-181	1381.77	345.83	90.	0.	0.000	1000.00	1.199s
PB-214	1405.13	351.67	16.	80.	0.045	14.62	1.235s
BA-133	1422.43	356.00	157.	-13.	-0.007	143.57	1.207s
I-131	1456.35	364.48	16.	8.	0.004	79.06	1.215s
Mo-99	1464.10	366.42	35.	-2.	-0.001	505.57	1.216s
BA-133	1533.76	383.84	99.	-14.	-0.008	85.30	1.231s
Cf-249	1550.19	387.95	66.	11.	0.006	113.22	1.235s
SN-113	1565.14	391.69	58.	10.	0.005	114.45	1.238
Se-75	1601.01	400.66	28.	1.	0.001	754.98	1.245
Cm-247	1607.97	402.40	27.	9.	0.005	86.47	1.247s
SB-125	1709.84	427.88	12.	8.	0.004	96.79	1.268s
AG-108M	1734.08	433.94	21.	1.	0.001	602.93	1.273s
PM-146	1813.83	453.88	16.	8.	0.004	104.96	1.290s
SB-125	1851.76	463.37	25.	9.	0.005	84.67	1.298s
Ir-192	1870.53	468.06	31.	8.	0.004	106.66	1.302s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	1908.66	477.60	63.	8.	0.004	144.70	1.310s
HF-181	1926.26	482.00	71.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	71.	0.	0.000	1000.00	1.317s
RU-103	1986.48	497.05	5.	15.	0.009	37.71	1.326s
RH-106	2045.71	511.86	0.	55.	0.031	13.47	2.588s
Kr-85	2054.17	513.98	70.	0.	0.000	1000.00	1.340s
Sr-85	2054.21	513.99	69.	1.	0.001	946.01	1.340s
Rb-83	2079.64	520.35	9.	7.	0.004	98.86	1.345s
Rb-83	2116.40	529.54	30.	-2.	-0.001	340.17	1.352s
Nd-147	2122.23	531.00	29.	7.	0.004	120.62	1.354s
Ba-140	2147.27	537.26	18.	2.	0.001	507.13	1.359s
Rb-83	2208.22	552.50	9.	5.	0.003	89.27	1.371s
Br-82	2215.58	554.34	17.	2.	0.001	255.95	1.373s
CS-134	2251.16	563.24	17.	2.	0.001	551.91	1.380s
CS-134	2275.49	569.32	23.	8.	0.005	88.41	1.385s
PA-234	2276.09	569.47	31.	3.	0.001	303.66	1.385s
BI-207	2277.02	569.70	47.	-12.	-0.007	87.20	1.385s
Ge-69	2294.21	574.00	16.	7.	0.004	90.79	1.389s
TL-208	2330.93	583.18	8.	38.	0.021	20.29	1.141
SB-125	2400.20	600.50	170.	-12.	-0.007	156.32	1.410s
SB-124	2409.12	602.73	158.	-12.	-0.007	150.71	1.412s
BI-214	2436.77	609.65	10.	52.	0.029	17.25	1.386
RU-103	2439.39	610.30	179.	-16.	-0.009	124.00	1.418s
AG-108M	2455.31	614.28	163.	-16.	-0.009	118.46	1.421s
PM-144	2470.44	618.06	148.	-16.	-0.009	55.85	1.424s
Br-82	2474.59	619.10	91.	13.	0.007	106.83	1.425s
RH-106	2485.86	621.92	135.	-15.	-0.008	113.29	1.427s
SB-125	2541.74	635.89	18.	4.	0.002	142.27	1.439s
I-131	2546.08	636.97	35.	-9.	-0.005	101.90	1.440s
AG-110M	2629.22	657.76	14.	6.	0.003	97.18	1.456s
CS-137	2644.82	661.66	20.	0.	0.000	1000.00	1.459s
PM-144	2784.35	696.54	8.	5.	0.003	89.47	1.487s
Br-82	2791.62	698.36	41.	-12.	-0.006	83.70	1.488
NB-94	2808.70	702.63	34.	8.	0.005	106.11	1.492s
SB-124	2889.33	722.79	16.	7.	0.004	84.71	1.507s
AG-108M	2889.93	722.94	23.	7.	0.004	99.36	1.507s
EU-154	2891.62	723.36	31.	6.	0.003	133.33	1.508s
PM-146	2941.07	735.72	15.	4.	0.002	152.96	1.518s
Mo-99	2956.19	739.50	11.	5.	0.003	99.42	1.520s
PM-146	2986.83	747.16	24.	-6.	-0.003	100.74	1.526s
ZR-95	3025.11	756.73	5.	5.	0.003	113.48	1.534s
AG-110M	3053.97	763.94	6.	5.	0.003	87.68	1.539s
NB-95	3061.35	765.79	35.	-12.	-0.007	75.24	1.541s
PA-234M	3063.85	766.41	13.	5.	0.003	115.84	1.541s
Br-82	3104.20	776.50	44.	-14.	-0.008	71.19	1.549s
Mo-99	3109.88	777.92	59.	-7.	-0.004	157.38	1.550s
EU-152	3113.88	778.92	47.	11.	0.006	94.61	1.551s
BI-212	3139.88	785.42	5.	14.	0.008	44.37	1.556s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3181.69	795.87	19.	7.	0.004	94.57	1.564s
TL-210	3196.61	799.60	26.	8.	0.004	99.76	1.567
CS-134	3206.02	801.95	33.	3.	0.002	253.53	1.569s
CO-58	3241.32	810.78	10.	22.	0.012	29.46	1.575s
La-140	3261.30	815.77	32.	0.	0.000	1000.00	1.579s
Cs-136	3272.22	818.50	42.	-8.	-0.004	122.75	1.581s
Br-82	3309.39	827.79	19.	2.	0.001	398.21	1.589s
MN-54	3337.63	834.85	5.	12.	0.007	46.81	1.594
Co-56	3385.32	846.77	15.	-1.	-0.001	674.43	1.603s
TL-208	3440.51	860.56	14.	8.	0.004	106.97	1.614
NB-94	3482.65	871.10	25.	-7.	-0.004	114.60	1.621s
Ge-69	3486.26	872.00	33.	0.	0.000	1000.00	1.622s
EU-154	3491.19	873.23	19.	8.	0.004	85.58	1.623s
PA-234	3520.39	880.53	53.	-13.	-0.007	86.27	1.628s
PA-234	3531.23	883.24	66.	-11.	-0.006	111.93	1.630s
AG-110M	3537.01	884.68	60.	11.	0.006	101.00	1.632s
Sc-46	3555.40	889.28	66.	-11.	-0.006	107.13	1.635s
Y-88	3590.45	898.04	14.	7.	0.004	86.61	1.642s
Lu-172	3601.05	900.69	22.	4.	0.002	162.18	1.644s
AC-228	3642.58	911.07	15.	10.	0.006	91.28	1.651s
AG-110M	3748.30	937.49	35.	-15.	-0.009	39.57	1.671s
V-48	3775.54	944.30	30.	-7.	-0.004	116.93	1.676s
PA-234	3782.42	946.02	31.	4.	0.002	232.82	1.677s
EU-152	3854.81	964.11	22.	4.	0.002	173.21	1.691s
AC-228	3874.26	968.97	61.	-16.	-0.009	75.33	1.694s
V-48	3932.40	983.50	15.	-3.	-0.002	289.64	1.705s
EU-154	3983.73	996.33	21.	8.	0.005	84.22	1.714s
EU-154	4017.53	1004.77	14.	3.	0.002	242.03	1.721s
Co-56	4149.84	1037.84	39.	2.	0.001	561.50	1.745s
Br-82	4174.49	1044.00	41.	0.	0.000	1000.00	1.749s
Cs-136	4190.78	1048.07	49.	-12.	-0.007	86.39	1.752s
RH-106	4199.94	1050.36	51.	10.	0.005	109.22	1.754s
BI-207	4253.17	1063.66	10.	8.	0.004	99.08	1.763s
Ga-68	4308.15	1077.40	35.	-16.	-0.009	83.47	1.773s
Lu-172	4373.14	1093.64	17.	9.	0.005	74.51	1.785
FE-59	4395.60	1099.25	27.	6.	0.003	124.27	1.789s
Ge-69	4424.61	1106.50	49.	3.	0.002	302.22	1.794s
ZN-65	4460.81	1115.55	29.	6.	0.003	137.52	1.800s
BI-214	4479.78	1120.29	21.	6.	0.003	123.13	1.803
Sc-46	4480.84	1120.55	26.	6.	0.003	122.22	1.804s
Ta-182	4483.84	1121.30	28.	6.	0.003	125.70	1.804s
CO-60	4691.70	1173.24	32.	-15.	-0.008	89.53	1.841s
Ta-182	4884.51	1221.41	16.	9.	0.005	106.38	1.874s
Co-56	4952.04	1238.28	43.	-8.	-0.004	88.31	1.886s
NA-22	5097.14	1274.53	0.	7.	0.004	37.80	1.910s
EU-154	5097.18	1274.54	7.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	21.	-8.	-0.005	130.66	1.922s
V-48	5245.52	1311.60	17.	5.	0.003	134.39	1.935s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	5251.13	1313.00	22.	0.	0.000	1000.00	1.936s
Br-82	5268.86	1317.43	14.	7.	0.004	86.95	1.939s
CO-60	5329.19	1332.50	6.	2.	0.001	272.09	1.949s
EU-152	5631.44	1408.00	6.	3.	0.002	204.86	1.999s
K-40	5843.72	1461.02	8.	232.	0.129	6.80	1.973
Br-82	5899.20	1474.88	0.	0.	0.000	1000.00	2.042s
La-140	6385.01	1596.21	1.	6.	0.004	42.96	2.119s
SB-124	6764.54	1690.98	6.	-1.	-0.001	600.00	2.176s
BI-214	7058.94	1764.49	3.	8.	0.004	50.98	2.219s
Co-56	7086.41	1771.35	11.	0.	0.000	1000.00	2.223s
Y-88	7345.60	1836.06	6.	-2.	-0.001	304.14	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.0157E+00					5.31E+01	
			477.60	3.016E+00	?(	1.496E+01	1.45E+02	1.05E+01 G
NA-22	C	5.8117E-01					9.50E+02	
			1274.53	5.812E-01	?(	6.119E-01	3.78E+01	9.99E+01 G
K-40	N	2.0116E+02					4.66E+11	
			1460.83	2.012E+02	(P	1.380E+01	6.80E+00	1.07E+01 G
Sc-46	F	-7.0722E-01					8.38E+01	
			889.28	-7.072E-01	?(	2.569E+00	1.07E+02	1.00E+02 G
			1120.55	4.716E-01	+	1.999E+00	1.22E+02	1.00E+02 G
MN-54	C	7.4462E-01					3.12E+02	
			834.85	7.446E-01	&(	7.714E-01	4.68E+01	1.00E+02 G
FE-59	F	8.1562E-01					4.45E+01	
			1099.25	8.156E-01	?(	3.516E+00	1.24E+02	5.65E+01 G
			1291.60	-1.617E+00	+	4.703E+00	1.31E+02	4.32E+01 G
Co-56	C	4.5157E-02					7.73E+01	
			846.77	-6.189E-02	?(P	1.268E+00	6.74E+02	9.99E+01 G
			1238.28	-9.597E-01	+ P	4.077E+00	8.83E+01	6.61E+01 G
			1037.84	8.023E-01	&(P	1.604E+01	5.61E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.280E+01	1.00E+03	1.55E+01 A

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	1.3067E+00					7.09E+01	
			810.78	1.307E+00	?(	1.036E+00	2.95E+01	9.95E+01 G
CO-60	F	1.8362E-01					1.93E+03	
			1332.50	1.836E-01	?(P	1.203E+00	2.72E+02	1.00E+02 G
			1173.24	-1.169E+00	+	2.265E+00	8.95E+01	9.99E+01 G
ZN-65	F	8.5356E-01					2.44E+02	
			1115.55	8.536E-01	?(P	4.084E+00	1.38E+02	5.06E+01 G
ZR-95	I	4.7386E-01					6.40E+01	
			756.73	4.739E-01	?(P	1.396E+00	1.13E+02	5.45E+01 G
			724.20	-7.061E-02	% P	3.850E+00	1.53E+03	4.42E+01 G
NB-95	I	-6.7987E-01					6.40E+01	
			765.79	-6.799E-01	&(	1.710E+00	7.52E+01	9.98E+01 G
RU-103	I	6.9686E-01					3.93E+01	
			497.05	6.969E-01	?(P	5.674E-01	3.77E+01	9.09E+01 G
			610.30	-1.297E+01	-	5.412E+01	1.24E+02	5.75E+00 GA
RH-106	I	-2.5169E-01					3.74E+02	
			621.92	-7.273E+00	?(	2.775E+01	1.13E+02	9.93E+00 G
			1050.36	4.444E+01	?(P	1.652E+02	1.09E+02	1.56E+00 G
			511.86	1.152E+01	?	1.542E+00	1.35E+01	2.00E+01 GA
AG-108M	C	2.5186E-01					1.53E+05	
			433.94	6.012E-02	(P	9.687E-01	6.03E+02	9.05E+01 G
			722.94	4.429E-01	?(	1.509E+00	9.94E+01	9.08E+01 G
			614.28	-8.358E-01	&	3.332E+00	1.18E+02	8.98E+01 G
AG-110M	F	6.7624E-01					2.50E+02	
			657.76	3.207E-01	?(	1.077E+00	9.72E+01	9.46E+01 G
			884.68	9.836E-01	?(	3.364E+00	1.01E+02	7.27E+01 G
			937.49	-2.944E+00	+ P	5.824E+00	3.96E+01	3.44E+01 G
			1384.30	-1.216E-01	%	6.709E+00	2.37E+03	2.43E+01 G
			763.94	1.184E+00	?(P	3.576E+00	8.77E+01	2.23E+01 G
SN-113	F	5.2097E-01					1.15E+02	
			391.69	5.210E-01	?(P	2.029E+00	1.14E+02	6.40E+01 G
SB-124	F	-1.5359E-01					6.02E+01	
			602.73	-5.798E-01	?(	2.957E+00	1.51E+02	9.83E+01 G
			1690.98	-2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
			722.79	3.720E+00	?(	1.072E+01	8.47E+01	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	1.6430E+00					1.01E+03	
			427.88	9.329E-01	?(P	2.322E+00	9.68E+01	2.96E+01 G
			600.50	-3.177E+00	&	1.680E+01	1.56E+02	1.79E+01 G
			635.89	1.933E+00	(P	9.701E+00	1.42E+02	1.13E+01 G
			463.37	3.338E+00	(	9.565E+00	8.47E+01	1.05E+01 G
I-131	I	3.1383E-01					8.02E+00	
			364.48	3.138E-01	(	8.375E-01	7.91E+01	8.17E+01 G
			284.30	-5.397E+00	+	2.360E+01	1.29E+02	6.14E+00 G
			636.97	-5.970E+00	&	2.077E+01	1.02E+02	7.17E+00 G
Ga-68	C	-4.2011E+01					4.71E-02	
			1077.40	-4.201E+01	?(	7.796E+01	8.35E+01	3.30E+00 G
Tc-99m	I	-3.9724E-01					2.51E-01	
								Energy duplication
			140.51	-3.972E-01	?(	1.974E+00	1.48E+02	8.93E+01 G
BA-133	F	-1.2497E-01					3.85E+03	
			356.00	-6.381E-01	?(	3.097E+00	1.44E+02	6.20E+01 G
			302.85	1.612E+00	?(	1.056E+01	1.94E+02	1.83E+01 G
			383.84	-5.149E+00	+ P	1.830E+01	8.53E+01	8.94E+00 GA
			80.99	9.314E-01	&	6.526E+00	2.09E+02	3.41E+01 GA
CS-134	I	8.9112E-01					7.54E+02	
			795.87	4.803E-01	?(P	1.555E+00	9.46E+01	8.55E+01 G
			604.71	-6.622E-03	%	2.873E+00	1.26E+04	9.76E+01 G
			569.32	2.460E+00	?(	7.394E+00	8.84E+01	1.54E+01 G
			801.95	2.205E+00	?(	1.980E+01	2.54E+02	8.69E+00 G
			563.24	8.413E-01	?(P	1.195E+01	5.52E+02	8.35E+00 G
CE-139	F	2.6571E-01					1.38E+02	
			165.85	2.657E-01	?(	1.098E+00	1.22E+02	7.99E+01 G
Ba-140	I	1.1177E+00					1.28E+01	
			537.26	3.061E-01	&(P	4.030E+00	5.07E+02	2.44E+01 G
			162.66	5.794E-01	?(	1.520E+01	7.58E+02	6.22E+00 G
			304.85	6.513E+00	&(	4.756E+01	2.16E+02	4.29E+00 G
La-140	I	7.7827E-01					1.28E+01	
			1596.21	6.711E-01	?(P	7.695E-01	4.30E+01	9.54E+01 G
			487.02	0.000E+00	-	3.714E+00	1.00E+03	4.55E+01 G
			328.76	1.282E+00	?(P	7.043E+00	1.61E+02	2.03E+01 G
			815.77	0.000E+00	-	7.410E+00	1.00E+03	2.33E+01 G
CE-141	I	-7.2695E-01					3.25E+01	
			145.44	-7.269E-01	&(	3.829E+00	1.57E+02	4.82E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C	2.8133E-01					3.63E+02	
			696.54	2.813E-01	?(	8.691E-01	8.95E+01	9.90E+01 G
			618.06	-7.834E-01	+ P	2.897E+00	5.59E+01	9.91E+01 G
EU-152	F	1.5807E+00					4.94E+03	
			121.78	0.000E+00	?(	3.203E+00	1.00E+03	2.86E+01 G
			344.29	-8.877E-02	% P	5.444E+00	1.86E+03	2.65E+01 G
			1112.07	-2.231E-01	% P	1.996E+01	1.87E+03	1.36E+01 G
			778.92	4.780E+00	?(	1.531E+01	9.46E+01	1.29E+01 G
			964.11	1.839E+00	?(	1.129E+01	1.73E+02	1.46E+01 G
			244.69	-1.162E+00	&	2.353E+01	5.95E+02	7.58E+00 G
			1408.00	1.235E+00	? P	6.084E+00	2.05E+02	2.10E+01 GA
EU-154	I	1.3797E+00					3.14E+03	
			123.10	-6.017E-01	&(	2.281E+00	1.13E+02	4.08E+01 G
			1274.54	0.000E+00	+	3.546E+00	1.00E+03	3.52E+01 G
			723.36	1.659E+00	&(	7.675E+00	1.33E+02	2.02E+01 G
			873.23	4.059E+00	?(	1.180E+01	8.56E+01	1.23E+01 G
			1004.77	1.320E+00	(	7.641E+00	2.42E+02	1.80E+01 G
			996.33	5.473E+00	?(	1.562E+01	8.42E+01	1.06E+01 G
EU-155	I	5.5422E-01					1.81E+03	
			105.31	-1.095E-01	%(P	1.042E+01	1.66E+03	2.12E+01 G
			86.54	1.013E+00	?(	7.315E+00	2.16E+02	3.07E+01 G
Ta-182	F	1.9295E+00					1.14E+02	
			1121.30	1.352E+00	?(	5.894E+00	1.26E+02	3.49E+01 G
			1221.41	2.676E+00	&(	6.348E+00	1.06E+02	2.70E+01 G
			1189.05	-1.618E-01	%	1.176E+01	3.15E+03	1.62E+01 G
TL-208	N	2.0999E+00					6.98E+02	
			583.02	2.100E+00	(P	8.507E-01	2.03E+01	8.45E+01 G
			277.28	1.397E+01	+ P	1.022E+01	2.62E+01	6.31E+00 G
			860.56	3.922E+00	+ P	1.005E+01	1.07E+02	1.24E+01 G
PM-146	C	5.8679E-01					2.02E+03	
			453.88	4.661E-01	?(P	1.254E+00	1.05E+02	6.50E+01 G
			747.16	-9.709E-01	+ P	4.173E+00	1.01E+02	3.40E+01 G
			735.72	9.355E-01	?(P	5.098E+00	1.53E+02	2.25E+01 G
Y-88	F	1.1206E-01					1.07E+02	
			1836.06	-2.271E-01	?(	1.604E+00	3.04E+02	9.92E+01 G
			898.04	4.711E-01	&(P	1.390E+00	8.66E+01	9.37E+01 G
Cd-113m		-8.9644E+02					5.33E+03	
			263.70	-8.964E+02	&(	1.657E+04	5.27E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Se-75		1.9515E-01					1.20E+02	
			264.66	0.000E+00	?(	1.730E+00	1.00E+03	5.85E+01 G
			136.00	0.000E+00	?(	2.522E+00	1.00E+03	5.83E+01 G
			279.54	5.413E-01	&(	3.765E+00	2.00E+02	2.48E+01 G
			121.12	9.522E-01	?(	5.139E+00	1.59E+02	1.71E+01 G
			400.66	3.039E-01	?(	8.317E+00	7.55E+02	1.14E+01 G
			96.73	0.000E+00	-	6.516E+01	1.00E+03	3.42E+00 G
Cf-251	T	1.6184E+00					3.28E+05	
			176.60	1.618E+00	(	4.254E+00	1.02E+02	1.70E+01 G
			227.00	-3.992E+00	+	1.392E+01	1.34E+02	6.30E+00 GA
Cf-249	T	7.7315E-01					1.28E+05	
			387.95	5.363E-01	?(	2.063E+00	1.13E+02	6.60E+01 G
			333.44	1.781E+00	?(	1.086E+01	1.79E+02	1.55E+01 G
Sn-126		-4.2735E+00					3.65E+07	
			87.57	0.000E+00	+	6.090E+00	1.00E+03	3.75E+01 GA
			64.28	-4.273E+00	?(	1.596E+01	1.12E+02	9.70E+00 G
			86.94	2.898E+00	&	2.509E+01	2.59E+02	9.04E+00 GA
PB-210	N	-1.5350E+01					8.14E+03	
			46.54	-1.535E+01	*(P	4.881E+01	9.01E+01	4.25E+00 G
PB-212	N	5.4508E+00					6.98E+02	
			238.63	5.451E+00	(P	1.442E+00	1.23E+01	4.33E+01 G
			300.03	8.279E+00	+ P	5.263E+01	1.87E+02	3.28E+00 GA
PB-214	N	6.6472E+00					5.84E+05	
			351.93	6.647E+00	*(P	1.760E+00	1.46E+01	3.76E+01 G
			295.09	8.067E-01	- P	8.382E+00	3.05E+02	1.93E+01 G
			242.00	9.096E+00		7.836E+00	2.98E+01	7.43E+00 GA
BI-207	C	8.3089E-03					1.18E+04	
			569.70	-5.480E-01	?(	1.610E+00	8.72E+01	9.77E+01 G
			1063.66	7.381E-01	?(P	1.720E+00	9.91E+01	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	1.749E+01	2.87E+03	7.55E+00 G
			785.42	6.116E+01	? P	6.119E+01	4.44E+01	1.28E+00 GA
BI-214	N	5.3437E+00					5.84E+05	
			609.31	5.354E+00	(P	1.834E+00	1.73E+01	4.61E+01 G
			1120.29	2.774E+00	- P	1.190E+01	1.23E+02	1.51E+01 G
			1764.49	5.313E+00	?(P	8.038E+00	5.10E+01	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	-7.5958E-01						1.10E+09	
			265.83	-7.596E-01	?(	2.213E+00	8.69E+01	5.00E+01	G
			304.90	0.000E+00	&	7.439E+00	1.00E+03	2.80E+01	G
AC-228	N	2.2084E+00						2.10E+03	
			911.07	2.208E+00	?(	4.609E+00	9.13E+01	2.90E+01	G
			968.97	-6.017E+00	+	1.511E+01	7.53E+01	1.75E+01	G
			338.32	-9.768E-02	% P	1.467E+01	3.67E+03	1.20E+01	G
			93.35	0.000E+00	-	4.036E+01	1.00E+03	5.56E+00	XA
TH-227	N	4.6506E+00						7.95E+03	
			256.24	3.656E+00	?(P	9.768E+00	1.02E+02	7.00E+00	G
			235.97	-2.567E+00	-	1.484E+01	1.72E+02	1.23E+01	G
			50.14	5.521E+00	&(	2.106E+01	1.13E+02	8.00E+00	G
TH-229	N	1.1706E+00						2.68E+06	
			193.51	-1.756E+00	?(P	1.885E+01	6.14E+02	4.40E+00	G
			210.85	5.477E+00	?(P	2.375E+01	1.64E+02	2.99E+00	G
TH-234	N	-7.9314E+00						1.63E+12	
			92.59	-7.931E+00	*(P	4.091E+01	8.84E+01	5.58E+00	G
			63.29	-4.911E+00	+ P	4.059E+01	2.41E+02	3.81E+00	G
PA-231	N	1.1011E+01						1.20E+07	
			302.65	1.025E+01	?(	6.553E+01	1.89E+02	2.88E+00	G
			300.07	1.190E+01	?(	7.214E+01	1.79E+02	2.46E+00	G
PA-233	C	6.9384E-01						7.82E+08	
			312.01	0.000E+00	?(	5.892E+00	1.00E+03	3.60E+01	G
			300.18	4.723E+00	?(	2.945E+01	1.84E+02	6.20E+00	G
PA-234	N	1.2684E+00						1.63E+12	
			131.29	8.297E-01	?(	7.982E+00	2.85E+02	1.80E+01	G
			946.02	1.732E+00	?(P	1.426E+01	2.33E+02	1.34E+01	G
			569.47	1.474E+00	?(	1.594E+01	3.04E+02	8.20E+00	G
			883.24	-6.995E+00	&	2.659E+01	1.12E+02	9.60E+00	G
			880.53	-1.325E+01	+	3.845E+01	8.63E+01	6.00E+00	GA
PA-234M	N	2.4767E+01						1.63E+12	
			1001.00	5.583E-01	%(P	2.429E+02	1.20E+04	8.37E-01	G
			766.41	9.369E+01	&(P	3.804E+02	1.16E+02	2.94E-01	G
U-235	N	-3.1784E+00						2.57E+11	
			143.79	-3.178E+00	(	1.643E+01	1.54E+02	1.10E+01	G
			205.33	-4.258E-01	% P	1.688E+01	2.32E+03	5.01E+00	G
			163.38	0.000E+00	+	1.881E+01	1.00E+03	5.08E+00	G
			185.72	4.067E-01	+	1.996E+00	1.45E+02	5.40E+01	GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T	-6.9088E-01					1.58E+05	
			59.54	-6.909E-01	(	4.767E+00	2.04E+02	3.59E+01 G
Np-237	F	2.3733E+00					2.14E+06	
			86.49	2.373E+00	?(	1.695E+01	2.14E+02	1.31E+01 G
Ir-192	F	2.2045E-01					7.40E+01	
			316.49	0.000E+00	?(	2.465E+00	1.00E+03	8.70E+01 G
			468.06	5.912E-01	?(	2.162E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	6.620E+00	1.00E+03	3.18E+01 G
Cs-136	F	-4.6260E-01					1.30E+01	
			818.50	-4.626E-01	?(	1.951E+00	1.23E+02	1.00E+02 G
			1048.07	-1.089E+00	+	3.166E+00	8.64E+01	8.00E+01 G
			340.57	-8.497E-01	+	2.788E+00	9.73E+01	4.69E+01 G
Np-239	T	1.3193E+00					2.36E+00	
			103.70	0.000E+00	&	9.206E+00	1.00E+03	2.40E+01 X
			106.13	1.319E+00	?(	9.561E+00	2.17E+02	2.27E+01 G
			99.50	0.000E+00	-	1.479E+01	1.00E+03	1.50E+01 X
Nd-147		2.2069E+00					1.11E+01	
			531.00	2.207E+00	&(	9.205E+00	1.21E+02	1.30E+01 G
			91.10	0.000E+00	&	7.978E+00	1.00E+03	2.83E+01 G
Mo-99	I	3.0308E+00					2.75E+00	
			739.50	2.405E+00	?(	8.319E+00	9.94E+01	1.21E+01 G
			181.07	4.297E+00	&(	1.449E+01	1.00E+02	5.99E+00 G
								Energy duplication
			140.51	-7.623E+00	+	3.871E+01	1.52E+02	4.52E+00 G
			777.92	-9.527E+00	+	5.162E+01	1.57E+02	4.26E+00 G
			366.42	-4.508E+00	+	8.154E+01	5.06E+02	1.19E+00 GA
Ge-69	C	1.4853E+00					1.62E+00	
			1106.50	9.548E-01	&(	1.013E+01	3.02E+02	2.60E+01 G
			574.00	2.654E+00	?(	8.253E+00	9.08E+01	1.18E+01 G
			872.00	0.000E+00	-	1.916E+01	1.00E+03	9.59E+00 G
Br-82	F	-9.8262E-01					1.47E+00	
			776.50	-9.826E-01	?(	2.326E+00	7.12E+01	8.34E+01 G
			554.34	1.477E-01	+	1.376E+00	2.56E+02	7.06E+01 G
			619.10	1.478E+00	+	5.331E+00	1.07E+02	4.31E+01 G
			1044.00	0.000E+00	+	8.324E+00	1.00E+03	2.80E+01 G
			698.36	-2.205E+00	+	6.210E+00	8.37E+01	2.79E+01 G
			1317.43	2.139E+00	+	6.353E+00	8.69E+01	2.70E+01 G
			827.79	5.813E-01	+	5.691E+00	3.98E+02	2.42E+01 G
			1474.88	0.000E+00	+	4.161E+00	1.00E+03	1.66E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
V-48 C	9.6769E-02					1.61E+01	
		983.50	-2.044E-01	?(	1.415E+00	2.90E+02	1.00E+02 G
		1311.60	4.041E-01	?(	1.915E+00	1.34E+02	9.80E+01 G
		944.30	-5.785E+00	+	2.333E+01	1.17E+02	8.00E+00 G
Sr-85 C	5.2642E-02					6.47E+01	
		513.99	5.264E-02	?(	1.748E+00	9.46E+02	9.93E+01 G
Rb-83 P	8.2797E-01					8.62E+01	
		520.35	6.076E-01	?(	1.510E+00	9.89E+01	4.61E+01 G
		529.54	-3.340E-01	-	4.062E+00	3.40E+02	3.00E+01 G
		552.50	1.451E+00	?(	4.471E+00	8.93E+01	1.63E+01 G
Cm-247 T	6.6447E-01					5.70E+09	
		402.40	4.414E-01	?(	1.293E+00	8.65E+01	7.20E+01 G
		84.00	1.363E+00	&(	9.639E+00	2.11E+02	2.30E+01 G
Hf-175	-6.5948E-02					7.00E+01	
		343.40	-6.595E-02	?(	1.634E+00	7.12E+02	8.69E+01 G
		89.36	0.000E+00	+	9.659E+01	1.00E+03	2.35E+00 A
Lu-172	9.5199E-01					7.00E+01	
		1093.64	8.609E-01	&(	2.150E+00	7.45E+01	7.52E+01 G
		900.69	9.816E-01	?(	5.630E+00	1.62E+02	2.77E+01 G
		181.47	1.266E+00	?(	4.854E+00	1.13E+02	1.92E+01 G
Kr-85m I	1.4285E-01					1.87E-01	
		151.00	-2.398E-01	(	1.113E+00	1.78E+02	7.55E+01 G
		304.47	2.207E+00	&(	1.480E+01	1.98E+02	1.40E+01 G
NB-94 I	4.4463E-01					7.41E+06	
		702.63	4.446E-01	?(P	1.613E+00	1.06E+02	9.79E+01 G
		871.10	-4.602E-01	& P	1.633E+00	1.15E+02	9.99E+01 G
TL-210 N	4.1541E-01					5.84E+05	
		799.60	4.553E-01	&(	1.556E+00	9.98E+01	9.90E+01 G
		296.00	3.655E-01	?(	2.090E+00	1.69E+02	7.90E+01 G
		1313.00	0.000E+00	-	9.936E+00	1.00E+03	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.

$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	172.	-20.	-0.011	90.12	-1.535E+01	P
TH-227	50.14	163.	16.	0.009	113.48	5.521E+00	
AM-241	59.54	279.	-12.	-0.006	204.46	-6.909E-01	
TH-234	63.29	254.	-9.	-0.005	240.82	-4.911E+00	P
Sn-126	64.28	261.	-21.	-0.012	111.57	-4.273E+00	
BA-133	80.99	732.	18.	0.010	209.48	9.314E-01	
Cm-247	84.00	750.	18.	0.010	211.47	1.363E+00	
Np-237	86.49	768.	18.	0.010	213.52	2.373E+00	
EU-155	86.54	787.	18.	0.010	216.04	1.013E+00	
Sn-126	86.94	805.	16.	0.009	258.71	2.898E+00	
TH-234	92.59	848.	-27.	-0.015	88.40	-7.931E+00	P
Np-239	106.13	794.	18.	0.010	216.73	1.319E+00	
Se-75	121.12	121.	10.	0.006	158.75	9.522E-01	
EU-154	123.10	135.	-15.	-0.008	112.55	-6.017E-01	
PA-234	131.29	324.	9.	0.005	284.80	8.297E-01	
CO-57	136.47	444.	-20.	-0.011	148.59	-3.184E+00	
Tc-99m	140.51	446.	-20.	-0.011	148.44	-3.972E-01	
Mo-99	140.51	466.	-20.	-0.011	151.72	-7.623E+00	
U-235	143.79	486.	-20.	-0.011	154.49	-3.178E+00	
CE-141	145.44	507.	-20.	-0.011	157.39	-7.269E-01	
Kr-85m	151.00	88.	-10.	-0.006	178.33	-2.398E-01	
Ba-140	162.66	114.	2.	0.001	758.29	5.794E-01	
CE-139	165.85	95.	12.	0.006	121.92	2.657E-01	
Cf-251	176.60	59.	15.	0.008	101.50	1.618E+00	
Mo-99	181.07	84.	13.	0.007	99.99	4.297E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Lu-172	181.47	97.	13.	0.007	113.40	1.266E+00		
U-235	185.72	129.	11.	0.006	144.80	4.067E-01		
TH-229	193.51	70.	-4.	-0.002	613.90	-1.756E+00		P
TH-229	210.85	44.	8.	0.004	164.03	5.477E+00		P
Cf-251	227.00	62.	-11.	-0.006	133.67	-3.992E+00		
TH-227	235.97	275.	-14.	-0.008	171.58	-2.567E+00		
EU-152	244.69	248.	-4.	-0.002	595.14	-1.162E+00		
TH-227	256.24	30.	11.	0.006	101.51	3.656E+00		P
Cd-113m	263.70	64.	-2.	-0.001	527.25	-8.964E+02		
BI-210M	265.83	80.	-15.	-0.008	86.89	-7.596E-01		
Se-75	279.54	51.	5.	0.003	200.05	5.413E-01		
I-131	284.30	126.	-13.	-0.007	129.27	-5.397E+00		
TL-210	296.00	155.	11.	0.006	168.63	3.655E-01		
PA-231	300.07	177.	11.	0.006	178.93	1.190E+01		
PA-233	300.18	187.	11.	0.006	184.10	4.723E+00		
PA-231	302.65	198.	11.	0.006	188.78	1.025E+01		
BA-133	302.85	209.	11.	0.006	193.64	1.612E+00		
Kr-85m	304.47	219.	11.	0.006	198.19	2.207E+00		
Ba-140	304.85	230.	10.	0.006	215.73	6.513E+00		
Cf-249	333.44	133.	9.	0.005	179.14	1.781E+00		
Cs-136	340.57	75.	-13.	-0.007	97.31	-8.497E-01		
Hf-175	343.40	88.	-2.	-0.001	711.62	-6.595E-02		
BA-133	356.00	157.	-13.	-0.007	143.57	-6.381E-01		
I-131	364.48	16.	8.	0.004	79.06	3.138E-01		
Mo-99	366.42	35.	-2.	-0.001	505.57	-4.508E+00		
BA-133	383.84	99.	-14.	-0.008	85.30	-5.149E+00		P
Cf-249	387.95	66.	11.	0.006	113.22	5.363E-01		
SN-113	391.69	58.	10.	0.005	114.45	5.210E-01		P
Se-75	400.66	28.	1.	0.001	754.98	3.039E-01		
Cm-247	402.40	27.	9.	0.005	86.47	4.414E-01		
SB-125	427.88	12.	8.	0.004	96.79	9.329E-01		P
AG-108M	433.94	21.	1.	0.001	602.93	6.012E-02		P
PM-146	453.88	16.	8.	0.004	104.96	4.661E-01		P
SB-125	463.37	25.	9.	0.005	84.67	3.338E+00		
Ir-192	468.06	31.	8.	0.004	106.66	5.912E-01		
BE-7	477.60	63.	8.	0.004	144.70	3.016E+00		
RH-106	511.86	0.	55.	0.031	13.47	1.152E+01		
Sr-85	513.99	69.	1.	0.001	946.01	5.264E-02		
Rb-83	520.35	9.	7.	0.004	98.86	6.076E-01		
Rb-83	529.54	30.	-2.	-0.001	340.17	-3.340E-01		
Nd-147	531.00	29.	7.	0.004	120.62	2.207E+00		
Ba-140	537.26	18.	2.	0.001	507.13	3.061E-01		P
Rb-83	552.50	9.	5.	0.003	89.27	1.451E+00		
Br-82	554.34	17.	2.	0.001	255.95	1.477E-01		
CS-134	563.24	17.	2.	0.001	551.91	8.413E-01		P
CS-134	569.32	23.	8.	0.005	88.41	2.460E+00		
PA-234	569.47	31.	3.	0.001	303.66	1.474E+00		
BI-207	569.70	47.	-12.	-0.007	87.20	-5.480E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ge-69	574.00	16.	7.	0.004	90.79	2.654E+00	
SB-125	600.50	170.	-12.	-0.007	156.32	-3.177E+00	
SB-124	602.73	158.	-12.	-0.007	150.71	-5.798E-01	
AG-108M	614.28	163.	-16.	-0.009	118.46	-8.358E-01	
PM-144	618.06	148.	-16.	-0.009	55.85	-7.834E-01	P
Br-82	619.10	91.	13.	0.007	106.83	1.478E+00	
RH-106	621.92	135.	-15.	-0.008	113.29	-7.273E+00	
SB-125	635.89	18.	4.	0.002	142.27	1.933E+00	P
I-131	636.97	35.	-9.	-0.005	101.90	-5.970E+00	
AG-110M	657.76	14.	6.	0.003	97.18	3.207E-01	
PM-144	696.54	8.	5.	0.003	89.47	2.813E-01	
Br-82	698.36	41.	-12.	-0.006	83.70	-2.205E+00	
NB-94	702.63	34.	8.	0.005	106.11	4.446E-01	P
SB-124	722.79	16.	7.	0.004	84.71	3.720E+00	
AG-108M	722.94	23.	7.	0.004	99.36	4.429E-01	
EU-154	723.36	31.	6.	0.003	133.33	1.659E+00	
PM-146	735.72	15.	4.	0.002	152.96	9.355E-01	P
Mo-99	739.50	11.	5.	0.003	99.42	2.405E+00	
PM-146	747.16	24.	-6.	-0.003	100.74	-9.709E-01	P
ZR-95	756.73	5.	5.	0.003	113.48	4.739E-01	P
AG-110M	763.94	6.	5.	0.003	87.68	1.184E+00	P
NB-95	765.79	35.	-12.	-0.007	75.24	-6.799E-01	
PA-234M	766.41	13.	5.	0.003	115.84	9.369E+01	P
Br-82	776.50	44.	-14.	-0.008	71.19	-9.826E-01	
Mo-99	777.92	59.	-7.	-0.004	157.38	-9.527E+00	
EU-152	778.92	47.	11.	0.006	94.61	4.780E+00	
BI-212	785.42	5.	14.	0.008	44.37	6.116E+01	P
CS-134	795.87	19.	7.	0.004	94.57	4.803E-01	P
TL-210	799.60	26.	8.	0.004	99.76	4.553E-01	
CS-134	801.95	33.	3.	0.002	253.53	2.205E+00	
Cs-136	818.50	42.	-8.	-0.004	122.75	-4.626E-01	
Br-82	827.79	19.	2.	0.001	398.21	5.813E-01	
MN-54	834.85	5.	12.	0.007	46.81	7.446E-01	
Co-56	846.77	15.	-1.	-0.001	674.43	-6.189E-02	P
NB-94	871.10	25.	-7.	-0.004	114.60	-4.602E-01	P
EU-154	873.23	19.	8.	0.004	85.58	4.059E+00	
PA-234	880.53	53.	-13.	-0.007	86.27	-1.325E+01	
PA-234	883.24	66.	-11.	-0.006	111.93	-6.995E+00	
AG-110M	884.68	60.	11.	0.006	101.00	9.836E-01	
Sc-46	889.28	66.	-11.	-0.006	107.13	-7.072E-01	
Y-88	898.04	14.	7.	0.004	86.61	4.711E-01	P
Lu-172	900.69	22.	4.	0.002	162.18	9.816E-01	
AC-228	911.07	15.	10.	0.006	91.28	2.208E+00	
AG-110M	937.49	35.	-15.	-0.009	39.57	-2.944E+00	P
V-48	944.30	30.	-7.	-0.004	116.93	-5.785E+00	
PA-234	946.02	31.	4.	0.002	232.82	1.732E+00	P
EU-152	964.11	22.	4.	0.002	173.21	1.839E+00	
AC-228	968.97	61.	-16.	-0.009	75.33	-6.017E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
V-48	983.50	15.	-3.	-0.002	289.64	-2.044E-01		
EU-154	996.33	21.	8.	0.005	84.22	5.473E+00		
EU-154	1004.77	14.	3.	0.002	242.03	1.320E+00		
Co-56	1037.84	39.	2.	0.001	561.50	8.023E-01		P
Cs-136	1048.07	49.	-12.	-0.007	86.39	-1.089E+00		
RH-106	1050.36	51.	10.	0.005	109.22	4.444E+01		P
BI-207	1063.66	10.	8.	0.004	99.08	7.381E-01		P
Ga-68	1077.40	35.	-16.	-0.009	83.47	-4.201E+01		
Lu-172	1093.64	17.	9.	0.005	74.51	8.609E-01		
FE-59	1099.25	27.	6.	0.003	124.27	8.156E-01		
Ge-69	1106.50	49.	3.	0.002	302.22	9.548E-01		
ZN-65	1115.55	29.	6.	0.003	137.52	8.536E-01		P
Sc-46	1120.55	26.	6.	0.003	122.22	4.716E-01		
CO-60	1173.24	32.	-15.	-0.008	89.53	-1.169E+00		
Co-56	1238.28	43.	-8.	-0.004	88.31	-9.597E-01		P
NA-22	1274.53	0.	7.	0.004	37.80	5.812E-01		
FE-59	1291.60	21.	-8.	-0.005	130.66	-1.617E+00		
V-48	1311.60	17.	5.	0.003	134.39	4.041E-01		
Br-82	1317.43	14.	7.	0.004	86.95	2.139E+00		
CO-60	1332.50	6.	2.	0.001	272.09	1.836E-01		P
EU-152	1408.00	6.	3.	0.002	204.86	1.235E+00		P
SB-124	1690.98	6.	-1.	-0.001	600.00	-2.190E-01		
Y-88	1836.06	6.	-2.	-0.001	304.14	-2.271E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.0157E+00	3.0157E+00	1.447E+02%	1.50E+01
NA-22	#A	5.8117E-01	5.8117E-01	3.780E+01%	6.12E-01
K-40		2.0116E+02	2.0116E+02	6.796E+00%	1.38E+01
Sc-46	#A	-7.0722E-01	-7.0722E-01	1.071E+02%	2.57E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+01
MN-54	#A	7.4462E-01	7.4462E-01	4.681E+01%	7.71E-01
FE-59	#A	8.1561E-01	8.1562E-01	1.243E+02%	3.52E+00
Co-56	#A	4.5157E-02	4.5157E-02	4.388E+02%	1.27E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.07E+00
CO-58	#	1.3067E+00	1.3067E+00	2.946E+01%	1.04E+00
CO-60	#A	1.8362E-01	1.8362E-01	2.721E+02%	1.20E+00
ZN-65	#A	8.5356E-01	8.5356E-01	1.375E+02%	4.08E+00
ZR-95	#A	4.7386E-01	4.7386E-01	1.135E+02%	1.40E+00
NB-95	#A	-6.7987E-01	-6.7987E-01	7.524E+01%	1.71E+00
RU-103	#	6.9686E-01	6.9686E-01	3.771E+01%	5.67E-01
RH-106	#A	-2.5169E-01	-2.5169E-01	7.868E+01%	2.78E+01
AG-108M	#A	2.5186E-01	2.5186E-01	9.936E+01%	9.69E-01

AG-110M#A	6.7624E-01	6.7624E-01	5.511E+01%	1.08E+00
SN-113 #A	5.2097E-01	5.2097E-01	1.144E+02%	2.03E+00
SB-124 #A	-1.5359E-01	-1.5359E-01	8.471E+01%	2.96E+00
SB-125 #A	1.6430E+00	1.6430E+00	6.393E+01%	2.32E+00
I-131 #A	3.1382E-01	3.1383E-01	7.906E+01%	8.38E-01
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	7.42E+00
Ga-68 #A	-4.1889E+01	-4.2011E+01	8.347E+01%	7.80E+01
Tc-99m #A	-3.9703E-01	-3.9724E-01	1.484E+02%	1.97E+00
BA-133 #A	-1.2497E-01	-1.2497E-01	1.205E+02%	3.10E+00
CS-134 #A	8.9112E-01	8.9112E-01	8.841E+01%	1.56E+00
CS-137 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+00
CE-139 #A	2.6571E-01	2.6571E-01	1.219E+02%	1.10E+00
Ba-140 #A	1.1177E+00	1.1177E+00	2.157E+02%	4.03E+00
La-140 #	7.7826E-01	7.7827E-01	4.296E+01%	7.70E-01
CE-141 #A	-7.2694E-01	-7.2695E-01	1.574E+02%	3.83E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144 #A	2.8133E-01	2.8133E-01	8.947E+01%	8.69E-01
EU-152 #A	1.5807E+00	1.5807E+00	9.461E+01%	3.20E+00
EU-154 #A	1.3797E+00	1.3797E+00	6.432E+01%	2.28E+00
EU-155 #A	5.5422E-01	5.5422E-01	2.160E+02%	1.04E+01
HF-181 #A	0.0000E+00	0.0000E+00	5.000E+02%	2.08E+00
Ta-182 #A	1.9295E+00	1.9295E+00	8.233E+01%	5.89E+00
Hg-203 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.21E+00
TL-208	2.0999E+00	2.0999E+00	2.029E+01%	8.51E-01
PM-146 #A	5.8679E-01	5.8679E-01	9.276E+01%	1.25E+00
Y-88 #A	1.1206E-01	1.1206E-01	8.661E+01%	1.60E+00
Cd-113m#A	-8.9644E+02	-8.9644E+02	5.272E+02%	1.66E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.02E+01
Se-75 #A	1.9515E-01	1.9515E-01	1.587E+02%	1.73E+00
Cf-251 #A	1.6184E+00	1.6184E+00	1.015E+02%	4.25E+00
Cf-249 #A	7.7315E-01	7.7315E-01	1.060E+02%	2.06E+00
Sn-126 #A	-4.2735E+00	-4.2735E+00	1.116E+02%	1.60E+01
PB-210 #A	-1.5350E+01	-1.5350E+01	9.012E+01%	4.88E+01
PB-212	5.4508E+00	5.4508E+00	1.230E+01%	1.44E+00
PB-214	6.6472E+00	6.6472E+00	1.462E+01%	1.76E+00
BI-207 #A	8.3089E-03	8.3089E-03	6.599E+01%	1.61E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	2.873E+03%	1.75E+01
BI-214	5.3437E+00	5.3437E+00	1.725E+01%	1.83E+00
BI-210M#A	-7.5958E-01	-7.5958E-01	8.689E+01%	2.21E+00
AC-228 #A	2.2084E+00	2.2084E+00	9.128E+01%	4.61E+00
TH-227 #A	4.6506E+00	4.6506E+00	7.613E+01%	9.77E+00
TH-229 #A	1.1706E+00	1.1706E+00	1.640E+02%	1.88E+01
TH-234 #A	-7.9314E+00	-7.9314E+00	8.840E+01%	4.09E+01
PA-231 #A	1.1011E+01	1.1011E+01	1.300E+02%	6.55E+01
PA-233 #A	6.9384E-01	6.9384E-01	1.841E+02%	5.89E+00
PA-234 #A	1.2684E+00	1.2684E+00	1.590E+02%	7.98E+00
PA-234M#A	2.4767E+01	2.4767E+01	1.158E+02%	2.43E+02
U-235 #A	-3.1784E+00	-3.1784E+00	1.545E+02%	1.64E+01
AM-241 #A	-6.9088E-01	-6.9088E-01	2.045E+02%	4.77E+00

Np-237	#A	2.3733E+00	2.3733E+00	2.135E+02%	1.69E+01
Ir-192	#A	2.2045E-01	2.2045E-01	1.067E+02%	2.46E+00
Cs-136	#A	-4.6259E-01	-4.6260E-01	1.227E+02%	1.95E+00
Np-239	#A	1.3193E+00	1.3193E+00	2.167E+02%	9.56E+00
Nd-147	#A	2.2069E+00	2.2069E+00	1.206E+02%	9.20E+00
Mo-99	#A	3.0306E+00	3.0308E+00	7.050E+01%	8.32E+00
Ge-69	#A	1.4851E+00	1.4853E+00	9.079E+01%	1.01E+01
Br-82	#A	-9.8252E-01	-9.8262E-01	7.119E+01%	2.33E+00
V-48	#A	9.6768E-02	9.6769E-02	1.344E+02%	1.41E+00
Sr-85	#A	5.2642E-02	5.2642E-02	9.460E+02%	1.75E+00
Rb-83	#A	8.2797E-01	8.2797E-01	6.660E+01%	1.51E+00
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.07E+02
Cm-247	#A	6.6447E-01	6.6447E-01	8.647E+01%	1.29E+00
Hf-175	#A	-6.5948E-02	-6.5948E-02	7.116E+02%	1.63E+00
Lu-172	#A	9.5198E-01	9.5199E-01	7.048E+01%	2.15E+00
Kr-85m	#A	1.4275E-01	1.4285E-01	1.333E+02%	1.11E+00
NB-94	#A	4.4463E-01	4.4463E-01	1.061E+02%	1.61E+00
TL-210	#A	4.1541E-01	4.1541E-01	9.796E+01%	1.56E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 2.207E+02 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 2.2070389E+02 Bq/Sample

The library has energies which are not separable.

Test America St. Louis Spectrum ID: 19_Gamma_20181616

Sample Description: 379959_Gamma_160-29881-A-37-B
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-B

Decay to Time: 8/23/2018 18:46 Live Time: 1800 sec
Acquisition Time: 8/23/2018 18:46:17 Real Time: 1802 sec
Analysis Time: 8/28/2018 12:38 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.016E+00	144.7	4.364E+00	4.366E+00	1.496E+01
NA-22	5.812E-01	37.8	2.197E-01	2.216E-01	6.119E-01
K-40	2.012E+02	6.8	1.367E+01	1.703E+01	1.380E+01
Sc-46	-7.072E-01	107.1	7.577E-01	7.585E-01	2.569E+00
CR-51	0.000E+00	1.#INF	1.539E+00	1.539E+00	2.178E+01
MN-54	7.446E-01	46.8	3.486E-01	3.506E-01	7.714E-01
FE-59	1.311E+00	96.3	1.262E+00	1.264E+00	2.799E+00
Co-56	-6.189E-02	674.4	4.174E-01	4.174E-01	1.268E+00
CO-57	-1.909E-01	156.2	2.982E-01	2.983E-01	1.014E+00
CO-58	1.307E+00	29.5	3.849E-01	3.906E-01	1.036E+00
CO-60	1.836E-01	272.1	4.996E-01	4.997E-01	1.203E+00
ZN-65	-7.326E-02	1552.9	1.138E+00	1.138E+00	4.950E+00
NB-94	3.147E-01	30.5	9.594E-02	9.728E-02	1.389E+00
ZR-95	4.739E-01	113.5	5.377E-01	5.383E-01	1.396E+00
NB-95	0.000E+00	1.#INF	1.135E-01	1.135E-01	1.537E+00
RU-103	6.969E-01	37.7	2.628E-01	2.651E-01	5.674E-01
RH-106	-7.273E+00	110.0	8.000E+00	8.008E+00	2.694E+01
AG-108M	2.519E-01	99.4	2.502E-01	2.506E-01	9.687E-01
AG-110M	9.836E-01	101.0	9.934E-01	9.947E-01	3.364E+00
SN-113	5.210E-01	114.4	5.962E-01	5.968E-01	2.029E+00
SB-124	-1.536E-01	84.7	1.301E-01	1.303E-01	2.957E+00
SB-125	1.643E+00	63.9	1.050E+00	1.054E+00	2.322E+00
I-131	3.138E-01	104.1	3.266E-01	3.270E-01	8.375E-01
Gd-153	0.000E+00	1.#INF	4.809E-01	4.809E-01	6.258E+00
Ga-68	-4.201E+01	83.5	3.507E+01	3.515E+01	7.796E+01
Tc-99m	0.000E+00	1.#INF	1.634E-01	1.634E-01	1.713E+00
BA-133	-1.250E-01	120.5	1.506E-01	1.508E-01	3.097E+00
CS-134	4.283E-01	94.6	4.051E-01	4.057E-01	2.873E+00
CS-137	0.000E+00	1.#INF	1.886E-01	1.886E-01	1.404E+00
CE-139	2.657E-01	121.9	3.240E-01	3.243E-01	1.098E+00
Ba-140	1.169E+00	198.1	2.317E+00	2.318E+00	4.030E+00
La-140	7.783E-01	43.0	3.344E-01	3.368E-01	7.695E-01
CE-141	-7.269E-01	147.4	1.072E+00	1.072E+00	3.588E+00

CE-144	0.000E+00	1.#INF	1.633E+00	1.633E+00	1.319E+01
PM-144	1.778E-02	2755.0	4.898E-01	4.898E-01	1.218E+00
EU-152	-1.750E+00	94.5	1.654E+00	1.656E+00	5.655E+00
EU-154	-1.161E-01	67.7	7.852E-02	7.874E-02	1.274E+01
EU-155	5.129E-01	179.5	9.207E-01	9.211E-01	8.795E+00
HF-181	2.767E-01	118.0	3.264E-01	3.267E-01	2.083E+00
Ta-182	1.660E+00	103.7	1.721E+00	1.723E+00	5.508E+00
Hg-203	2.825E-01	102.7	2.901E-01	2.905E-01	9.897E-01
TL-208	2.100E+00	20.3	4.260E-01	4.392E-01	8.507E-01
pm-146	-9.709E-01	114.4	1.111E+00	1.112E+00	4.173E+00
y-88	8.060E-01	52.3	4.215E-01	4.235E-01	9.695E-01
Cd-113m	-8.964E+02	527.2	4.726E+03	4.727E+03	1.657E+04
Cd-109	7.604E+00	189.0	1.437E+01	1.437E+01	4.815E+01
Cf-251	1.618E+00	101.5	1.643E+00	1.645E+00	4.254E+00
Cf-249	7.732E-01	106.0	8.192E-01	8.202E-01	2.063E+00
Sn-126	-4.273E+00	111.6	4.768E+00	4.774E+00	1.596E+01
PB-210	-2.009E+01	71.6	1.438E+01	1.444E+01	5.098E+01
PB-212	5.451E+00	12.3	6.705E-01	7.283E-01	1.442E+00
PB-214	6.647E+00	14.6	9.717E-01	1.029E+00	1.760E+00
BI-207	4.203E-01	99.1	4.164E-01	4.170E-01	1.098E+00
BI-212	-2.218E-01	2160.8	4.792E+00	4.793E+00	1.749E+01
U-235	0.000E+00	1.#INF	1.494E+00	1.494E+00	1.367E+01
BI-214	5.344E+00	17.3	9.219E-01	9.612E-01	1.834E+00
BI-210M	-7.596E-01	86.9	6.600E-01	6.612E-01	2.213E+00
AC-228	2.208E+00	91.3	2.016E+00	2.019E+00	4.609E+00
TH-227	4.651E+00	75.4	3.505E+00	3.515E+00	2.068E+01
TH-229	1.171E+00	164.0	1.920E+00	1.921E+00	1.885E+01
TH-234	-4.911E+00	240.8	1.183E+01	1.183E+01	4.059E+01
PA-231	1.101E+01	130.0	1.432E+01	1.433E+01	6.553E+01
PA-233	6.938E-01	184.1	1.277E+00	1.278E+00	5.892E+00
PA-234	1.426E+00	163.0	2.324E+00	2.325E+00	7.982E+00
PA-234M	3.946E+01	100.8	3.977E+01	3.982E+01	1.934E+02
AM-241	-6.909E-01	204.5	1.413E+00	1.413E+00	4.767E+00
Np-237	2.209E+00	176.3	3.894E+00	3.896E+00	1.306E+01
Ir-192	2.205E-01	106.7	2.351E-01	2.355E-01	2.465E+00
Cs-136	7.382E-02	69.6	5.140E-02	5.157E-02	1.951E+00
Np-239	-1.296E+00	190.7	2.473E+00	2.474E+00	8.279E+00
Nd-147	1.596E+00	103.8	1.656E+00	1.659E+00	7.320E+00
TL-210	4.154E-01	98.0	4.069E-01	4.076E-01	1.556E+00
Total	3.148E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-37-B

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181616.An1

Acquisition information

Start time:	8/23/2018 6:46:17 PM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1415

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-26.	71.58	0.93	1.709E-02	46.54	4.250	PBC<MDA	PB210
49.55	16.	111.40	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
63.41	-9.	240.82	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
77.22	57.	23.16	0.91	3.148E-02				
86.49	17.	176.25	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.426E-01	EU155
					86.94	9.040	3.196E+00	Sn126
86.54	17.	179.52	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	9.426E-01	EU155
					86.94	9.040	3.196E+00	Sn126
86.94	18.	175.12	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.435E+00	Sn126
87.57	17.	185.95	0.97	3.314E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	7.600E+00	Cd109
88.04	17.	188.96	0.97	3.320E-02	87.57	37.500	PBC<MDA	Sn126
					88.04	3.790	7.604E+00	Cd109
91.10	17.	191.48	0.97	3.352E-02	91.10	28.300	PBC<MDA	Nd147
92.49	-10.	356.61	0.98	3.366E-02	92.59	5.584	PBC<MDA	TH234
93.35	7.	454.23	0.98	3.372E-02	93.35	5.561	PBC<MDA	AC228
131.29	9.	284.80	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
162.66	2.	758.29	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	121.92	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	15.	101.50	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
185.72	41.	34.91	1.06	2.864E-02	185.72	54.000	1.485E+00	U235
210.85	8.	164.03	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229
238.36	106.	15.32	0.96	2.415E-02	238.63	43.300	5.192E+00	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
241.78	29.	29.79	1.11	2.388E-02	242.00	7.430	9.096E+00	PB214
257.35	11.	101.51	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
277.28	11.	84.31	1.14	2.153E-02	277.28	6.310	PBC<MDA	TL208
279.20	9.	102.70	1.14	2.141E-02	279.20	81.460	PBC<MDA	Hg203
294.74	6.	304.77	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	11.	168.63	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	10.	187.39	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	178.93	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
300.18	11.	184.10	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
302.65	11.	188.78	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
302.85	11.	193.64	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
304.85	11.	198.12	1.16	1.998E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.062E+00	BI210M
304.90	10.	215.81	1.16	1.998E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	9.976E-01	BI210M
328.76	9.	161.09	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	179.14	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
345.83	12.	117.98	1.20	1.808E-02	345.83	15.070	PBC<MDA	HF181
351.67	80.	14.62	1.24	1.782E-02	351.93	37.600	6.647E+00	PB214
364.48	8.	104.08	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	11.	113.22	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	114.45	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
427.88	8.	96.79	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	1.	602.93	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	104.96	1.29	1.458E-02	453.88	65.000	PBC<MDA	pm146
463.37	9.	84.67	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.66	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	144.70	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	15.	37.71	1.33	1.358E-02	497.05	90.900	6.969E-01	RU103
511.86	57.	21.13	2.59	1.328E-02	511.86	20.000	1.185E+01	RH106
531.00	9.	103.77	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	2.	507.13	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140
563.24	2.	551.91	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	6.	112.07	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.137E+00	PA234
					569.70	97.740	2.633E-01	BI207
569.70	4.	173.37	1.39	1.224E-02	569.32	15.380	1.131E+00	CS134
					569.47	8.200	2.122E+00	PA234
					569.70	97.740	1.781E-01	BI207
583.18	38.	20.29	1.14	1.202E-02	583.02	84.500	2.100E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.65	52.	17.25	1.39	1.163E-02	609.31	46.090	5.354E+00	BI214
					610.30	5.750	4.297E+01	RU103
635.89	4.	142.27	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	6.	97.18	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
722.79	7.	84.71	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.428E-01	AG108M
					723.36	20.220	1.990E+00	EU154
722.94	7.	99.36	1.51	1.024E-02	722.79	10.810	3.721E+00	SB124
					722.94	90.840	4.429E-01	AG108M
					723.36	20.220	1.990E+00	EU154
723.36	6.	133.33	1.51	1.023E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.690E-01	AG108M
					723.36	20.220	1.659E+00	EU154
756.73	5.	113.48	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
766.41	5.	100.79	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	2.	403.11	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
785.42	14.	44.37	1.56	9.628E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	94.57	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
799.60	8.	99.76	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	3.	253.53	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
810.78	22.	29.46	1.58	9.404E-03	810.78	99.460	1.307E+00	CO58
834.85	12.	46.81	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
861.30	8.	106.97	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
871.10	11.	30.48	1.62	8.920E-03	871.10	99.890	6.830E-01	NB94
884.68	11.	101.00	1.63	8.818E-03	884.68	72.680	PBC<MDA	AG110M
898.04	12.	52.29	1.64	8.721E-03	898.04	93.700	PBC<MDA	y88
911.07	10.	91.28	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	5.	163.03	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234
964.11	4.	173.21	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
996.33	6.	86.55	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1001.00	2.	263.91	1.72	8.047E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	6.	119.56	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1048.07	8.	69.63	1.75	7.775E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	1.	853.07	1.75	7.762E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	99.08	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	10.	96.26	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1119.86	4.	166.57	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.87	4.	177.94	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	8.746E-01	Ta182
1218.85	9.	106.38	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	37.80	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.651E+00	EU154
1332.50	2.	272.09	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	204.86	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1461.02	232.	6.80	1.97	6.004E-03	1460.83	10.670	2.012E+02	K40
1596.21	6.	42.96	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.61	8.	50.98	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.93	77.22	43.	57.	1.800E+03	23.16	0.906	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.30	46.54	188.	-26.	-0.015	71.58	0.934s
TH-227	199.70	50.14	157.	16.	0.009	111.40	0.938s
AM-241	237.25	59.54	279.	-12.	-0.006	204.46	0.946s
TH-234	252.25	63.29	254.	-9.	-0.005	240.82	0.950
Sn-126	256.21	64.28	261.	-21.	-0.012	111.57	0.951s
BA-133	323.00	80.99	271.	-16.	-0.009	146.18	0.966s
Np-237	344.99	86.49	451.	17.	0.010	176.25	0.971s
EU-155	345.20	86.54	468.	17.	0.010	179.52	0.971s
Sn-126	346.79	86.94	514.	18.	0.010	175.12	0.971s
Sn-126	349.31	87.57	504.	17.	0.010	185.95	0.972s
Cd-109	351.19	88.04	521.	17.	0.010	188.96	0.972s
Nd-147	363.42	91.10	538.	17.	0.010	191.48	0.975
TH-234	369.37	92.59	582.	-10.	-0.005	356.61	0.976
AC-228	372.41	93.35	573.	7.	0.004	454.23	0.977s
Gd-153	389.00	97.50	580.	0.	0.000	1000.00	0.981s
Np-239	396.99	99.50	580.	0.	0.000	1000.00	0.982s
Gd-153	411.78	103.20	580.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	580.	0.	0.000	1000.00	0.986s
Np-239	423.49	106.13	591.	-18.	-0.010	190.73	0.988s
EU-152	486.04	121.78	120.	0.	0.000	1000.00	1.002s
CO-57	487.18	122.06	117.	-10.	-0.006	156.21	1.003s
EU-154	491.33	123.10	127.	0.	0.000	1000.00	1.004s
PA-234	524.09	131.29	324.	9.	0.005	284.80	1.011
HF-181	531.00	133.02	333.	0.	0.000	1000.00	1.013s
CE-144	533.06	133.54	333.	0.	0.000	1000.00	1.013s
HF-181	544.09	136.30	333.	0.	0.000	1000.00	1.015s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	544.79	136.47	333.	0.	0.000	1000.00	1.016s
Tc-99m	560.92	140.51	333.	0.	0.000	1000.00	1.019s
U-235	574.02	143.79	333.	0.	0.000	1000.00	1.022s
CE-141	580.63	145.44	444.	-20.	-0.011	147.43	1.024s
Ba-140	649.47	162.66	114.	2.	0.001	758.29	1.039s
U-235	652.34	163.38	116.	0.	0.000	1000.00	1.040s
CE-139	662.23	165.85	95.	12.	0.006	121.92	1.042s
Cf-251	705.19	176.60	59.	15.	0.008	101.50	1.051s
U-235	741.65	185.72	48.	41.	0.023	34.91	1.060s
TH-229	772.79	193.51	70.	-4.	-0.002	878.55	1.066s
TH-229	842.11	210.85	44.	8.	0.004	164.03	1.082s
Cf-251	906.68	227.00	62.	-11.	-0.006	133.67	1.096s
PB-212	953.18	238.63	27.	103.	0.057	12.30	1.106D
PB-214	966.63	242.00	23.	29.	0.016	29.79	1.109D
EU-152	977.41	244.69	251.	-14.	-0.008	163.07	1.111s
TH-227	1023.58	256.24	30.	11.	0.006	101.51	1.122s
Cd-113m	1053.40	263.70	64.	-2.	-0.001	527.25	1.128s
BI-210M	1061.92	265.83	80.	-15.	-0.008	86.89	1.130
TL-208	1107.70	277.28	38.	11.	0.006	84.31	1.140
Hg-203	1115.37	279.20	37.	9.	0.005	102.70	1.141s
I-131	1135.76	284.30	44.	-6.	-0.003	220.27	1.146s
PB-214	1178.90	295.09	150.	6.	0.003	304.77	1.155
TL-210	1182.54	296.00	155.	11.	0.006	168.63	1.156s
PB-212	1198.65	300.03	167.	10.	0.005	187.39	1.159
PA-231	1198.81	300.07	177.	11.	0.006	178.93	1.159s
PA-233	1199.25	300.18	187.	11.	0.006	184.10	1.159s
PA-231	1209.13	302.65	198.	11.	0.006	188.78	1.162s
BA-133	1209.93	302.85	209.	11.	0.006	193.64	1.162s
Ba-140	1217.92	304.85	219.	11.	0.006	198.12	1.164s
BI-210M	1218.11	304.90	230.	10.	0.006	215.81	1.164s
Ir-192	1232.27	308.44	240.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	240.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	240.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	240.	0.	0.000	1000.00	1.177
La-140	1313.52	328.76	96.	9.	0.005	161.09	1.184s
Cf-249	1332.23	333.44	133.	9.	0.005	179.14	1.188s
Cs-136	1360.74	340.57	75.	-13.	-0.007	97.31	1.194s
EU-152	1375.60	344.29	98.	-15.	-0.008	94.50	1.197s
HF-181	1381.77	345.83	102.	12.	0.007	117.98	1.199s
PB-214	1405.13	351.67	16.	80.	0.045	14.62	1.235s
BA-133	1422.43	356.00	157.	-13.	-0.007	143.57	1.207s
I-131	1456.35	364.48	16.	8.	0.004	104.08	1.215s
BA-133	1533.76	383.84	99.	-14.	-0.008	85.30	1.231s
Cf-249	1550.19	387.95	66.	11.	0.006	113.22	1.235s
SN-113	1565.14	391.69	58.	10.	0.005	114.45	1.238
SB-125	1709.84	427.88	12.	8.	0.004	96.79	1.268s
AG-108M	1734.08	433.94	21.	1.	0.001	602.93	1.273s
pm-146	1813.83	453.88	16.	8.	0.004	104.96	1.290s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	1851.76	463.37	25.	9.	0.005	84.67	1.298s
Ir-192	1870.53	468.06	31.	8.	0.004	106.66	1.302s
BE-7	1908.66	477.60	63.	8.	0.004	144.70	1.310s
HF-181	1926.26	482.00	71.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	71.	0.	0.000	1000.00	1.317s
RU-103	1986.48	497.05	5.	15.	0.009	37.71	1.326s
RH-106	2045.71	511.86	13.	57.	0.031	21.13	2.588s
Nd-147	2122.23	531.00	17.	9.	0.005	103.77	1.354s
Ba-140	2147.27	537.26	18.	2.	0.001	507.13	1.359s
CS-134	2251.16	563.24	17.	2.	0.001	551.91	1.380s
CS-134	2275.49	569.32	17.	6.	0.003	112.07	1.385s
PA-234	2276.09	569.47	28.	-4.	-0.002	186.68	1.385s
BI-207	2277.02	569.70	20.	4.	0.002	173.37	1.385s
TL-208	2330.93	583.18	8.	38.	0.021	20.29	1.141
SB-125	2400.20	600.50	170.	-12.	-0.007	156.32	1.410s
SB-124	2409.12	602.73	158.	-12.	-0.007	150.71	1.412s
BI-214	2436.77	609.65	10.	52.	0.029	17.25	1.386
RU-103	2439.39	610.30	162.	-14.	-0.008	131.73	1.418s
AG-108M	2455.31	614.28	148.	-14.	-0.008	125.89	1.421s
PM-144	2470.44	618.06	134.	-14.	-0.008	62.25	1.424s
RH-106	2485.86	621.92	127.	-15.	-0.008	109.99	1.427s
SB-125	2541.74	635.89	18.	4.	0.002	142.27	1.439s
I-131	2546.08	636.97	35.	-9.	-0.005	101.90	1.440s
AG-110M	2629.23	657.76	14.	6.	0.003	97.18	1.456s
CS-137	2644.82	661.66	20.	0.	0.000	1000.00	1.459s
NB-94	2808.70	702.63	24.	-1.	-0.001	574.56	1.492s
SB-124	2889.33	722.79	16.	7.	0.004	84.71	1.507s
AG-108M	2889.93	722.94	23.	7.	0.004	99.36	1.507s
EU-154	2891.61	723.36	31.	6.	0.003	133.33	1.508s
pm-146	2941.07	735.72	19.	-7.	-0.004	97.71	1.518s
pm-146	2986.83	747.16	24.	-6.	-0.003	114.40	1.526s
ZR-95	3025.11	756.73	5.	5.	0.003	113.48	1.534s
AG-110M	3053.97	763.94	25.	-3.	-0.002	155.60	1.539s
NB-95	3061.35	765.79	27.	0.	0.000	1000.00	1.541s
PA-234M	3063.85	766.41	9.	5.	0.003	100.79	1.541s
EU-152	3113.88	778.92	14.	2.	0.001	403.11	1.551s
BI-212	3139.88	785.42	5.	14.	0.008	44.37	1.556s
CS-134	3181.68	795.87	19.	7.	0.004	94.57	1.564s
TL-210	3196.61	799.60	26.	8.	0.004	99.76	1.567s
CS-134	3206.02	801.95	33.	3.	0.002	253.53	1.569s
CO-58	3241.32	810.78	10.	22.	0.012	29.46	1.575s
La-140	3261.30	815.77	32.	0.	0.000	1000.00	1.579s
Cs-136	3272.22	818.50	42.	-8.	-0.004	122.75	1.581s
MN-54	3337.63	834.85	5.	12.	0.007	46.81	1.594
Co-56	3385.32	846.77	15.	-1.	-0.001	674.43	1.603s
TL-208	3440.51	860.56	14.	8.	0.004	106.97	1.614
NB-94	3482.65	871.10	0.	11.	0.006	30.48	1.621s
EU-154	3491.19	873.23	23.	-7.	-0.004	104.00	1.623s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3520.39	880.53	53.	-13.	-0.007	86.27	1.628s
PA-234	3531.23	883.24	66.	-11.	-0.006	111.93	1.630s
AG-110M	3537.01	884.68	60.	11.	0.006	101.00	1.632s
Sc-46	3555.40	889.28	66.	-11.	-0.006	107.13	1.635s
y-88	3590.45	898.04	6.	12.	0.007	52.29	1.642s
AC-228	3642.58	911.07	15.	10.	0.006	91.28	1.651s
AG-110M	3748.30	937.49	35.	-15.	-0.009	40.85	1.671s
PA-234	3782.42	946.02	10.	5.	0.003	163.03	1.677s
EU-152	3854.81	964.11	22.	4.	0.002	173.21	1.691s
AC-228	3874.26	968.97	61.	-16.	-0.009	75.33	1.694s
EU-154	3983.73	996.33	10.	6.	0.003	86.55	1.714s
PA-234M	4002.41	1001.00	20.	2.	0.001	263.91	1.718s
EU-154	4017.53	1004.77	23.	6.	0.003	119.56	1.721s
Co-56	4149.84	1037.84	20.	-4.	-0.002	150.14	1.745s
Cs-136	4190.78	1048.07	13.	8.	0.005	69.63	1.752s
RH-106	4199.94	1050.36	22.	1.	0.000	853.07	1.754s
BI-207	4253.17	1063.66	10.	8.	0.004	99.08	1.763s
Ga-68	4308.15	1077.40	35.	-16.	-0.009	83.47	1.773s
FE-59	4395.60	1099.25	16.	10.	0.006	96.26	1.789s
EU-152	4446.92	1112.07	53.	-10.	-0.005	77.99	1.798s
BI-214	4479.78	1120.29	23.	4.	0.002	166.57	1.803
Sc-46	4480.84	1120.55	32.	-5.	-0.003	166.13	1.804s
Ta-182	4483.84	1121.30	24.	4.	0.002	177.94	1.804s
CO-60	4691.70	1173.24	32.	-15.	-0.008	89.53	1.841s
Ta-182	4884.51	1221.41	16.	9.	0.005	106.38	1.874s
Co-56	4952.04	1238.28	43.	-8.	-0.004	90.87	1.886s
NA-22	5097.14	1274.53	0.	7.	0.004	37.80	1.910s
EU-154	5097.19	1274.54	7.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	21.	-8.	-0.005	130.66	1.922s
TL-210	5251.13	1313.00	16.	0.	0.000	1000.00	1.936s
CO-60	5329.19	1332.50	6.	2.	0.001	272.09	1.949s
EU-152	5631.44	1408.00	6.	3.	0.002	204.86	1.999s
K-40	5843.72	1461.02	8.	232.	0.129	6.80	1.973
La-140	6385.01	1596.21	1.	6.	0.004	42.96	2.119s
SB-124	6764.54	1690.98	6.	-1.	-0.001	600.00	2.176s
BI-214	7058.94	1764.49	3.	8.	0.004	50.98	2.219s
Co-56	7086.41	1771.35	11.	0.	0.000	1000.00	2.223s
y-88	7345.60	1836.06	6.	-2.	-0.001	304.14	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

BE-7     C   3.0157E+00                                      5.31E+01
                          477.60 3.016E+00 ?(  1.496E+01 1.45E+02 1.05E+01 G

NA-22    C   5.8117E-01                                      9.50E+02
                         1274.53 5.812E-01 ?(  6.119E-01 3.78E+01 9.99E+01 G

K-40     N   2.0116E+02                                      4.66E+11
                         1460.83 2.012E+02  (P 1.380E+01 6.80E+00 1.07E+01 G

Sc-46    F  -7.0722E-01                                      8.38E+01
                          889.28-7.072E-01 ?(  2.569E+00 1.07E+02 1.00E+02 G
                         1120.55-3.758E-01 +   2.185E+00 1.66E+02 1.00E+02 G

MN-54    C   7.4462E-01                                      3.12E+02
                          834.85 7.446E-01 &(  7.714E-01 4.68E+01 1.00E+02 G

FE-59    F   1.3109E+00                                      4.45E+01
                         1099.25 1.311E+00 ?(  2.799E+00 9.63E+01 5.65E+01 G
                         1291.60-1.617E+00 +   4.703E+00 1.31E+02 4.32E+01 G

Co-56    C  -6.1893E-02                                      7.73E+01
                          846.77-6.189E-02 ?(P 1.268E+00 6.74E+02 9.99E+01 G
                         1238.28-9.597E-01 + P 4.077E+00 9.09E+01 6.61E+01 G
                         1037.84-2.210E+00 + P 1.193E+01 1.50E+02 1.41E+01 G
                         1771.35 0.000E+00 +   1.280E+01 1.00E+03 1.55E+01  A

CO-57    C  -1.9089E-01                                      2.72E+02
                          122.06-1.909E-01 ?(  1.014E+00 1.56E+02 8.56E+01 G
                          136.47 0.000E+00 +   1.378E+01 1.00E+03 1.07E+01 G

CO-58    C   1.3067E+00                                      7.09E+01
                          810.78 1.307E+00 ?(  1.036E+00 2.95E+01 9.95E+01 G

CO-60    F   1.8362E-01                                      1.93E+03
                         1332.50 1.836E-01 ?(P 1.203E+00 2.72E+02 1.00E+02 G
                         1173.24-1.169E+00 +   2.265E+00 8.95E+01 9.99E+01 G

ZN-65    F  -7.3260E-02                                      2.44E+02
                         1115.55-7.326E-02 %(P 4.950E+00 1.55E+03 5.06E+01 G
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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	I	3.1472E-01					7.41E+06	
			702.63	-6.100E-02	?(P	1.389E+00	5.75E+02	9.79E+01 G
			871.10	6.830E-01	&(P	4.595E-01	3.05E+01	9.99E+01 G
ZR-95	I	4.7386E-01					6.40E+01	
			756.73	4.739E-01	?(P	1.396E+00	1.13E+02	5.45E+01 G
			724.20	-7.061E-02	% P	3.850E+00	1.14E+03	4.42E+01 G
RU-103	I	6.9686E-01					3.93E+01	
			497.05	6.969E-01	?(P	5.674E-01	3.77E+01	9.09E+01 G
			610.30	-1.160E+01	-	5.155E+01	1.32E+02	5.75E+00 GA
RH-106	I	-7.2731E+00					3.74E+02	
			621.92	-7.273E+00	?(	2.694E+01	1.10E+02	9.93E+00 G
			1050.36	3.621E+00	+ P	1.132E+02	8.53E+02	1.56E+00 G
			511.86	1.185E+01	?	4.127E+00	2.11E+01	2.00E+01 GA
AG-108M	C	2.5186E-01					1.53E+05	
			433.94	6.012E-02	(P	9.687E-01	6.03E+02	9.05E+01 G
			722.94	4.429E-01	?(	1.509E+00	9.94E+01	9.08E+01 G
			614.28	-7.475E-01	&	3.175E+00	1.26E+02	8.98E+01 G
AG-110M	F	9.8363E-01					2.50E+02	
			884.68	9.836E-01	?(	3.364E+00	1.01E+02	7.27E+01 G
			657.76	3.207E-01	-	1.077E+00	9.72E+01	9.46E+01 G
			937.49	-2.944E+00	+ P	5.824E+00	4.08E+01	3.44E+01 G
			1384.30	-1.216E-01	%	6.709E+00	2.37E+03	2.43E+01 G
			763.94	-8.793E-01	- P	6.655E+00	1.56E+02	2.23E+01 G
SN-113	F	5.2097E-01					1.15E+02	
			391.69	5.210E-01	?(P	2.029E+00	1.14E+02	6.40E+01 G
SB-124	F	-1.5359E-01					6.02E+01	
			602.73	-5.798E-01	?(	2.957E+00	1.51E+02	9.83E+01 G
			1690.98	-2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
			722.79	3.720E+00	?(	1.072E+01	8.47E+01	1.08E+01 G
SB-125	I	1.6430E+00					1.01E+03	
			427.88	9.329E-01	?(P	2.322E+00	9.68E+01	2.96E+01 G
			600.50	-3.177E+00	&	1.680E+01	1.56E+02	1.79E+01 G
			635.89	1.933E+00	(P	9.701E+00	1.42E+02	1.13E+01 G
			463.37	3.338E+00	(	9.565E+00	8.47E+01	1.05E+01 G
I-131	I	3.1383E-01					8.02E+00	
			364.48	3.138E-01	(	8.375E-01	1.04E+02	8.17E+01 G
			284.30	-2.572E+00	+	1.441E+01	2.20E+02	6.14E+00 G
			636.97	-5.970E+00	&	2.077E+01	1.02E+02	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C	-4.2011E+01					4.71E-02	
			1077.40	-4.201E+01	?(	7.796E+01	8.35E+01	3.30E+00 G
BA-133	F	-1.2497E-01					3.85E+03	
			356.00	-6.381E-01	?(	3.097E+00	1.44E+02	6.20E+01 G
			302.85	1.612E+00	?(	1.056E+01	1.94E+02	1.83E+01 G
			383.84	-5.149E+00	+ P	1.830E+01	8.53E+01	8.94E+00 GA
			80.99	-8.194E-01	&	4.027E+00	1.46E+02	3.41E+01 GA
CS-134	I	4.2834E-01					7.54E+02	
			604.71	-6.622E-03	%(	2.873E+00	1.26E+04	9.76E+01 G
			795.87	4.803E-01	?(P	1.555E+00	9.46E+01	8.55E+01 G
			569.32	1.672E+00	?(	6.525E+00	1.12E+02	1.54E+01 G
			801.95	2.205E+00	?(	1.980E+01	2.54E+02	8.69E+00 G
			563.24	8.413E-01	?(P	1.195E+01	5.52E+02	8.35E+00 G
CE-139	F	2.6571E-01					1.38E+02	
			165.85	2.657E-01	?(	1.098E+00	1.22E+02	7.99E+01 G
Ba-140	I	1.1694E+00					1.28E+01	
			537.26	3.061E-01	&(P	4.030E+00	5.07E+02	2.44E+01 G
			162.66	5.794E-01	?(	1.520E+01	7.58E+02	6.22E+00 G
			304.85	6.933E+00	&(	4.648E+01	1.98E+02	4.29E+00 G
La-140	I	7.7827E-01					1.28E+01	
			1596.21	6.711E-01	?(P	7.695E-01	4.30E+01	9.54E+01 G
			487.02	0.000E+00	-	3.714E+00	1.00E+03	4.55E+01 G
			328.76	1.282E+00	?(P	7.043E+00	1.61E+02	2.03E+01 G
			815.77	0.000E+00	-	7.410E+00	1.00E+03	2.33E+01 G
CE-141	I	-7.2695E-01					3.25E+01	
			145.44	-7.269E-01	&(	3.588E+00	1.47E+02	4.82E+01 G
PM-144	C	1.7777E-02					3.63E+02	
			696.54	1.778E-02	%(	1.218E+00	2.75E+03	9.90E+01 G
			618.06	-7.028E-01	+ P	2.762E+00	6.23E+01	9.91E+01 G
EU-152	F	-1.7502E+00					4.94E+03	
			344.29	-1.750E+00	?(P	5.655E+00	9.45E+01	2.65E+01 G
			1112.07	-5.342E+00	+ P	2.002E+01	7.80E+01	1.36E+01 G
			121.78	0.000E+00	+	3.072E+00	1.00E+03	2.86E+01 G
			778.92	8.864E-01	+	8.929E+00	4.03E+02	1.29E+01 G
			964.11	1.839E+00	+	1.129E+01	1.73E+02	1.46E+01 G
			244.69	-4.308E+00	&	2.367E+01	1.63E+02	7.58E+00 G
			1408.00	1.235E+00	+ P	6.084E+00	2.05E+02	2.10E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	-1.1607E-01					3.14E+03	
			873.23	-3.560E+00	?(	1.274E+01	1.04E+02	1.23E+01 G
			123.10	0.000E+00	&	2.215E+00	1.00E+03	4.08E+01 G
			1274.54	0.000E+00	+	3.546E+00	1.00E+03	3.52E+01 G
			723.36	1.659E+00	&	7.675E+00	1.33E+02	2.02E+01 G
			1004.77	2.301E+00	+	9.559E+00	1.20E+02	1.80E+01 G
			996.33	3.870E+00	?(	1.148E+01	8.65E+01	1.06E+01 G
EU-155	I	5.1287E-01					1.81E+03	
			105.31	-1.095E-01	%(P	8.795E+00	2.38E+03	2.12E+01 G
			86.54	9.426E-01	?(	5.674E+00	1.80E+02	3.07E+01 G
HF-181	F	2.7666E-01					4.24E+01	
			482.00	0.000E+00	&(	2.083E+00	1.00E+03	8.05E+01 G
			133.02	0.000E+00	?(	3.374E+00	1.00E+03	4.33E+01 G
			345.83	2.549E+00	?(	1.018E+01	1.18E+02	1.51E+01 G
			136.30	0.000E+00	-	2.515E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.6602E+00					1.14E+02	
			1121.30	8.746E-01	?(	5.508E+00	1.78E+02	3.49E+01 G
			1221.41	2.676E+00	&(	6.348E+00	1.06E+02	2.70E+01 G
			1189.05	-1.618E-01	%	1.176E+01	3.15E+03	1.62E+01 G
Hg-203	F	2.8247E-01					4.66E+01	
			279.20	2.825E-01	?(	9.897E-01	1.03E+02	8.15E+01 G
TL-208	N	2.0999E+00					6.98E+02	
			583.02	2.100E+00	(P	8.507E-01	2.03E+01	8.45E+01 G
			277.28	4.508E+00	+ P	1.278E+01	8.43E+01	6.31E+00 G
			860.56	3.922E+00	+ P	1.005E+01	1.07E+02	1.24E+01 G
pm-146	C	-9.7094E-01					2.02E+03	
			747.16	-9.709E-01	?(P	4.173E+00	1.14E+02	3.40E+01 G
			735.72	-1.671E+00	+ P	5.605E+00	9.77E+01	2.25E+01 G
			453.88	4.661E-01	+ P	1.254E+00	1.05E+02	6.50E+01 G
y-88	F	8.0605E-01					1.07E+02	
			898.04	8.060E-01	&(P	9.695E-01	5.23E+01	9.37E+01 G
			1836.06	-2.271E-01	-	1.604E+00	3.04E+02	9.92E+01 G
Cd-113m		-8.9644E+02					5.33E+03	
			263.70	-8.964E+02	&(	1.657E+04	5.27E+02	6.00E-03 K
Cd-109	F	7.6037E+00					4.53E+02	
			88.04	7.604E+00	&(	4.815E+01	1.89E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-251	T	1.6184E+00					3.28E+05	
			176.60	1.618E+00	(	4.254E+00	1.02E+02	1.70E+01 G
			227.00	-3.992E+00	+	1.392E+01	1.34E+02	6.30E+00 GA
Cf-249	T	7.7315E-01					1.28E+05	
			387.95	5.363E-01	?(	2.063E+00	1.13E+02	6.60E+01 G
			333.44	1.781E+00	?(	1.086E+01	1.79E+02	1.55E+01 G
Sn-126		-4.2735E+00					3.65E+07	
			87.57	7.694E-01	+	4.796E+00	1.86E+02	3.75E+01 GA
			64.28	-4.273E+00	?(	1.596E+01	1.12E+02	9.70E+00 G
			86.94	3.435E+00	&	2.015E+01	1.75E+02	9.04E+00 GA
PB-210	N	-2.0092E+01					8.14E+03	
			46.54	-2.009E+01	*(P	5.098E+01	7.16E+01	4.25E+00 G
PB-212	N	5.4508E+00					6.98E+02	
			238.63	5.451E+00	(P	1.442E+00	1.23E+01	4.33E+01 G
			300.03	8.279E+00	+ P	5.263E+01	1.87E+02	3.28E+00 GA
PB-214	N	6.6472E+00					5.84E+05	
			351.93	6.647E+00	*(P	1.760E+00	1.46E+01	3.76E+01 G
			295.09	8.067E-01	- P	8.382E+00	3.05E+02	1.93E+01 G
			242.00	9.096E+00		7.836E+00	2.98E+01	7.43E+00 GA
BI-207	C	4.2031E-01					1.18E+04	
			569.70	1.781E-01	?(	1.098E+00	1.73E+02	9.77E+01 G
			1063.66	7.381E-01	?(P	1.720E+00	9.91E+01	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	1.749E+01	2.16E+03	7.55E+00 G
			785.42	6.116E+01	? P	6.119E+01	4.44E+01	1.28E+00 GA
BI-214	N	5.3437E+00					5.84E+05	
			609.31	5.354E+00	(P	1.834E+00	1.73E+01	4.61E+01 G
			1120.29	2.110E+00	- P	1.241E+01	1.67E+02	1.51E+01 G
			1764.49	5.313E+00	?(P	8.038E+00	5.10E+01	1.54E+01 G
BI-210M	T	-7.5958E-01					1.10E+09	
			265.83	-7.596E-01	?(	2.213E+00	8.69E+01	5.00E+01 G
			304.90	9.976E-01	&	7.287E+00	2.16E+02	2.80E+01 G
AC-228	N	2.2084E+00					2.10E+03	
			911.07	2.208E+00	?(	4.609E+00	9.13E+01	2.90E+01 G
			968.97	-6.017E+00	+	1.511E+01	7.53E+01	1.75E+01 G
			338.32	-9.768E-02	% P	1.467E+01	3.67E+03	1.20E+01 G
			93.35	2.214E+00	*	3.383E+01	4.54E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	N	4.6506E+00					7.95E+03	
			50.14	5.521E+00	&(	2.068E+01	1.11E+02	8.00E+00 G
			256.24	3.656E+00	&(P	9.768E+00	1.02E+02	7.00E+00 G
TH-229	N	1.1706E+00					2.68E+06	
			193.51	-1.756E+00	?(P	1.885E+01	8.79E+02	4.40E+00 G
			210.85	5.477E+00	?(P	2.375E+01	1.64E+02	2.99E+00 G
TH-234	N	-4.9115E+00					1.63E+12	
			63.29	-4.911E+00	(P	4.059E+01	2.41E+02	3.81E+00 G
			92.59	-2.820E+00	+ P	3.403E+01	3.57E+02	5.58E+00 G
PA-231	N	1.1011E+01					1.20E+07	
			302.65	1.025E+01	?(	6.553E+01	1.89E+02	2.88E+00 G
			300.07	1.190E+01	?(	7.214E+01	1.79E+02	2.46E+00 G
PA-233	C	6.9384E-01					7.82E+08	
			312.01	0.000E+00	?(	5.892E+00	1.00E+03	3.60E+01 G
			300.18	4.723E+00	?(	2.945E+01	1.84E+02	6.20E+00 G
PA-234	N	1.4257E+00					1.63E+12	
			131.29	8.297E-01	?(	7.982E+00	2.85E+02	1.80E+01 G
			946.02	2.226E+00	?(P	8.797E+00	1.63E+02	1.34E+01 G
			569.47	-2.307E+00	+	1.519E+01	1.87E+02	8.20E+00 G
			883.24	-6.995E+00	&	2.659E+01	1.12E+02	9.60E+00 G
			880.53	-1.325E+01	+	3.845E+01	8.63E+01	6.00E+00 GA
PA-234M	N	3.9456E+01					1.63E+12	
			1001.00	2.041E+01	?(P	1.934E+02	2.64E+02	8.37E-01 G
			766.41	9.369E+01	?(P	3.291E+02	1.01E+02	2.94E-01 G
AM-241	T	-6.9088E-01					1.58E+05	
			59.54	-6.909E-01	(	4.767E+00	2.04E+02	3.59E+01 G
Np-237	F	2.2095E+00					2.14E+06	
			86.49	2.209E+00	?(	1.306E+01	1.76E+02	1.31E+01 G
Ir-192	F	2.2045E-01					7.40E+01	
			316.49	0.000E+00	?(	2.465E+00	1.00E+03	8.70E+01 G
			468.06	5.912E-01	?(	2.162E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	6.620E+00	1.00E+03	3.18E+01 G
Cs-136	F	7.3818E-02					1.30E+01	
			818.50	-4.626E-01	?(	1.951E+00	1.23E+02	1.00E+02 G
			1048.07	7.443E-01	?(	1.723E+00	6.96E+01	8.00E+01 G
			340.57	-8.497E-01	+	2.788E+00	9.73E+01	4.69E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Np-239   T  -1.2964E+00                                      2.36E+00
                          103.70 0.000E+00 &   7.767E+00 1.00E+03 2.40E+01 X
                          106.13-1.296E+00 ?(  8.279E+00 1.91E+02 2.27E+01 G
                           99.50 0.000E+00 +   1.248E+01 1.00E+03 1.50E+01 X

Nd-147       1.5960E+00                                      1.11E+01
                          531.00 2.869E+00 ?(  7.320E+00 1.04E+02 1.30E+01 G
                           91.10 1.011E+00 &(  6.488E+00 1.91E+02 2.83E+01 G

TL-210   N   4.1541E-01                                      5.84E+05
                          799.60 4.553E-01 &(  1.556E+00 9.98E+01 9.90E+01 G
                          296.00 3.655E-01 ?(  2.090E+00 1.69E+02 7.90E+01 G
                         1313.00 0.000E+00 -   8.635E+00 1.00E+03 2.10E+01 GA
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	188.	-26.	-0.015	71.58	-2.009E+01	P
AM-241	59.54	279.	-12.	-0.006	204.46	-6.909E-01	
TH-234	63.29	254.	-9.	-0.005	240.82	-4.911E+00	P
Sn-126	64.28	261.	-21.	-0.012	111.57	-4.273E+00	
BA-133	80.99	271.	-16.	-0.009	146.18	-8.194E-01	
Np-237	86.49	451.	17.	0.010	176.25	2.209E+00	
EU-155	86.54	468.	17.	0.010	179.52	9.426E-01	
Sn-126	86.94	514.	18.	0.010	175.12	3.435E+00	
Sn-126	87.57	504.	17.	0.010	185.95	7.694E-01	
Cd-109	88.04	521.	17.	0.010	188.96	7.604E+00	
Nd-147	91.10	538.	17.	0.010	191.48	1.011E+00	
TH-234	92.59	582.	-10.	-0.005	356.61	-2.820E+00	P
AC-228	93.35	573.	7.	0.004	454.23	2.214E+00	
Np-239	106.13	591.	-18.	-0.010	190.73	-1.296E+00	
CO-57	122.06	117.	-10.	-0.006	156.21	-1.909E-01	
PA-234	131.29	324.	9.	0.005	284.80	8.297E-01	
CE-141	145.44	444.	-20.	-0.011	147.43	-7.269E-01	
Ba-140	162.66	114.	2.	0.001	758.29	5.794E-01	
CE-139	165.85	95.	12.	0.006	121.92	2.657E-01	
Cf-251	176.60	59.	15.	0.008	101.50	1.618E+00	
U-235	185.72	48.	41.	0.023	34.91	1.485E+00	
TH-229	193.51	70.	-4.	-0.002	878.55	-1.756E+00	P
TH-229	210.85	44.	8.	0.004	164.03	5.477E+00	P
Cf-251	227.00	62.	-11.	-0.006	133.67	-3.992E+00	
EU-152	244.69	251.	-14.	-0.008	163.07	-4.308E+00	
Cd-113m	263.70	64.	-2.	-0.001	527.25	-8.964E+02	
BI-210M	265.83	80.	-15.	-0.008	86.89	-7.596E-01	
Hg-203	279.20	37.	9.	0.005	102.70	2.825E-01	
I-131	284.30	44.	-6.	-0.003	220.27	-2.572E+00	
TL-210	296.00	155.	11.	0.006	168.63	3.655E-01	
PA-231	300.07	177.	11.	0.006	178.93	1.190E+01	
PA-233	300.18	187.	11.	0.006	184.10	4.723E+00	
PA-231	302.65	198.	11.	0.006	188.78	1.025E+01	
BA-133	302.85	209.	11.	0.006	193.64	1.612E+00	
Ba-140	304.85	219.	11.	0.006	198.12	6.933E+00	
BI-210M	304.90	230.	10.	0.006	215.81	9.976E-01	
Cf-249	333.44	133.	9.	0.005	179.14	1.781E+00	
Cs-136	340.57	75.	-13.	-0.007	97.31	-8.497E-01	
EU-152	344.29	98.	-15.	-0.008	94.50	-1.750E+00	P
HF-181	345.83	102.	12.	0.007	117.98	2.549E+00	
BA-133	356.00	157.	-13.	-0.007	143.57	-6.381E-01	
I-131	364.48	16.	8.	0.004	104.08	3.138E-01	
BA-133	383.84	99.	-14.	-0.008	85.30	-5.149E+00	P
Cf-249	387.95	66.	11.	0.006	113.22	5.363E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	391.69	58.	10.	0.005	114.45	5.210E-01	P
SB-125	427.88	12.	8.	0.004	96.79	9.329E-01	P
AG-108M	433.94	21.	1.	0.001	602.93	6.012E-02	P
pm-146	453.88	16.	8.	0.004	104.96	4.661E-01	P
SB-125	463.37	25.	9.	0.005	84.67	3.338E+00	
Ir-192	468.06	31.	8.	0.004	106.66	5.912E-01	
BE-7	477.60	63.	8.	0.004	144.70	3.016E+00	
RH-106	511.86	13.	57.	0.031	21.13	1.185E+01	
Nd-147	531.00	17.	9.	0.005	103.77	2.869E+00	
Ba-140	537.26	18.	2.	0.001	507.13	3.061E-01	P
CS-134	563.24	17.	2.	0.001	551.91	8.413E-01	P
CS-134	569.32	17.	6.	0.003	112.07	1.672E+00	
PA-234	569.47	28.	-4.	-0.002	186.68	-2.307E+00	
BI-207	569.70	20.	4.	0.002	173.37	1.781E-01	
SB-125	600.50	170.	-12.	-0.007	156.32	-3.177E+00	
SB-124	602.73	158.	-12.	-0.007	150.71	-5.798E-01	
AG-108M	614.28	148.	-14.	-0.008	125.89	-7.475E-01	
PM-144	618.06	134.	-14.	-0.008	62.25	-7.028E-01	P
RH-106	621.92	127.	-15.	-0.008	109.99	-7.273E+00	
SB-125	635.89	18.	4.	0.002	142.27	1.933E+00	P
I-131	636.97	35.	-9.	-0.005	101.90	-5.970E+00	
AG-110M	657.76	14.	6.	0.003	97.18	3.207E-01	
NB-94	702.63	24.	-1.	-0.001	574.56	-6.100E-02	P
SB-124	722.79	16.	7.	0.004	84.71	3.720E+00	
AG-108M	722.94	23.	7.	0.004	99.36	4.429E-01	
EU-154	723.36	31.	6.	0.003	133.33	1.659E+00	
pm-146	735.72	19.	-7.	-0.004	97.71	-1.671E+00	P
pm-146	747.16	24.	-6.	-0.003	114.40	-9.709E-01	P
ZR-95	756.73	5.	5.	0.003	113.48	4.739E-01	P
AG-110M	763.94	25.	-3.	-0.002	155.60	-8.793E-01	P
PA-234M	766.41	9.	5.	0.003	100.79	9.369E+01	P
EU-152	778.92	14.	2.	0.001	403.11	8.864E-01	
BI-212	785.42	5.	14.	0.008	44.37	6.116E+01	P
CS-134	795.87	19.	7.	0.004	94.57	4.803E-01	P
TL-210	799.60	26.	8.	0.004	99.76	4.553E-01	
CS-134	801.95	33.	3.	0.002	253.53	2.205E+00	
Cs-136	818.50	42.	-8.	-0.004	122.75	-4.626E-01	
MN-54	834.85	5.	12.	0.007	46.81	7.446E-01	
Co-56	846.77	15.	-1.	-0.001	674.43	-6.189E-02	P
NB-94	871.10	0.	11.	0.006	30.48	6.830E-01	P
EU-154	873.23	23.	-7.	-0.004	104.00	-3.560E+00	
PA-234	880.53	53.	-13.	-0.007	86.27	-1.325E+01	
PA-234	883.24	66.	-11.	-0.006	111.93	-6.995E+00	
AG-110M	884.68	60.	11.	0.006	101.00	9.836E-01	
Sc-46	889.28	66.	-11.	-0.006	107.13	-7.072E-01	
y-88	898.04	6.	12.	0.007	52.29	8.060E-01	P
AC-228	911.07	15.	10.	0.006	91.28	2.208E+00	
AG-110M	937.49	35.	-15.	-0.009	40.85	-2.944E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	946.02	10.	5.	0.003	163.03	2.226E+00		P
EU-152	964.11	22.	4.	0.002	173.21	1.839E+00		
AC-228	968.97	61.	-16.	-0.009	75.33	-6.017E+00		
EU-154	996.33	10.	6.	0.003	86.55	3.870E+00		
PA-234M	1001.00	20.	2.	0.001	263.91	2.041E+01		P
EU-154	1004.77	23.	6.	0.003	119.56	2.301E+00		
Co-56	1037.84	20.	-4.	-0.002	150.14	-2.210E+00		P
Cs-136	1048.07	13.	8.	0.005	69.63	7.443E-01		
RH-106	1050.36	22.	1.	0.000	853.07	3.621E+00		P
BI-207	1063.66	10.	8.	0.004	99.08	7.381E-01		P
Ga-68	1077.40	35.	-16.	-0.009	83.47	-4.201E+01		
FE-59	1099.25	16.	10.	0.006	96.26	1.311E+00		
EU-152	1112.07	53.	-10.	-0.005	77.99	-5.342E+00		P
Sc-46	1120.55	32.	-5.	-0.003	166.13	-3.758E-01		
CO-60	1173.24	32.	-15.	-0.008	89.53	-1.169E+00		
Co-56	1238.28	43.	-8.	-0.004	90.87	-9.597E-01		P
NA-22	1274.53	0.	7.	0.004	37.80	5.812E-01		
FE-59	1291.60	21.	-8.	-0.005	130.66	-1.617E+00		
CO-60	1332.50	6.	2.	0.001	272.09	1.836E-01		P
EU-152	1408.00	6.	3.	0.002	204.86	1.235E+00		P
SB-124	1690.98	6.	-1.	-0.001	600.00	-2.190E-01		
y-88	1836.06	6.	-2.	-0.001	304.14	-2.271E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.0157E+00	3.0157E+00	1.447E+02%	1.50E+01
NA-22	#A	5.8117E-01	5.8117E-01	3.780E+01%	6.12E-01
K-40		2.0116E+02	2.0116E+02	6.796E+00%	1.38E+01
Sc-46	#A	-7.0722E-01	-7.0722E-01	1.071E+02%	2.57E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+01
MN-54	#A	7.4462E-01	7.4462E-01	4.681E+01%	7.71E-01
FE-59	#A	1.3109E+00	1.3109E+00	9.626E+01%	2.80E+00
Co-56	#A	-6.1893E-02	-6.1893E-02	6.744E+02%	1.27E+00
CO-57	#A	-1.9089E-01	-1.9089E-01	1.562E+02%	1.01E+00
CO-58	#	1.3067E+00	1.3067E+00	2.946E+01%	1.04E+00
CO-60	#A	1.8362E-01	1.8362E-01	2.721E+02%	1.20E+00
ZN-65	#A	-7.3260E-02	-7.3260E-02	1.553E+03%	4.95E+00
NB-94	#A	3.1472E-01	3.1472E-01	3.048E+01%	1.39E+00
ZR-95	#A	4.7386E-01	4.7386E-01	1.135E+02%	1.40E+00
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.54E+00
RU-103	#	6.9686E-01	6.9686E-01	3.771E+01%	5.67E-01
RH-106	#A	-7.2731E+00	-7.2731E+00	1.100E+02%	2.69E+01
AG-108M	#A	2.5186E-01	2.5186E-01	9.936E+01%	9.69E-01

AG-110M#A	9.8363E-01	9.8363E-01	1.010E+02%	3.36E+00
SN-113 #A	5.2097E-01	5.2097E-01	1.144E+02%	2.03E+00
SB-124 #A	-1.5359E-01	-1.5359E-01	8.471E+01%	2.96E+00
SB-125 #A	1.6430E+00	1.6430E+00	6.393E+01%	2.32E+00
I-131 #A	3.1382E-01	3.1383E-01	1.041E+02%	8.38E-01
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	6.26E+00
Ga-68 #A	-4.1889E+01	-4.2011E+01	8.347E+01%	7.80E+01
Tc-99m #A	0.0000E+00	0.0000E+00	1.000E+03%	1.71E+00
BA-133 #A	-1.2497E-01	-1.2497E-01	1.205E+02%	3.10E+00
CS-134 #A	4.2834E-01	4.2834E-01	9.457E+01%	2.87E+00
CS-137 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+00
CE-139 #A	2.6571E-01	2.6571E-01	1.219E+02%	1.10E+00
Ba-140 #A	1.1694E+00	1.1694E+00	1.981E+02%	4.03E+00
La-140 #	7.7826E-01	7.7827E-01	4.296E+01%	7.70E-01
CE-141 #A	-7.2694E-01	-7.2695E-01	1.474E+02%	3.59E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144 #A	1.7777E-02	1.7777E-02	2.755E+03%	1.22E+00
EU-152 #A	-1.7502E+00	-1.7502E+00	9.450E+01%	5.66E+00
EU-154 #A	-1.1607E-01	-1.1607E-01	6.765E+01%	1.27E+01
EU-155 #A	5.1287E-01	5.1287E-01	1.795E+02%	8.79E+00
HF-181 #A	2.7666E-01	2.7666E-01	1.180E+02%	2.08E+00
Ta-182 #A	1.6602E+00	1.6602E+00	1.037E+02%	5.51E+00
Hg-203 #A	2.8247E-01	2.8247E-01	1.027E+02%	9.90E-01
TL-208	2.0999E+00	2.0999E+00	2.029E+01%	8.51E-01
pm-146 #A	-9.7094E-01	-9.7094E-01	1.144E+02%	4.17E+00
y-88 #A	8.0604E-01	8.0605E-01	5.229E+01%	9.70E-01
Cd-113m#A	-8.9644E+02	-8.9644E+02	5.272E+02%	1.66E+04
Cd-109 #A	7.6037E+00	7.6037E+00	1.890E+02%	4.82E+01
Cf-251 #A	1.6184E+00	1.6184E+00	1.015E+02%	4.25E+00
Cf-249 #A	7.7315E-01	7.7315E-01	1.060E+02%	2.06E+00
Sn-126 #A	-4.2735E+00	-4.2735E+00	1.116E+02%	1.60E+01
PB-210 #A	-2.0092E+01	-2.0092E+01	7.158E+01%	5.10E+01
PB-212	5.4508E+00	5.4508E+00	1.230E+01%	1.44E+00
PB-214	6.6472E+00	6.6472E+00	1.462E+01%	1.76E+00
BI-207 #A	4.2031E-01	4.2031E-01	9.908E+01%	1.10E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	2.161E+03%	1.75E+01
U-235 #A	0.0000E+00	0.0000E+00	7.071E+02%	1.37E+01
BI-214	5.3437E+00	5.3437E+00	1.725E+01%	1.83E+00
BI-210M#A	-7.5958E-01	-7.5958E-01	8.689E+01%	2.21E+00
AC-228 #A	2.2084E+00	2.2084E+00	9.128E+01%	4.61E+00
TH-227 A	4.6506E+00	4.6506E+00	7.536E+01%	2.07E+01
TH-229 #A	1.1706E+00	1.1706E+00	1.640E+02%	1.88E+01
TH-234 #A	-4.9115E+00	-4.9115E+00	2.408E+02%	4.06E+01
PA-231 #A	1.1011E+01	1.1011E+01	1.300E+02%	6.55E+01
PA-233 #A	6.9384E-01	6.9384E-01	1.841E+02%	5.89E+00
PA-234 #A	1.4257E+00	1.4257E+00	1.630E+02%	7.98E+00
PA-234M#A	3.9456E+01	3.9456E+01	1.008E+02%	1.93E+02
AM-241 #A	-6.9088E-01	-6.9088E-01	2.045E+02%	4.77E+00
Np-237 #A	2.2095E+00	2.2095E+00	1.763E+02%	1.31E+01

Ir-192 #A	2.2045E-01	2.2045E-01	1.067E+02%		2.46E+00
Cs-136 #A	7.3817E-02	7.3818E-02	6.963E+01%		1.95E+00
Np-239 #A	-1.2963E+00	-1.2964E+00	1.907E+02%		8.28E+00
Nd-147 #A	1.5960E+00	1.5960E+00	1.038E+02%		7.32E+00
TL-210 #A	4.1541E-01	4.1541E-01	9.796E+01%		1.56E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.7 to  1999.4 keV)     2.207E+02  Bq/Sample
Total Decayed Activity (   37.7 to  1999.4 keV) 2.2070389E+02  Bq/Sample
```

Test America St. Louis Spectrum ID: 19_Gamma_20181616

Sample Description: 379959_Gamma_160-29881-A-37-B
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-B

Decay to Time: 8/23/2018 18:46 Live Time: 1800 sec
Acquisition Time: 8/23/2018 18:46:17 Real Time: 1802 sec
Analysis Time: 8/28/2018 19:33 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.016E+00	144.7	4.364E+00	4.366E+00	1.496E+01
NA-22	5.812E-01	37.8	2.197E-01	2.216E-01	6.119E-01
K-40	2.012E+02	6.8	1.367E+01	1.703E+01	1.380E+01
Sc-46	-7.072E-01	107.1	7.577E-01	7.585E-01	2.569E+00
CR-51	0.000E+00	1.#INF	1.539E+00	1.539E+00	2.178E+01
MN-54	7.446E-01	46.8	3.486E-01	3.506E-01	7.714E-01
FE-59	8.156E-01	124.3	1.014E+00	1.014E+00	3.516E+00
Co-56	4.516E-02	438.8	1.981E-01	1.982E-01	1.268E+00
CO-57	0.000E+00	1.#INF	1.479E-01	1.479E-01	1.070E+00
CO-58	1.307E+00	29.5	3.849E-01	3.906E-01	1.036E+00
CO-60	1.836E-01	272.1	4.996E-01	4.997E-01	1.203E+00
ZN-65	8.536E-01	137.5	1.174E+00	1.175E+00	4.084E+00
ZR-95	4.739E-01	113.5	5.377E-01	5.383E-01	1.396E+00
NB-95	-6.799E-01	75.2	5.115E-01	5.127E-01	1.710E+00
RU-103	6.969E-01	37.7	2.628E-01	2.651E-01	5.674E-01
RH-106	-2.517E-01	78.7	1.980E-01	1.984E-01	2.775E+01
AG-108M	2.519E-01	99.4	2.502E-01	2.506E-01	9.687E-01
AG-110M	6.762E-01	55.1	3.727E-01	3.743E-01	1.077E+00
SN-113	5.210E-01	114.4	5.962E-01	5.968E-01	2.029E+00
SB-124	-1.536E-01	84.7	1.301E-01	1.303E-01	2.957E+00
SB-125	1.643E+00	63.9	1.050E+00	1.054E+00	2.322E+00
I-131	3.138E-01	79.1	2.481E-01	2.486E-01	8.375E-01
Gd-153	0.000E+00	1.#INF	4.809E-01	4.809E-01	7.418E+00
Ga-68	-4.201E+01	83.5	3.507E+01	3.515E+01	7.796E+01
Tc-99m	-3.972E-01	148.4	5.897E-01	5.901E-01	1.974E+00
BA-133	-1.250E-01	120.5	1.506E-01	1.508E-01	3.097E+00
CS-134	8.911E-01	88.4	7.878E-01	7.891E-01	1.555E+00
CS-137	0.000E+00	1.#INF	1.886E-01	1.886E-01	1.404E+00
CE-139	2.657E-01	121.9	3.240E-01	3.243E-01	1.098E+00
Ba-140	1.118E+00	215.7	2.411E+00	2.412E+00	4.030E+00
La-140	7.783E-01	43.0	3.344E-01	3.368E-01	7.695E-01
CE-141	-7.269E-01	157.4	1.144E+00	1.145E+00	3.829E+00
CE-144	0.000E+00	1.#INF	1.633E+00	1.633E+00	1.319E+01

PM-144	2.813E-01	89.5	2.517E-01	2.521E-01	8.691E-01
EU-152	1.581E+00	94.6	1.495E+00	1.498E+00	3.203E+00
EU-154	1.380E+00	64.3	8.875E-01	8.903E-01	2.281E+00
EU-155	5.542E-01	216.0	1.197E+00	1.198E+00	1.042E+01
HF-181	0.000E+00	1.#INF	3.508E-01	3.508E-01	2.083E+00
Ta-182	1.929E+00	82.3	1.589E+00	1.592E+00	5.894E+00
Hg-203	0.000E+00	1.#INF	1.802E-01	1.802E-01	1.207E+00
TL-208	2.100E+00	20.3	4.260E-01	4.392E-01	8.507E-01
PM-146	5.868E-01	92.8	5.443E-01	5.451E-01	1.254E+00
Y-88	1.121E-01	86.6	9.705E-02	9.726E-02	1.604E+00
Cd-113m	-8.964E+02	527.2	4.726E+03	4.727E+03	1.657E+04
Cd-109	0.000E+00	1.#INF	5.655E+00	5.655E+00	6.016E+01
Se-75	1.951E-01	158.7	3.098E-01	3.100E-01	1.730E+00
Cf-251	1.618E+00	101.5	1.643E+00	1.645E+00	4.254E+00
Cf-249	7.732E-01	106.0	8.192E-01	8.202E-01	2.063E+00
Sn-126	-4.273E+00	111.6	4.768E+00	4.774E+00	1.596E+01
PB-210	-1.535E+01	90.1	1.383E+01	1.387E+01	4.881E+01
PB-212	5.451E+00	12.3	6.705E-01	7.283E-01	1.442E+00
PB-214	6.647E+00	14.6	9.717E-01	1.029E+00	1.760E+00
BI-207	8.309E-03	66.0	5.483E-03	5.500E-03	1.610E+00
BI-212	-2.218E-01	2873.4	6.373E+00	6.373E+00	1.749E+01
BI-214	5.344E+00	17.3	9.219E-01	9.612E-01	1.834E+00
BI-210M	-7.596E-01	86.9	6.600E-01	6.612E-01	2.213E+00
AC-228	2.208E+00	91.3	2.016E+00	2.019E+00	4.609E+00
TH-227	4.651E+00	76.1	3.540E+00	3.549E+00	9.768E+00
TH-229	1.171E+00	164.0	1.920E+00	1.921E+00	1.885E+01
TH-234	-7.931E+00	88.4	7.012E+00	7.025E+00	4.091E+01
PA-231	1.101E+01	130.0	1.432E+01	1.433E+01	6.553E+01
PA-233	6.938E-01	184.1	1.277E+00	1.278E+00	5.892E+00
PA-234	1.268E+00	159.0	2.017E+00	2.018E+00	7.982E+00
PA-234M	2.477E+01	115.8	2.869E+01	2.872E+01	2.429E+02
U-235	-3.178E+00	154.5	4.910E+00	4.913E+00	1.643E+01
AM-241	-6.909E-01	204.5	1.413E+00	1.413E+00	4.767E+00
Np-237	2.373E+00	213.5	5.068E+00	5.069E+00	1.695E+01
Ir-192	2.205E-01	106.7	2.351E-01	2.355E-01	2.465E+00
Cs-136	-4.626E-01	122.7	5.678E-01	5.684E-01	1.951E+00
Np-239	1.319E+00	216.7	2.859E+00	2.860E+00	9.561E+00
Nd-147	2.207E+00	120.6	2.662E+00	2.665E+00	9.205E+00
Mo-99	3.031E+00	70.5	2.137E+00	2.142E+00	8.319E+00
Ge-69	1.485E+00	90.8	1.348E+00	1.351E+00	1.013E+01
Br-82	-9.826E-01	71.2	6.995E-01	7.017E-01	2.326E+00
V-48	9.677E-02	134.4	1.300E-01	1.302E-01	1.415E+00
Sr-85	5.264E-02	946.0	4.980E-01	4.980E-01	1.748E+00
Rb-83	8.280E-01	66.6	5.514E-01	5.534E-01	1.510E+00
Kr-85	0.000E+00	1.#INF	1.380E+01	1.380E+01	4.070E+02
Cm-247	6.645E-01	86.5	5.746E-01	5.756E-01	1.293E+00
Hf-175	-6.595E-02	711.6	4.693E-01	4.693E-01	1.634E+00
Lu-172	9.520E-01	70.5	6.710E-01	6.731E-01	2.150E+00
Kr-85m	1.429E-01	133.3	1.904E-01	1.906E-01	1.113E+00
NB-94	4.446E-01	106.1	4.718E-01	4.723E-01	1.613E+00
TL-210	4.154E-01	98.0	4.069E-01	4.076E-01	1.556E+00
Total	3.049E+02				

Analyst: Rachel Mueller

Sample description
379959_Gamma_160-29881-A-37-B

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181616.An1

Acquisition information

Start time:	8/23/2018 6:46:17 PM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Extra_Long_Rev7.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 6:46:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1415

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	-20.	90.12	0.93	1.709E-02	46.54	4.250	PBC<MDA	PB210
50.14	16.	113.48	0.94	2.049E-02	50.14	8.000	PBC<MDA	TH227
63.29	-9.	240.82	0.95	2.764E-02	63.29	3.810	PBC<MDA	TH234
77.22	57.	23.16	0.91	3.148E-02				
80.99	18.	209.48	0.97	3.218E-02	80.99	34.060	PBC<MDA	BA133
84.00	18.	211.47	0.97	3.266E-02	84.00	23.000	PBC<MDA	Cm247
86.49	18.	213.52	0.97	3.300E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.433E+00	Sn126
86.54	18.	216.04	0.97	3.301E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.013E+00	EU155
					86.94	9.040	3.433E+00	Sn126
86.94	16.	258.71	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	8.545E-01	EU155
					86.94	9.040	2.898E+00	Sn126
106.13	18.	216.73	0.99	3.430E-02	106.13	22.700	PBC<MDA	Np239
121.12	10.	158.75	1.00	3.404E-02	121.12	17.140	PBC<MDA	Se75
131.29	9.	284.80	1.01	3.348E-02	131.29	18.000	PBC<MDA	PA234
162.66	2.	758.29	1.04	3.083E-02	162.66	6.220	PBC<MDA	Ba140
165.85	12.	121.92	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	15.	101.50	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
181.07	13.	99.99	1.06	2.908E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	1.342E+00	Lu172
181.47	13.	113.40	1.06	2.904E-02	181.07	5.990	PBC<MDA	Mo99
					181.47	19.200	1.266E+00	Lu172
185.72	11.	144.80	1.06	2.864E-02	185.72	54.000	PBC<MDA	U235
210.85	8.	164.03	1.08	2.637E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.36	106.	15.32	0.96	2.415E-02	238.63	43.300	5.192E+00	PB212
241.78	29.	29.79	1.11	2.388E-02	242.00	7.430	9.096E+00	PB214
256.24	11.	101.51	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
277.28	34.	26.21	1.14	2.153E-02	277.28	6.310	1.397E+01	TL208
279.54	5.	200.05	1.14	2.139E-02	279.20	81.460	PBC<MDA	Hg203
					279.54	24.790	5.413E-01	Se75
294.74	6.	304.77	1.16	2.050E-02	295.09	19.300	PBC<MDA	PB214
296.00	11.	168.63	1.16	2.045E-02	296.00	79.000	PBC<MDA	TL210
300.03	10.	187.39	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
300.07	11.	178.93	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
300.18	11.	184.10	1.16	2.023E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.190E+01	PA231
					300.18	6.200	4.723E+00	PA233
302.65	11.	188.78	1.16	2.010E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
302.85	11.	193.64	1.16	2.009E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.612E+00	BA133
304.47	11.	198.19	1.16	2.000E-02	304.47	14.000	PBC<MDA	Kr85m
					304.85	4.290	6.931E+00	Ba140
					304.90	28.000	1.062E+00	BI210M
304.85	10.	215.73	1.16	1.998E-02	304.47	14.000	PBC<MDA	Kr85m
					304.85	4.290	6.513E+00	Ba140
					304.90	28.000	9.980E-01	BI210M
328.76	9.	161.09	1.18	1.882E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	179.14	1.19	1.861E-02	333.44	15.510	PBC<MDA	Cf249
351.67	80.	14.62	1.24	1.782E-02	351.93	37.600	6.647E+00	PB214
364.48	8.	79.06	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
387.95	11.	113.22	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	10.	114.45	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
400.66	1.	754.98	1.25	1.608E-02	400.66	11.370	PBC<MDA	Se75
402.40	9.	86.47	1.25	1.602E-02	402.40	72.000	PBC<MDA	Cm247
427.88	8.	96.79	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
433.94	1.	602.93	1.27	1.510E-02	433.94	90.480	PBC<MDA	AG108M
453.88	8.	104.96	1.29	1.458E-02	453.88	65.000	PBC<MDA	PM146
463.37	9.	84.67	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.66	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	144.70	1.31	1.401E-02	477.60	10.520	PBC<MDA	BE7
497.05	15.	37.71	1.33	1.358E-02	497.05	90.900	6.969E-01	RU103
511.86	55.	13.47	2.59	1.328E-02	511.86	20.000	1.152E+01	RH106
513.99	1.	946.01	1.34	1.324E-02	513.98	0.430	1.215E+01	Kr85
					513.99	99.280	5.264E-02	Sr85
520.35	7.	98.86	1.35	1.311E-02	520.35	46.110	PBC<MDA	Rb83
531.00	7.	120.62	1.35	1.291E-02	531.00	13.000	PBC<MDA	Nd147
537.26	2.	507.13	1.36	1.279E-02	537.26	24.390	PBC<MDA	Ba140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
552.50	5.	89.27	1.37	1.252E-02	552.50	16.300	PBC<MDA	Rb83
554.34	2.	255.95	1.37	1.249E-02	554.34	70.600	PBC<MDA	Br82
563.24	2.	551.91	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	8.	88.41	1.38	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.616E+00	PA234
					569.70	97.740	3.874E-01	BI207
569.47	3.	303.66	1.39	1.224E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.474E+00	PA234
					569.70	97.740	1.237E-01	BI207
574.00	7.	90.79	1.39	1.217E-02	574.00	11.800	PBC<MDA	Ge69
583.18	38.	20.29	1.14	1.202E-02	583.02	84.500	2.100E+00	TL208
609.65	52.	17.25	1.39	1.163E-02	609.31	46.090	5.354E+00	BI214
					610.30	5.750	4.297E+01	RU103
619.10	13.	106.83	1.43	1.149E-02	619.10	43.100	PBC<MDA	Br82
635.89	4.	142.27	1.44	1.126E-02	635.89	11.310	PBC<MDA	SB125
657.76	6.	97.18	1.46	1.098E-02	657.76	94.640	PBC<MDA	AG110M
696.54	5.	89.47	1.49	1.052E-02	696.54	99.000	PBC<MDA	PM144
702.63	8.	106.11	1.49	1.045E-02	702.63	97.900	PBC<MDA	NB94
722.79	7.	84.71	1.51	1.024E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	4.428E-01	AG108M
					723.36	20.220	1.990E+00	EU154
722.94	7.	99.36	1.51	1.024E-02	722.79	10.810	3.721E+00	SB124
					722.94	90.840	4.429E-01	AG108M
					723.36	20.220	1.990E+00	EU154
723.36	6.	133.33	1.51	1.023E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.690E-01	AG108M
					723.36	20.220	1.659E+00	EU154
735.72	4.	152.96	1.52	1.010E-02	735.72	22.500	PBC<MDA	PM146
739.50	5.	99.42	1.52	1.007E-02	739.50	12.130	PBC<MDA	Mo99
756.73	5.	113.48	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
763.94	5.	87.68	1.54	9.827E-03	763.94	22.280	PBC<MDA	AG110M
766.41	5.	115.84	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	11.	94.61	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
785.42	14.	44.37	1.56	9.628E-03	785.42	1.280	PBC<MDA	BI212
795.87	7.	94.57	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
799.60	8.	99.76	1.57	9.501E-03	799.60	98.960	PBC<MDA	TL210
801.95	3.	253.53	1.57	9.481E-03	801.95	8.690	PBC<MDA	CS134
810.78	22.	29.46	1.58	9.404E-03	810.78	99.460	1.307E+00	CO58
827.79	2.	398.21	1.59	9.262E-03	827.79	24.200	PBC<MDA	Br82
834.85	12.	46.81	1.59	9.204E-03	834.85	99.980	PBC<MDA	MN54
861.30	8.	106.97	1.61	9.000E-03	860.56	12.420	PBC<MDA	TL208
873.23	8.	85.58	1.62	8.903E-03	873.23	12.270	PBC<MDA	EU154
884.68	11.	101.00	1.63	8.818E-03	884.68	72.680	PBC<MDA	AG110M
898.04	7.	86.61	1.64	8.721E-03	898.04	93.700	PBC<MDA	Y88
900.69	4.	162.18	1.64	8.702E-03	900.69	27.710	PBC<MDA	Lu172
911.07	10.	91.28	1.65	8.629E-03	911.07	29.000	PBC<MDA	AC228
946.02	4.	232.82	1.68	8.392E-03	946.02	13.400	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
964.11	4.	173.21	1.69	8.274E-03	964.11	14.605	PBC<MDA	EU152
996.33	8.	84.22	1.71	8.075E-03	996.33	10.600	PBC<MDA	EU154
1004.77	3.	242.03	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	2.	561.50	1.74	7.832E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	10.	109.22	1.75	7.762E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	8.	99.08	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1093.64	9.	74.51	1.78	7.530E-03	1093.64	75.230	PBC<MDA	Lu172
1099.25	6.	124.27	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1106.50	3.	302.22	1.79	7.464E-03	1106.50	26.000	PBC<MDA	Ge69
1115.55	6.	137.52	1.80	7.418E-03	1115.55	50.600	PBC<MDA	ZN65
1119.86	6.	123.13	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	122.22	1.80	7.393E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.716E-01	Sc46
					1121.30	34.900	1.352E+00	Ta182
1120.87	6.	125.70	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.352E+00	Ta182
1218.85	9.	106.38	1.87	6.921E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	37.80	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.651E+00	EU154
1311.60	5.	134.39	1.94	6.547E-03	1311.60	98.000	PBC<MDA	V48
1317.43	7.	86.95	1.94	6.524E-03	1317.43	27.000	PBC<MDA	Br82
1332.50	2.	272.09	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	204.86	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1461.02	232.	6.80	1.97	6.004E-03	1460.83	10.670	2.012E+02	K40
1596.21	6.	42.96	2.12	5.577E-03	1596.21	95.400	PBC<MDA	La140
1764.61	8.	50.98	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
307.93	77.22	43.	57.	1.800E+03	23.16	0.906	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.30	46.54	172.	-20.	-0.011	90.12	0.934s
TH-227	199.70	50.14	163.	16.	0.009	113.48	0.938s
AM-241	237.25	59.54	279.	-12.	-0.006	204.46	0.946s
TH-234	252.25	63.29	254.	-9.	-0.005	240.82	0.950
Sn-126	256.21	64.28	261.	-21.	-0.012	111.57	0.951s
BA-133	323.00	80.99	732.	18.	0.010	209.48	0.966s
Cm-247	335.04	84.00	750.	18.	0.010	211.47	0.968s
Np-237	344.99	86.49	768.	18.	0.010	213.52	0.971s
EU-155	345.20	86.54	787.	18.	0.010	216.04	0.971s
Sn-126	346.79	86.94	805.	16.	0.009	258.71	0.971s
Sn-126	349.31	87.57	821.	0.	0.000	1000.00	0.972s
Cd-109	351.19	88.04	821.	0.	0.000	1000.00	0.972s
Hf-175	356.46	89.36	821.	0.	0.000	1000.00	0.973s
Nd-147	363.42	91.10	821.	0.	0.000	1000.00	0.975
TH-234	369.37	92.59	848.	-27.	-0.015	88.40	0.976s
AC-228	372.41	93.35	821.	0.	0.000	1000.00	0.977s
Se-75	385.92	96.73	821.	0.	0.000	1000.00	0.980s
Gd-153	389.00	97.50	821.	0.	0.000	1000.00	0.981s
Np-239	396.99	99.50	821.	0.	0.000	1000.00	0.982s
Gd-153	411.78	103.20	821.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	821.	0.	0.000	1000.00	0.986s
Np-239	423.49	106.13	794.	18.	0.010	216.73	0.988s
Se-75	483.41	121.12	121.	10.	0.006	158.75	1.002s
EU-152	486.05	121.78	131.	0.	0.000	1000.00	1.002s
CO-57	487.18	122.06	131.	0.	0.000	1000.00	1.003s
EU-154	491.33	123.10	135.	-15.	-0.008	112.55	1.004s
PA-234	524.09	131.29	324.	9.	0.005	284.80	1.011
HF-181	531.00	133.02	333.	0.	0.000	1000.00	1.013s
CE-144	533.06	133.54	333.	0.	0.000	1000.00	1.013s
Se-75	542.89	136.00	333.	0.	0.000	1000.00	1.015s
HF-181	544.09	136.30	333.	0.	0.000	1000.00	1.015s
CO-57	544.79	136.47	444.	-20.	-0.011	148.59	1.016s
Tc-99m	560.92	140.51	446.	-20.	-0.011	148.44	1.019D
Mo-99	560.92	140.51	466.	-20.	-0.011	151.72	1.019D
U-235	574.02	143.79	486.	-20.	-0.011	154.49	1.022s
CE-141	580.63	145.44	507.	-20.	-0.011	157.39	1.024s
Kr-85m	602.86	151.00	88.	-10.	-0.006	178.33	1.029
Ba-140	649.47	162.66	114.	2.	0.001	758.29	1.039s
U-235	652.34	163.38	116.	0.	0.000	1000.00	1.040s
CE-139	662.23	165.85	95.	12.	0.006	121.92	1.042s
Cf-251	705.19	176.60	59.	15.	0.008	101.50	1.051s
Mo-99	723.06	181.07	84.	13.	0.007	99.99	1.055s
Lu-172	724.66	181.47	97.	13.	0.007	113.40	1.056s
U-235	741.65	185.72	129.	11.	0.006	144.80	1.060s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	772.79	193.51	70.	-4.	-0.002	613.90	1.066s
TH-229	842.11	210.85	44.	8.	0.004	164.03	1.082s
Cf-251	906.68	227.00	62.	-11.	-0.006	133.67	1.096s
TH-227	942.54	235.97	275.	-14.	-0.008	171.58	1.104s
PB-212	953.18	238.63	27.	103.	0.057	12.30	1.106D
PB-214	966.63	242.00	23.	29.	0.016	29.79	1.109D
EU-152	977.41	244.69	248.	-4.	-0.002	595.14	1.111s
TH-227	1023.57	256.24	30.	11.	0.006	101.51	1.122s
Cd-113m	1053.40	263.70	64.	-2.	-0.001	527.25	1.128s
Se-75	1057.24	264.66	66.	0.	0.000	1000.00	1.129s
BI-210M	1061.92	265.83	80.	-15.	-0.008	86.89	1.130
TL-208	1107.70	277.28	23.	34.	0.019	26.21	1.140
Hg-203	1115.37	279.20	57.	0.	0.000	1000.00	1.141s
Se-75	1116.73	279.54	51.	5.	0.003	200.05	1.142s
I-131	1135.76	284.30	126.	-13.	-0.007	129.27	1.146s
PB-214	1178.90	295.09	150.	6.	0.003	304.77	1.155
TL-210	1182.54	296.00	155.	11.	0.006	168.63	1.156s
PB-212	1198.65	300.03	167.	10.	0.005	187.39	1.159
PA-231	1198.81	300.07	177.	11.	0.006	178.93	1.159s
PA-233	1199.25	300.18	187.	11.	0.006	184.10	1.159s
PA-231	1209.13	302.65	198.	11.	0.006	188.78	1.162s
BA-133	1209.93	302.85	209.	11.	0.006	193.64	1.162s
Kr-85m	1216.40	304.47	219.	11.	0.006	198.19	1.163s
Ba-140	1217.92	304.85	230.	10.	0.006	215.73	1.164s
BI-210M	1218.11	304.90	240.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	240.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	240.	0.	0.000	1000.00	1.170s
Ir-192	1264.46	316.49	240.	0.	0.000	1000.00	1.173s
CR-51	1278.83	320.08	240.	0.	0.000	1000.00	1.177
La-140	1313.52	328.76	96.	9.	0.005	161.09	1.184s
Cf-249	1332.23	333.44	133.	9.	0.005	179.14	1.188s
Cs-136	1360.74	340.57	75.	-13.	-0.007	97.31	1.194s
Hf-175	1372.06	343.40	88.	-2.	-0.001	711.62	1.197s
HF-181	1381.77	345.83	90.	0.	0.000	1000.00	1.199s
PB-214	1405.13	351.67	16.	80.	0.045	14.62	1.235s
BA-133	1422.43	356.00	157.	-13.	-0.007	143.57	1.207s
I-131	1456.35	364.48	16.	8.	0.004	79.06	1.215s
Mo-99	1464.10	366.42	35.	-2.	-0.001	505.57	1.216s
BA-133	1533.76	383.84	99.	-14.	-0.008	85.30	1.231s
Cf-249	1550.19	387.95	66.	11.	0.006	113.22	1.235s
SN-113	1565.14	391.69	58.	10.	0.005	114.45	1.238
Se-75	1601.01	400.66	28.	1.	0.001	754.98	1.245
Cm-247	1607.97	402.40	27.	9.	0.005	86.47	1.247s
SB-125	1709.84	427.88	12.	8.	0.004	96.79	1.268s
AG-108M	1734.08	433.94	21.	1.	0.001	602.93	1.273s
PM-146	1813.83	453.88	16.	8.	0.004	104.96	1.290s
SB-125	1851.76	463.37	25.	9.	0.005	84.67	1.298s
Ir-192	1870.53	468.06	31.	8.	0.004	106.66	1.302s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BE-7	1908.66	477.60	63.	8.	0.004	144.70	1.310s
HF-181	1926.26	482.00	71.	0.	0.000	1000.00	1.313s
La-140	1946.35	487.02	71.	0.	0.000	1000.00	1.317s
RU-103	1986.48	497.05	5.	15.	0.009	37.71	1.326s
RH-106	2045.71	511.86	0.	55.	0.031	13.47	2.588s
Kr-85	2054.17	513.98	70.	0.	0.000	1000.00	1.340s
Sr-85	2054.21	513.99	69.	1.	0.001	946.01	1.340s
Rb-83	2079.64	520.35	9.	7.	0.004	98.86	1.345s
Rb-83	2116.40	529.54	30.	-2.	-0.001	340.17	1.352s
Nd-147	2122.23	531.00	29.	7.	0.004	120.62	1.354s
Ba-140	2147.27	537.26	18.	2.	0.001	507.13	1.359s
Rb-83	2208.22	552.50	9.	5.	0.003	89.27	1.371s
Br-82	2215.58	554.34	17.	2.	0.001	255.95	1.373s
CS-134	2251.16	563.24	17.	2.	0.001	551.91	1.380s
CS-134	2275.49	569.32	23.	8.	0.005	88.41	1.385s
PA-234	2276.09	569.47	31.	3.	0.001	303.66	1.385s
BI-207	2277.02	569.70	47.	-12.	-0.007	87.20	1.385s
Ge-69	2294.21	574.00	16.	7.	0.004	90.79	1.389s
TL-208	2330.93	583.18	8.	38.	0.021	20.29	1.141
SB-125	2400.20	600.50	170.	-12.	-0.007	156.32	1.410s
SB-124	2409.12	602.73	158.	-12.	-0.007	150.71	1.412s
BI-214	2436.77	609.65	10.	52.	0.029	17.25	1.386
RU-103	2439.39	610.30	179.	-16.	-0.009	124.00	1.418s
AG-108M	2455.31	614.28	163.	-16.	-0.009	118.46	1.421s
PM-144	2470.44	618.06	148.	-16.	-0.009	55.85	1.424s
Br-82	2474.59	619.10	91.	13.	0.007	106.83	1.425s
RH-106	2485.86	621.92	135.	-15.	-0.008	113.29	1.427s
SB-125	2541.74	635.89	18.	4.	0.002	142.27	1.439s
I-131	2546.08	636.97	35.	-9.	-0.005	101.90	1.440s
AG-110M	2629.22	657.76	14.	6.	0.003	97.18	1.456s
CS-137	2644.82	661.66	20.	0.	0.000	1000.00	1.459s
PM-144	2784.35	696.54	8.	5.	0.003	89.47	1.487s
Br-82	2791.62	698.36	41.	-12.	-0.006	83.70	1.488
NB-94	2808.70	702.63	34.	8.	0.005	106.11	1.492s
SB-124	2889.33	722.79	16.	7.	0.004	84.71	1.507s
AG-108M	2889.93	722.94	23.	7.	0.004	99.36	1.507s
EU-154	2891.62	723.36	31.	6.	0.003	133.33	1.508s
PM-146	2941.07	735.72	15.	4.	0.002	152.96	1.518s
Mo-99	2956.19	739.50	11.	5.	0.003	99.42	1.520s
PM-146	2986.83	747.16	24.	-6.	-0.003	100.74	1.526s
ZR-95	3025.11	756.73	5.	5.	0.003	113.48	1.534s
AG-110M	3053.97	763.94	6.	5.	0.003	87.68	1.539s
NB-95	3061.35	765.79	35.	-12.	-0.007	75.24	1.541s
PA-234M	3063.85	766.41	13.	5.	0.003	115.84	1.541s
Br-82	3104.20	776.50	44.	-14.	-0.008	71.19	1.549s
Mo-99	3109.88	777.92	59.	-7.	-0.004	157.38	1.550s
EU-152	3113.88	778.92	47.	11.	0.006	94.61	1.551s
BI-212	3139.88	785.42	5.	14.	0.008	44.37	1.556s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3181.69	795.87	19.	7.	0.004	94.57	1.564s
TL-210	3196.61	799.60	26.	8.	0.004	99.76	1.567
CS-134	3206.02	801.95	33.	3.	0.002	253.53	1.569s
CO-58	3241.32	810.78	10.	22.	0.012	29.46	1.575s
La-140	3261.30	815.77	32.	0.	0.000	1000.00	1.579s
Cs-136	3272.22	818.50	42.	-8.	-0.004	122.75	1.581s
Br-82	3309.39	827.79	19.	2.	0.001	398.21	1.589s
MN-54	3337.63	834.85	5.	12.	0.007	46.81	1.594
Co-56	3385.32	846.77	15.	-1.	-0.001	674.43	1.603s
TL-208	3440.51	860.56	14.	8.	0.004	106.97	1.614
NB-94	3482.65	871.10	25.	-7.	-0.004	114.60	1.621s
Ge-69	3486.26	872.00	33.	0.	0.000	1000.00	1.622s
EU-154	3491.19	873.23	19.	8.	0.004	85.58	1.623s
PA-234	3520.39	880.53	53.	-13.	-0.007	86.27	1.628s
PA-234	3531.23	883.24	66.	-11.	-0.006	111.93	1.630s
AG-110M	3537.01	884.68	60.	11.	0.006	101.00	1.632s
Sc-46	3555.40	889.28	66.	-11.	-0.006	107.13	1.635s
Y-88	3590.45	898.04	14.	7.	0.004	86.61	1.642s
Lu-172	3601.05	900.69	22.	4.	0.002	162.18	1.644s
AC-228	3642.58	911.07	15.	10.	0.006	91.28	1.651s
AG-110M	3748.30	937.49	35.	-15.	-0.009	39.57	1.671s
V-48	3775.54	944.30	30.	-7.	-0.004	116.93	1.676s
PA-234	3782.42	946.02	31.	4.	0.002	232.82	1.677s
EU-152	3854.81	964.11	22.	4.	0.002	173.21	1.691s
AC-228	3874.26	968.97	61.	-16.	-0.009	75.33	1.694s
V-48	3932.40	983.50	15.	-3.	-0.002	289.64	1.705s
EU-154	3983.73	996.33	21.	8.	0.005	84.22	1.714s
EU-154	4017.53	1004.77	14.	3.	0.002	242.03	1.721s
Co-56	4149.84	1037.84	39.	2.	0.001	561.50	1.745s
Br-82	4174.49	1044.00	41.	0.	0.000	1000.00	1.749s
Cs-136	4190.78	1048.07	49.	-12.	-0.007	86.39	1.752s
RH-106	4199.94	1050.36	51.	10.	0.005	109.22	1.754s
BI-207	4253.17	1063.66	10.	8.	0.004	99.08	1.763s
Ga-68	4308.15	1077.40	35.	-16.	-0.009	83.47	1.773s
Lu-172	4373.14	1093.64	17.	9.	0.005	74.51	1.785
FE-59	4395.60	1099.25	27.	6.	0.003	124.27	1.789s
Ge-69	4424.61	1106.50	49.	3.	0.002	302.22	1.794s
ZN-65	4460.81	1115.55	29.	6.	0.003	137.52	1.800s
BI-214	4479.78	1120.29	21.	6.	0.003	123.13	1.803
Sc-46	4480.84	1120.55	26.	6.	0.003	122.22	1.804s
Ta-182	4483.84	1121.30	28.	6.	0.003	125.70	1.804s
CO-60	4691.70	1173.24	32.	-15.	-0.008	89.53	1.841s
Ta-182	4884.51	1221.41	16.	9.	0.005	106.38	1.874s
Co-56	4952.04	1238.28	43.	-8.	-0.004	88.31	1.886s
NA-22	5097.14	1274.53	0.	7.	0.004	37.80	1.910s
EU-154	5097.18	1274.54	7.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	21.	-8.	-0.005	130.66	1.922s
V-48	5245.52	1311.60	17.	5.	0.003	134.39	1.935s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-210	5251.13	1313.00	22.	0.	0.000	1000.00	1.936s
Br-82	5268.86	1317.43	14.	7.	0.004	86.95	1.939s
CO-60	5329.19	1332.50	6.	2.	0.001	272.09	1.949s
EU-152	5631.44	1408.00	6.	3.	0.002	204.86	1.999s
K-40	5843.72	1461.02	8.	232.	0.129	6.80	1.973
Br-82	5899.20	1474.88	0.	0.	0.000	1000.00	2.042s
La-140	6385.01	1596.21	1.	6.	0.004	42.96	2.119s
SB-124	6764.54	1690.98	6.	-1.	-0.001	600.00	2.176s
BI-214	7058.94	1764.49	3.	8.	0.004	50.98	2.219s
Co-56	7086.41	1771.35	11.	0.	0.000	1000.00	2.223s
Y-88	7345.60	1836.06	6.	-2.	-0.001	304.14	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.0157E+00					5.31E+01	
			477.60	3.016E+00	?(	1.496E+01	1.45E+02	1.05E+01 G
NA-22	C	5.8117E-01					9.50E+02	
			1274.53	5.812E-01	?(	6.119E-01	3.78E+01	9.99E+01 G
K-40	N	2.0116E+02					4.66E+11	
			1460.83	2.012E+02	(P	1.380E+01	6.80E+00	1.07E+01 G
Sc-46	F	-7.0722E-01					8.38E+01	
			889.28	-7.072E-01	?(	2.569E+00	1.07E+02	1.00E+02 G
			1120.55	4.716E-01	+	1.999E+00	1.22E+02	1.00E+02 G
MN-54	C	7.4462E-01					3.12E+02	
			834.85	7.446E-01	&(	7.714E-01	4.68E+01	1.00E+02 G
FE-59	F	8.1562E-01					4.45E+01	
			1099.25	8.156E-01	?(	3.516E+00	1.24E+02	5.65E+01 G
			1291.60	-1.617E+00	+	4.703E+00	1.31E+02	4.32E+01 G
Co-56	C	4.5157E-02					7.73E+01	
			846.77	-6.189E-02	?(P	1.268E+00	6.74E+02	9.99E+01 G
			1238.28	-9.597E-01	+ P	4.077E+00	8.83E+01	6.61E+01 G
			1037.84	8.023E-01	&(P	1.604E+01	5.61E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.280E+01	1.00E+03	1.55E+01 A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C 1.3067E+00					7.09E+01	
		810.78	1.307E+00	?(	1.036E+00	2.95E+01	9.95E+01 G
CO-60	F 1.8362E-01					1.93E+03	
		1332.50	1.836E-01	?(P	1.203E+00	2.72E+02	1.00E+02 G
		1173.24	-1.169E+00	+	2.265E+00	8.95E+01	9.99E+01 G
ZN-65	F 8.5356E-01					2.44E+02	
		1115.55	8.536E-01	?(P	4.084E+00	1.38E+02	5.06E+01 G
ZR-95	I 4.7386E-01					6.40E+01	
		756.73	4.739E-01	?(P	1.396E+00	1.13E+02	5.45E+01 G
		724.20	-7.061E-02	% P	3.850E+00	1.53E+03	4.42E+01 G
NB-95	I -6.7987E-01					6.40E+01	
		765.79	-6.799E-01	&(	1.710E+00	7.52E+01	9.98E+01 G
RU-103	I 6.9686E-01					3.93E+01	
		497.05	6.969E-01	?(P	5.674E-01	3.77E+01	9.09E+01 G
		610.30	-1.297E+01	-	5.412E+01	1.24E+02	5.75E+00 GA
RH-106	I -2.5169E-01					3.74E+02	
		621.92	-7.273E+00	?(	2.775E+01	1.13E+02	9.93E+00 G
		1050.36	4.444E+01	?(P	1.652E+02	1.09E+02	1.56E+00 G
		511.86	1.152E+01	?	1.542E+00	1.35E+01	2.00E+01 GA
AG-108M	C 2.5186E-01					1.53E+05	
		433.94	6.012E-02	(P	9.687E-01	6.03E+02	9.05E+01 G
		722.94	4.429E-01	?(	1.509E+00	9.94E+01	9.08E+01 G
		614.28	-8.358E-01	&	3.332E+00	1.18E+02	8.98E+01 G
AG-110M	F 6.7624E-01					2.50E+02	
		657.76	3.207E-01	?(	1.077E+00	9.72E+01	9.46E+01 G
		884.68	9.836E-01	?(	3.364E+00	1.01E+02	7.27E+01 G
		937.49	-2.944E+00	+ P	5.824E+00	3.96E+01	3.44E+01 G
		1384.30	-1.216E-01	%	6.709E+00	2.37E+03	2.43E+01 G
		763.94	1.184E+00	?(P	3.576E+00	8.77E+01	2.23E+01 G
SN-113	F 5.2097E-01					1.15E+02	
		391.69	5.210E-01	?(P	2.029E+00	1.14E+02	6.40E+01 G
SB-124	F -1.5359E-01					6.02E+01	
		602.73	-5.798E-01	?(	2.957E+00	1.51E+02	9.83E+01 G
		1690.98	-2.190E-01	+	3.094E+00	6.00E+02	4.78E+01 G
		722.79	3.720E+00	?(	1.072E+01	8.47E+01	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	1.6430E+00					1.01E+03	
			427.88	9.329E-01	?(P	2.322E+00	9.68E+01	2.96E+01 G
			600.50	-3.177E+00	&	1.680E+01	1.56E+02	1.79E+01 G
			635.89	1.933E+00	(P	9.701E+00	1.42E+02	1.13E+01 G
			463.37	3.338E+00	(	9.565E+00	8.47E+01	1.05E+01 G
I-131	I	3.1383E-01					8.02E+00	
			364.48	3.138E-01	(	8.375E-01	7.91E+01	8.17E+01 G
			284.30	-5.397E+00	+	2.360E+01	1.29E+02	6.14E+00 G
			636.97	-5.970E+00	&	2.077E+01	1.02E+02	7.17E+00 G
Ga-68	C	-4.2011E+01					4.71E-02	
			1077.40	-4.201E+01	?(	7.796E+01	8.35E+01	3.30E+00 G
Tc-99m	I	-3.9724E-01					2.51E-01	
								Energy duplication
			140.51	-3.972E-01	?(	1.974E+00	1.48E+02	8.93E+01 G
BA-133	F	-1.2497E-01					3.85E+03	
			356.00	-6.381E-01	?(	3.097E+00	1.44E+02	6.20E+01 G
			302.85	1.612E+00	?(	1.056E+01	1.94E+02	1.83E+01 G
			383.84	-5.149E+00	+ P	1.830E+01	8.53E+01	8.94E+00 GA
			80.99	9.314E-01	&	6.526E+00	2.09E+02	3.41E+01 GA
CS-134	I	8.9112E-01					7.54E+02	
			795.87	4.803E-01	?(P	1.555E+00	9.46E+01	8.55E+01 G
			604.71	-6.622E-03	%	2.873E+00	1.26E+04	9.76E+01 G
			569.32	2.460E+00	?(	7.394E+00	8.84E+01	1.54E+01 G
			801.95	2.205E+00	?(	1.980E+01	2.54E+02	8.69E+00 G
			563.24	8.413E-01	?(P	1.195E+01	5.52E+02	8.35E+00 G
CE-139	F	2.6571E-01					1.38E+02	
			165.85	2.657E-01	?(	1.098E+00	1.22E+02	7.99E+01 G
Ba-140	I	1.1177E+00					1.28E+01	
			537.26	3.061E-01	&(P	4.030E+00	5.07E+02	2.44E+01 G
			162.66	5.794E-01	?(	1.520E+01	7.58E+02	6.22E+00 G
			304.85	6.513E+00	&(	4.756E+01	2.16E+02	4.29E+00 G
La-140	I	7.7827E-01					1.28E+01	
			1596.21	6.711E-01	?(P	7.695E-01	4.30E+01	9.54E+01 G
			487.02	0.000E+00	-	3.714E+00	1.00E+03	4.55E+01 G
			328.76	1.282E+00	?(P	7.043E+00	1.61E+02	2.03E+01 G
			815.77	0.000E+00	-	7.410E+00	1.00E+03	2.33E+01 G
CE-141	I	-7.2695E-01					3.25E+01	
			145.44	-7.269E-01	&(	3.829E+00	1.57E+02	4.82E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C 2.8133E-01					3.63E+02	
		696.54	2.813E-01	?(	8.691E-01	8.95E+01	9.90E+01 G
		618.06	-7.834E-01	+ P	2.897E+00	5.59E+01	9.91E+01 G
EU-152	F 1.5807E+00					4.94E+03	
		121.78	0.000E+00	?(	3.203E+00	1.00E+03	2.86E+01 G
		344.29	-8.877E-02	% P	5.444E+00	1.86E+03	2.65E+01 G
		1112.07	-2.231E-01	% P	1.996E+01	1.87E+03	1.36E+01 G
		778.92	4.780E+00	?(	1.531E+01	9.46E+01	1.29E+01 G
		964.11	1.839E+00	?(	1.129E+01	1.73E+02	1.46E+01 G
		244.69	-1.162E+00	&	2.353E+01	5.95E+02	7.58E+00 G
		1408.00	1.235E+00	? P	6.084E+00	2.05E+02	2.10E+01 GA
EU-154	I 1.3797E+00					3.14E+03	
		123.10	-6.017E-01	&(	2.281E+00	1.13E+02	4.08E+01 G
		1274.54	0.000E+00	+	3.546E+00	1.00E+03	3.52E+01 G
		723.36	1.659E+00	&(	7.675E+00	1.33E+02	2.02E+01 G
		873.23	4.059E+00	?(	1.180E+01	8.56E+01	1.23E+01 G
		1004.77	1.320E+00	(	7.641E+00	2.42E+02	1.80E+01 G
		996.33	5.473E+00	?(	1.562E+01	8.42E+01	1.06E+01 G
EU-155	I 5.5422E-01					1.81E+03	
		105.31	-1.095E-01	%(P	1.042E+01	1.66E+03	2.12E+01 G
		86.54	1.013E+00	?(	7.315E+00	2.16E+02	3.07E+01 G
Ta-182	F 1.9295E+00					1.14E+02	
		1121.30	1.352E+00	?(	5.894E+00	1.26E+02	3.49E+01 G
		1221.41	2.676E+00	&(	6.348E+00	1.06E+02	2.70E+01 G
		1189.05	-1.618E-01	%	1.176E+01	3.15E+03	1.62E+01 G
TL-208	N 2.0999E+00					6.98E+02	
		583.02	2.100E+00	(P	8.507E-01	2.03E+01	8.45E+01 G
		277.28	1.397E+01	+ P	1.022E+01	2.62E+01	6.31E+00 G
		860.56	3.922E+00	+ P	1.005E+01	1.07E+02	1.24E+01 G
PM-146	C 5.8679E-01					2.02E+03	
		453.88	4.661E-01	?(P	1.254E+00	1.05E+02	6.50E+01 G
		747.16	-9.709E-01	+ P	4.173E+00	1.01E+02	3.40E+01 G
		735.72	9.355E-01	?(P	5.098E+00	1.53E+02	2.25E+01 G
Y-88	F 1.1206E-01					1.07E+02	
		1836.06	-2.271E-01	?(	1.604E+00	3.04E+02	9.92E+01 G
		898.04	4.711E-01	&(P	1.390E+00	8.66E+01	9.37E+01 G
Cd-113m	-8.9644E+02					5.33E+03	
		263.70	-8.964E+02	&(	1.657E+04	5.27E+02	6.00E-03 K

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Se-75		1.9515E-01					1.20E+02	
			264.66	0.000E+00	?(	1.730E+00	1.00E+03	5.85E+01 G
			136.00	0.000E+00	?(	2.522E+00	1.00E+03	5.83E+01 G
			279.54	5.413E-01	&(	3.765E+00	2.00E+02	2.48E+01 G
			121.12	9.522E-01	?(	5.139E+00	1.59E+02	1.71E+01 G
			400.66	3.039E-01	?(	8.317E+00	7.55E+02	1.14E+01 G
			96.73	0.000E+00	-	6.516E+01	1.00E+03	3.42E+00 G
Cf-251	T	1.6184E+00					3.28E+05	
			176.60	1.618E+00	(	4.254E+00	1.02E+02	1.70E+01 G
			227.00	-3.992E+00	+	1.392E+01	1.34E+02	6.30E+00 GA
Cf-249	T	7.7315E-01					1.28E+05	
			387.95	5.363E-01	?(	2.063E+00	1.13E+02	6.60E+01 G
			333.44	1.781E+00	?(	1.086E+01	1.79E+02	1.55E+01 G
Sn-126		-4.2735E+00					3.65E+07	
			87.57	0.000E+00	+	6.090E+00	1.00E+03	3.75E+01 GA
			64.28	-4.273E+00	?(	1.596E+01	1.12E+02	9.70E+00 G
			86.94	2.898E+00	&	2.509E+01	2.59E+02	9.04E+00 GA
PB-210	N	-1.5350E+01					8.14E+03	
			46.54	-1.535E+01	*(P	4.881E+01	9.01E+01	4.25E+00 G
PB-212	N	5.4508E+00					6.98E+02	
			238.63	5.451E+00	(P	1.442E+00	1.23E+01	4.33E+01 G
			300.03	8.279E+00	+ P	5.263E+01	1.87E+02	3.28E+00 GA
PB-214	N	6.6472E+00					5.84E+05	
			351.93	6.647E+00	*(P	1.760E+00	1.46E+01	3.76E+01 G
			295.09	8.067E-01	- P	8.382E+00	3.05E+02	1.93E+01 G
			242.00	9.096E+00		7.836E+00	2.98E+01	7.43E+00 GA
BI-207	C	8.3089E-03					1.18E+04	
			569.70	-5.480E-01	?(	1.610E+00	8.72E+01	9.77E+01 G
			1063.66	7.381E-01	?(P	1.720E+00	9.91E+01	7.45E+01 G
BI-212	N	-2.2180E-01					6.98E+02	
			727.17	-2.218E-01	&(P	1.749E+01	2.87E+03	7.55E+00 G
			785.42	6.116E+01	? P	6.119E+01	4.44E+01	1.28E+00 GA
BI-214	N	5.3437E+00					5.84E+05	
			609.31	5.354E+00	(P	1.834E+00	1.73E+01	4.61E+01 G
			1120.29	2.774E+00	- P	1.190E+01	1.23E+02	1.51E+01 G
			1764.49	5.313E+00	?(P	8.038E+00	5.10E+01	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	-7.5958E-01						1.10E+09	
			265.83	-7.596E-01	?(	2.213E+00	8.69E+01	5.00E+01	G
			304.90	0.000E+00	&	7.439E+00	1.00E+03	2.80E+01	G
AC-228	N	2.2084E+00						2.10E+03	
			911.07	2.208E+00	?(	4.609E+00	9.13E+01	2.90E+01	G
			968.97	-6.017E+00	+	1.511E+01	7.53E+01	1.75E+01	G
			338.32	-9.768E-02	% P	1.467E+01	3.67E+03	1.20E+01	G
			93.35	0.000E+00	-	4.036E+01	1.00E+03	5.56E+00	XA
TH-227	N	4.6506E+00						7.95E+03	
			256.24	3.656E+00	?(P	9.768E+00	1.02E+02	7.00E+00	G
			235.97	-2.567E+00	-	1.484E+01	1.72E+02	1.23E+01	G
			50.14	5.521E+00	&(	2.106E+01	1.13E+02	8.00E+00	G
TH-229	N	1.1706E+00						2.68E+06	
			193.51	-1.756E+00	?(P	1.885E+01	6.14E+02	4.40E+00	G
			210.85	5.477E+00	?(P	2.375E+01	1.64E+02	2.99E+00	G
TH-234	N	-7.9314E+00						1.63E+12	
			92.59	-7.931E+00	*(P	4.091E+01	8.84E+01	5.58E+00	G
			63.29	-4.911E+00	+ P	4.059E+01	2.41E+02	3.81E+00	G
PA-231	N	1.1011E+01						1.20E+07	
			302.65	1.025E+01	?(	6.553E+01	1.89E+02	2.88E+00	G
			300.07	1.190E+01	?(	7.214E+01	1.79E+02	2.46E+00	G
PA-233	C	6.9384E-01						7.82E+08	
			312.01	0.000E+00	?(	5.892E+00	1.00E+03	3.60E+01	G
			300.18	4.723E+00	?(	2.945E+01	1.84E+02	6.20E+00	G
PA-234	N	1.2684E+00						1.63E+12	
			131.29	8.297E-01	?(	7.982E+00	2.85E+02	1.80E+01	G
			946.02	1.732E+00	?(P	1.426E+01	2.33E+02	1.34E+01	G
			569.47	1.474E+00	?(	1.594E+01	3.04E+02	8.20E+00	G
			883.24	-6.995E+00	&	2.659E+01	1.12E+02	9.60E+00	G
			880.53	-1.325E+01	+	3.845E+01	8.63E+01	6.00E+00	GA
PA-234M	N	2.4767E+01						1.63E+12	
			1001.00	5.583E-01	%(P	2.429E+02	1.20E+04	8.37E-01	G
			766.41	9.369E+01	&(P	3.804E+02	1.16E+02	2.94E-01	G
U-235	N	-3.1784E+00						2.57E+11	
			143.79	-3.178E+00	(	1.643E+01	1.54E+02	1.10E+01	G
			205.33	-4.258E-01	% P	1.688E+01	2.32E+03	5.01E+00	G
			163.38	0.000E+00	+	1.881E+01	1.00E+03	5.08E+00	G
			185.72	4.067E-01	+	1.996E+00	1.45E+02	5.40E+01	GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T	-6.9088E-01					1.58E+05	
			59.54	-6.909E-01	(	4.767E+00	2.04E+02	3.59E+01 G
Np-237	F	2.3733E+00					2.14E+06	
			86.49	2.373E+00	?(	1.695E+01	2.14E+02	1.31E+01 G
Ir-192	F	2.2045E-01					7.40E+01	
			316.49	0.000E+00	?(	2.465E+00	1.00E+03	8.70E+01 G
			468.06	5.912E-01	?(	2.162E+00	1.07E+02	5.18E+01 G
			308.44	0.000E+00	-	6.620E+00	1.00E+03	3.18E+01 G
Cs-136	F	-4.6260E-01					1.30E+01	
			818.50	-4.626E-01	?(	1.951E+00	1.23E+02	1.00E+02 G
			1048.07	-1.089E+00	+	3.166E+00	8.64E+01	8.00E+01 G
			340.57	-8.497E-01	+	2.788E+00	9.73E+01	4.69E+01 G
Np-239	T	1.3193E+00					2.36E+00	
			103.70	0.000E+00	&	9.206E+00	1.00E+03	2.40E+01 X
			106.13	1.319E+00	?(	9.561E+00	2.17E+02	2.27E+01 G
			99.50	0.000E+00	-	1.479E+01	1.00E+03	1.50E+01 X
Nd-147		2.2069E+00					1.11E+01	
			531.00	2.207E+00	&(	9.205E+00	1.21E+02	1.30E+01 G
			91.10	0.000E+00	&	7.978E+00	1.00E+03	2.83E+01 G
Mo-99	I	3.0308E+00					2.75E+00	
			739.50	2.405E+00	?(	8.319E+00	9.94E+01	1.21E+01 G
			181.07	4.297E+00	&(	1.449E+01	1.00E+02	5.99E+00 G
								Energy duplication
			140.51	-7.623E+00	+	3.871E+01	1.52E+02	4.52E+00 G
			777.92	-9.527E+00	+	5.162E+01	1.57E+02	4.26E+00 G
			366.42	-4.508E+00	+	8.154E+01	5.06E+02	1.19E+00 GA
Ge-69	C	1.4853E+00					1.62E+00	
			1106.50	9.548E-01	&(	1.013E+01	3.02E+02	2.60E+01 G
			574.00	2.654E+00	?(	8.253E+00	9.08E+01	1.18E+01 G
			872.00	0.000E+00	-	1.916E+01	1.00E+03	9.59E+00 G
Br-82	F	-9.8262E-01					1.47E+00	
			776.50	-9.826E-01	?(	2.326E+00	7.12E+01	8.34E+01 G
			554.34	1.477E-01	+	1.376E+00	2.56E+02	7.06E+01 G
			619.10	1.478E+00	+	5.331E+00	1.07E+02	4.31E+01 G
			1044.00	0.000E+00	+	8.324E+00	1.00E+03	2.80E+01 G
			698.36	-2.205E+00	+	6.210E+00	8.37E+01	2.79E+01 G
			1317.43	2.139E+00	+	6.353E+00	8.69E+01	2.70E+01 G
			827.79	5.813E-01	+	5.691E+00	3.98E+02	2.42E+01 G
			1474.88	0.000E+00	+	4.161E+00	1.00E+03	1.66E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
V-48 C	9.6769E-02					1.61E+01	
		983.50	-2.044E-01	?(	1.415E+00	2.90E+02	1.00E+02 G
		1311.60	4.041E-01	?(	1.915E+00	1.34E+02	9.80E+01 G
		944.30	-5.785E+00	+	2.333E+01	1.17E+02	8.00E+00 G
Sr-85 C	5.2642E-02					6.47E+01	
		513.99	5.264E-02	?(	1.748E+00	9.46E+02	9.93E+01 G
Rb-83 P	8.2797E-01					8.62E+01	
		520.35	6.076E-01	?(	1.510E+00	9.89E+01	4.61E+01 G
		529.54	-3.340E-01	-	4.062E+00	3.40E+02	3.00E+01 G
		552.50	1.451E+00	?(	4.471E+00	8.93E+01	1.63E+01 G
Cm-247 T	6.6447E-01					5.70E+09	
		402.40	4.414E-01	?(	1.293E+00	8.65E+01	7.20E+01 G
		84.00	1.363E+00	&(	9.639E+00	2.11E+02	2.30E+01 G
Hf-175	-6.5948E-02					7.00E+01	
		343.40	-6.595E-02	?(	1.634E+00	7.12E+02	8.69E+01 G
		89.36	0.000E+00	+	9.659E+01	1.00E+03	2.35E+00 A
Lu-172	9.5199E-01					7.00E+01	
		1093.64	8.609E-01	&(	2.150E+00	7.45E+01	7.52E+01 G
		900.69	9.816E-01	?(	5.630E+00	1.62E+02	2.77E+01 G
		181.47	1.266E+00	?(	4.854E+00	1.13E+02	1.92E+01 G
Kr-85m I	1.4285E-01					1.87E-01	
		151.00	-2.398E-01	(	1.113E+00	1.78E+02	7.55E+01 G
		304.47	2.207E+00	&(	1.480E+01	1.98E+02	1.40E+01 G
NB-94 I	4.4463E-01					7.41E+06	
		702.63	4.446E-01	?(P	1.613E+00	1.06E+02	9.79E+01 G
		871.10	-4.602E-01	& P	1.633E+00	1.15E+02	9.99E+01 G
TL-210 N	4.1541E-01					5.84E+05	
		799.60	4.553E-01	&(	1.556E+00	9.98E+01	9.90E+01 G
		296.00	3.655E-01	?(	2.090E+00	1.69E+02	7.90E+01 G
		1313.00	0.000E+00	-	9.936E+00	1.00E+03	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.

$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	172.	-20.	-0.011	90.12	-1.535E+01	P
TH-227	50.14	163.	16.	0.009	113.48	5.521E+00	
AM-241	59.54	279.	-12.	-0.006	204.46	-6.909E-01	
TH-234	63.29	254.	-9.	-0.005	240.82	-4.911E+00	P
Sn-126	64.28	261.	-21.	-0.012	111.57	-4.273E+00	
BA-133	80.99	732.	18.	0.010	209.48	9.314E-01	
Cm-247	84.00	750.	18.	0.010	211.47	1.363E+00	
Np-237	86.49	768.	18.	0.010	213.52	2.373E+00	
EU-155	86.54	787.	18.	0.010	216.04	1.013E+00	
Sn-126	86.94	805.	16.	0.009	258.71	2.898E+00	
TH-234	92.59	848.	-27.	-0.015	88.40	-7.931E+00	P
Np-239	106.13	794.	18.	0.010	216.73	1.319E+00	
Se-75	121.12	121.	10.	0.006	158.75	9.522E-01	
EU-154	123.10	135.	-15.	-0.008	112.55	-6.017E-01	
PA-234	131.29	324.	9.	0.005	284.80	8.297E-01	
CO-57	136.47	444.	-20.	-0.011	148.59	-3.184E+00	
Tc-99m	140.51	446.	-20.	-0.011	148.44	-3.972E-01	
Mo-99	140.51	466.	-20.	-0.011	151.72	-7.623E+00	
U-235	143.79	486.	-20.	-0.011	154.49	-3.178E+00	
CE-141	145.44	507.	-20.	-0.011	157.39	-7.269E-01	
Kr-85m	151.00	88.	-10.	-0.006	178.33	-2.398E-01	
Ba-140	162.66	114.	2.	0.001	758.29	5.794E-01	
CE-139	165.85	95.	12.	0.006	121.92	2.657E-01	
Cf-251	176.60	59.	15.	0.008	101.50	1.618E+00	
Mo-99	181.07	84.	13.	0.007	99.99	4.297E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Lu-172	181.47	97.	13.	0.007	113.40	1.266E+00		
U-235	185.72	129.	11.	0.006	144.80	4.067E-01		
TH-229	193.51	70.	-4.	-0.002	613.90	-1.756E+00		P
TH-229	210.85	44.	8.	0.004	164.03	5.477E+00		P
Cf-251	227.00	62.	-11.	-0.006	133.67	-3.992E+00		
TH-227	235.97	275.	-14.	-0.008	171.58	-2.567E+00		
EU-152	244.69	248.	-4.	-0.002	595.14	-1.162E+00		
TH-227	256.24	30.	11.	0.006	101.51	3.656E+00		P
Cd-113m	263.70	64.	-2.	-0.001	527.25	-8.964E+02		
BI-210M	265.83	80.	-15.	-0.008	86.89	-7.596E-01		
Se-75	279.54	51.	5.	0.003	200.05	5.413E-01		
I-131	284.30	126.	-13.	-0.007	129.27	-5.397E+00		
TL-210	296.00	155.	11.	0.006	168.63	3.655E-01		
PA-231	300.07	177.	11.	0.006	178.93	1.190E+01		
PA-233	300.18	187.	11.	0.006	184.10	4.723E+00		
PA-231	302.65	198.	11.	0.006	188.78	1.025E+01		
BA-133	302.85	209.	11.	0.006	193.64	1.612E+00		
Kr-85m	304.47	219.	11.	0.006	198.19	2.207E+00		
Ba-140	304.85	230.	10.	0.006	215.73	6.513E+00		
Cf-249	333.44	133.	9.	0.005	179.14	1.781E+00		
Cs-136	340.57	75.	-13.	-0.007	97.31	-8.497E-01		
Hf-175	343.40	88.	-2.	-0.001	711.62	-6.595E-02		
BA-133	356.00	157.	-13.	-0.007	143.57	-6.381E-01		
I-131	364.48	16.	8.	0.004	79.06	3.138E-01		
Mo-99	366.42	35.	-2.	-0.001	505.57	-4.508E+00		
BA-133	383.84	99.	-14.	-0.008	85.30	-5.149E+00		P
Cf-249	387.95	66.	11.	0.006	113.22	5.363E-01		
SN-113	391.69	58.	10.	0.005	114.45	5.210E-01		P
Se-75	400.66	28.	1.	0.001	754.98	3.039E-01		
Cm-247	402.40	27.	9.	0.005	86.47	4.414E-01		
SB-125	427.88	12.	8.	0.004	96.79	9.329E-01		P
AG-108M	433.94	21.	1.	0.001	602.93	6.012E-02		P
PM-146	453.88	16.	8.	0.004	104.96	4.661E-01		P
SB-125	463.37	25.	9.	0.005	84.67	3.338E+00		
Ir-192	468.06	31.	8.	0.004	106.66	5.912E-01		
BE-7	477.60	63.	8.	0.004	144.70	3.016E+00		
RH-106	511.86	0.	55.	0.031	13.47	1.152E+01		
Sr-85	513.99	69.	1.	0.001	946.01	5.264E-02		
Rb-83	520.35	9.	7.	0.004	98.86	6.076E-01		
Rb-83	529.54	30.	-2.	-0.001	340.17	-3.340E-01		
Nd-147	531.00	29.	7.	0.004	120.62	2.207E+00		
Ba-140	537.26	18.	2.	0.001	507.13	3.061E-01		P
Rb-83	552.50	9.	5.	0.003	89.27	1.451E+00		
Br-82	554.34	17.	2.	0.001	255.95	1.477E-01		
CS-134	563.24	17.	2.	0.001	551.91	8.413E-01		P
CS-134	569.32	23.	8.	0.005	88.41	2.460E+00		
PA-234	569.47	31.	3.	0.001	303.66	1.474E+00		
BI-207	569.70	47.	-12.	-0.007	87.20	-5.480E-01		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ge-69	574.00	16.	7.	0.004	90.79	2.654E+00	
SB-125	600.50	170.	-12.	-0.007	156.32	-3.177E+00	
SB-124	602.73	158.	-12.	-0.007	150.71	-5.798E-01	
AG-108M	614.28	163.	-16.	-0.009	118.46	-8.358E-01	
PM-144	618.06	148.	-16.	-0.009	55.85	-7.834E-01	P
Br-82	619.10	91.	13.	0.007	106.83	1.478E+00	
RH-106	621.92	135.	-15.	-0.008	113.29	-7.273E+00	
SB-125	635.89	18.	4.	0.002	142.27	1.933E+00	P
I-131	636.97	35.	-9.	-0.005	101.90	-5.970E+00	
AG-110M	657.76	14.	6.	0.003	97.18	3.207E-01	
PM-144	696.54	8.	5.	0.003	89.47	2.813E-01	
Br-82	698.36	41.	-12.	-0.006	83.70	-2.205E+00	
NB-94	702.63	34.	8.	0.005	106.11	4.446E-01	P
SB-124	722.79	16.	7.	0.004	84.71	3.720E+00	
AG-108M	722.94	23.	7.	0.004	99.36	4.429E-01	
EU-154	723.36	31.	6.	0.003	133.33	1.659E+00	
PM-146	735.72	15.	4.	0.002	152.96	9.355E-01	P
Mo-99	739.50	11.	5.	0.003	99.42	2.405E+00	
PM-146	747.16	24.	-6.	-0.003	100.74	-9.709E-01	P
ZR-95	756.73	5.	5.	0.003	113.48	4.739E-01	P
AG-110M	763.94	6.	5.	0.003	87.68	1.184E+00	P
NB-95	765.79	35.	-12.	-0.007	75.24	-6.799E-01	
PA-234M	766.41	13.	5.	0.003	115.84	9.369E+01	P
Br-82	776.50	44.	-14.	-0.008	71.19	-9.826E-01	
Mo-99	777.92	59.	-7.	-0.004	157.38	-9.527E+00	
EU-152	778.92	47.	11.	0.006	94.61	4.780E+00	
BI-212	785.42	5.	14.	0.008	44.37	6.116E+01	P
CS-134	795.87	19.	7.	0.004	94.57	4.803E-01	P
TL-210	799.60	26.	8.	0.004	99.76	4.553E-01	
CS-134	801.95	33.	3.	0.002	253.53	2.205E+00	
Cs-136	818.50	42.	-8.	-0.004	122.75	-4.626E-01	
Br-82	827.79	19.	2.	0.001	398.21	5.813E-01	
MN-54	834.85	5.	12.	0.007	46.81	7.446E-01	
Co-56	846.77	15.	-1.	-0.001	674.43	-6.189E-02	P
NB-94	871.10	25.	-7.	-0.004	114.60	-4.602E-01	P
EU-154	873.23	19.	8.	0.004	85.58	4.059E+00	
PA-234	880.53	53.	-13.	-0.007	86.27	-1.325E+01	
PA-234	883.24	66.	-11.	-0.006	111.93	-6.995E+00	
AG-110M	884.68	60.	11.	0.006	101.00	9.836E-01	
Sc-46	889.28	66.	-11.	-0.006	107.13	-7.072E-01	
Y-88	898.04	14.	7.	0.004	86.61	4.711E-01	P
Lu-172	900.69	22.	4.	0.002	162.18	9.816E-01	
AC-228	911.07	15.	10.	0.006	91.28	2.208E+00	
AG-110M	937.49	35.	-15.	-0.009	39.57	-2.944E+00	P
V-48	944.30	30.	-7.	-0.004	116.93	-5.785E+00	
PA-234	946.02	31.	4.	0.002	232.82	1.732E+00	P
EU-152	964.11	22.	4.	0.002	173.21	1.839E+00	
AC-228	968.97	61.	-16.	-0.009	75.33	-6.017E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
V-48	983.50	15.	-3.	-0.002	289.64	-2.044E-01		
EU-154	996.33	21.	8.	0.005	84.22	5.473E+00		
EU-154	1004.77	14.	3.	0.002	242.03	1.320E+00		
Co-56	1037.84	39.	2.	0.001	561.50	8.023E-01		P
Cs-136	1048.07	49.	-12.	-0.007	86.39	-1.089E+00		
RH-106	1050.36	51.	10.	0.005	109.22	4.444E+01		P
BI-207	1063.66	10.	8.	0.004	99.08	7.381E-01		P
Ga-68	1077.40	35.	-16.	-0.009	83.47	-4.201E+01		
Lu-172	1093.64	17.	9.	0.005	74.51	8.609E-01		
FE-59	1099.25	27.	6.	0.003	124.27	8.156E-01		
Ge-69	1106.50	49.	3.	0.002	302.22	9.548E-01		
ZN-65	1115.55	29.	6.	0.003	137.52	8.536E-01		P
Sc-46	1120.55	26.	6.	0.003	122.22	4.716E-01		
CO-60	1173.24	32.	-15.	-0.008	89.53	-1.169E+00		
Co-56	1238.28	43.	-8.	-0.004	88.31	-9.597E-01		P
NA-22	1274.53	0.	7.	0.004	37.80	5.812E-01		
FE-59	1291.60	21.	-8.	-0.005	130.66	-1.617E+00		
V-48	1311.60	17.	5.	0.003	134.39	4.041E-01		
Br-82	1317.43	14.	7.	0.004	86.95	2.139E+00		
CO-60	1332.50	6.	2.	0.001	272.09	1.836E-01		P
EU-152	1408.00	6.	3.	0.002	204.86	1.235E+00		P
SB-124	1690.98	6.	-1.	-0.001	600.00	-2.190E-01		
Y-88	1836.06	6.	-2.	-0.001	304.14	-2.271E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.0157E+00	3.0157E+00	1.447E+02%	1.50E+01
NA-22	#A	5.8117E-01	5.8117E-01	3.780E+01%	6.12E-01
K-40		2.0116E+02	2.0116E+02	6.796E+00%	1.38E+01
Sc-46	#A	-7.0722E-01	-7.0722E-01	1.071E+02%	2.57E+00
CR-51	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.18E+01
MN-54	#A	7.4462E-01	7.4462E-01	4.681E+01%	7.71E-01
FE-59	#A	8.1561E-01	8.1562E-01	1.243E+02%	3.52E+00
Co-56	#A	4.5157E-02	4.5157E-02	4.388E+02%	1.27E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.07E+00
CO-58	#	1.3067E+00	1.3067E+00	2.946E+01%	1.04E+00
CO-60	#A	1.8362E-01	1.8362E-01	2.721E+02%	1.20E+00
ZN-65	#A	8.5356E-01	8.5356E-01	1.375E+02%	4.08E+00
ZR-95	#A	4.7386E-01	4.7386E-01	1.135E+02%	1.40E+00
NB-95	#A	-6.7987E-01	-6.7987E-01	7.524E+01%	1.71E+00
RU-103	#	6.9686E-01	6.9686E-01	3.771E+01%	5.67E-01
RH-106	#A	-2.5169E-01	-2.5169E-01	7.868E+01%	2.78E+01
AG-108M	#A	2.5186E-01	2.5186E-01	9.936E+01%	9.69E-01

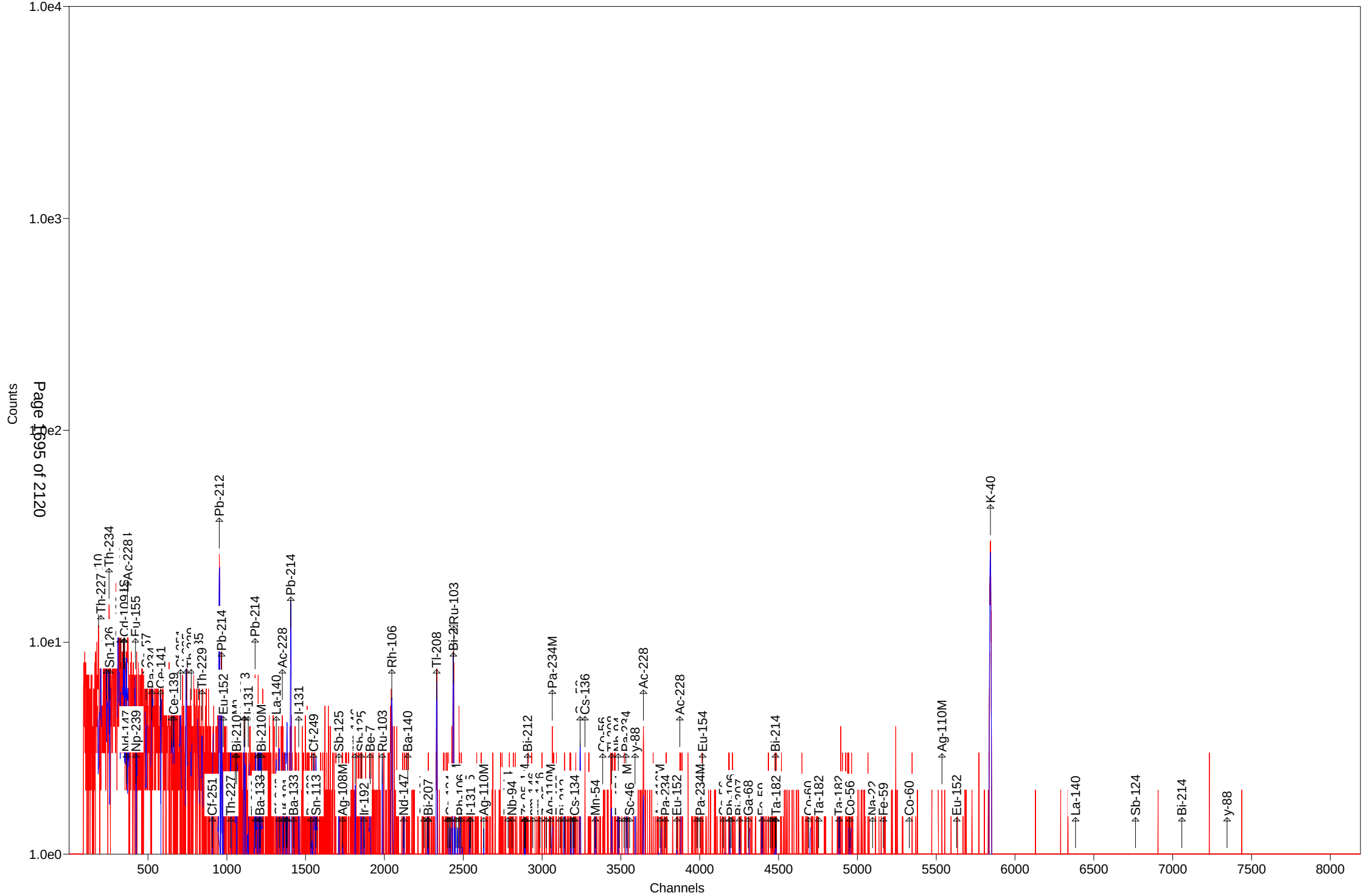
AG-110M#A	6.7624E-01	6.7624E-01	5.511E+01%	1.08E+00
SN-113 #A	5.2097E-01	5.2097E-01	1.144E+02%	2.03E+00
SB-124 #A	-1.5359E-01	-1.5359E-01	8.471E+01%	2.96E+00
SB-125 #A	1.6430E+00	1.6430E+00	6.393E+01%	2.32E+00
I-131 #A	3.1382E-01	3.1383E-01	7.906E+01%	8.38E-01
Gd-153 #A	0.0000E+00	0.0000E+00	7.071E+02%	7.42E+00
Ga-68 #A	-4.1889E+01	-4.2011E+01	8.347E+01%	7.80E+01
Tc-99m #A	-3.9703E-01	-3.9724E-01	1.484E+02%	1.97E+00
BA-133 #A	-1.2497E-01	-1.2497E-01	1.205E+02%	3.10E+00
CS-134 #A	8.9112E-01	8.9112E-01	8.841E+01%	1.56E+00
CS-137 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.40E+00
CE-139 #A	2.6571E-01	2.6571E-01	1.219E+02%	1.10E+00
Ba-140 #A	1.1177E+00	1.1177E+00	2.157E+02%	4.03E+00
La-140 #	7.7826E-01	7.7827E-01	4.296E+01%	7.70E-01
CE-141 #A	-7.2694E-01	-7.2695E-01	1.574E+02%	3.83E+00
CE-144 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.32E+01
PM-144 #A	2.8133E-01	2.8133E-01	8.947E+01%	8.69E-01
EU-152 #A	1.5807E+00	1.5807E+00	9.461E+01%	3.20E+00
EU-154 #A	1.3797E+00	1.3797E+00	6.432E+01%	2.28E+00
EU-155 #A	5.5422E-01	5.5422E-01	2.160E+02%	1.04E+01
HF-181 #A	0.0000E+00	0.0000E+00	5.000E+02%	2.08E+00
Ta-182 #A	1.9295E+00	1.9295E+00	8.233E+01%	5.89E+00
Hg-203 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.21E+00
TL-208	2.0999E+00	2.0999E+00	2.029E+01%	8.51E-01
PM-146 #A	5.8679E-01	5.8679E-01	9.276E+01%	1.25E+00
Y-88 #A	1.1206E-01	1.1206E-01	8.661E+01%	1.60E+00
Cd-113m#A	-8.9644E+02	-8.9644E+02	5.272E+02%	1.66E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%	6.02E+01
Se-75 #A	1.9515E-01	1.9515E-01	1.587E+02%	1.73E+00
Cf-251 #A	1.6184E+00	1.6184E+00	1.015E+02%	4.25E+00
Cf-249 #A	7.7315E-01	7.7315E-01	1.060E+02%	2.06E+00
Sn-126 #A	-4.2735E+00	-4.2735E+00	1.116E+02%	1.60E+01
PB-210 #A	-1.5350E+01	-1.5350E+01	9.012E+01%	4.88E+01
PB-212	5.4508E+00	5.4508E+00	1.230E+01%	1.44E+00
PB-214	6.6472E+00	6.6472E+00	1.462E+01%	1.76E+00
BI-207 #A	8.3089E-03	8.3089E-03	6.599E+01%	1.61E+00
BI-212 #A	-2.2180E-01	-2.2180E-01	2.873E+03%	1.75E+01
BI-214	5.3437E+00	5.3437E+00	1.725E+01%	1.83E+00
BI-210M#A	-7.5958E-01	-7.5958E-01	8.689E+01%	2.21E+00
AC-228 #A	2.2084E+00	2.2084E+00	9.128E+01%	4.61E+00
TH-227 #A	4.6506E+00	4.6506E+00	7.613E+01%	9.77E+00
TH-229 #A	1.1706E+00	1.1706E+00	1.640E+02%	1.88E+01
TH-234 #A	-7.9314E+00	-7.9314E+00	8.840E+01%	4.09E+01
PA-231 #A	1.1011E+01	1.1011E+01	1.300E+02%	6.55E+01
PA-233 #A	6.9384E-01	6.9384E-01	1.841E+02%	5.89E+00
PA-234 #A	1.2684E+00	1.2684E+00	1.590E+02%	7.98E+00
PA-234M#A	2.4767E+01	2.4767E+01	1.158E+02%	2.43E+02
U-235 #A	-3.1784E+00	-3.1784E+00	1.545E+02%	1.64E+01
AM-241 #A	-6.9088E-01	-6.9088E-01	2.045E+02%	4.77E+00

Np-237	#A	2.3733E+00	2.3733E+00	2.135E+02%	1.69E+01
Ir-192	#A	2.2045E-01	2.2045E-01	1.067E+02%	2.46E+00
Cs-136	#A	-4.6259E-01	-4.6260E-01	1.227E+02%	1.95E+00
Np-239	#A	1.3193E+00	1.3193E+00	2.167E+02%	9.56E+00
Nd-147	#A	2.2069E+00	2.2069E+00	1.206E+02%	9.20E+00
Mo-99	#A	3.0306E+00	3.0308E+00	7.050E+01%	8.32E+00
Ge-69	#A	1.4851E+00	1.4853E+00	9.079E+01%	1.01E+01
Br-82	#A	-9.8252E-01	-9.8262E-01	7.119E+01%	2.33E+00
V-48	#A	9.6768E-02	9.6769E-02	1.344E+02%	1.41E+00
Sr-85	#A	5.2642E-02	5.2642E-02	9.460E+02%	1.75E+00
Rb-83	#A	8.2797E-01	8.2797E-01	6.660E+01%	1.51E+00
Kr-85	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.07E+02
Cm-247	#A	6.6447E-01	6.6447E-01	8.647E+01%	1.29E+00
Hf-175	#A	-6.5948E-02	-6.5948E-02	7.116E+02%	1.63E+00
Lu-172	#A	9.5198E-01	9.5199E-01	7.048E+01%	2.15E+00
Kr-85m	#A	1.4275E-01	1.4285E-01	1.333E+02%	1.11E+00
NB-94	#A	4.4463E-01	4.4463E-01	1.061E+02%	1.61E+00
TL-210	#A	4.1541E-01	4.1541E-01	9.796E+01%	1.56E+00

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.7 to  1999.4 keV)     2.207E+02  Bq/Sample
Total Decayed Activity (   37.7 to  1999.4 keV) 2.2070389E+02  Bq/Sample


The library has energies which are not separable.
```

379959_Gamma_160-29881-A-37-B. 19_Gamma_20181616.spc.



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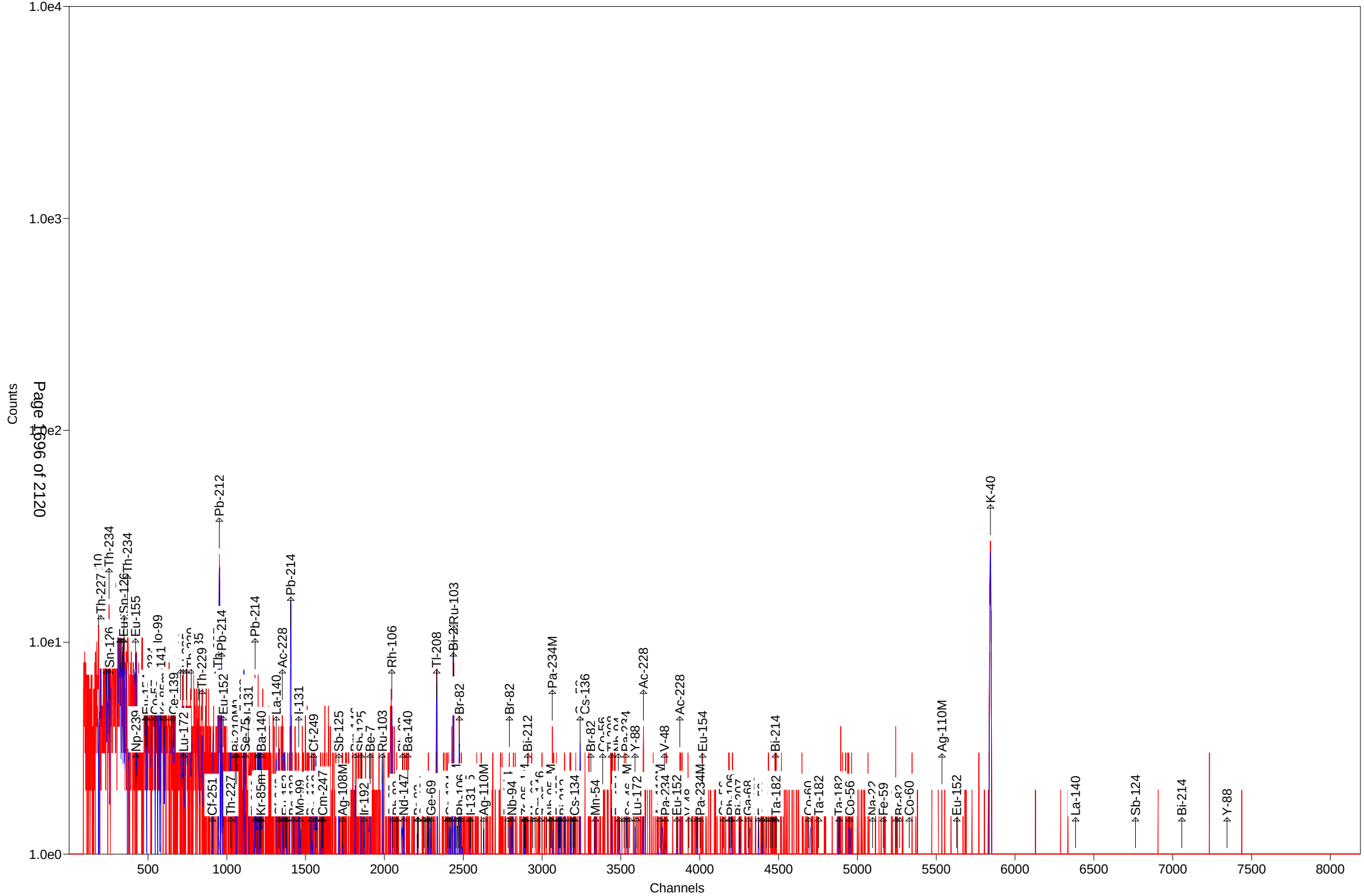

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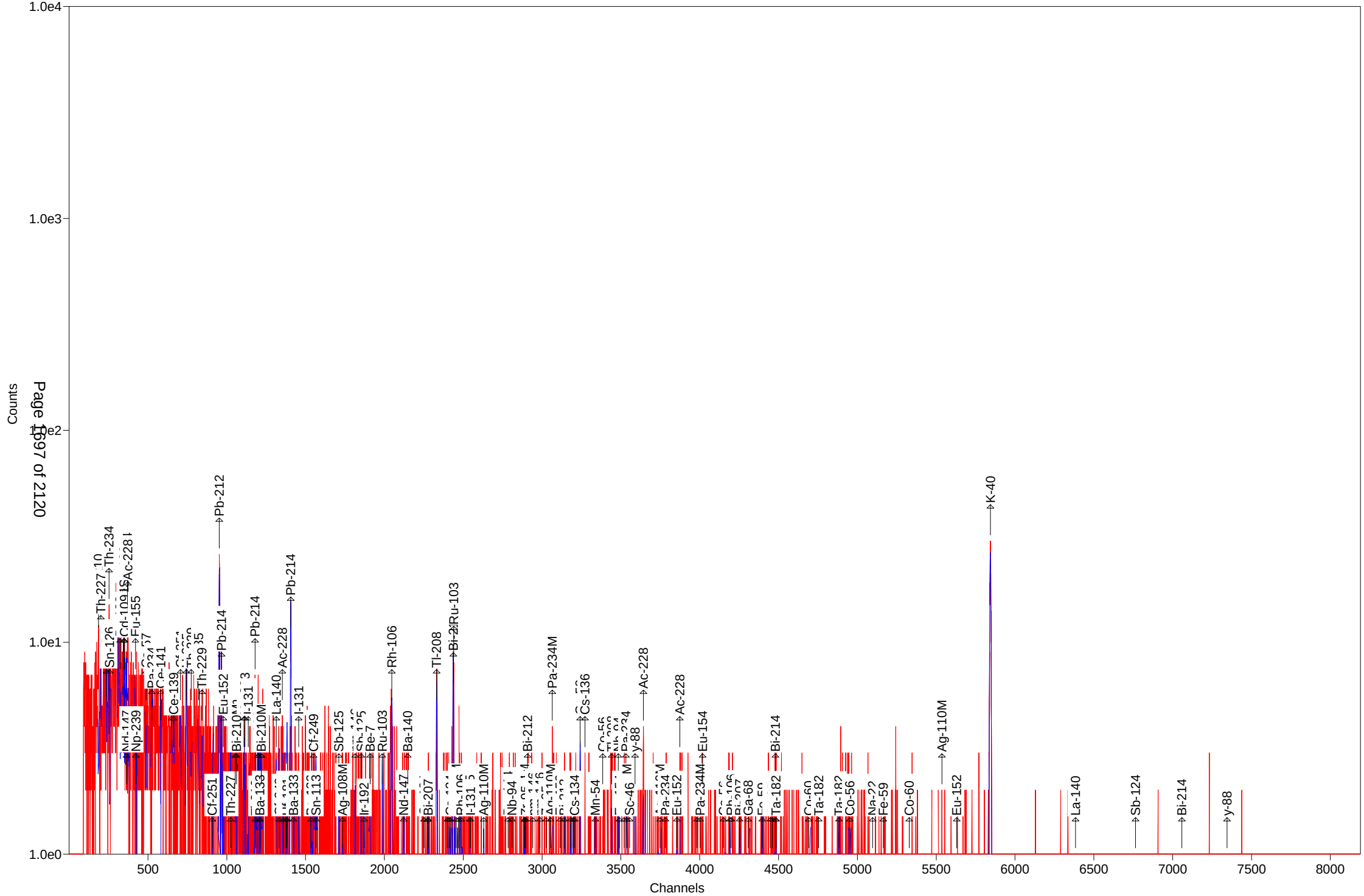

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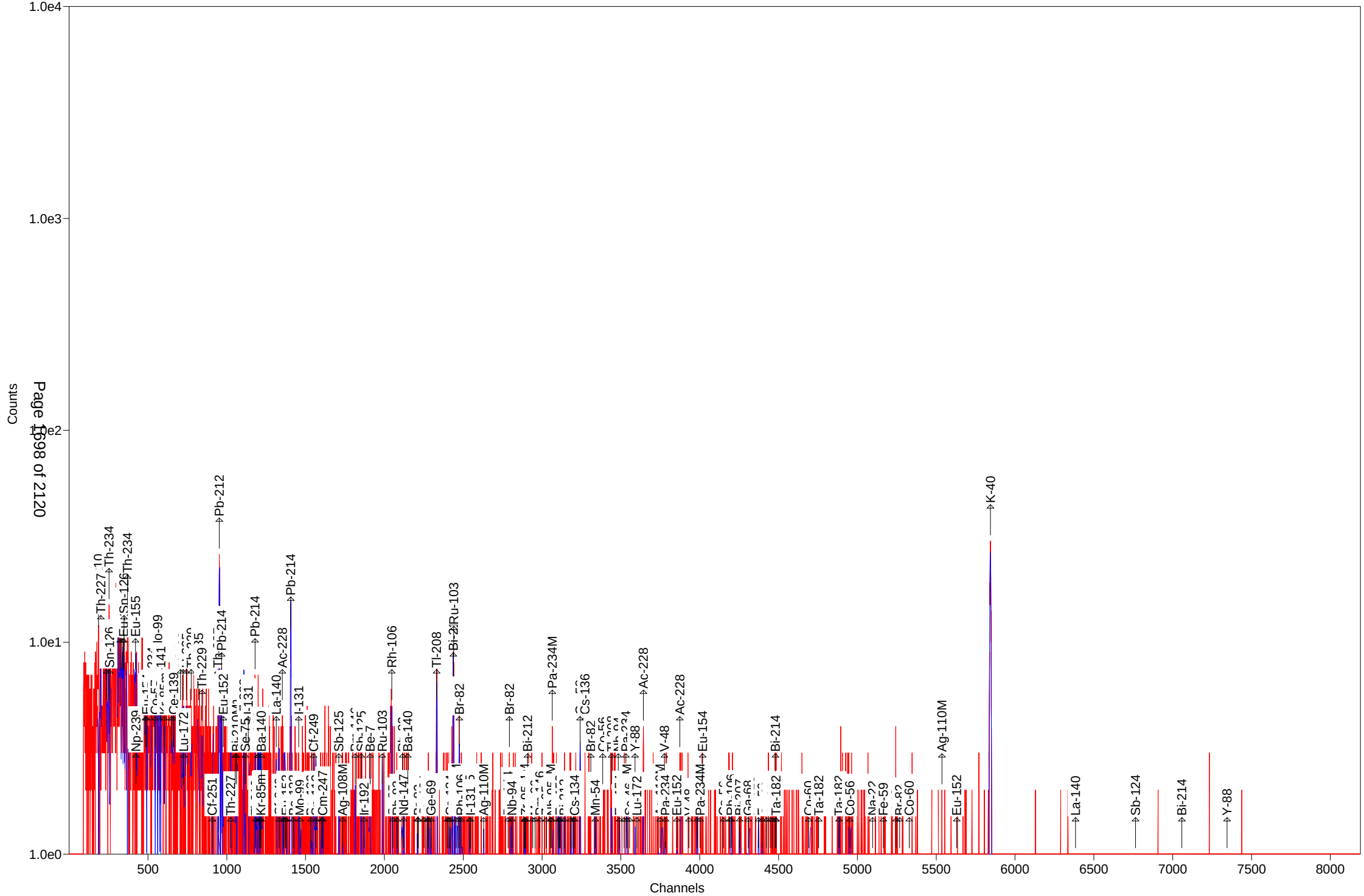

Test America St. Louis Spectrum ID: 12_Gamma_20181534

Sample Description: 379959_Gamma_160-29881-A-37-C DU
Detector: Detector #12
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-C DU

Decay to Time: 8/23/2018 17:34 Live Time: 1800 sec
Acquisition Time: 8/23/2018 17:34:30 Real Time: 1801 sec
Analysis Time: 8/23/2018 18:04 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.562E+00	105.6	4.819E+00	4.824E+00	1.624E+01
NA-22	-7.258E-01	79.2	5.750E-01	5.761E-01	1.933E+00
K-40	1.933E+02	6.2	1.189E+01	1.539E+01	5.395E+00
Sc-46	6.088E-02	126.8	7.717E-02	7.723E-02	2.212E+00
CR-51	-3.130E+00	186.0	5.821E+00	5.824E+00	1.964E+01
MN-54	-1.028E-01	403.1	4.145E-01	4.145E-01	1.036E+00
FE-59	4.993E-01	88.0	4.396E-01	4.403E-01	2.373E+00
Co-56	-2.598E-01	201.7	5.240E-01	5.241E-01	1.224E+00
CO-57	-3.130E-01	106.2	3.324E-01	3.328E-01	1.115E+00
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	2.422E-01	176.2	4.268E-01	4.270E-01	1.003E+00
ZN-65	8.145E-01	146.7	1.195E+00	1.195E+00	4.133E+00
NB-94	6.137E-02	91.3	5.602E-02	5.611E-02	1.169E+00
ZR-95	2.684E-01	99.6	2.673E-01	2.677E-01	2.008E+00
NB-95	4.840E-02	866.0	4.191E-01	4.191E-01	1.503E+00
RU-103	3.024E-01	93.8	2.838E-01	2.842E-01	7.292E-01
RH-106	-2.855E+00	267.0	7.624E+00	7.625E+00	2.599E+01
AG-108M	-4.559E-01	108.0	4.922E-01	4.927E-01	1.227E+00
AG-110M	2.625E-01	133.6	3.506E-01	3.509E-01	2.051E+00
SN-113	-6.874E-01	116.5	8.007E-01	8.014E-01	2.697E+00
SB-124	2.841E-01	218.2	6.198E-01	6.199E-01	2.123E+00
SB-125	2.453E-01	50.9	1.249E-01	1.255E-01	3.413E+00
I-131	3.090E-01	101.9	3.147E-01	3.151E-01	8.004E-01
Gd-153	7.569E-01	144.8	1.096E+00	1.097E+00	3.690E+00
Ga-68	1.167E+01	145.8	1.702E+01	1.703E+01	3.924E+01
Tc-99m	-1.110E-01	481.2	5.340E-01	5.341E-01	1.802E+00
BA-133	-5.884E-01	140.0	8.238E-01	8.244E-01	2.782E+00
CS-134	5.354E-01	81.9	4.384E-01	4.392E-01	2.205E+00
CS-137	0.000E+00	1.#INF	1.907E-01	1.908E-01	1.302E+00
CE-139	2.760E-01	112.8	3.114E-01	3.117E-01	1.051E+00
Ba-140	9.168E-01	129.3	1.185E+00	1.186E+00	2.981E+00
La-140	2.855E-01	100.3	2.864E-01	2.868E-01	1.243E+00
CE-141	5.099E-01	177.0	9.027E-01	9.030E-01	3.031E+00

CE-144	-2.359E+00	165.6	3.906E+00	3.908E+00	1.310E+01
PM-144	-1.822E-01	285.0	5.193E-01	5.194E-01	1.247E+00
EU-152	1.389E+00	74.8	1.039E+00	1.042E+00	4.946E+00
EU-154	5.552E-02	71.9	3.991E-02	4.001E-02	1.136E+01
EU-155	0.000E+00	1.#INF	4.448E-01	4.448E-01	5.352E+00
HF-181	-2.078E-01	84.3	1.752E-01	1.755E-01	2.159E+00
Ta-182	3.018E+00	21.3	6.434E-01	6.608E-01	5.705E+00
Hg-203	-4.458E-01	98.8	4.402E-01	4.408E-01	1.136E+00
TL-208	1.070E+00	31.6	3.380E-01	3.423E-01	8.233E-01
pm-146	-1.674E+00	97.9	1.639E+00	1.641E+00	3.819E+00
y-88	-6.361E-01	104.4	6.640E-01	6.648E-01	1.504E+00
Cd-113m	-1.329E+03	335.1	4.455E+03	4.455E+03	1.548E+04
Cd-109	0.000E+00	1.#INF	1.736E+00	1.736E+00	3.616E+01
Cf-251	1.979E-01	697.3	1.380E+00	1.380E+00	3.688E+00
Cf-249	-4.129E-01	159.0	6.565E-01	6.569E-01	2.237E+00
Sn-126	-7.238E-01	561.3	4.063E+00	4.063E+00	1.385E+01
PB-210	-1.207E+01	107.9	1.302E+01	1.304E+01	4.580E+01
PB-212	3.796E+00	14.8	5.611E-01	5.950E-01	1.337E+00
PB-214	5.920E+00	14.2	8.436E-01	8.954E-01	1.883E+00
BI-207	1.186E-01	229.3	2.721E-01	2.721E-01	1.376E+00
BI-212	1.937E+00	350.5	6.790E+00	6.791E+00	2.375E+01
U-235	1.399E+00	105.8	1.480E+00	1.482E+00	1.444E+01
BI-214	5.937E+00	13.7	8.129E-01	8.673E-01	1.101E+00
BI-210M	-6.723E-01	90.3	6.074E-01	6.084E-01	2.039E+00
AC-228	2.172E+00	64.0	1.391E+00	1.396E+00	4.446E+00
TH-227	3.148E+00	100.9	3.177E+00	3.182E+00	1.964E+01
TH-229	1.400E+00	313.5	4.388E+00	4.388E+00	1.243E+01
TH-234	-3.576E+00	267.8	9.577E+00	9.579E+00	3.305E+01
PA-231	0.000E+00	1.#INF	2.049E+00	2.049E+00	6.254E+01
PA-233	0.000E+00	1.#INF	2.166E-01	2.166E-01	5.120E+00
PA-234	-1.661E+00	121.0	2.009E+00	2.011E+00	6.732E+00
PA-234M	6.315E+01	76.5	4.832E+01	4.842E+01	1.507E+02
AM-241	9.187E-01	129.8	1.193E+00	1.194E+00	4.009E+00
Np-237	-9.929E-01	309.9	3.077E+00	3.078E+00	1.040E+01
Ir-192	1.852E-01	106.1	1.965E-01	1.968E-01	2.141E+00
Cs-136	1.115E-01	250.3	2.790E-01	2.791E-01	1.487E+00
Np-239	-5.252E-01	272.7	1.432E+00	1.433E+00	4.857E+00
Nd-147	-1.137E+00	265.0	3.012E+00	3.013E+00	7.523E+00
TL-210	0.000E+00	1.#INF	1.233E-01	1.233E-01	1.525E+00
Total	3.079E+02				

Analyst: Aaron Schroder

Sample description
379959_Gamma_160-29881-A-37-C DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181534.An1

Acquisition information
Start time: 8/23/2018 5:34:30 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 5:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1217

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.60	-17.	107.88	0.85	1.805E-02	46.54	4.250	PBC<MDA	PB210
50.20	8.	231.30	0.85	2.193E-02	50.14	8.000	PBC<MDA	TH227
59.54	17.	129.82	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
63.29	-7.	267.82	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
74.52	46.	28.69	0.88	3.324E-02				
77.06	77.	18.22	0.88	3.383E-02				
91.10	4.	600.08	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
93.35	11.	218.53	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
97.50	15.	144.80	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	753.41	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
123.10	14.	110.14	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	16.	177.04	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
165.85	14.	112.81	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
176.60	2.	697.32	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
193.51	2.	489.90	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	12.	105.80	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	391.34	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	115.52	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.38	76.	17.58	1.01	2.745E-02	238.63	43.300	3.569E+00	PB212
241.77	28.	37.63	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
256.24	13.	100.93	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
294.95	57.	22.46	1.39	2.350E-02	295.09	19.300	7.002E+00	PB214
328.76	12.	100.31	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
338.32	12.	111.51	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
340.57	6.	250.27	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	126.10	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.61	75.	17.55	1.13	2.055E-02	351.93	37.600	5.364E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
364.48	9.	101.86	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
453.88	5.	142.83	1.26	1.692E-02	453.88	65.000	PBC<MDA	pm146
463.37	8.	94.27	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.12	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	8.	93.84	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	40.	45.96	2.56	1.546E-02	511.86	20.000	7.249E+00	RH106
537.26	6.	129.28	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
583.03	23.	31.59	1.26	1.403E-02	583.02	84.500	1.070E+00	TL208
600.50	7.	211.73	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	218.17	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	7.	224.44	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
609.34	65.	13.69	1.66	1.358E-02	609.31	46.090	5.738E+00	BI214
610.30	7.	229.97	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
614.28	7.	235.55	1.41	1.350E-02	614.28	89.850	PBC<MDA	AG108M
635.89	7.	73.01	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	228.52	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
724.20	11.	99.61	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
727.17	3.	350.50	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
765.79	1.	866.03	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.644E+01	PA234M
766.41	7.	114.63	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.205E+02	PA234M
778.92	4.	184.30	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
785.42	8.	35.36	1.57	1.129E-02	785.42	1.280	3.074E+01	BI212
795.87	10.	81.88	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	117.84	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	148.47	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
857.25	14.	44.13	1.64	1.057E-02	860.56	12.420	5.922E+00	TL208
871.10	6.	91.29	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
884.68	6.	138.30	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.07	12.	88.87	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
964.11	6.	74.80	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	128.75	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	5.	136.03	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1063.66	3.	229.35	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	145.77	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	6.	136.00	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	146.68	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1120.06	7.	116.17	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.145E-01	Sc46
1120.55	7.	128.71	1.87	8.721E-03	1120.29	15.100	2.744E+00	BI214
					1120.55	99.987	4.145E-01	Sc46
					1121.30	34.900	1.188E+00	Ta182
1121.04	7.	138.69	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.189E+00	Ta182

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1189.05	7.	87.20	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	22.	21.32	1.96	8.175E-03	1221.41	27.000	5.537E+00	Ta182
1291.60	7.	88.04	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	176.21	2.05	7.647E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	205.48	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.81	264.	6.15	2.06	7.112E-03	1460.83	10.670	1.933E+02	K40
1764.34	11.	30.15	2.40	6.075E-03	1764.49	15.400	6.532E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.65	74.48	63.	46.	1.376E+03	28.69	0.880	- sD
307.79	77.01	60.	77.	2.283E+03	18.22	0.882	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.54	169.	-17.	-0.009	107.88	0.851s
TH-227	200.18	50.14	162.	8.	0.004	231.30	0.855s
AM-241	237.74	59.54	227.	17.	0.009	129.82	0.865s
TH-234	252.74	63.29	193.	-7.	-0.004	267.82	0.868s
Sn-126	256.71	64.28	227.	-4.	-0.002	561.29	0.869s
BA-133	323.50	80.99	133.	-19.	-0.011	107.88	0.887s
Np-237	345.49	86.49	329.	-8.	-0.005	309.92	0.892s
EU-155	345.70	86.54	338.	0.	0.000	1000.00	0.892
Sn-126	347.29	86.94	338.	0.	0.000	1000.00	0.892
Sn-126	349.81	87.57	338.	0.	0.000	1000.00	0.893
Cd-109	351.68	88.04	338.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	310.	4.	0.002	600.08	0.897s
TH-234	369.87	92.59	338.	-31.	-0.017	51.99	0.898s
AC-228	372.91	93.35	292.	11.	0.006	218.53	0.899s
Gd-153	389.50	97.50	230.	15.	0.008	144.80	0.903
Np-239	397.50	99.50	245.	3.	0.002	753.41	0.905s
Gd-153	412.29	103.20	248.	0.	0.000	1000.00	0.909s
Np-239	414.29	103.70	248.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	248.	0.	0.000	1000.00	0.911s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	424.00	106.13	234.	-8.	-0.004	272.72	0.912s
EU-152	486.55	121.78	155.	-18.	-0.010	100.87	0.928s
CO-57	487.69	122.06	173.	-18.	-0.010	106.22	0.928s
EU-154	491.84	123.10	119.	14.	0.008	110.14	0.929s
PA-234	524.60	131.29	278.	-20.	-0.011	120.98	0.938s
HF-181	531.51	133.02	389.	-17.	-0.009	166.20	0.939s
CE-144	533.57	133.54	401.	-17.	-0.010	165.59	0.940s
HF-181	544.61	136.30	418.	-17.	-0.010	168.55	0.943s
CO-57	545.30	136.47	435.	-17.	-0.010	171.94	0.943s
Tc-99m	561.44	140.51	453.	-6.	-0.003	481.16	0.947s
U-235	574.53	143.79	459.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	386.	16.	0.009	177.04	0.952s
Ba-140	649.99	162.66	127.	-9.	-0.005	186.77	0.969s
U-235	652.87	163.38	112.	-13.	-0.007	120.00	0.970
CE-139	662.76	165.85	110.	14.	0.008	112.81	0.973s
Cf-251	705.72	176.60	55.	2.	0.001	697.32	0.983s
TH-229	773.32	193.51	37.	2.	0.001	489.90	1.000s
U-235	820.59	205.33	44.	12.	0.007	105.80	1.012s
TH-229	842.65	210.85	48.	3.	0.002	391.34	1.018s
Cf-251	907.22	227.00	40.	11.	0.006	115.52	1.034s
PB-212	953.73	238.63	31.	81.	0.045	14.78	1.045D
PB-214	967.18	242.00	40.	28.	0.015	37.63	1.049D
EU-152	977.96	244.69	274.	-16.	-0.009	149.12	1.051s
TH-227	1024.13	256.24	44.	13.	0.007	100.93	1.063
Cd-113m	1053.96	263.70	74.	-4.	-0.002	335.13	1.070s
BI-210M	1062.48	265.83	89.	-15.	-0.009	90.34	1.072s
Hg-203	1115.93	279.20	67.	-16.	-0.009	98.75	1.086s
I-131	1136.32	284.30	66.	-16.	-0.009	97.74	1.091s
PB-214	1178.92	294.95	21.	57.	0.032	22.46	1.395s
TL-210	1183.11	296.00	249.	-10.	-0.006	221.80	1.102s
PB-212	1199.22	300.03	239.	0.	0.000	1000.00	1.106
PA-231	1199.38	300.07	239.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	239.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	239.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	239.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	239.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	239.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	239.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	239.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	239.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	259.	-12.	-0.007	185.97	1.126s
La-140	1314.10	328.76	64.	12.	0.007	100.31	1.135s
Cf-249	1332.81	333.44	103.	-14.	-0.008	103.87	1.139s
AC-228	1352.33	338.32	82.	12.	0.007	111.51	1.144
Cs-136	1361.32	340.57	94.	6.	0.003	250.27	1.146s
EU-152	1376.18	344.29	100.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	72.	10.	0.005	126.10	1.151
PB-214	1405.47	351.61	25.	75.	0.041	17.55	1.125

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1423.02	356.00	169.	-13.	-0.007	140.01	1.162s
I-131	1456.95	364.48	20.	9.	0.005	101.86	1.170s
BA-133	1534.35	383.84	112.	-14.	-0.008	107.87	1.189s
Cf-249	1550.79	387.95	106.	-9.	-0.005	159.02	1.193s
SN-113	1565.74	391.69	145.	-15.	-0.008	116.47	1.196s
SB-125	1710.45	427.88	40.	-14.	-0.008	95.43	1.232s
AG-108M	1734.69	433.94	48.	-13.	-0.007	107.97	1.238s
pm-146	1814.45	453.88	12.	5.	0.003	142.83	1.257
SB-125	1852.39	463.37	22.	8.	0.004	94.27	1.266
Ir-192	1871.16	468.06	29.	8.	0.004	106.12	1.271s
BE-7	1909.29	477.60	103.	-14.	-0.008	105.62	1.280s
HF-181	1926.90	482.00	106.	-13.	-0.007	111.91	1.284s
La-140	1946.98	487.02	131.	-14.	-0.008	117.21	1.289s
RU-103	1987.11	497.05	12.	8.	0.004	93.84	1.298s
RH-106	2046.35	511.86	47.	40.	0.022	45.96	2.563s
Nd-147	2122.88	531.00	26.	-4.	-0.002	264.97	1.331s
Ba-140	2147.92	537.26	13.	6.	0.003	129.28	1.337s
CS-134	2251.82	563.24	26.	-7.	-0.004	153.42	1.362s
CS-134	2276.15	569.32	37.	-9.	-0.005	98.20	1.367s
PA-234	2276.75	569.47	47.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	47.	0.	0.000	1000.00	1.368s
TL-208	2330.98	583.03	10.	23.	0.013	31.59	1.257
SB-125	2400.87	600.50	102.	7.	0.004	211.73	1.397
SB-124	2409.79	602.73	109.	7.	0.004	218.17	1.399s
CS-134	2417.71	604.71	116.	7.	0.004	224.44	1.401s
BI-214	2436.22	609.34	4.	65.	0.036	13.69	1.661
RU-103	2440.06	610.30	123.	7.	0.004	229.97	1.406s
AG-108M	2455.99	614.28	130.	7.	0.004	235.55	1.410s
PM-144	2471.12	618.06	187.	-11.	-0.006	178.76	1.414s
RH-106	2486.54	621.92	163.	-7.	-0.004	267.01	1.417s
SB-125	2542.43	635.89	10.	7.	0.004	73.01	1.430s
I-131	2546.77	636.97	28.	-2.	-0.001	444.58	1.432s
AG-110M	2629.92	657.76	22.	3.	0.002	228.52	1.451s
CS-137	2645.51	661.66	24.	0.	0.000	1000.00	1.455s
PM-144	2785.05	696.54	28.	-4.	-0.002	285.04	1.487s
NB-94	2809.41	702.63	23.	-4.	-0.002	241.30	1.493s
SB-124	2890.04	722.79	59.	-15.	-0.008	77.34	1.512s
AG-108M	2890.65	722.94	74.	-9.	-0.005	141.89	1.512s
EU-154	2892.32	723.36	82.	0.	0.000	1000.00	1.512
ZR-95	2895.69	724.20	50.	11.	0.006	99.61	1.513s
BI-212	2907.58	727.17	59.	3.	0.002	350.50	1.516s
pm-146	2941.78	735.72	23.	-5.	-0.003	196.95	1.524s
pm-146	2987.55	747.16	28.	-12.	-0.007	97.89	1.535s
ZR-95	3025.83	756.73	19.	-5.	-0.003	201.78	1.543s
AG-110M	3054.69	763.94	35.	-1.	-0.001	842.61	1.550s
NB-95	3062.08	765.79	37.	1.	0.001	866.03	1.552s
PA-234M	3064.57	766.41	32.	7.	0.004	114.63	1.552s
EU-152	3114.61	778.92	9.	4.	0.002	184.30	1.564s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3140.62	785.42	0.	8.	0.004	35.36	1.570
CS-134	3182.42	795.87	26.	10.	0.005	81.88	1.579s
TL-210	3197.35	799.60	35.	0.	0.000	1000.00	1.583s
CS-134	3206.76	801.95	18.	6.	0.003	117.84	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	27.	5.	0.003	148.47	1.598s
MN-54	3338.38	834.85	14.	-2.	-0.001	403.11	1.615s
Co-56	3386.08	846.77	20.	-5.	-0.003	201.66	1.626s
TL-208	3441.27	860.56	5.	14.	0.008	44.13	1.638s
NB-94	3483.41	871.10	12.	6.	0.003	91.29	1.648s
EU-154	3491.95	873.23	26.	-6.	-0.004	116.66	1.650s
PA-234	3521.16	880.53	52.	-13.	-0.007	84.28	1.657s
PA-234	3532.00	883.24	65.	-7.	-0.004	177.10	1.659s
AG-110M	3537.78	884.68	29.	6.	0.003	138.30	1.660s
Sc-46	3556.17	889.28	68.	-5.	-0.003	218.41	1.664s
y-88	3591.22	898.04	25.	-11.	-0.006	104.38	1.672s
AC-228	3643.36	911.07	20.	12.	0.007	88.87	1.684s
AG-110M	3749.09	937.49	25.	-13.	-0.007	88.99	1.708s
PA-234	3783.21	946.02	10.	-1.	-0.001	702.38	1.716s
EU-152	3855.60	964.11	8.	6.	0.003	74.80	1.732s
AC-228	3875.05	968.97	22.	6.	0.003	128.75	1.736s
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	16.	6.	0.003	101.37	1.765s
EU-154	4018.33	1004.77	23.	5.	0.003	136.03	1.768s
Co-56	4150.66	1037.84	16.	-1.	-0.001	914.69	1.798s
Cs-136	4191.60	1048.07	32.	-8.	-0.004	109.91	1.807s
RH-106	4200.76	1050.36	42.	-2.	-0.001	615.24	1.809s
BI-207	4253.99	1063.66	11.	3.	0.002	229.35	1.820s
Ga-68	4308.98	1077.40	11.	5.	0.003	145.77	1.833s
FE-59	4396.44	1099.25	16.	0.	0.000	1000.00	1.852s
EU-152	4447.76	1112.07	36.	6.	0.004	136.00	1.863s
ZN-65	4461.66	1115.55	42.	6.	0.004	146.68	1.866s
BI-214	4480.63	1120.29	25.	7.	0.004	116.17	1.870s
Sc-46	4481.68	1120.55	32.	7.	0.004	128.71	1.870s
Ta-182	4484.69	1121.30	37.	7.	0.004	138.69	1.871s
CO-60	4692.57	1173.24	21.	-8.	-0.005	130.66	1.916s
Ta-182	4755.86	1189.05	5.	7.	0.004	87.20	1.930
Ta-182	4885.39	1221.41	0.	22.	0.012	21.32	1.957
Co-56	4952.92	1238.28	34.	-10.	-0.006	140.36	1.972s
NA-22	5098.03	1274.53	28.	-10.	-0.006	79.21	2.003s
EU-154	5098.09	1274.54	39.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	7.	0.004	88.04	2.017s
TL-210	5252.04	1313.00	23.	-10.	-0.005	119.90	2.036s
CO-60	5330.11	1332.50	6.	3.	0.002	176.21	2.052s
AG-110M	5537.48	1384.30	11.	-2.	-0.001	344.64	2.096s
EU-152	5632.39	1408.00	6.	3.	0.002	205.48	2.115s
K-40	5843.83	1460.81	0.	264.	0.147	6.15	2.060
La-140	6386.02	1596.21	6.	-2.	-0.001	304.14	2.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7060.00	1764.49	0.	11.	0.006	30.15	2.403s
Co-56	7087.48	1771.35	11.	0.	0.000	1000.00	2.408s
y-88	7346.69	1836.06	7.	-3.	-0.001	254.34	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	-4.5622E+00					5.31E+01	
			477.60	-4.562E+00	?(	1.624E+01	1.06E+02	1.05E+01 G
NA-22	C	-7.2584E-01					9.50E+02	
			1274.53	-7.258E-01	?(	1.933E+00	7.92E+01	9.99E+01 G
K-40	N	1.9327E+02					4.66E+11	
			1460.83	1.933E+02	(	5.395E+00	6.15E+00	1.07E+01 G
Sc-46	F	6.0876E-02					8.38E+01	
			889.28	-2.928E-01	?(	2.212E+00	2.18E+02	1.00E+02 G
			1120.55	4.145E-01	&(	1.847E+00	1.29E+02	1.00E+02 G
CR-51	F	-3.1303E+00					2.77E+01	
			320.08	-3.130E+00	?(	1.964E+01	1.86E+02	9.94E+00 G
MN-54	C	-1.0282E-01					3.12E+02	
			834.85	-1.028E-01	&(	1.036E+00	4.03E+02	1.00E+02 G
FE-59	F	4.9930E-01					4.45E+01	
			1099.25	0.000E+00	&(	2.373E+00	1.00E+03	5.65E+01 G
			1291.60	1.152E+00	?(	2.266E+00	8.80E+01	4.32E+01 G
Co-56	C	-2.5982E-01					7.73E+01	
			846.77	-2.598E-01	?(	1.224E+00	2.02E+02	9.99E+01 G
			1238.28	-1.039E+00	+	3.106E+00	1.40E+02	6.61E+01 G
			1037.84	-4.261E-01	+	9.096E+00	9.15E+02	1.41E+01 G
			1771.35	0.000E+00	+	1.077E+01	1.00E+03	1.55E+01 A
CO-57	C	-3.1296E-01					2.72E+02	
			122.06	-3.130E-01	(	1.115E+00	1.06E+02	8.56E+01 G
			136.47	-2.469E+00	+	1.424E+01	1.72E+02	1.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	3.9640E-01					7.09E+01	
			810.78	3.964E-01	?(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F	2.4221E-01					1.93E+03	
			1332.50	2.422E-01	?(	1.003E+00	1.76E+02	1.00E+02 G
			1173.24	-5.500E-01	+	1.599E+00	1.31E+02	9.99E+01 G
ZN-65	F	8.1449E-01					2.44E+02	
			1115.55	8.145E-01	?(	4.133E+00	1.47E+02	5.06E+01 G
NB-94	I	6.1370E-02					7.41E+06	
			702.63	-2.009E-01	&(	1.169E+00	2.41E+02	9.79E+01 G
			871.10	3.184E-01	?(	1.000E+00	9.13E+01	9.99E+01 G
ZR-95	I	2.6837E-01					6.40E+01	
			756.73	-4.103E-01	?(	2.008E+00	2.02E+02	5.45E+01 G
			724.20	1.106E+00	?(	3.735E+00	9.96E+01	4.42E+01 G
NB-95	I	4.8397E-02					6.40E+01	
			765.79	4.840E-02	?(	1.503E+00	8.66E+02	9.98E+01 G
RU-103	I	3.0239E-01					3.93E+01	
			497.05	3.024E-01	?(	7.292E-01	9.38E+01	9.09E+01 G
			610.30	4.924E+00	?	3.873E+01	2.30E+02	5.75E+00 GA
RH-106	I	-2.8552E+00					3.74E+02	
			621.92	-2.855E+00	?(	2.599E+01	2.67E+02	9.93E+00 G
			1050.36	-5.840E+00	+	1.279E+02	6.15E+02	1.56E+00 G
			511.86	7.249E+00	?	6.208E+00	4.60E+01	2.00E+01 GA
AG-108M	C	-4.5588E-01					1.53E+05	
			433.94	-4.559E-01	?(	1.227E+00	1.08E+02	9.05E+01 G
			722.94	-4.487E-01	+	2.176E+00	1.42E+02	9.08E+01 G
			614.28	3.175E-01	+	2.556E+00	2.36E+02	8.98E+01 G
AG-110M	F	2.6253E-01					2.50E+02	
			884.68	4.259E-01	?(	2.051E+00	1.38E+02	7.27E+01 G
			657.76	1.371E-01	?(	1.123E+00	2.29E+02	9.46E+01 G
			937.49	-2.115E+00	+	4.231E+00	8.90E+01	3.44E+01 G
			1384.30	-7.190E-01	+	5.669E+00	3.45E+02	2.43E+01 G
			763.94	-2.164E-01	&	6.552E+00	8.43E+02	2.23E+01 G
SN-113	F	-6.8744E-01					1.15E+02	
			391.69	-6.874E-01	&(	2.697E+00	1.16E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	2.8408E-01					6.02E+01	
			602.73	2.841E-01	?(	2.123E+00	2.18E+02	9.83E+01 G
			1690.98	-6.148E-02	%	2.663E+00	1.88E+03	4.78E+01 G
			722.79	-6.370E+00	+	1.645E+01	7.73E+01	1.08E+01 G
SB-125	I	2.4528E-01					1.01E+03	
			427.88	-1.436E+00	?(	3.413E+00	9.54E+01	2.96E+01 G
			600.50	1.556E+00	+	1.129E+01	2.12E+02	1.79E+01 G
			635.89	2.624E+00	?(	6.417E+00	7.30E+01	1.13E+01 G
			463.37	2.428E+00	?(	7.825E+00	9.43E+01	1.05E+01 G
I-131	I	3.0900E-01					8.02E+00	
			364.48	3.090E-01	?(	8.004E-01	1.02E+02	8.17E+01 G
			284.30	-6.022E+00	+	1.519E+01	9.77E+01	6.14E+00 G
			636.97	-1.002E+00	+	1.605E+01	4.45E+02	7.17E+00 G
Gd-153	F	7.5693E-01					2.42E+02	
			97.50	7.569E-01	?(	3.690E+00	1.45E+02	3.00E+01 G
			103.20	0.000E+00	-	5.217E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.1673E+01					4.71E-02	
			1077.40	1.167E+01	&(	3.924E+01	1.46E+02	3.30E+00 G
Tc-99m	I	-1.1099E-01					2.51E-01	
			140.51	-1.110E-01	?(	1.802E+00	4.81E+02	8.93E+01 G
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	?(	2.782E+00	1.40E+02	6.20E+01 G
			302.85	0.000E+00	+	9.831E+00	1.00E+03	1.83E+01 G
			383.84	-4.625E+00	+	1.681E+01	1.08E+02	8.94E+00 GA
			80.99	-9.168E-01	+	2.660E+00	1.08E+02	3.41E+01 GA
CS-134	I	5.3541E-01					7.54E+02	
			604.71	2.870E-01	?(	2.205E+00	2.24E+02	9.76E+01 G
			795.87	5.516E-01	&(	1.524E+00	8.19E+01	8.55E+01 G
			569.32	-2.361E+00	+	7.888E+00	9.82E+01	1.54E+01 G
			801.95	3.167E+00	?(	1.302E+01	1.18E+02	8.69E+00 G
			563.24	-3.236E+00	+	1.224E+01	1.53E+02	8.35E+00 G
CE-139	F	2.7600E-01					1.38E+02	
			165.85	2.760E-01	?(	1.051E+00	1.13E+02	7.99E+01 G
Ba-140	I	9.1677E-01					1.28E+01	
			537.26	9.168E-01	?(	2.981E+00	1.29E+02	2.44E+01 G
			162.66	-2.253E+00	+	1.434E+01	1.87E+02	6.22E+00 G
			304.85	0.000E+00	-	4.222E+01	1.00E+03	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	2.8550E-01					1.28E+01	
			1596.21	-1.760E-01	?(	1.243E+00	3.04E+02	9.54E+01 G
			487.02	-1.078E+00	&	4.262E+00	1.17E+02	4.55E+01 G
			328.76	1.495E+00	?(	5.073E+00	1.00E+02	2.03E+01 G
			815.77	1.122E+00	?(	5.830E+00	1.48E+02	2.33E+01 G
CE-141	I	5.0986E-01					3.25E+01	
			145.44	5.099E-01	?(	3.031E+00	1.77E+02	4.82E+01 G
CE-144	I	-2.3589E+00					2.85E+02	
			133.54	-2.359E+00	(	1.310E+01	1.66E+02	1.11E+01 G
PM-144	C	-1.8219E-01					3.63E+02	
			696.54	-1.822E-01	?(	1.247E+00	2.85E+02	9.90E+01 G
			618.06	-4.583E-01	+	2.774E+00	1.79E+02	9.91E+01 G
EU-152	F	1.3894E+00					4.94E+03	
			344.29	0.000E+00	&(	4.946E+00	1.00E+03	2.65E+01 G
			1112.07	3.009E+00	?(	1.417E+01	1.36E+02	1.36E+01 G
			121.78	-9.369E-01	+	3.169E+00	1.01E+02	2.86E+01 G
			778.92	1.385E+00	?(	6.403E+00	1.84E+02	1.29E+01 G
			964.11	2.401E+00	?(	6.043E+00	7.48E+01	1.46E+01 G
			244.69	-4.331E+00	+	2.172E+01	1.49E+02	7.58E+00 G
			1408.00	1.083E+00	?	5.101E+00	2.05E+02	2.10E+01 GA
EU-154	I	5.5521E-02					3.14E+03	
			873.23	-2.813E+00	&(	1.136E+01	1.17E+02	1.23E+01 G
			123.10	5.286E-01	+	1.962E+00	1.10E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.321E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.031E+01	1.00E+03	2.02E+01 G
			1004.77	1.710E+00	+	8.142E+00	1.36E+02	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
HF-181	F	-2.0778E-01					4.24E+01	
			482.00	-5.715E-01	?(	2.159E+00	1.12E+02	8.05E+01 G
			133.02	-5.925E-01	+	3.304E+00	1.66E+02	4.33E+01 G
			345.83	1.735E+00	&(	7.454E+00	1.26E+02	1.51E+01 G
			136.30	-4.507E+00	+	2.548E+01	1.69E+02	5.85E+00 G
Ta-182	F	3.0180E+00					1.14E+02	
			1121.30	1.189E+00	?(	5.705E+00	1.39E+02	3.49E+01 G
			1221.41	5.537E+00	(	1.855E+00	2.13E+01	2.70E+01 G
			1189.05	2.760E+00	(	5.538E+00	8.72E+01	1.62E+01 G
Hg-203	F	-4.4579E-01					4.66E+01	
			279.20	-4.458E-01	?(	1.136E+00	9.88E+01	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.0697E+00					6.98E+02	
			583.02	1.070E+00	(P	8.233E-01	3.16E+01	8.45E+01 G
			277.28	-2.980E-01	%	1.273E+01	1.20E+03	6.31E+00 G
			860.56	5.922E+00	&	5.554E+00	4.41E+01	1.24E+01 G
pm-146	C	-1.6745E+00					2.02E+03	
			747.16	-1.674E+00	&(	3.819E+00	9.79E+01	3.40E+01 G
			735.72	-1.112E+00	+	5.259E+00	1.97E+02	2.25E+01 G
			453.88	2.525E-01	+	9.522E-01	1.43E+02	6.50E+01 G
y-88	F	-6.3611E-01					1.07E+02	
			898.04	-6.361E-01	?(	1.504E+00	1.04E+02	9.37E+01 G
			1836.06	-2.546E-01	+	1.407E+00	2.54E+02	9.92E+01 G
Cd-113m		-1.3292E+03					5.33E+03	
			263.70	-1.329E+03	?(	1.548E+04	3.35E+02	6.00E-03 K
Cf-251	T	1.9791E-01					3.28E+05	
			176.60	1.979E-01	?(	3.688E+00	6.97E+02	1.70E+01 G
			227.00	3.314E+00	?	1.004E+01	1.16E+02	6.30E+00 GA
Cf-249	T	-4.1286E-01					1.28E+05	
			387.95	-4.129E-01	?(	2.237E+00	1.59E+02	6.60E+01 G
			333.44	-2.388E+00	+	8.356E+00	1.04E+02	1.55E+01 G
Sn-126		-7.2380E-01					3.65E+07	
			87.57	0.000E+00	+	3.661E+00	1.00E+03	3.75E+01 GA
			64.28	-7.238E-01	?(	1.385E+01	5.61E+02	9.70E+00 G
			86.94	0.000E+00	+	1.522E+01	1.00E+03	9.04E+00 GA
PB-210	N	-1.2066E+01					8.14E+03	
			46.54	-1.207E+01	(P	4.580E+01	1.08E+02	4.25E+00 G
PB-212	N	3.7964E+00					6.98E+02	
			238.63	3.796E+00	(P	1.337E+00	1.48E+01	4.33E+01 G
			300.03	0.000E+00	-	5.456E+01	1.00E+03	3.28E+00 GA
PB-214	N	5.9200E+00					5.84E+05	
			351.93	5.364E+00	(P	1.883E+00	1.75E+01	3.76E+01 G
			295.09	7.002E+00	(	2.937E+00	2.25E+01	1.93E+01 G
			242.00	7.639E+00	P	8.885E+00	3.76E+01	7.43E+00 GA
BI-207	C	1.1863E-01					1.18E+04	
			569.70	0.000E+00	(	1.376E+00	1.00E+03	9.77E+01 G
			1063.66	2.743E-01	?(	1.475E+00	2.29E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	1.9373E+00					6.98E+02	
			727.17	1.937E+00	?(	2.375E+01	3.50E+02	7.55E+00 G
			785.42	3.074E+01	?	2.832E+01	3.54E+01	1.28E+00 GA
U-235	N	1.3990E+00					2.57E+11	
			143.79	0.000E+00	&(	1.444E+01	1.00E+03	1.10E+01 G
			205.33	4.459E+00	(	1.231E+01	1.06E+02	5.01E+00 G
			163.38	-4.094E+00	+	1.661E+01	1.20E+02	5.08E+00 G
			185.72	-5.344E-02	% P	1.505E+00	1.02E+03	5.40E+01 GA
BI-214	N	5.9370E+00					5.84E+05	
			609.31	5.738E+00	(	1.101E+00	1.37E+01	4.61E+01 G
			1120.29	2.744E+00	-	1.103E+01	1.16E+02	1.51E+01 G
			1764.49	6.532E+00	?(	4.376E+00	3.02E+01	1.54E+01 G
BI-210M	T	-6.7235E-01					1.10E+09	
			265.83	-6.723E-01	(	2.039E+00	9.03E+01	5.00E+01 G
			304.90	0.000E+00	+	6.469E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1724E+00					2.10E+03	
			911.07	2.212E+00	?(	4.446E+00	8.89E+01	2.90E+01 G
			968.97	1.810E+00	&(	8.134E+00	1.29E+02	1.75E+01 G
			338.32	2.605E+00	?(	9.835E+00	1.12E+02	1.20E+01 G
			93.35	3.060E+00		2.257E+01	2.19E+02	5.56E+00 XA
TH-227	N	3.1477E+00					7.95E+03	
			50.14	2.495E+00	?(	1.964E+01	2.31E+02	8.00E+00 G
			256.24	3.894E+00	(	1.023E+01	1.01E+02	7.00E+00 G
TH-229	N	1.3996E+00					2.68E+06	
			193.51	9.382E-01	&(	1.243E+01	4.90E+02	4.40E+00 G
			210.85	2.079E+00	?(	2.175E+01	3.91E+02	2.99E+00 G
TH-234	N	-3.5758E+00					1.63E+12	
			63.29	-3.576E+00	(P	3.305E+01	2.68E+02	3.81E+00 G
			92.59	-8.595E+00	+ P	2.417E+01	5.20E+01	5.58E+00 G
PA-234	N	-1.6607E+00					1.63E+12	
			131.29	-1.661E+00	?(	6.732E+00	1.21E+02	1.80E+01 G
			946.02	-4.199E-01	+	7.326E+00	7.02E+02	1.34E+01 G
			569.47	0.000E+00	+	1.639E+01	1.00E+03	8.20E+00 G
			883.24	-3.691E+00	+	2.252E+01	1.77E+02	9.60E+00 G
			880.53	-1.147E+01	+	3.247E+01	8.43E+01	6.00E+00 GA
PA-234M	N	6.3152E+01					1.63E+12	
			1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
			766.41	1.205E+02	?(	4.756E+02	1.15E+02	2.94E-01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T	9.1873E-01					1.58E+05	
			59.54	9.187E-01	&(	4.009E+00	1.30E+02	3.59E+01 G
Np-237	F	-9.9293E-01					2.14E+06	
			86.49	-9.929E-01	?(	1.040E+01	3.10E+02	1.31E+01 G
Ir-192	F	1.8520E-01					7.40E+01	
			316.49	0.000E+00	?(	2.141E+00	1.00E+03	8.70E+01 G
			468.06	4.967E-01	?(	1.809E+00	1.06E+02	5.18E+01 G
			308.44	0.000E+00	&	5.755E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.1148E-01					1.30E+01	
			818.50	1.689E-02	%(	1.487E+00	2.43E+03	1.00E+02 G
			1048.07	-5.811E-01	+	2.193E+00	1.10E+02	8.00E+01 G
			340.57	3.132E-01	?(	2.698E+00	2.50E+02	4.69E+01 G
Np-239	T	-5.2515E-01					2.36E+00	
			103.70	0.000E+00	+	4.736E+00	1.00E+03	2.40E+01 X
			106.13	-5.252E-01	?(	4.857E+00	2.73E+02	2.27E+01 G
			99.50	2.953E-01		7.580E+00	7.53E+02	1.50E+01 X
Nd-147		-1.1367E+00					1.11E+01	
			531.00	-1.137E+00	?(	7.523E+00	2.65E+02	1.30E+01 G
			91.10	2.259E-01	&	4.599E+00	6.00E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	169.	-17.	-0.009	107.88	-1.207E+01	P
AM-241	59.54	227.	17.	0.009	129.82	9.187E-01	
TH-234	63.29	193.	-7.	-0.004	267.82	-3.576E+00	P
Sn-126	64.28	227.	-4.	-0.002	561.29	-7.238E-01	
BA-133	80.99	133.	-19.	-0.011	107.88	-9.168E-01	
Np-237	86.49	329.	-8.	-0.005	309.92	-9.929E-01	
Nd-147	91.10	310.	4.	0.002	600.08	2.259E-01	
TH-234	92.59	338.	-31.	-0.017	51.99	-8.595E+00	P
AC-228	93.35	292.	11.	0.006	218.53	3.060E+00	
Gd-153	97.50	230.	15.	0.008	144.80	7.569E-01	
Np-239	99.50	245.	3.	0.002	753.41	2.953E-01	
Np-239	106.13	234.	-8.	-0.004	272.72	-5.252E-01	
EU-152	121.78	155.	-18.	-0.010	100.87	-9.369E-01	
CO-57	122.06	173.	-18.	-0.010	106.22	-3.130E-01	
EU-154	123.10	119.	14.	0.008	110.14	5.286E-01	
PA-234	131.29	278.	-20.	-0.011	120.98	-1.661E+00	
HF-181	133.02	389.	-17.	-0.009	166.20	-5.925E-01	
CE-144	133.54	401.	-17.	-0.010	165.59	-2.359E+00	
HF-181	136.30	418.	-17.	-0.010	168.55	-4.507E+00	
CO-57	136.47	435.	-17.	-0.010	171.94	-2.469E+00	
Tc-99m	140.51	453.	-6.	-0.003	481.16	-1.110E-01	
CE-141	145.44	386.	16.	0.009	177.04	5.099E-01	
Ba-140	162.66	127.	-9.	-0.005	186.77	-2.253E+00	
U-235	163.38	112.	-13.	-0.007	120.00	-4.094E+00	
CE-139	165.85	110.	14.	0.008	112.81	2.760E-01	
Cf-251	176.60	55.	2.	0.001	697.32	1.979E-01	
TH-229	193.51	37.	2.	0.001	489.90	9.382E-01	
U-235	205.33	44.	12.	0.007	105.80	4.459E+00	
TH-229	210.85	48.	3.	0.002	391.34	2.079E+00	
Cf-251	227.00	40.	11.	0.006	115.52	3.314E+00	
EU-152	244.69	274.	-16.	-0.009	149.12	-4.331E+00	
Cd-113m	263.70	74.	-4.	-0.002	335.13	-1.329E+03	
BI-210M	265.83	89.	-15.	-0.009	90.34	-6.723E-01	
Hg-203	279.20	67.	-16.	-0.009	98.75	-4.458E-01	
I-131	284.30	66.	-16.	-0.009	97.74	-6.022E+00	
TL-210	296.00	249.	-10.	-0.006	221.80	-3.049E-01	
CR-51	320.08	259.	-12.	-0.007	185.97	-3.130E+00	
La-140	328.76	64.	12.	0.007	100.31	1.495E+00	
Cf-249	333.44	103.	-14.	-0.008	103.87	-2.388E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	338.32	82.	12.	0.007	111.51	2.605E+00	
Cs-136	340.57	94.	6.	0.003	250.27	3.132E-01	
HF-181	345.83	72.	10.	0.005	126.10	1.735E+00	
BA-133	356.00	169.	-13.	-0.007	140.01	-5.884E-01	
I-131	364.48	20.	9.	0.005	101.86	3.090E-01	
BA-133	383.84	112.	-14.	-0.008	107.87	-4.625E+00	
Cf-249	387.95	106.	-9.	-0.005	159.02	-4.129E-01	
SN-113	391.69	145.	-15.	-0.008	116.47	-6.874E-01	
SB-125	427.88	40.	-14.	-0.008	95.43	-1.436E+00	
AG-108M	433.94	48.	-13.	-0.007	107.97	-4.559E-01	
pm-146	453.88	12.	5.	0.003	142.83	2.525E-01	
SB-125	463.37	22.	8.	0.004	94.27	2.428E+00	
Ir-192	468.06	29.	8.	0.004	106.12	4.967E-01	
BE-7	477.60	103.	-14.	-0.008	105.62	-4.562E+00	
HF-181	482.00	106.	-13.	-0.007	111.91	-5.715E-01	
La-140	487.02	131.	-14.	-0.008	117.21	-1.078E+00	
RU-103	497.05	12.	8.	0.004	93.84	3.024E-01	
RH-106	511.86	47.	40.	0.022	45.96	7.249E+00	
Nd-147	531.00	26.	-4.	-0.002	264.97	-1.137E+00	
Ba-140	537.26	13.	6.	0.003	129.28	9.168E-01	
CS-134	563.24	26.	-7.	-0.004	153.42	-3.236E+00	
CS-134	569.32	37.	-9.	-0.005	98.20	-2.361E+00	
SB-125	600.50	102.	7.	0.004	211.73	1.556E+00	
SB-124	602.73	109.	7.	0.004	218.17	2.841E-01	
CS-134	604.71	116.	7.	0.004	224.44	2.870E-01	
RU-103	610.30	123.	7.	0.004	229.97	4.924E+00	
AG-108M	614.28	130.	7.	0.004	235.55	3.175E-01	
PM-144	618.06	187.	-11.	-0.006	178.76	-4.583E-01	
RH-106	621.92	163.	-7.	-0.004	267.01	-2.855E+00	
SB-125	635.89	10.	7.	0.004	73.01	2.624E+00	
I-131	636.97	28.	-2.	-0.001	444.58	-1.002E+00	
AG-110M	657.76	22.	3.	0.002	228.52	1.371E-01	
PM-144	696.54	28.	-4.	-0.002	285.04	-1.822E-01	
NB-94	702.63	23.	-4.	-0.002	241.30	-2.009E-01	
SB-124	722.79	59.	-15.	-0.008	77.34	-6.370E+00	
AG-108M	722.94	74.	-9.	-0.005	141.89	-4.487E-01	
ZR-95	724.20	50.	11.	0.006	99.61	1.106E+00	
BI-212	727.17	59.	3.	0.002	350.50	1.937E+00	
pm-146	735.72	23.	-5.	-0.003	196.95	-1.112E+00	
pm-146	747.16	28.	-12.	-0.007	97.89	-1.674E+00	
ZR-95	756.73	19.	-5.	-0.003	201.78	-4.103E-01	
AG-110M	763.94	35.	-1.	-0.001	842.61	-2.164E-01	
NB-95	765.79	37.	1.	0.001	866.03	4.840E-02	
PA-234M	766.41	32.	7.	0.004	114.63	1.205E+02	
EU-152	778.92	9.	4.	0.002	184.30	1.385E+00	
BI-212	785.42	0.	8.	0.004	35.36	3.074E+01	
CS-134	795.87	26.	10.	0.005	81.88	5.516E-01	
CS-134	801.95	18.	6.	0.003	117.84	3.167E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	27.	5.	0.003	148.47	1.122E+00	
MN-54	834.85	14.	-2.	-0.001	403.11	-1.028E-01	
Co-56	846.77	20.	-5.	-0.003	201.66	-2.598E-01	
NB-94	871.10	12.	6.	0.003	91.29	3.184E-01	
EU-154	873.23	26.	-6.	-0.004	116.66	-2.813E+00	
PA-234	880.53	52.	-13.	-0.007	84.28	-1.147E+01	
PA-234	883.24	65.	-7.	-0.004	177.10	-3.691E+00	
AG-110M	884.68	29.	6.	0.003	138.30	4.259E-01	
Sc-46	889.28	68.	-5.	-0.003	218.41	-2.928E-01	
y-88	898.04	25.	-11.	-0.006	104.38	-6.361E-01	
AC-228	911.07	20.	12.	0.007	88.87	2.212E+00	
AG-110M	937.49	25.	-13.	-0.007	88.99	-2.115E+00	
PA-234	946.02	10.	-1.	-0.001	702.38	-4.199E-01	
EU-152	964.11	8.	6.	0.003	74.80	2.401E+00	
AC-228	968.97	22.	6.	0.003	128.75	1.810E+00	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	16.	6.	0.003	101.37	4.300E+01	
EU-154	1004.77	23.	5.	0.003	136.03	1.710E+00	
Co-56	1037.84	16.	-1.	-0.001	914.69	-4.261E-01	
Cs-136	1048.07	32.	-8.	-0.004	109.91	-5.811E-01	
RH-106	1050.36	42.	-2.	-0.001	615.24	-5.840E+00	
BI-207	1063.66	11.	3.	0.002	229.35	2.743E-01	
Ga-68	1077.40	11.	5.	0.003	145.77	1.167E+01	
EU-152	1112.07	36.	6.	0.004	136.00	3.009E+00	
ZN-65	1115.55	42.	6.	0.004	146.68	8.145E-01	
Sc-46	1120.55	32.	7.	0.004	128.71	4.145E-01	
CO-60	1173.24	21.	-8.	-0.005	130.66	-5.500E-01	
Co-56	1238.28	34.	-10.	-0.006	140.36	-1.039E+00	
NA-22	1274.53	28.	-10.	-0.006	79.21	-7.258E-01	
FE-59	1291.60	6.	7.	0.004	88.04	1.152E+00	
TL-210	1313.00	23.	-10.	-0.005	119.90	-3.306E+00	
CO-60	1332.50	6.	3.	0.002	176.21	2.422E-01	
AG-110M	1384.30	11.	-2.	-0.001	344.64	-7.190E-01	
EU-152	1408.00	6.	3.	0.002	205.48	1.083E+00	
La-140	1596.21	6.	-2.	-0.001	304.14	-1.760E-01	
y-88	1836.06	7.	-3.	-0.001	254.34	-2.546E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-4.5621E+00	-4.5622E+00	1.056E+02%	1.62E+01
NA-22	#A	-7.2583E-01	-7.2584E-01	7.921E+01%	1.93E+00
K-40		1.9327E+02	1.9327E+02	6.155E+00%	5.40E+00
Sc-46	#A	6.0876E-02	6.0876E-02	1.268E+02%	2.21E+00
CR-51	#A	-3.1302E+00	-3.1303E+00	1.860E+02%	1.96E+01
MN-54	#A	-1.0282E-01	-1.0282E-01	4.031E+02%	1.04E+00
FE-59	#A	4.9929E-01	4.9930E-01	8.804E+01%	2.37E+00
Co-56	#A	-2.5982E-01	-2.5982E-01	2.017E+02%	1.22E+00
CO-57	#A	-3.1296E-01	-3.1296E-01	1.062E+02%	1.12E+00
CO-58	#A	3.9640E-01	3.9640E-01	8.642E+01%	1.16E+00
CO-60	#A	2.4221E-01	2.4221E-01	1.762E+02%	1.00E+00
ZN-65	#A	8.1448E-01	8.1449E-01	1.467E+02%	4.13E+00
NB-94	#A	6.1370E-02	6.1370E-02	9.129E+01%	1.17E+00
ZR-95	#A	2.6837E-01	2.6837E-01	9.961E+01%	2.01E+00
NB-95	#A	4.8397E-02	4.8397E-02	8.660E+02%	1.50E+00
RU-103	#A	3.0239E-01	3.0239E-01	9.384E+01%	7.29E-01
RH-106	#A	-2.8552E+00	-2.8552E+00	2.670E+02%	2.60E+01
AG-108M	#A	-4.5588E-01	-4.5588E-01	1.080E+02%	1.23E+00
AG-110M	#A	2.6253E-01	2.6253E-01	1.336E+02%	2.05E+00
SN-113	#A	-6.8744E-01	-6.8744E-01	1.165E+02%	2.70E+00
SB-124	#A	2.8408E-01	2.8408E-01	2.182E+02%	2.12E+00
SB-125	#A	2.4528E-01	2.4528E-01	5.091E+01%	3.41E+00
I-131	#A	3.0899E-01	3.0900E-01	1.019E+02%	8.00E-01
Gd-153	#A	7.5693E-01	7.5693E-01	1.448E+02%	3.69E+00
Ga-68	#A	1.1614E+01	1.1673E+01	1.458E+02%	3.92E+01
Tc-99m	#A	-1.1088E-01	-1.1099E-01	4.812E+02%	1.80E+00
BA-133	#A	-5.8842E-01	-5.8842E-01	1.400E+02%	2.78E+00
CS-134	#A	5.3541E-01	5.3541E-01	8.188E+01%	2.20E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
CE-139	#A	2.7600E-01	2.7600E-01	1.128E+02%	1.05E+00
Ba-140	#A	9.1675E-01	9.1677E-01	1.293E+02%	2.98E+00
La-140	#A	2.8549E-01	2.8550E-01	1.003E+02%	1.24E+00
CE-141	#A	5.0986E-01	5.0986E-01	1.770E+02%	3.03E+00
CE-144	#A	-2.3589E+00	-2.3589E+00	1.656E+02%	1.31E+01
PM-144	#A	-1.8219E-01	-1.8219E-01	2.850E+02%	1.25E+00
EU-152	#A	1.3894E+00	1.3894E+00	7.480E+01%	4.95E+00
EU-154	#A	5.5521E-02	5.5521E-02	7.187E+01%	1.14E+01
EU-155	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.35E+00
HF-181	#A	-2.0778E-01	-2.0778E-01	8.430E+01%	2.16E+00
Ta-182	A	3.0179E+00	3.0180E+00	2.132E+01%	5.71E+00
Hg-203	#A	-4.4578E-01	-4.4579E-01	9.875E+01%	1.14E+00
TL-208		1.0697E+00	1.0697E+00	3.159E+01%	8.23E-01
pm-146	#A	-1.6745E+00	-1.6745E+00	9.789E+01%	3.82E+00

y-88	#A	-6.3610E-01	-6.3611E-01	1.044E+02%	1.50E+00
Cd-113m	#A	-1.3292E+03	-1.3292E+03	3.351E+02%	1.55E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.62E+01
Cf-251	#A	1.9791E-01	1.9791E-01	6.973E+02%	3.69E+00
Cf-249	#A	-4.1286E-01	-4.1286E-01	1.590E+02%	2.24E+00
Sn-126	#A	-7.2380E-01	-7.2380E-01	5.613E+02%	1.38E+01
PB-210	#A	-1.2066E+01	-1.2066E+01	1.079E+02%	4.58E+01
PB-212		3.7964E+00	3.7964E+00	1.478E+01%	1.34E+00
PB-214		5.9200E+00	5.9200E+00	1.425E+01%	1.88E+00
BI-207	#A	1.1863E-01	1.1863E-01	2.293E+02%	1.38E+00
BI-212	#A	1.9373E+00	1.9373E+00	3.505E+02%	2.38E+01
U-235	#A	1.3990E+00	1.3990E+00	1.058E+02%	1.44E+01
BI-214		5.9370E+00	5.9370E+00	1.369E+01%	1.10E+00
BI-210M	#A	-6.7235E-01	-6.7235E-01	9.034E+01%	2.04E+00
AC-228	#A	2.1724E+00	2.1724E+00	6.404E+01%	4.45E+00
TH-227	A	3.1477E+00	3.1477E+00	1.009E+02%	1.96E+01
TH-229	#A	1.3996E+00	1.3996E+00	3.135E+02%	1.24E+01
TH-234	#A	-3.5758E+00	-3.5758E+00	2.678E+02%	3.31E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.25E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.12E+00
PA-234	#A	-1.6607E+00	-1.6607E+00	1.210E+02%	6.73E+00
PA-234M	#A	6.3152E+01	6.3152E+01	7.651E+01%	1.51E+02
AM-241	#A	9.1873E-01	9.1873E-01	1.298E+02%	4.01E+00
Np-237	#A	-9.9293E-01	-9.9293E-01	3.099E+02%	1.04E+01
Ir-192	#A	1.8520E-01	1.8520E-01	1.061E+02%	2.14E+00
Cs-136	#A	1.1148E-01	1.1148E-01	2.503E+02%	1.49E+00
Np-239	#A	-5.2510E-01	-5.2515E-01	2.727E+02%	4.86E+00
Nd-147	#A	-1.1367E+00	-1.1367E+00	2.650E+02%	7.52E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.52E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 2.100E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.0999216E+02 Bq/Sample

Test America St. Louis Spectrum ID: 12_Gamma_20181534

Sample Description: 379959_Gamma_160-29881-A-37-C DU
Detector: Detector #12
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-C DU

Decay to Time: 8/23/2018 17:34 Live Time: 1800 sec
Acquisition Time: 8/23/2018 17:34:30 Real Time: 1801 sec
Analysis Time: 8/28/2018 11:51 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.562E+00	105.6	4.819E+00	4.824E+00	1.624E+01
NA-22	-7.258E-01	79.2	5.750E-01	5.761E-01	1.933E+00
K-40	1.933E+02	6.2	1.189E+01	1.539E+01	5.395E+00
Sc-46	8.919E-02	121.4	1.083E-01	1.084E-01	2.212E+00
CR-51	-3.130E+00	186.0	5.821E+00	5.824E+00	1.964E+01
MN-54	-1.028E-01	403.1	4.145E-01	4.145E-01	1.036E+00
FE-59	4.592E-01	88.0	4.043E-01	4.049E-01	4.292E+00
Co-56	2.390E-01	88.7	2.120E-01	2.124E-01	1.224E+00
CO-57	-1.207E-02	2819.6	3.403E-01	3.403E-01	1.168E+00
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	2.422E-01	176.2	4.268E-01	4.270E-01	1.003E+00
ZN-65	9.833E-01	127.7	1.256E+00	1.257E+00	4.313E+00
ZR-95	2.684E-01	99.6	2.673E-01	2.677E-01	2.008E+00
NB-95	4.840E-02	866.0	4.191E-01	4.191E-01	1.503E+00
RU-103	3.024E-01	93.8	2.838E-01	2.842E-01	7.292E-01
RH-106	-4.121E+00	189.7	7.815E+00	7.818E+00	2.652E+01
AG-108M	-4.559E-01	108.0	4.922E-01	4.927E-01	1.227E+00
AG-110M	2.625E-01	133.6	3.506E-01	3.509E-01	1.123E+00
SN-113	-6.874E-01	116.5	8.007E-01	8.014E-01	2.697E+00
SB-124	2.841E-01	218.2	6.198E-01	6.199E-01	2.123E+00
SB-125	2.453E-01	51.2	1.256E-01	1.262E-01	3.413E+00
I-131	3.090E-01	88.1	2.721E-01	2.725E-01	9.227E-01
Gd-153	8.561E-01	151.2	1.295E+00	1.296E+00	5.253E+00
Ga-68	1.167E+01	145.8	1.702E+01	1.703E+01	3.924E+01
Tc-99m	0.000E+00	1.#INF	7.504E-02	7.504E-02	1.814E+00
BA-133	-5.884E-01	140.0	8.238E-01	8.244E-01	2.782E+00
CS-134	5.354E-01	81.9	4.384E-01	4.392E-01	1.524E+00
CS-137	0.000E+00	1.#INF	1.907E-01	1.908E-01	1.302E+00
CE-139	2.760E-01	112.8	3.114E-01	3.117E-01	1.051E+00
Ba-140	9.168E-01	129.3	1.185E+00	1.186E+00	2.981E+00
La-140	2.855E-01	100.3	2.864E-01	2.868E-01	1.243E+00
CE-141	5.099E-01	177.0	9.027E-01	9.030E-01	3.031E+00
CE-144	-2.359E+00	165.4	3.902E+00	3.904E+00	1.309E+01

PM-144	6.534E-02	180.5	1.179E-01	1.180E-01	1.507E+00
EU-152	5.766E-01	59.1	3.408E-01	3.421E-01	3.337E+00
EU-154	1.282E+00	67.2	8.614E-01	8.639E-01	2.270E+00
EU-155	8.638E-01	161.5	1.395E+00	1.396E+00	7.777E+00
HF-181	-2.078E-01	84.3	1.752E-01	1.755E-01	2.159E+00
Ta-182	2.596E+00	21.3	5.534E-01	5.683E-01	6.119E+00
Hg-203	-2.413E-01	139.4	3.365E-01	3.367E-01	1.151E+00
TL-208	1.086E+00	31.6	3.433E-01	3.477E-01	8.233E-01
PM-146	2.525E-01	142.8	3.607E-01	3.609E-01	9.522E-01
Y-88	-2.546E-01	254.3	6.475E-01	6.477E-01	1.407E+00
Cd-113m	-1.813E+03	201.0	3.643E+03	3.645E+03	1.269E+04
Cd-109	5.961E+00	243.0	1.448E+01	1.449E+01	4.855E+01
Se-75	-1.818E-01	85.6	1.556E-01	1.560E-01	1.642E+00
Cf-251	1.979E-01	697.3	1.380E+00	1.380E+00	3.688E+00
Cf-249	-4.129E-01	159.0	6.565E-01	6.569E-01	2.237E+00
Sn-126	-3.143E+00	138.4	4.349E+00	4.353E+00	1.462E+01
PB-210	4.502E+00	200.0	9.002E+00	9.006E+00	2.827E+01
PB-212	3.796E+00	14.8	5.611E-01	5.950E-01	1.337E+00
PB-214	5.920E+00	14.2	8.436E-01	8.954E-01	1.883E+00
BI-207	-5.681E-01	84.8	4.816E-01	4.825E-01	1.616E+00
BI-212	1.937E+00	350.5	6.790E+00	6.791E+00	2.375E+01
BI-214	5.937E+00	13.7	8.129E-01	8.673E-01	1.101E+00
BI-210M	-2.034E-01	315.7	6.421E-01	6.422E-01	2.212E+00
AC-228	2.172E+00	64.0	1.391E+00	1.396E+00	4.446E+00
TH-227	3.894E+00	100.9	3.930E+00	3.936E+00	1.023E+01
TH-229	1.400E+00	313.5	4.388E+00	4.388E+00	1.243E+01
TH-234	1.607E+01	27.6	4.432E+00	4.520E+00	1.248E+01
PA-231	0.000E+00	1.#INF	2.049E+00	2.049E+00	6.254E+01
PA-233	0.000E+00	1.#INF	2.166E-01	2.166E-01	5.120E+00
PA-234	-1.592E+00	119.8	1.907E+00	1.908E+00	6.393E+00
PA-234M	6.315E+01	76.5	4.832E+01	4.842E+01	1.507E+02
U-235	1.399E+00	105.8	1.480E+00	1.482E+00	1.444E+01
AM-241	-7.233E-01	163.9	1.185E+00	1.186E+00	3.999E+00
Np-237	1.732E+00	231.9	4.016E+00	4.017E+00	1.347E+01
Ir-192	1.852E-01	106.1	1.965E-01	1.968E-01	2.141E+00
Cs-136	1.115E-01	250.3	2.790E-01	2.791E-01	1.487E+00
Np-239	-9.532E-01	168.4	1.605E+00	1.606E+00	5.402E+00
Nd-147	-1.042E+00	290.4	3.026E+00	3.027E+00	7.566E+00
Mo-99	-3.041E+00	116.7	3.548E+00	3.551E+00	1.218E+01
Ge-69	2.229E+00	116.3	2.593E+00	2.596E+00	8.852E+00
Br-82	4.383E-01	128.7	5.642E-01	5.648E-01	1.338E+00
V-48	3.735E-01	70.8	2.642E-01	2.651E-01	1.010E+00
Sr-85	3.320E-01	107.8	3.579E-01	3.584E-01	1.221E+00
Rb-83	2.792E-01	229.0	6.394E-01	6.396E-01	1.540E+00
Kr-85	7.664E+01	117.5	9.008E+01	9.018E+01	3.076E+02
Cm-247	4.700E-01	90.2	4.238E-01	4.245E-01	9.314E-01
Hf-175	0.000E+00	1.#INF	1.615E-01	1.615E-01	1.505E+00
Lu-172	-7.114E-01	71.3	5.070E-01	5.086E-01	4.412E+00
Kr-85m	-1.370E-01	243.9	3.341E-01	3.342E-01	9.218E-01
NB-94	-3.423E-02	78.9	2.699E-02	2.705E-02	1.735E+00
TL-210	0.000E+00	1.#INF	1.233E-01	1.233E-01	1.525E+00
Total	4.183E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-37-C DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181534.An1

Acquisition information
Start time: 8/23/2018 5:34:30 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Extra_Long_Rev7.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 5:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1217

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.76	6.	199.95	1.57	1.805E-02	46.54	4.250	PBC<MDA	PB210
63.45	50.	31.50	1.47	2.978E-02	63.29	3.810	2.430E+01	TH234
74.52	46.	28.69	0.88	3.324E-02				
77.06	77.	18.22	0.88	3.383E-02				
80.99	14.	227.23	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
84.00	14.	229.47	0.89	3.520E-02	84.00	23.000	PBC<MDA	Cm247
86.49	15.	231.86	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.388E-01	EU155
86.54	15.	234.74	0.89	3.560E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.390E-01	EU155
					86.94	9.040	2.506E+00	Sn126
86.94	15.	237.59	0.89	3.566E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	2.506E+00	Sn126
87.57	15.	240.26	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
88.04	15.	242.96	0.89	3.582E-02	88.04	3.790	PBC<MDA	Cd109
89.36	15.	245.43	0.89	3.599E-02	89.36	2.350	PBC<MDA	Hf175
92.88	38.	45.27	1.15	3.637E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
96.73	15.	208.35	0.90	3.677E-02	96.73	3.420	PBC<MDA	Se75
97.50	15.	211.35	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	15.	214.12	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
103.20	15.	216.36	0.91	3.717E-02	103.20	21.800	PBC<MDA	Gd153
103.70	15.	219.33	0.91	3.720E-02	103.70	24.000	PBC<MDA	Np239
105.31	15.	221.96	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
123.10	15.	122.75	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	16.	177.04	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
165.85	14.	112.81	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	2.	697.32	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
181.47	13.	91.16	0.99	3.256E-02	181.07	5.990	3.784E+00	Mo99
					181.47	19.200	1.182E+00	Lu172
193.51	2.	489.90	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	12.	105.80	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	391.34	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	115.52	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.38	76.	17.58	1.01	2.745E-02	238.63	43.300	3.569E+00	PB212
241.77	28.	37.63	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
256.24	13.	100.93	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
277.28	4.	281.23	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
294.95	57.	22.46	1.39	2.350E-02	295.09	19.300	7.002E+00	PB214
328.76	12.	100.31	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
338.32	12.	111.51	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
340.57	6.	250.27	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	126.10	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.61	75.	17.55	1.13	2.055E-02	351.93	37.600	5.364E+00	PB214
364.48	9.	88.06	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
366.42	8.	108.36	1.17	1.993E-02	366.42	1.190	PBC<MDA	Mo99
402.40	7.	90.18	1.21	1.855E-02	402.40	72.000	PBC<MDA	Cm247
453.88	5.	142.83	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
463.37	8.	94.27	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.12	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	8.	93.84	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	16.	102.70	2.56	1.546E-02	511.86	20.000	PBC<MDA	RH106
513.98	9.	117.54	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
					513.99	99.280	3.320E-01	Sr85
513.99	9.	107.83	1.31	1.541E-02	513.98	0.430	7.664E+01	Kr85
					513.99	99.280	3.320E-01	Sr85
520.35	2.	374.72	1.32	1.527E-02	520.35	46.110	PBC<MDA	Rb83
537.26	6.	129.28	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
552.50	3.	263.39	1.35	1.460E-02	552.50	16.300	PBC<MDA	Rb83
583.03	23.	31.59	1.26	1.403E-02	583.02	84.500	1.070E+00	TL208
600.50	7.	211.73	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	218.17	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	7.	224.44	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
609.34	65.	13.69	1.66	1.358E-02	609.31	46.090	5.738E+00	BI214
610.30	7.	229.97	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
614.28	7.	235.55	1.41	1.350E-02	614.28	89.850	PBC<MDA	AG108M
618.06	7.	241.00	1.41	1.344E-02	618.06	99.100	PBC<MDA	PM144
635.89	7.	74.83	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	228.52	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
724.20	11.	99.61	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
727.17	3.	350.50	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
765.79	1.	866.03	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.644E+01	PA234M
766.41	7.	114.63	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.205E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
776.50	2.	413.66	1.56	1.139E-02	776.50	83.400	PBC<MDA	Br82
778.92	5.	119.15	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
785.42	8.	35.36	1.57	1.129E-02	785.42	1.280	3.074E+01	BI212
795.87	10.	81.88	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	117.84	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	148.47	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
857.25	14.	44.13	1.64	1.057E-02	860.56	12.420	5.922E+00	TL208
871.10	6.	91.29	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
884.68	6.	138.30	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.07	12.	88.87	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
964.11	6.	74.80	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	128.75	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
983.50	4.	180.85	1.75	9.598E-03	983.50	100.000	PBC<MDA	V48
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	5.	136.03	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	9.	88.70	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1044.00	7.	128.73	1.80	9.188E-03	1044.00	28.000	PBC<MDA	Br82
1063.66	3.	229.35	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	145.77	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1106.50	9.	116.34	1.86	8.803E-03	1106.50	26.000	PBC<MDA	Ge69
1115.55	8.	127.71	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1120.06	9.	93.09	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.862E-01	Sc46
1120.55	7.	121.41	1.87	8.721E-03	1120.29	15.100	3.119E+00	BI214
					1120.55	99.987	4.712E-01	Sc46
					1121.30	34.900	1.351E+00	Ta182
1121.04	1.	706.22	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.435E-01	Ta182
1189.05	7.	87.20	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	22.	21.32	1.96	8.175E-03	1221.41	27.000	5.537E+00	Ta182
1291.60	7.	88.04	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1311.60	7.	70.75	2.03	7.741E-03	1311.60	98.000	PBC<MDA	V48
1313.00	1.	623.91	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	3.	176.21	2.05	7.647E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	205.48	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.81	264.	6.15	2.06	7.112E-03	1460.83	10.670	1.933E+02	K40
1764.34	11.	30.15	2.40	6.075E-03	1764.49	15.400	6.532E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.65	74.48	63.	46.	1.376E+03	28.69	0.880	- sD
307.79	77.01	60.	77.	2.283E+03	18.22	0.882	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.65	46.76	61.	6.	0.003	199.95	1.567s
TH-227	200.18	50.14	182.	-15.	-0.009	126.11	0.855s
AM-241	237.74	59.54	226.	-13.	-0.007	163.86	0.865s
TH-234	253.38	63.45	62.	50.	0.028	31.50	1.469s
Sn-126	256.71	64.28	254.	-17.	-0.009	138.38	0.869s
BA-133	323.50	80.99	532.	14.	0.008	227.23	0.887s
Cm-247	335.53	84.00	546.	14.	0.008	229.47	0.890s
Np-237	345.49	86.49	561.	15.	0.008	231.86	0.892s
EU-155	345.70	86.54	575.	15.	0.008	234.74	0.892
Sn-126	347.29	86.94	590.	15.	0.008	237.59	0.892
Sn-126	349.81	87.57	604.	15.	0.008	240.26	0.893
Cd-109	351.68	88.04	619.	15.	0.008	242.96	0.894s
Hf-175	356.96	89.36	633.	15.	0.008	245.43	0.895
TH-234	371.02	92.88	85.	38.	0.021	45.27	1.149s
Se-75	386.42	96.73	462.	15.	0.008	208.35	0.902s
Gd-153	389.50	97.50	477.	15.	0.008	211.35	0.903
Np-239	397.50	99.50	491.	15.	0.008	214.12	0.905s
Gd-153	412.29	103.20	506.	15.	0.008	216.36	0.909s
Np-239	414.29	103.70	521.	15.	0.008	219.33	0.909s
EU-155	420.73	105.31	536.	15.	0.008	221.96	0.911s
Np-239	424.00	106.13	292.	-15.	-0.008	168.38	0.912s
Se-75	483.92	121.12	155.	-18.	-0.010	102.58	0.927s
EU-152	486.56	121.78	173.	-18.	-0.010	107.87	0.928s
EU-154	491.84	123.10	162.	15.	0.008	122.75	0.929s
PA-234	524.60	131.29	249.	-19.	-0.011	119.77	0.938s
HF-181	531.51	133.02	388.	-17.	-0.009	166.03	0.939s
CE-144	533.57	133.54	400.	-17.	-0.010	165.42	0.940s
Se-75	543.41	136.00	417.	-17.	-0.010	168.48	0.942s
HF-181	544.61	136.30	435.	-17.	-0.010	171.78	0.943s
CO-57	545.30	136.47	452.	-7.	-0.004	424.78	0.943s
Tc-99m	561.44	140.51	459.	0.	0.000	1000.00	0.947D
Mo-99	561.44	140.51	459.	0.	0.000	1000.00	0.947D
U-235	574.53	143.79	459.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	386.	16.	0.009	177.04	0.952s
Kr-85m	603.38	151.00	73.	-6.	-0.004	243.87	0.957s
Ba-140	649.99	162.66	127.	-9.	-0.005	186.77	0.969s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	652.87	163.38	112.	-13.	-0.007	120.00	0.970
CE-139	662.76	165.85	110.	14.	0.008	112.81	0.973s
Cf-251	705.72	176.60	55.	2.	0.001	697.32	0.983s
Mo-99	723.59	181.07	73.	-9.	-0.005	133.82	0.988s
Lu-172	725.19	181.47	67.	13.	0.007	91.16	0.988s
TH-229	773.32	193.51	37.	2.	0.001	489.90	1.000s
U-235	820.59	205.33	44.	12.	0.007	105.80	1.012s
TH-229	842.65	210.85	48.	3.	0.002	391.34	1.018s
Cf-251	907.22	227.00	40.	11.	0.006	115.52	1.034s
TH-227	943.09	235.97	401.	-19.	-0.011	149.38	1.043
PB-212	953.73	238.63	31.	81.	0.045	14.78	1.045D
PB-214	967.18	242.00	40.	28.	0.015	37.63	1.049D
EU-152	977.96	244.69	315.	-17.	-0.010	148.45	1.051s
TH-227	1024.13	256.24	44.	13.	0.007	100.93	1.063s
Cd-113m	1053.96	263.70	48.	-5.	-0.003	201.00	1.070s
Se-75	1057.80	264.66	79.	-15.	-0.009	85.60	1.071s
BI-210M	1062.48	265.83	105.	-5.	-0.003	315.67	1.072s
TL-208	1108.27	277.28	51.	4.	0.002	281.23	1.084
Hg-203	1115.93	279.20	69.	-9.	-0.005	139.42	1.086s
Se-75	1117.29	279.54	77.	-5.	-0.003	237.17	1.086s
I-131	1136.32	284.30	66.	-16.	-0.009	97.74	1.091s
PB-214	1178.92	294.95	21.	57.	0.032	22.46	1.395s
TL-210	1183.11	296.00	249.	-10.	-0.006	221.80	1.102s
PB-212	1199.22	300.03	239.	0.	0.000	1000.00	1.106
PA-231	1199.38	300.07	239.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	239.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	239.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	239.	0.	0.000	1000.00	1.109s
Kr-85m	1216.97	304.47	239.	0.	0.000	1000.00	1.111s
Ba-140	1218.49	304.85	239.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	239.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	239.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	239.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	239.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	259.	-12.	-0.007	185.97	1.126s
La-140	1314.10	328.76	64.	12.	0.007	100.31	1.135s
Cf-249	1332.81	333.44	103.	-14.	-0.008	103.87	1.139s
AC-228	1352.33	338.32	82.	12.	0.007	111.51	1.144
Cs-136	1361.32	340.57	94.	6.	0.003	250.27	1.146s
Hf-175	1372.64	343.40	100.	0.	0.000	1000.00	1.149s
EU-152	1376.18	344.29	100.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	72.	10.	0.005	126.10	1.151
PB-214	1405.47	351.61	25.	75.	0.041	17.55	1.125
BA-133	1423.02	356.00	169.	-13.	-0.007	140.01	1.162s
I-131	1456.95	364.48	28.	9.	0.005	88.06	1.170s
Mo-99	1464.69	366.42	36.	8.	0.005	108.36	1.172s
BA-133	1534.35	383.84	112.	-14.	-0.008	107.87	1.189s
Cf-249	1550.79	387.95	106.	-9.	-0.005	159.02	1.193s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	1565.74	391.69	145.	-15.	-0.008	116.47	1.196s
Se-75	1601.61	400.66	37.	-2.	-0.001	376.07	1.205s
Cm-247	1608.57	402.40	18.	7.	0.004	90.18	1.207
SB-125	1710.45	427.88	40.	-14.	-0.008	95.43	1.232s
AG-108M	1734.69	433.94	48.	-13.	-0.007	107.97	1.238s
PM-146	1814.45	453.88	12.	5.	0.003	142.83	1.257
SB-125	1852.39	463.37	22.	8.	0.004	94.27	1.266
Ir-192	1871.16	468.06	29.	8.	0.004	106.12	1.271s
BE-7	1909.29	477.60	103.	-14.	-0.008	105.62	1.280s
HF-181	1926.90	482.00	106.	-13.	-0.007	111.91	1.284s
La-140	1946.98	487.02	131.	-14.	-0.008	117.21	1.289s
RU-103	1987.11	497.05	12.	8.	0.004	93.84	1.298s
RH-106	2046.35	511.86	127.	16.	0.009	102.70	2.563s
Kr-85	2054.81	513.98	53.	9.	0.005	117.54	1.315s
Sr-85	2054.85	513.99	44.	9.	0.005	107.83	1.315s
Rb-83	2080.29	520.35	13.	2.	0.001	374.72	1.321s
Nd-147	2122.88	531.00	26.	-4.	-0.002	290.41	1.331s
Ba-140	2147.92	537.26	13.	6.	0.003	129.28	1.337s
Rb-83	2208.88	552.50	23.	3.	0.001	263.39	1.352s
Br-82	2216.24	554.34	30.	-4.	-0.002	192.75	1.353s
CS-134	2251.82	563.24	26.	-7.	-0.004	153.42	1.362s
CS-134	2276.15	569.32	45.	-3.	-0.002	321.46	1.367s
PA-234	2276.75	569.47	48.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	66.	-14.	-0.008	84.77	1.368s
TL-208	2330.98	583.03	10.	23.	0.013	31.59	1.257
SB-125	2400.87	600.50	102.	7.	0.004	211.73	1.397
SB-124	2409.79	602.73	109.	7.	0.004	218.17	1.399s
CS-134	2417.71	604.71	116.	7.	0.004	224.44	1.401s
BI-214	2436.22	609.34	4.	65.	0.036	13.69	1.661
RU-103	2440.06	610.30	123.	7.	0.004	229.97	1.406s
AG-108M	2455.99	614.28	130.	7.	0.004	235.55	1.410s
PM-144	2471.12	618.06	137.	7.	0.004	241.00	1.414s
Br-82	2475.27	619.10	194.	-11.	-0.006	181.83	1.415s
RH-106	2486.54	621.92	170.	-10.	-0.005	189.65	1.417s
SB-125	2542.43	635.89	10.	7.	0.004	74.83	1.430s
I-131	2546.77	636.97	28.	-2.	-0.001	444.58	1.432s
AG-110M	2629.91	657.76	22.	3.	0.002	228.52	1.451s
CS-137	2645.51	661.66	24.	0.	0.000	1000.00	1.455s
PM-144	2785.05	696.54	42.	-4.	-0.002	268.78	1.487s
Br-82	2792.32	698.36	46.	0.	0.000	1000.00	1.489s
NB-94	2809.41	702.63	56.	-8.	-0.005	128.61	1.493s
SB-124	2890.04	722.79	59.	-15.	-0.008	77.34	1.512s
AG-108M	2890.65	722.94	74.	-9.	-0.005	141.89	1.512s
EU-154	2892.34	723.36	82.	0.	0.000	1000.00	1.512
ZR-95	2895.69	724.20	50.	11.	0.006	99.61	1.513s
BI-212	2907.58	727.17	59.	3.	0.002	350.50	1.516s
PM-146	2941.78	735.72	28.	-2.	-0.001	380.79	1.524s
Mo-99	2956.91	739.50	38.	-8.	-0.004	116.65	1.527

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-146	2987.55	747.16	28.	-12.	-0.007	97.89	1.535s
ZR-95	3025.83	756.73	19.	-5.	-0.003	201.78	1.543s
AG-110M	3054.69	763.94	35.	-1.	-0.001	842.61	1.550s
NB-95	3062.08	765.79	37.	1.	0.001	866.03	1.552s
PA-234M	3064.57	766.41	32.	7.	0.004	114.63	1.552s
Br-82	3104.93	776.50	18.	2.	0.001	413.66	1.561s
Mo-99	3110.61	777.92	20.	0.	0.000	1000.00	1.563s
EU-152	3114.61	778.92	14.	5.	0.003	119.15	1.564s
BI-212	3140.62	785.42	0.	8.	0.004	35.36	1.570
CS-134	3182.43	795.87	26.	10.	0.005	81.88	1.579s
TL-210	3197.35	799.60	35.	0.	0.000	1000.00	1.583s
CS-134	3206.76	801.95	18.	6.	0.003	117.84	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	27.	5.	0.003	148.47	1.598s
Br-82	3310.14	827.79	33.	-13.	-0.007	99.76	1.609s
MN-54	3338.38	834.85	14.	-2.	-0.001	403.11	1.615s
Co-56	3386.08	846.77	20.	-5.	-0.003	201.66	1.626s
TL-208	3441.27	860.56	5.	14.	0.008	44.13	1.638s
NB-94	3483.41	871.10	12.	6.	0.003	91.29	1.648s
Ge-69	3487.03	872.00	23.	-5.	-0.003	142.83	1.649s
EU-154	3491.95	873.23	20.	-2.	-0.001	434.61	1.650s
PA-234	3521.16	880.53	52.	-13.	-0.007	84.28	1.657s
PA-234	3532.00	883.24	65.	-7.	-0.004	177.10	1.659s
AG-110M	3537.78	884.68	29.	6.	0.003	138.30	1.660s
Sc-46	3556.17	889.28	68.	-5.	-0.003	218.41	1.664s
Y-88	3591.22	898.04	25.	-11.	-0.006	71.00	1.672s
Lu-172	3601.83	900.69	52.	-7.	-0.004	150.51	1.675s
AC-228	3643.36	911.07	20.	12.	0.007	88.87	1.684s
AG-110M	3749.09	937.49	25.	-13.	-0.007	88.99	1.708s
V-48	3776.33	944.30	23.	-9.	-0.005	80.18	1.714s
EU-152	3855.60	964.11	8.	6.	0.003	74.80	1.732s
AC-228	3875.05	968.97	22.	6.	0.003	128.75	1.736s
V-48	3933.20	983.50	10.	4.	0.002	180.85	1.749s
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	16.	6.	0.003	101.37	1.765s
EU-154	4018.33	1004.77	23.	5.	0.003	136.03	1.768s
Co-56	4150.66	1037.84	26.	9.	0.005	88.70	1.798s
Br-82	4175.31	1044.00	35.	7.	0.004	128.73	1.803s
Cs-136	4191.60	1048.07	42.	0.	0.000	1000.00	1.807s
RH-106	4200.76	1050.36	43.	0.	0.000	1000.00	1.809s
BI-207	4253.99	1063.66	11.	3.	0.002	229.35	1.820s
Ga-68	4308.98	1077.40	11.	5.	0.003	145.77	1.833s
Lu-172	4373.98	1093.64	117.	-14.	-0.008	109.57	1.847
Ge-69	4425.45	1106.50	52.	9.	0.005	116.34	1.858s
ZN-65	4461.66	1115.55	46.	8.	0.004	127.71	1.866s
BI-214	4480.63	1120.29	32.	9.	0.005	93.09	1.870s
Sc-46	4481.68	1120.55	37.	7.	0.004	121.41	1.870s
Ta-182	4484.69	1121.30	44.	1.	0.001	706.22	1.871s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.57	1173.24	21.	-8.	-0.005	130.66	1.916s
Ta-182	4755.86	1189.05	5.	7.	0.004	87.20	1.930
Ta-182	4885.39	1221.41	0.	22.	0.012	21.32	1.957
Co-56	4952.92	1238.28	34.	-10.	-0.006	140.36	1.972s
NA-22	5098.03	1274.53	28.	-10.	-0.006	79.21	2.003s
EU-154	5098.08	1274.54	39.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	7.	0.004	88.04	2.017s
V-48	5246.44	1311.60	9.	7.	0.004	70.75	2.034s
TL-210	5252.04	1313.00	16.	1.	0.001	623.91	2.036s
Br-82	5269.78	1317.43	27.	-7.	-0.004	107.37	2.039s
CO-60	5330.11	1332.50	6.	3.	0.002	176.21	2.052s
AG-110M	5537.48	1384.30	11.	-2.	-0.001	344.64	2.096s
EU-152	5632.39	1408.00	6.	3.	0.002	205.48	2.115s
K-40	5843.83	1460.81	0.	264.	0.147	6.15	2.060
Br-82	5900.17	1474.88	0.	0.	0.000	1000.00	2.171s
La-140	6386.02	1596.21	6.	-2.	-0.001	304.14	2.269s
BI-214	7060.00	1764.49	0.	11.	0.006	30.15	2.403s
Co-56	7087.48	1771.35	11.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	7.	-3.	-0.001	254.34	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.5622E+00				5.31E+01	
			477.60	-4.562E+00	?(	1.624E+01 1.06E+02 1.05E+01	G
NA-22	C	-7.2584E-01				9.50E+02	
			1274.53	-7.258E-01	?(	1.933E+00 7.92E+01 9.99E+01	G
K-40	N	1.9327E+02				4.66E+11	
			1460.83	1.933E+02	(	5.395E+00 6.15E+00 1.07E+01	G
Sc-46	F	8.9192E-02				8.38E+01	
			889.28	-2.928E-01	?(	2.212E+00 2.18E+02 1.00E+02	G
			1120.55	4.712E-01	&(	1.969E+00 1.21E+02 1.00E+02	G
CR-51	F	-3.1303E+00				2.77E+01	
			320.08	-3.130E+00	?(	1.964E+01 1.86E+02 9.94E+00	G
MN-54	C	-1.0282E-01				3.12E+02	
			834.85	-1.028E-01	&(	1.036E+00 4.03E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	4.5921E-01					4.45E+01	
			1099.25	-7.074E-02	&(	4.292E+00	1.72E+03	5.65E+01 G
			1291.60	1.152E+00	?(	2.266E+00	8.80E+01	4.32E+01 G
Co-56	C	2.3905E-01					7.73E+01	
			846.77	-2.598E-01	?(	1.224E+00	2.02E+02	9.99E+01 G
			1238.28	-1.039E+00	+	3.106E+00	1.40E+02	6.61E+01 G
			1037.84	3.767E+00	?(	1.134E+01	8.87E+01	1.41E+01 G
			1771.35	0.000E+00	-	1.077E+01	1.00E+03	1.55E+01 A
CO-57	C	-1.2070E-02					2.72E+02	
			122.06	-1.207E-02	%(	1.168E+00	2.82E+03	8.56E+01 G
			136.47	-1.012E+00	+	1.450E+01	4.25E+02	1.07E+01 G
CO-58	C	3.9640E-01					7.09E+01	
			810.78	3.964E-01	?(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F	2.4221E-01					1.93E+03	
			1332.50	2.422E-01	?(	1.003E+00	1.76E+02	1.00E+02 G
			1173.24	-5.500E-01	+	1.599E+00	1.31E+02	9.99E+01 G
ZN-65	F	9.8335E-01					2.44E+02	
			1115.55	9.833E-01	?(	4.313E+00	1.28E+02	5.06E+01 G
ZR-95	I	2.6837E-01					6.40E+01	
			756.73	-4.103E-01	?(	2.008E+00	2.02E+02	5.45E+01 G
			724.20	1.106E+00	?(	3.735E+00	9.96E+01	4.42E+01 G
NB-95	I	4.8397E-02					6.40E+01	
			765.79	4.840E-02	?(	1.503E+00	8.66E+02	9.98E+01 G
RU-103	I	3.0239E-01					3.93E+01	
			497.05	3.024E-01	?(	7.292E-01	9.38E+01	9.09E+01 G
			610.30	4.924E+00	?	3.873E+01	2.30E+02	5.75E+00 GA
RH-106	I	-4.1208E+00					3.74E+02	
			621.92	-4.121E+00	?(	2.652E+01	1.90E+02	9.93E+00 G
			1050.36	0.000E+00	+	1.295E+02	1.00E+03	1.56E+00 G
			511.86	2.875E+00	?	9.925E+00	1.03E+02	2.00E+01 GA
AG-108M	C	-4.5588E-01					1.53E+05	
			433.94	-4.559E-01	?(	1.227E+00	1.08E+02	9.05E+01 G
			722.94	-4.487E-01	+	2.176E+00	1.42E+02	9.08E+01 G
			614.28	3.175E-01	+	2.556E+00	2.36E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.6253E-01					2.50E+02	
			657.76	1.371E-01	?(	1.123E+00	2.29E+02	9.46E+01 G
			884.68	4.259E-01	?(	2.051E+00	1.38E+02	7.27E+01 G
			937.49	-2.115E+00	+	4.231E+00	8.90E+01	3.44E+01 G
			1384.30	-7.190E-01	+	5.669E+00	3.45E+02	2.43E+01 G
			763.94	-2.164E-01	&	6.552E+00	8.43E+02	2.23E+01 G
SN-113	F	-6.8744E-01					1.15E+02	
			391.69	-6.874E-01	&(	2.697E+00	1.16E+02	6.40E+01 G
SB-124	F	2.8408E-01					6.02E+01	
			602.73	2.841E-01	?(	2.123E+00	2.18E+02	9.83E+01 G
			1690.98	-6.148E-02	%	2.663E+00	1.88E+03	4.78E+01 G
			722.79	-6.370E+00	+	1.645E+01	7.73E+01	1.08E+01 G
SB-125	I	2.4528E-01					1.01E+03	
			427.88	-1.436E+00	?(	3.413E+00	9.54E+01	2.96E+01 G
			600.50	1.556E+00	+	1.129E+01	2.12E+02	1.79E+01 G
			635.89	2.624E+00	?(	6.600E+00	7.48E+01	1.13E+01 G
			463.37	2.428E+00	?(	7.825E+00	9.43E+01	1.05E+01 G
I-131	I	3.0900E-01					8.02E+00	
			364.48	3.090E-01	?(	9.227E-01	8.81E+01	8.17E+01 G
			284.30	-6.022E+00	+	1.519E+01	9.77E+01	6.14E+00 G
			636.97	-1.002E+00	+	1.605E+01	4.45E+02	7.17E+00 G
Gd-153	F	8.5611E-01					2.42E+02	
			97.50	7.403E-01	?(	5.253E+00	2.11E+02	3.00E+01 G
			103.20	1.015E+00	?(	7.373E+00	2.16E+02	2.18E+01 G
Ga-68	C	1.1673E+01					4.71E-02	
			1077.40	1.167E+01	&(	3.924E+01	1.46E+02	3.30E+00 G
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	?(	2.782E+00	1.40E+02	6.20E+01 G
			302.85	0.000E+00	+	9.831E+00	1.00E+03	1.83E+01 G
			383.84	-4.625E+00	+	1.681E+01	1.08E+02	8.94E+00 GA
			80.99	6.800E-01	?	5.184E+00	2.27E+02	3.41E+01 GA
CS-134	I	5.3541E-01					7.54E+02	
			795.87	5.516E-01	&(	1.524E+00	8.19E+01	8.55E+01 G
			604.71	2.870E-01	?(	2.205E+00	2.24E+02	9.76E+01 G
			569.32	-7.588E-01	+	8.593E+00	3.21E+02	1.54E+01 G
			801.95	3.167E+00	?(	1.302E+01	1.18E+02	8.69E+00 G
			563.24	-3.236E+00	+	1.224E+01	1.53E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	2.7600E-01					1.38E+02	
			165.85	2.760E-01	?(	1.051E+00	1.13E+02	7.99E+01 G
Ba-140	I	9.1677E-01					1.28E+01	
			537.26	9.168E-01	?(	2.981E+00	1.29E+02	2.44E+01 G
			162.66	-2.253E+00	+	1.434E+01	1.87E+02	6.22E+00 G
			304.85	0.000E+00	-	4.222E+01	1.00E+03	4.29E+00 G
La-140	I	2.8550E-01					1.28E+01	
			1596.21	-1.760E-01	?(	1.243E+00	3.04E+02	9.54E+01 G
			487.02	-1.078E+00	&	4.262E+00	1.17E+02	4.55E+01 G
			328.76	1.495E+00	?(	5.073E+00	1.00E+02	2.03E+01 G
			815.77	1.122E+00	?(	5.830E+00	1.48E+02	2.33E+01 G
CE-141	I	5.0986E-01					3.25E+01	
			145.44	5.099E-01	?(	3.031E+00	1.77E+02	4.82E+01 G
CE-144	I	-2.3589E+00					2.85E+02	
			133.54	-2.359E+00	(	1.309E+01	1.65E+02	1.11E+01 G
PM-144	C	6.5338E-02					3.63E+02	
			696.54	-1.594E-01	?(	1.507E+00	2.69E+02	9.90E+01 G
			618.06	2.899E-01	?(	2.386E+00	2.41E+02	9.91E+01 G
EU-152	F	5.7663E-01					4.94E+03	
			121.78	-9.216E-01	(	3.337E+00	1.08E+02	2.86E+01 G
			344.29	0.000E+00	&	4.946E+00	1.00E+03	2.65E+01 G
			1112.07	4.190E-01	%	1.817E+01	1.23E+03	1.36E+01 G
			778.92	1.826E+00	?(	7.651E+00	1.19E+02	1.29E+01 G
			964.11	2.401E+00	?(	6.043E+00	7.48E+01	1.46E+01 G
			244.69	-4.661E+00	+	2.323E+01	1.48E+02	7.58E+00 G
			1408.00	1.083E+00	?	5.101E+00	2.05E+02	2.10E+01 GA
EU-154	I	1.2821E+00					3.14E+03	
			123.10	5.491E-01	?(	2.270E+00	1.23E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.321E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.031E+01	1.00E+03	2.02E+01 G
			873.23	-6.491E-01	&	1.030E+01	4.35E+02	1.23E+01 G
			1004.77	1.710E+00	?(	8.142E+00	1.36E+02	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
EU-155	I	8.6381E-01					1.81E+03	
			105.31	1.044E+00	?(	7.777E+00	2.22E+02	2.12E+01 G
			86.54	7.390E-01	&(	5.819E+00	2.35E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	-2.0778E-01					4.24E+01	
			482.00	-5.715E-01	?(	2.159E+00	1.12E+02	8.05E+01 G
			133.02	-5.925E-01	+	3.301E+00	1.66E+02	4.33E+01 G
			345.83	1.735E+00	&(	7.454E+00	1.26E+02	1.51E+01 G
			136.30	-4.507E+00	+	2.596E+01	1.72E+02	5.85E+00 G
Ta-182	F	2.5956E+00					1.14E+02	
			1121.30	2.435E-01	?(	6.119E+00	7.06E+02	3.49E+01 G
			1221.41	5.537E+00	(	1.855E+00	2.13E+01	2.70E+01 G
			1189.05	2.760E+00	(	5.538E+00	8.72E+01	1.62E+01 G
Hg-203	F	-2.4133E-01					4.66E+01	
			279.20	-2.413E-01	?(	1.151E+00	1.39E+02	8.15E+01 G
TL-208	N	1.0865E+00					6.98E+02	
			583.02	1.070E+00	(P	8.233E-01	3.16E+01	8.45E+01 G
			277.28	1.311E+00	(	1.291E+01	2.81E+02	6.31E+00 G
			860.56	5.922E+00	&	5.554E+00	4.41E+01	1.24E+01 G
PM-146	C	2.5254E-01					2.02E+03	
			453.88	2.525E-01	?(	9.522E-01	1.43E+02	6.50E+01 G
			747.16	-1.674E+00	&	3.819E+00	9.79E+01	3.40E+01 G
			735.72	-4.170E-01	+	5.707E+00	3.81E+02	2.25E+01 G
Y-88	F	-2.5458E-01					1.07E+02	
			1836.06	-2.546E-01	?(	1.407E+00	2.54E+02	9.92E+01 G
			898.04	-6.361E-01	+	1.504E+00	7.10E+01	9.37E+01 G
Cd-113m		-1.8125E+03					5.33E+03	
			263.70	-1.813E+03	?(	1.269E+04	2.01E+02	6.00E-03 K
Cd-109	F	5.9607E+00					4.53E+02	
			88.04	5.961E+00	?(	4.855E+01	2.43E+02	3.79E+00 G
Se-75		-1.8181E-01					1.20E+02	
			264.66	-5.723E-01	&(	1.642E+00	8.56E+01	5.85E+01 G
			136.00	-4.517E-01	+	2.553E+00	1.68E+02	5.83E+01 G
			279.54	-4.885E-01	+	4.001E+00	2.37E+02	2.48E+01 G
			121.12	-1.535E+00	+	5.281E+00	1.03E+02	1.71E+01 G
			400.66	-6.127E-01	+	8.188E+00	3.76E+02	1.14E+01 G
			96.73	6.497E+00	&(	4.545E+01	2.08E+02	3.42E+00 G
Cf-251	T	1.9791E-01					3.28E+05	
			176.60	1.979E-01	?(	3.688E+00	6.97E+02	1.70E+01 G
			227.00	3.314E+00	?	1.004E+01	1.16E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-4.1286E-01					1.28E+05	
			387.95	-4.129E-01	?(	2.237E+00	1.59E+02	6.60E+01 G
			333.44	-2.388E+00	+	8.356E+00	1.04E+02	1.55E+01 G
Sn-126		-3.1428E+00					3.65E+07	
			87.57	6.032E-01	+	4.859E+00	2.40E+02	3.75E+01 GA
			64.28	-3.143E+00	?(	1.462E+01	1.38E+02	9.70E+00 G
			86.94	2.506E+00	?	1.997E+01	2.38E+02	9.04E+00 GA
PB-210	N	4.5019E+00					8.14E+03	
			46.54	4.502E+00	(P	2.827E+01	2.00E+02	4.25E+00 G
PB-212	N	3.7964E+00					6.98E+02	
			238.63	3.796E+00	(P	1.337E+00	1.48E+01	4.33E+01 G
			300.03	0.000E+00	-	5.456E+01	1.00E+03	3.28E+00 GA
PB-214	N	5.9200E+00					5.84E+05	
			351.93	5.364E+00	(P	1.883E+00	1.75E+01	3.76E+01 G
			295.09	7.002E+00	(	2.937E+00	2.25E+01	1.93E+01 G
			242.00	7.639E+00	P	8.885E+00	3.76E+01	7.43E+00 GA
BI-207	C	-5.6815E-01					1.18E+04	
			569.70	-5.681E-01	(	1.616E+00	8.48E+01	9.77E+01 G
			1063.66	2.743E-01	+	1.475E+00	2.29E+02	7.45E+01 G
BI-212	N	1.9373E+00					6.98E+02	
			727.17	1.937E+00	?(	2.375E+01	3.50E+02	7.55E+00 G
			785.42	3.074E+01	?	2.832E+01	3.54E+01	1.28E+00 GA
BI-214	N	5.9370E+00					5.84E+05	
			609.31	5.738E+00	(	1.101E+00	1.37E+01	4.61E+01 G
			1120.29	3.881E+00	-	1.228E+01	9.31E+01	1.51E+01 G
			1764.49	6.532E+00	?(	4.376E+00	3.02E+01	1.54E+01 G
BI-210M	T	-2.0342E-01					1.10E+09	
			265.83	-2.034E-01	(	2.212E+00	3.16E+02	5.00E+01 G
			304.90	0.000E+00	+	6.469E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1724E+00					2.10E+03	
			911.07	2.212E+00	?(	4.446E+00	8.89E+01	2.90E+01 G
			968.97	1.810E+00	&(	8.134E+00	1.29E+02	1.75E+01 G
			338.32	2.605E+00	?(	9.835E+00	1.12E+02	1.20E+01 G
			93.35	-4.182E-06	%	3.325E+01	2.36E+08	5.56E+00 XA
TH-227	N	3.8941E+00					7.95E+03	
			256.24	3.894E+00	?(	1.023E+01	1.01E+02	7.00E+00 G
			235.97	-3.133E+00	-	1.568E+01	1.49E+02	1.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			50.14	-4.886E+00	+	2.074E+01	1.26E+02	8.00E+00 G
TH-229	N	1.3996E+00					2.68E+06	
			193.51	9.382E-01	&(	1.243E+01	4.90E+02	4.40E+00 G
			210.85	2.079E+00	?(	2.175E+01	3.91E+02	2.99E+00 G
TH-234	N	1.6072E+01					1.63E+12	
			92.59	1.046E+01	(P	1.248E+01	4.53E+01	5.58E+00 G
			63.29	2.430E+01	*(P	1.935E+01	3.15E+01	3.81E+00 G
PA-234	N	-1.5920E+00					1.63E+12	
			131.29	-1.592E+00	?(	6.393E+00	1.20E+02	1.80E+01 G
			946.02	-1.400E-01	%	1.255E+01	2.48E+03	1.34E+01 G
			569.47	0.000E+00	+	1.661E+01	1.00E+03	8.20E+00 G
			883.24	-3.691E+00	+	2.252E+01	1.77E+02	9.60E+00 G
			880.53	-1.147E+01	+	3.247E+01	8.43E+01	6.00E+00 GA
PA-234M	N	6.3152E+01					1.63E+12	
			1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
			766.41	1.205E+02	?(	4.756E+02	1.15E+02	2.94E-01 G
U-235	N	1.3990E+00					2.57E+11	
			143.79	0.000E+00	&(	1.444E+01	1.00E+03	1.10E+01 G
			205.33	4.459E+00	(	1.231E+01	1.06E+02	5.01E+00 G
			163.38	-4.094E+00	+	1.661E+01	1.20E+02	5.08E+00 G
			185.72	-5.344E-02	% P	1.505E+00	1.02E+03	5.40E+01 GA
AM-241	T	-7.2329E-01					1.58E+05	
			59.54	-7.233E-01	&(	3.999E+00	1.64E+02	3.59E+01 G
Np-237	F	1.7319E+00					2.14E+06	
			86.49	1.732E+00	?(	1.347E+01	2.32E+02	1.31E+01 G
Ir-192	F	1.8520E-01					7.40E+01	
			316.49	0.000E+00	?(	2.141E+00	1.00E+03	8.70E+01 G
			468.06	4.967E-01	?(	1.809E+00	1.06E+02	5.18E+01 G
			308.44	0.000E+00	&	5.755E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.1148E-01					1.30E+01	
			818.50	1.689E-02	%(	1.487E+00	2.43E+03	1.00E+02 G
			1048.07	0.000E+00	-	2.494E+00	1.00E+03	8.00E+01 G
			340.57	3.132E-01	?(	2.698E+00	2.50E+02	4.69E+01 G
Np-239	T	-9.5324E-01					2.36E+00	
			103.70	9.225E-01	?	6.789E+00	2.19E+02	2.40E+01 X
			106.13	-9.532E-01	?(	5.402E+00	1.68E+02	2.27E+01 G
			99.50	1.478E+00		1.062E+01	2.14E+02	1.50E+01 X

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147		-1.0420E+00					1.11E+01	
			531.00	-1.042E+00	?(	7.566E+00	2.90E+02	1.30E+01 G
			91.10	3.600E-03	&	6.578E+00	5.42E+04	2.83E+01 G
Mo-99	I	-3.0413E+00					2.75E+00	
			739.50	-3.041E+00	?(	1.218E+01	1.17E+02	1.21E+01 G
			181.07	-2.656E+00	+	1.213E+01	1.34E+02	5.99E+00 G
							Energy duplication	
			140.51	0.000E+00	+	3.479E+01	1.00E+03	4.52E+00 G
			777.92	0.000E+00	+	2.701E+01	1.00E+03	4.26E+00 G
			366.42	1.931E+01	?	7.164E+01	1.08E+02	1.19E+00 GA
Ge-69	C	2.2287E+00					1.62E+00	
			1106.50	2.229E+00	?(	8.852E+00	1.16E+02	2.60E+01 G
			574.00	8.895E-02	%	1.455E+01	4.66E+03	1.18E+01 G
			872.00	-2.778E+00	+	1.392E+01	1.43E+02	9.59E+00 G
Br-82	F	4.3830E-01					1.47E+00	
			776.50	8.818E-02	?(	1.338E+00	4.14E+02	8.34E+01 G
			554.34	-2.263E-01	&	1.537E+00	1.93E+02	7.06E+01 G
			619.10	-1.061E+00	+	6.532E+00	1.82E+02	4.31E+01 G
			1044.00	1.481E+00	?(	6.587E+00	1.29E+02	2.80E+01 G
			698.36	0.000E+00	-	5.585E+00	1.00E+03	2.79E+01 G
			1317.43	-1.966E+00	+	7.257E+00	1.07E+02	2.70E+01 G
			827.79	-2.688E+00	+	6.226E+00	9.98E+01	2.42E+01 G
			1474.88	0.000E+00	-	3.513E+00	1.00E+03	1.66E+01 G
V-48	C	3.7349E-01					1.61E+01	
			983.50	2.315E-01	?(	1.010E+00	1.81E+02	1.00E+02 G
			1311.60	5.183E-01	?(	1.222E+00	7.08E+01	9.80E+01 G
			944.30	-6.556E+00	+	1.772E+01	8.02E+01	8.00E+00 G
Sr-85	C	3.3195E-01					6.47E+01	
			513.99	3.320E-01	?(	1.221E+00	1.08E+02	9.93E+01 G
Rb-83	P	2.7918E-01					8.62E+01	
			520.35	1.578E-01	?(	1.540E+00	3.75E+02	4.61E+01 G
			529.54	-4.096E-02	&	2.717E+00	1.77E+03	3.00E+01 G
			552.50	6.225E-01	?(	5.887E+00	2.63E+02	1.63E+01 G
Kr-85	I	7.6641E+01					3.92E+03	
			513.98	7.664E+01	?(	3.076E+02	1.18E+02	4.30E-01 G
Cm-247	T	4.6998E-01					5.70E+09	
			402.40	3.023E-01	?(	9.314E-01	9.02E+01	7.20E+01 G
			84.00	9.949E-01	*(	7.659E+00	2.29E+02	2.30E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Lu-172      -7.1142E-01                                      7.00E+01
                         1093.64-1.195E+00 ?(  4.412E+00 1.10E+02 7.52E+01 G
                          900.69-1.372E+00 +   7.116E+00 1.51E+02 2.77E+01 G
                          181.47 1.182E+00 ?(  3.627E+00 9.12E+01 1.92E+01 G

Kr-85m   I  -1.3699E-01                                      1.87E-01
                          151.00-1.370E-01 ?(  9.218E-01 2.44E+02 7.55E+01 G
                          304.47 0.000E+00 +   1.345E+01 1.00E+03 1.40E+01 G

NB-94    I  -3.4225E-02                                      7.41E+06
                          702.63-3.940E-01 &(  1.735E+00 1.29E+02 9.79E+01 G
                          871.10 3.184E-01 ?(  1.000E+00 9.13E+01 9.99E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	182.	-15.	-0.009	126.11	-4.886E+00
AM-241	59.54	226.	-13.	-0.007	163.86	-7.233E-01
Sn-126	64.28	254.	-17.	-0.009	138.38	-3.143E+00
BA-133	80.99	532.	14.	0.008	227.23	6.800E-01
Cm-247	84.00	546.	14.	0.008	229.47	9.949E-01
Np-237	86.49	561.	15.	0.008	231.86	1.732E+00
EU-155	86.54	575.	15.	0.008	234.74	7.390E-01
Sn-126	86.94	590.	15.	0.008	237.59	2.506E+00
Sn-126	87.57	604.	15.	0.008	240.26	6.032E-01
Cd-109	88.04	619.	15.	0.008	242.96	5.961E+00
Hf-175	89.36	633.	15.	0.008	245.43	9.580E+00
Se-75	96.73	462.	15.	0.008	208.35	6.497E+00
Gd-153	97.50	477.	15.	0.008	211.35	7.403E-01
Np-239	99.50	491.	15.	0.008	214.12	1.478E+00
Gd-153	103.20	506.	15.	0.008	216.36	1.015E+00
Np-239	103.70	521.	15.	0.008	219.33	9.225E-01
EU-155	105.31	536.	15.	0.008	221.96	1.044E+00
Np-239	106.13	292.	-15.	-0.008	168.38	-9.532E-01
Se-75	121.12	155.	-18.	-0.010	102.58	-1.535E+00
EU-152	121.78	173.	-18.	-0.010	107.87	-9.216E-01
EU-154	123.10	162.	15.	0.008	122.75	5.491E-01
PA-234	131.29	249.	-19.	-0.011	119.77	-1.592E+00
HF-181	133.02	388.	-17.	-0.009	166.03	-5.925E-01
CE-144	133.54	400.	-17.	-0.010	165.42	-2.359E+00
Se-75	136.00	417.	-17.	-0.010	168.48	-4.517E-01
HF-181	136.30	435.	-17.	-0.010	171.78	-4.507E+00
CO-57	136.47	452.	-7.	-0.004	424.78	-1.012E+00
CE-141	145.44	386.	16.	0.009	177.04	5.099E-01
Kr-85m	151.00	73.	-6.	-0.004	243.87	-1.370E-01
Ba-140	162.66	127.	-9.	-0.005	186.77	-2.253E+00
U-235	163.38	112.	-13.	-0.007	120.00	-4.094E+00
CE-139	165.85	110.	14.	0.008	112.81	2.760E-01
Cf-251	176.60	55.	2.	0.001	697.32	1.979E-01
Mo-99	181.07	73.	-9.	-0.005	133.82	-2.656E+00
Lu-172	181.47	67.	13.	0.007	91.16	1.182E+00
TH-229	193.51	37.	2.	0.001	489.90	9.382E-01
U-235	205.33	44.	12.	0.007	105.80	4.459E+00
TH-229	210.85	48.	3.	0.002	391.34	2.079E+00
Cf-251	227.00	40.	11.	0.006	115.52	3.314E+00
TH-227	235.97	401.	-19.	-0.011	149.38	-3.133E+00
EU-152	244.69	315.	-17.	-0.010	148.45	-4.661E+00
TH-227	256.24	44.	13.	0.007	100.93	3.894E+00
Cd-113m	263.70	48.	-5.	-0.003	201.00	-1.813E+03
Se-75	264.66	79.	-15.	-0.009	85.60	-5.723E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	105.	-5.	-0.003	315.67	-2.034E-01	
Hg-203	279.20	69.	-9.	-0.005	139.42	-2.413E-01	
Se-75	279.54	77.	-5.	-0.003	237.17	-4.885E-01	
I-131	284.30	66.	-16.	-0.009	97.74	-6.022E+00	
TL-210	296.00	249.	-10.	-0.006	221.80	-3.049E-01	
CR-51	320.08	259.	-12.	-0.007	185.97	-3.130E+00	
La-140	328.76	64.	12.	0.007	100.31	1.495E+00	
Cf-249	333.44	103.	-14.	-0.008	103.87	-2.388E+00	
AC-228	338.32	82.	12.	0.007	111.51	2.605E+00	
Cs-136	340.57	94.	6.	0.003	250.27	3.132E-01	
HF-181	345.83	72.	10.	0.005	126.10	1.735E+00	
BA-133	356.00	169.	-13.	-0.007	140.01	-5.884E-01	
I-131	364.48	28.	9.	0.005	88.06	3.090E-01	
Mo-99	366.42	36.	8.	0.005	108.36	1.931E+01	
BA-133	383.84	112.	-14.	-0.008	107.87	-4.625E+00	
Cf-249	387.95	106.	-9.	-0.005	159.02	-4.129E-01	
SN-113	391.69	145.	-15.	-0.008	116.47	-6.874E-01	
Se-75	400.66	37.	-2.	-0.001	376.07	-6.127E-01	
Cm-247	402.40	18.	7.	0.004	90.18	3.023E-01	
SB-125	427.88	40.	-14.	-0.008	95.43	-1.436E+00	
AG-108M	433.94	48.	-13.	-0.007	107.97	-4.559E-01	
PM-146	453.88	12.	5.	0.003	142.83	2.525E-01	
SB-125	463.37	22.	8.	0.004	94.27	2.428E+00	
Ir-192	468.06	29.	8.	0.004	106.12	4.967E-01	
BE-7	477.60	103.	-14.	-0.008	105.62	-4.562E+00	
HF-181	482.00	106.	-13.	-0.007	111.91	-5.715E-01	
La-140	487.02	131.	-14.	-0.008	117.21	-1.078E+00	
RU-103	497.05	12.	8.	0.004	93.84	3.024E-01	
RH-106	511.86	127.	16.	0.009	102.70	2.875E+00	
Kr-85	513.98	53.	9.	0.005	117.54	7.664E+01	
Sr-85	513.99	44.	9.	0.005	107.83	3.320E-01	
Rb-83	520.35	13.	2.	0.001	374.72	1.578E-01	
Nd-147	531.00	26.	-4.	-0.002	290.41	-1.042E+00	
Ba-140	537.26	13.	6.	0.003	129.28	9.168E-01	
Rb-83	552.50	23.	3.	0.001	263.39	6.225E-01	
Br-82	554.34	30.	-4.	-0.002	192.75	-2.263E-01	
CS-134	563.24	26.	-7.	-0.004	153.42	-3.236E+00	
CS-134	569.32	45.	-3.	-0.002	321.46	-7.588E-01	
BI-207	569.70	66.	-14.	-0.008	84.77	-5.681E-01	
SB-125	600.50	102.	7.	0.004	211.73	1.556E+00	
SB-124	602.73	109.	7.	0.004	218.17	2.841E-01	
CS-134	604.71	116.	7.	0.004	224.44	2.870E-01	
RU-103	610.30	123.	7.	0.004	229.97	4.924E+00	
AG-108M	614.28	130.	7.	0.004	235.55	3.175E-01	
PM-144	618.06	137.	7.	0.004	241.00	2.899E-01	
Br-82	619.10	194.	-11.	-0.006	181.83	-1.061E+00	
RH-106	621.92	170.	-10.	-0.005	189.65	-4.121E+00	
SB-125	635.89	10.	7.	0.004	74.83	2.624E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	636.97	28.	-2.	-0.001	444.58	-1.002E+00	
AG-110M	657.76	22.	3.	0.002	228.52	1.371E-01	
PM-144	696.54	42.	-4.	-0.002	268.78	-1.594E-01	
NB-94	702.63	56.	-8.	-0.005	128.61	-3.940E-01	
SB-124	722.79	59.	-15.	-0.008	77.34	-6.370E+00	
AG-108M	722.94	74.	-9.	-0.005	141.89	-4.487E-01	
ZR-95	724.20	50.	11.	0.006	99.61	1.106E+00	
BI-212	727.17	59.	3.	0.002	350.50	1.937E+00	
PM-146	735.72	28.	-2.	-0.001	380.79	-4.170E-01	
Mo-99	739.50	38.	-8.	-0.004	116.65	-3.041E+00	
PM-146	747.16	28.	-12.	-0.007	97.89	-1.674E+00	
ZR-95	756.73	19.	-5.	-0.003	201.78	-4.103E-01	
AG-110M	763.94	35.	-1.	-0.001	842.61	-2.164E-01	
NB-95	765.79	37.	1.	0.001	866.03	4.840E-02	
PA-234M	766.41	32.	7.	0.004	114.63	1.205E+02	
Br-82	776.50	18.	2.	0.001	413.66	8.818E-02	
EU-152	778.92	14.	5.	0.003	119.15	1.826E+00	
BI-212	785.42	0.	8.	0.004	35.36	3.074E+01	
CS-134	795.87	26.	10.	0.005	81.88	5.516E-01	
CS-134	801.95	18.	6.	0.003	117.84	3.167E+00	
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	27.	5.	0.003	148.47	1.122E+00	
Br-82	827.79	33.	-13.	-0.007	99.76	-2.688E+00	
MN-54	834.85	14.	-2.	-0.001	403.11	-1.028E-01	
Co-56	846.77	20.	-5.	-0.003	201.66	-2.598E-01	
NB-94	871.10	12.	6.	0.003	91.29	3.184E-01	
Ge-69	872.00	23.	-5.	-0.003	142.83	-2.778E+00	
EU-154	873.23	20.	-2.	-0.001	434.61	-6.491E-01	
PA-234	880.53	52.	-13.	-0.007	84.28	-1.147E+01	
PA-234	883.24	65.	-7.	-0.004	177.10	-3.691E+00	
AG-110M	884.68	29.	6.	0.003	138.30	4.259E-01	
Sc-46	889.28	68.	-5.	-0.003	218.41	-2.928E-01	
Y-88	898.04	25.	-11.	-0.006	71.00	-6.361E-01	
Lu-172	900.69	52.	-7.	-0.004	150.51	-1.372E+00	
AC-228	911.07	20.	12.	0.007	88.87	2.212E+00	
AG-110M	937.49	25.	-13.	-0.007	88.99	-2.115E+00	
V-48	944.30	23.	-9.	-0.005	80.18	-6.556E+00	
EU-152	964.11	8.	6.	0.003	74.80	2.401E+00	
AC-228	968.97	22.	6.	0.003	128.75	1.810E+00	
V-48	983.50	10.	4.	0.002	180.85	2.315E-01	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	16.	6.	0.003	101.37	4.300E+01	
EU-154	1004.77	23.	5.	0.003	136.03	1.710E+00	
Co-56	1037.84	26.	9.	0.005	88.70	3.767E+00	
Br-82	1044.00	35.	7.	0.004	128.73	1.481E+00	
BI-207	1063.66	11.	3.	0.002	229.35	2.743E-01	
Ga-68	1077.40	11.	5.	0.003	145.77	1.167E+01	
Lu-172	1093.64	117.	-14.	-0.008	109.57	-1.195E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ge-69	1106.50	52.	9.	0.005	116.34	2.229E+00	
ZN-65	1115.55	46.	8.	0.004	127.71	9.833E-01	
Sc-46	1120.55	37.	7.	0.004	121.41	4.712E-01	
CO-60	1173.24	21.	-8.	-0.005	130.66	-5.500E-01	
Co-56	1238.28	34.	-10.	-0.006	140.36	-1.039E+00	
NA-22	1274.53	28.	-10.	-0.006	79.21	-7.258E-01	
FE-59	1291.60	6.	7.	0.004	88.04	1.152E+00	
V-48	1311.60	9.	7.	0.004	70.75	5.183E-01	
TL-210	1313.00	16.	1.	0.001	623.91	3.153E-01	
Br-82	1317.43	27.	-7.	-0.004	107.37	-1.966E+00	
CO-60	1332.50	6.	3.	0.002	176.21	2.422E-01	
AG-110M	1384.30	11.	-2.	-0.001	344.64	-7.190E-01	
EU-152	1408.00	6.	3.	0.002	205.48	1.083E+00	
La-140	1596.21	6.	-2.	-0.001	304.14	-1.760E-01	
Y-88	1836.06	7.	-3.	-0.001	254.34	-2.546E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.5621E+00	-4.5622E+00	1.056E+02%	1.62E+01
NA-22	#A	-7.2583E-01	-7.2584E-01	7.921E+01%	1.93E+00
K-40		1.9327E+02	1.9327E+02	6.155E+00%	5.40E+00
Sc-46	#A	8.9192E-02	8.9192E-02	1.214E+02%	2.21E+00
CR-51	#A	-3.1302E+00	-3.1303E+00	1.860E+02%	1.96E+01
MN-54	#A	-1.0282E-01	-1.0282E-01	4.031E+02%	1.04E+00
FE-59	#A	4.5921E-01	4.5921E-01	8.804E+01%	4.29E+00
Co-56	#A	2.3905E-01	2.3905E-01	8.870E+01%	1.22E+00
CO-57	#A	-1.2070E-02	-1.2070E-02	2.820E+03%	1.17E+00
CO-58	#A	3.9640E-01	3.9640E-01	8.642E+01%	1.16E+00
CO-60	#A	2.4221E-01	2.4221E-01	1.762E+02%	1.00E+00
ZN-65	#A	9.8335E-01	9.8335E-01	1.277E+02%	4.31E+00
ZR-95	#A	2.6837E-01	2.6837E-01	9.961E+01%	2.01E+00
NB-95	#A	4.8397E-02	4.8397E-02	8.660E+02%	1.50E+00
RU-103	#A	3.0239E-01	3.0239E-01	9.384E+01%	7.29E-01
RH-106	#A	-4.1208E+00	-4.1208E+00	1.897E+02%	2.65E+01
AG-108M	#A	-4.5588E-01	-4.5588E-01	1.080E+02%	1.23E+00
AG-110M	#A	2.6253E-01	2.6253E-01	1.336E+02%	1.12E+00
SN-113	#A	-6.8744E-01	-6.8744E-01	1.165E+02%	2.70E+00
SB-124	#A	2.8408E-01	2.8408E-01	2.182E+02%	2.12E+00
SB-125	#A	2.4528E-01	2.4528E-01	5.120E+01%	3.41E+00
I-131	#A	3.0899E-01	3.0900E-01	8.806E+01%	9.23E-01
Gd-153	#A	8.5610E-01	8.5611E-01	1.512E+02%	5.25E+00
Ga-68	#A	1.1614E+01	1.1673E+01	1.458E+02%	3.92E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.81E+00

BA-133	#A	-5.8842E-01	-5.8842E-01	1.400E+02%	2.78E+00
CS-134	#A	5.3541E-01	5.3541E-01	8.188E+01%	1.52E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
CE-139	#A	2.7600E-01	2.7600E-01	1.128E+02%	1.05E+00
Ba-140	#A	9.1675E-01	9.1677E-01	1.293E+02%	2.98E+00
La-140	#A	2.8549E-01	2.8550E-01	1.003E+02%	1.24E+00
CE-141	#A	5.0986E-01	5.0986E-01	1.770E+02%	3.03E+00
CE-144	#A	-2.3589E+00	-2.3589E+00	1.654E+02%	1.31E+01
PM-144	#A	6.5338E-02	6.5338E-02	1.805E+02%	1.51E+00
EU-152	#A	5.7663E-01	5.7663E-01	5.909E+01%	3.34E+00
EU-154	#A	1.2821E+00	1.2821E+00	6.719E+01%	2.27E+00
EU-155	#A	8.6381E-01	8.6381E-01	1.615E+02%	7.78E+00
HF-181	#A	-2.0778E-01	-2.0778E-01	8.430E+01%	2.16E+00
Ta-182	A	2.5956E+00	2.5956E+00	2.132E+01%	6.12E+00
Hg-203	#A	-2.4133E-01	-2.4133E-01	1.394E+02%	1.15E+00
TL-208		1.0865E+00	1.0865E+00	3.159E+01%	8.23E-01
PM-146	#A	2.5254E-01	2.5254E-01	1.428E+02%	9.52E-01
Y-88	#A	-2.5458E-01	-2.5458E-01	2.543E+02%	1.41E+00
Cd-113m	#A	-1.8125E+03	-1.8125E+03	2.010E+02%	1.27E+04
Cd-109	#A	5.9607E+00	5.9607E+00	2.430E+02%	4.86E+01
Se-75	#A	-1.8181E-01	-1.8181E-01	8.560E+01%	1.64E+00
Cf-251	#A	1.9791E-01	1.9791E-01	6.973E+02%	3.69E+00
Cf-249	#A	-4.1286E-01	-4.1286E-01	1.590E+02%	2.24E+00
Sn-126	#A	-3.1428E+00	-3.1428E+00	1.384E+02%	1.46E+01
PB-210	A	4.5019E+00	4.5019E+00	2.000E+02%	2.83E+01
PB-212		3.7964E+00	3.7964E+00	1.478E+01%	1.34E+00
PB-214		5.9200E+00	5.9200E+00	1.425E+01%	1.88E+00
BI-207	#A	-5.6815E-01	-5.6815E-01	8.477E+01%	1.62E+00
BI-212	#A	1.9373E+00	1.9373E+00	3.505E+02%	2.38E+01
BI-214		5.9370E+00	5.9370E+00	1.369E+01%	1.10E+00
BI-210M	#A	-2.0342E-01	-2.0342E-01	3.157E+02%	2.21E+00
AC-228	#A	2.1724E+00	2.1724E+00	6.404E+01%	4.45E+00
TH-227	#A	3.8941E+00	3.8941E+00	1.009E+02%	1.02E+01
TH-229	#A	1.3996E+00	1.3996E+00	3.135E+02%	1.24E+01
TH-234	#	1.6072E+01	1.6072E+01	2.757E+01%	1.25E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.25E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.12E+00
PA-234	#A	-1.5920E+00	-1.5920E+00	1.198E+02%	6.39E+00
PA-234M	#A	6.3152E+01	6.3152E+01	7.651E+01%	1.51E+02
U-235	#A	1.3990E+00	1.3990E+00	1.058E+02%	1.44E+01
AM-241	#A	-7.2329E-01	-7.2329E-01	1.639E+02%	4.00E+00
Np-237	#A	1.7319E+00	1.7319E+00	2.319E+02%	1.35E+01
Ir-192	#A	1.8520E-01	1.8520E-01	1.061E+02%	2.14E+00
Cs-136	#A	1.1148E-01	1.1148E-01	2.503E+02%	1.49E+00
Np-239	#A	-9.5314E-01	-9.5324E-01	1.684E+02%	5.40E+00
Nd-147	#A	-1.0420E+00	-1.0420E+00	2.904E+02%	7.57E+00
Mo-99	#A	-3.0411E+00	-3.0413E+00	1.167E+02%	1.22E+01
Ge-69	#A	2.2284E+00	2.2287E+00	1.163E+02%	8.85E+00
Br-82	#A	4.3822E-01	4.3830E-01	1.287E+02%	1.34E+00

V-48	#A	3.7348E-01	3.7349E-01	7.075E+01%	1.01E+00
Sr-85	#A	3.3195E-01	3.3195E-01	1.078E+02%	1.22E+00
Rb-83	#A	2.7918E-01	2.7918E-01	2.290E+02%	1.54E+00
Kr-85	#A	7.6641E+01	7.6641E+01	1.175E+02%	3.08E+02
Cm-247	#A	4.6998E-01	4.6998E-01	9.018E+01%	9.31E-01
Hf-175	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+00
Lu-172	#A	-7.1142E-01	-7.1142E-01	7.127E+01%	4.41E+00
Kr-85m	#A	-1.3682E-01	-1.3699E-01	2.439E+02%	9.22E-01
NB-94	#A	-3.4225E-02	-3.4225E-02	7.886E+01%	1.73E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.52E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 2.261E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.2608044E+02 Bq/Sample

The library has energies which are not separable.

Test America St. Louis Spectrum ID: 12_Gamma_20181534

Sample Description: 379959_Gamma_160-29881-A-37-C DU
Detector: Detector #12
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-C DU

Decay to Time: 8/23/2018 17:34 Live Time: 1800 sec
Acquisition Time: 8/23/2018 17:34:30 Real Time: 1801 sec
Analysis Time: 8/28/2018 12:36 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.562E+00	105.6	4.819E+00	4.824E+00	1.624E+01
NA-22	-7.258E-01	79.2	5.750E-01	5.761E-01	1.933E+00
K-40	1.933E+02	6.2	1.189E+01	1.539E+01	5.395E+00
Sc-46	6.088E-02	126.8	7.717E-02	7.723E-02	2.212E+00
CR-51	-3.130E+00	186.0	5.821E+00	5.824E+00	1.964E+01
MN-54	-1.028E-01	403.1	4.145E-01	4.145E-01	1.036E+00
FE-59	4.993E-01	88.0	4.396E-01	4.403E-01	2.373E+00
Co-56	-2.598E-01	201.7	5.240E-01	5.241E-01	1.224E+00
CO-57	-3.130E-01	106.2	3.324E-01	3.328E-01	1.115E+00
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	2.422E-01	176.2	4.268E-01	4.270E-01	1.003E+00
ZN-65	8.145E-01	146.7	1.195E+00	1.195E+00	4.133E+00
NB-94	6.137E-02	91.3	5.602E-02	5.611E-02	1.169E+00
ZR-95	2.684E-01	99.6	2.673E-01	2.677E-01	2.008E+00
NB-95	4.840E-02	866.0	4.191E-01	4.191E-01	1.503E+00
RU-103	3.024E-01	93.8	2.838E-01	2.842E-01	7.292E-01
RH-106	-2.855E+00	267.0	7.624E+00	7.625E+00	2.599E+01
AG-108M	-4.559E-01	108.0	4.922E-01	4.927E-01	1.227E+00
AG-110M	2.625E-01	133.6	3.506E-01	3.509E-01	2.051E+00
SN-113	-6.874E-01	116.5	8.007E-01	8.014E-01	2.697E+00
SB-124	2.841E-01	218.2	6.198E-01	6.199E-01	2.123E+00
SB-125	2.453E-01	50.9	1.249E-01	1.255E-01	3.413E+00
I-131	3.090E-01	101.9	3.147E-01	3.151E-01	8.004E-01
Gd-153	7.569E-01	144.8	1.096E+00	1.097E+00	3.690E+00
Ga-68	1.167E+01	145.8	1.702E+01	1.703E+01	3.924E+01
Tc-99m	-1.110E-01	481.2	5.340E-01	5.341E-01	1.802E+00
BA-133	-5.884E-01	140.0	8.238E-01	8.244E-01	2.782E+00
CS-134	5.354E-01	81.9	4.384E-01	4.392E-01	2.205E+00
CS-137	0.000E+00	1.#INF	1.907E-01	1.908E-01	1.302E+00
CE-139	2.760E-01	112.8	3.114E-01	3.117E-01	1.051E+00
Ba-140	9.168E-01	129.3	1.185E+00	1.186E+00	2.981E+00
La-140	2.855E-01	100.3	2.864E-01	2.868E-01	1.243E+00
CE-141	5.099E-01	177.0	9.027E-01	9.030E-01	3.031E+00

CE-144	-2.359E+00	165.6	3.906E+00	3.908E+00	1.310E+01
PM-144	-1.822E-01	285.0	5.193E-01	5.194E-01	1.247E+00
EU-152	1.389E+00	74.8	1.039E+00	1.042E+00	4.946E+00
EU-154	5.552E-02	71.9	3.991E-02	4.001E-02	1.136E+01
EU-155	0.000E+00	1.#INF	4.448E-01	4.448E-01	5.352E+00
HF-181	-2.078E-01	84.3	1.752E-01	1.755E-01	2.159E+00
Ta-182	3.018E+00	21.3	6.434E-01	6.608E-01	5.705E+00
Hg-203	-4.458E-01	98.8	4.402E-01	4.408E-01	1.136E+00
TL-208	1.070E+00	31.6	3.380E-01	3.423E-01	8.233E-01
pm-146	-1.674E+00	97.9	1.639E+00	1.641E+00	3.819E+00
y-88	-6.361E-01	104.4	6.640E-01	6.648E-01	1.504E+00
Cd-113m	-1.329E+03	335.1	4.455E+03	4.455E+03	1.548E+04
Cd-109	0.000E+00	1.#INF	1.736E+00	1.736E+00	3.616E+01
Cf-251	1.979E-01	697.3	1.380E+00	1.380E+00	3.688E+00
Cf-249	-4.129E-01	159.0	6.565E-01	6.569E-01	2.237E+00
Sn-126	-7.238E-01	561.3	4.063E+00	4.063E+00	1.385E+01
PB-210	-1.207E+01	107.9	1.302E+01	1.304E+01	4.580E+01
PB-212	3.796E+00	14.8	5.611E-01	5.950E-01	1.337E+00
PB-214	5.920E+00	14.2	8.436E-01	8.954E-01	1.883E+00
BI-207	1.186E-01	229.3	2.721E-01	2.721E-01	1.376E+00
BI-212	1.937E+00	350.5	6.790E+00	6.791E+00	2.375E+01
U-235	1.399E+00	105.8	1.480E+00	1.482E+00	1.444E+01
BI-214	5.937E+00	13.7	8.129E-01	8.673E-01	1.101E+00
BI-210M	-6.723E-01	90.3	6.074E-01	6.084E-01	2.039E+00
AC-228	2.172E+00	64.0	1.391E+00	1.396E+00	4.446E+00
TH-227	3.148E+00	100.9	3.177E+00	3.182E+00	1.964E+01
TH-229	1.400E+00	313.5	4.388E+00	4.388E+00	1.243E+01
TH-234	-3.576E+00	267.8	9.577E+00	9.579E+00	3.305E+01
PA-231	0.000E+00	1.#INF	2.049E+00	2.049E+00	6.254E+01
PA-233	0.000E+00	1.#INF	2.166E-01	2.166E-01	5.120E+00
PA-234	-1.661E+00	121.0	2.009E+00	2.011E+00	6.732E+00
PA-234M	6.315E+01	76.5	4.832E+01	4.842E+01	1.507E+02
AM-241	9.187E-01	129.8	1.193E+00	1.194E+00	4.009E+00
Np-237	-9.929E-01	309.9	3.077E+00	3.078E+00	1.040E+01
Ir-192	1.852E-01	106.1	1.965E-01	1.968E-01	2.141E+00
Cs-136	1.115E-01	250.3	2.790E-01	2.791E-01	1.487E+00
Np-239	-5.252E-01	272.7	1.432E+00	1.433E+00	4.857E+00
Nd-147	-1.137E+00	265.0	3.012E+00	3.013E+00	7.523E+00
TL-210	0.000E+00	1.#INF	1.233E-01	1.233E-01	1.525E+00
Total	3.079E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-37-C DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181534.An1

Acquisition information
Start time: 8/23/2018 5:34:30 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 5:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1217

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.60	-17.	107.88	0.85	1.805E-02	46.54	4.250	PBC<MDA	PB210
50.20	8.	231.30	0.85	2.193E-02	50.14	8.000	PBC<MDA	TH227
59.54	17.	129.82	0.86	2.817E-02	59.54	35.900	PBC<MDA	AM241
63.29	-7.	267.82	0.87	2.978E-02	63.29	3.810	PBC<MDA	TH234
74.52	46.	28.69	0.88	3.324E-02				
77.06	77.	18.22	0.88	3.383E-02				
91.10	4.	600.08	0.90	3.621E-02	91.10	28.300	PBC<MDA	Nd147
93.35	11.	218.53	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
97.50	15.	144.80	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	3.	753.41	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
123.10	14.	110.14	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	16.	177.04	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
165.85	14.	112.81	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139
176.60	2.	697.32	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
193.51	2.	489.90	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	12.	105.80	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	391.34	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	115.52	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.38	76.	17.58	1.01	2.745E-02	238.63	43.300	3.569E+00	PB212
241.77	28.	37.63	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
256.24	13.	100.93	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
294.95	57.	22.46	1.39	2.350E-02	295.09	19.300	7.002E+00	PB214
328.76	12.	100.31	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
338.32	12.	111.51	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
340.57	6.	250.27	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	126.10	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.61	75.	17.55	1.13	2.055E-02	351.93	37.600	5.364E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
364.48	9.	101.86	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
453.88	5.	142.83	1.26	1.692E-02	453.88	65.000	PBC<MDA	pm146
463.37	8.	94.27	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.12	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	8.	93.84	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	40.	45.96	2.56	1.546E-02	511.86	20.000	7.249E+00	RH106
537.26	6.	129.28	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
583.03	23.	31.59	1.26	1.403E-02	583.02	84.500	1.070E+00	TL208
600.50	7.	211.73	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	218.17	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	7.	224.44	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
609.34	65.	13.69	1.66	1.358E-02	609.31	46.090	5.738E+00	BI214
610.30	7.	229.97	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
614.28	7.	235.55	1.41	1.350E-02	614.28	89.850	PBC<MDA	AG108M
635.89	7.	73.01	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	228.52	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
724.20	11.	99.61	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
727.17	3.	350.50	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
765.79	1.	866.03	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.644E+01	PA234M
766.41	7.	114.63	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.205E+02	PA234M
778.92	4.	184.30	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
785.42	8.	35.36	1.57	1.129E-02	785.42	1.280	3.074E+01	BI212
795.87	10.	81.88	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	117.84	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	148.47	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
857.25	14.	44.13	1.64	1.057E-02	860.56	12.420	5.922E+00	TL208
871.10	6.	91.29	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
884.68	6.	138.30	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.07	12.	88.87	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
964.11	6.	74.80	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	128.75	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	5.	136.03	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1063.66	3.	229.35	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	145.77	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	6.	136.00	1.86	8.770E-03	1112.07	13.644	PBC<MDA	EU152
1115.55	6.	146.68	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1120.06	7.	116.17	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.145E-01	Sc46
1120.55	7.	128.71	1.87	8.721E-03	1120.29	15.100	2.744E+00	BI214
					1120.55	99.987	4.145E-01	Sc46
					1121.30	34.900	1.188E+00	Ta182
1121.04	7.	138.69	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.189E+00	Ta182

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1189.05	7.	87.20	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	22.	21.32	1.96	8.175E-03	1221.41	27.000	5.537E+00	Ta182
1291.60	7.	88.04	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1332.50	3.	176.21	2.05	7.647E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	205.48	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.81	264.	6.15	2.06	7.112E-03	1460.83	10.670	1.933E+02	K40
1764.34	11.	30.15	2.40	6.075E-03	1764.49	15.400	6.532E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.65	74.48	63.	46.	1.376E+03	28.69	0.880	- sD
307.79	77.01	60.	77.	2.283E+03	18.22	0.882	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.79	46.54	169.	-17.	-0.009	107.88	0.851s
TH-227	200.18	50.14	162.	8.	0.004	231.30	0.855s
AM-241	237.74	59.54	227.	17.	0.009	129.82	0.865s
TH-234	252.74	63.29	193.	-7.	-0.004	267.82	0.868s
Sn-126	256.71	64.28	227.	-4.	-0.002	561.29	0.869s
BA-133	323.50	80.99	133.	-19.	-0.011	107.88	0.887s
Np-237	345.49	86.49	329.	-8.	-0.005	309.92	0.892s
EU-155	345.70	86.54	338.	0.	0.000	1000.00	0.892
Sn-126	347.29	86.94	338.	0.	0.000	1000.00	0.892
Sn-126	349.81	87.57	338.	0.	0.000	1000.00	0.893
Cd-109	351.68	88.04	338.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	310.	4.	0.002	600.08	0.897s
TH-234	369.87	92.59	338.	-31.	-0.017	51.99	0.898s
AC-228	372.91	93.35	292.	11.	0.006	218.53	0.899s
Gd-153	389.50	97.50	230.	15.	0.008	144.80	0.903
Np-239	397.50	99.50	245.	3.	0.002	753.41	0.905s
Gd-153	412.29	103.20	248.	0.	0.000	1000.00	0.909s
Np-239	414.29	103.70	248.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	248.	0.	0.000	1000.00	0.911s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-239	424.00	106.13	234.	-8.	-0.004	272.72	0.912s
EU-152	486.55	121.78	155.	-18.	-0.010	100.87	0.928s
CO-57	487.69	122.06	173.	-18.	-0.010	106.22	0.928s
EU-154	491.84	123.10	119.	14.	0.008	110.14	0.929s
PA-234	524.60	131.29	278.	-20.	-0.011	120.98	0.938s
HF-181	531.51	133.02	389.	-17.	-0.009	166.20	0.939s
CE-144	533.57	133.54	401.	-17.	-0.010	165.59	0.940s
HF-181	544.61	136.30	418.	-17.	-0.010	168.55	0.943s
CO-57	545.30	136.47	435.	-17.	-0.010	171.94	0.943s
Tc-99m	561.44	140.51	453.	-6.	-0.003	481.16	0.947s
U-235	574.53	143.79	459.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	386.	16.	0.009	177.04	0.952s
Ba-140	649.99	162.66	127.	-9.	-0.005	186.77	0.969s
U-235	652.87	163.38	112.	-13.	-0.007	120.00	0.970
CE-139	662.76	165.85	110.	14.	0.008	112.81	0.973s
Cf-251	705.72	176.60	55.	2.	0.001	697.32	0.983s
TH-229	773.32	193.51	37.	2.	0.001	489.90	1.000s
U-235	820.59	205.33	44.	12.	0.007	105.80	1.012s
TH-229	842.65	210.85	48.	3.	0.002	391.34	1.018s
Cf-251	907.22	227.00	40.	11.	0.006	115.52	1.034s
PB-212	953.73	238.63	31.	81.	0.045	14.78	1.045D
PB-214	967.18	242.00	40.	28.	0.015	37.63	1.049D
EU-152	977.96	244.69	274.	-16.	-0.009	149.12	1.051s
TH-227	1024.13	256.24	44.	13.	0.007	100.93	1.063
Cd-113m	1053.96	263.70	74.	-4.	-0.002	335.13	1.070s
BI-210M	1062.48	265.83	89.	-15.	-0.009	90.34	1.072s
Hg-203	1115.93	279.20	67.	-16.	-0.009	98.75	1.086s
I-131	1136.32	284.30	66.	-16.	-0.009	97.74	1.091s
PB-214	1178.92	294.95	21.	57.	0.032	22.46	1.395s
TL-210	1183.11	296.00	249.	-10.	-0.006	221.80	1.102s
PB-212	1199.22	300.03	239.	0.	0.000	1000.00	1.106
PA-231	1199.38	300.07	239.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	239.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	239.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	239.	0.	0.000	1000.00	1.109s
Ba-140	1218.49	304.85	239.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	239.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	239.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	239.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	239.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	259.	-12.	-0.007	185.97	1.126s
La-140	1314.10	328.76	64.	12.	0.007	100.31	1.135s
Cf-249	1332.81	333.44	103.	-14.	-0.008	103.87	1.139s
AC-228	1352.33	338.32	82.	12.	0.007	111.51	1.144
Cs-136	1361.32	340.57	94.	6.	0.003	250.27	1.146s
EU-152	1376.18	344.29	100.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	72.	10.	0.005	126.10	1.151
PB-214	1405.47	351.61	25.	75.	0.041	17.55	1.125

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1423.02	356.00	169.	-13.	-0.007	140.01	1.162s
I-131	1456.95	364.48	20.	9.	0.005	101.86	1.170s
BA-133	1534.35	383.84	112.	-14.	-0.008	107.87	1.189s
Cf-249	1550.79	387.95	106.	-9.	-0.005	159.02	1.193s
SN-113	1565.74	391.69	145.	-15.	-0.008	116.47	1.196s
SB-125	1710.45	427.88	40.	-14.	-0.008	95.43	1.232s
AG-108M	1734.69	433.94	48.	-13.	-0.007	107.97	1.238s
pm-146	1814.45	453.88	12.	5.	0.003	142.83	1.257
SB-125	1852.39	463.37	22.	8.	0.004	94.27	1.266
Ir-192	1871.16	468.06	29.	8.	0.004	106.12	1.271s
BE-7	1909.29	477.60	103.	-14.	-0.008	105.62	1.280s
HF-181	1926.90	482.00	106.	-13.	-0.007	111.91	1.284s
La-140	1946.98	487.02	131.	-14.	-0.008	117.21	1.289s
RU-103	1987.11	497.05	12.	8.	0.004	93.84	1.298s
RH-106	2046.35	511.86	47.	40.	0.022	45.96	2.563s
Nd-147	2122.88	531.00	26.	-4.	-0.002	264.97	1.331s
Ba-140	2147.92	537.26	13.	6.	0.003	129.28	1.337s
CS-134	2251.82	563.24	26.	-7.	-0.004	153.42	1.362s
CS-134	2276.15	569.32	37.	-9.	-0.005	98.20	1.367s
PA-234	2276.75	569.47	47.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	47.	0.	0.000	1000.00	1.368s
TL-208	2330.98	583.03	10.	23.	0.013	31.59	1.257
SB-125	2400.87	600.50	102.	7.	0.004	211.73	1.397
SB-124	2409.79	602.73	109.	7.	0.004	218.17	1.399s
CS-134	2417.71	604.71	116.	7.	0.004	224.44	1.401s
BI-214	2436.22	609.34	4.	65.	0.036	13.69	1.661
RU-103	2440.06	610.30	123.	7.	0.004	229.97	1.406s
AG-108M	2455.99	614.28	130.	7.	0.004	235.55	1.410s
PM-144	2471.12	618.06	187.	-11.	-0.006	178.76	1.414s
RH-106	2486.54	621.92	163.	-7.	-0.004	267.01	1.417s
SB-125	2542.43	635.89	10.	7.	0.004	73.01	1.430s
I-131	2546.77	636.97	28.	-2.	-0.001	444.58	1.432s
AG-110M	2629.92	657.76	22.	3.	0.002	228.52	1.451s
CS-137	2645.51	661.66	24.	0.	0.000	1000.00	1.455s
PM-144	2785.05	696.54	28.	-4.	-0.002	285.04	1.487s
NB-94	2809.41	702.63	23.	-4.	-0.002	241.30	1.493s
SB-124	2890.04	722.79	59.	-15.	-0.008	77.34	1.512s
AG-108M	2890.65	722.94	74.	-9.	-0.005	141.89	1.512s
EU-154	2892.32	723.36	82.	0.	0.000	1000.00	1.512
ZR-95	2895.69	724.20	50.	11.	0.006	99.61	1.513s
BI-212	2907.58	727.17	59.	3.	0.002	350.50	1.516s
pm-146	2941.78	735.72	23.	-5.	-0.003	196.95	1.524s
pm-146	2987.55	747.16	28.	-12.	-0.007	97.89	1.535s
ZR-95	3025.83	756.73	19.	-5.	-0.003	201.78	1.543s
AG-110M	3054.69	763.94	35.	-1.	-0.001	842.61	1.550s
NB-95	3062.08	765.79	37.	1.	0.001	866.03	1.552s
PA-234M	3064.57	766.41	32.	7.	0.004	114.63	1.552s
EU-152	3114.61	778.92	9.	4.	0.002	184.30	1.564s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3140.62	785.42	0.	8.	0.004	35.36	1.570
CS-134	3182.42	795.87	26.	10.	0.005	81.88	1.579s
TL-210	3197.35	799.60	35.	0.	0.000	1000.00	1.583s
CS-134	3206.76	801.95	18.	6.	0.003	117.84	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	27.	5.	0.003	148.47	1.598s
MN-54	3338.38	834.85	14.	-2.	-0.001	403.11	1.615s
Co-56	3386.08	846.77	20.	-5.	-0.003	201.66	1.626s
TL-208	3441.27	860.56	5.	14.	0.008	44.13	1.638s
NB-94	3483.41	871.10	12.	6.	0.003	91.29	1.648s
EU-154	3491.95	873.23	26.	-6.	-0.004	116.66	1.650s
PA-234	3521.16	880.53	52.	-13.	-0.007	84.28	1.657s
PA-234	3532.00	883.24	65.	-7.	-0.004	177.10	1.659s
AG-110M	3537.78	884.68	29.	6.	0.003	138.30	1.660s
Sc-46	3556.17	889.28	68.	-5.	-0.003	218.41	1.664s
y-88	3591.22	898.04	25.	-11.	-0.006	104.38	1.672s
AC-228	3643.36	911.07	20.	12.	0.007	88.87	1.684s
AG-110M	3749.09	937.49	25.	-13.	-0.007	88.99	1.708s
PA-234	3783.21	946.02	10.	-1.	-0.001	702.38	1.716s
EU-152	3855.60	964.11	8.	6.	0.003	74.80	1.732s
AC-228	3875.05	968.97	22.	6.	0.003	128.75	1.736s
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	16.	6.	0.003	101.37	1.765s
EU-154	4018.33	1004.77	23.	5.	0.003	136.03	1.768s
Co-56	4150.66	1037.84	16.	-1.	-0.001	914.69	1.798s
Cs-136	4191.60	1048.07	32.	-8.	-0.004	109.91	1.807s
RH-106	4200.76	1050.36	42.	-2.	-0.001	615.24	1.809s
BI-207	4253.99	1063.66	11.	3.	0.002	229.35	1.820s
Ga-68	4308.98	1077.40	11.	5.	0.003	145.77	1.833s
FE-59	4396.44	1099.25	16.	0.	0.000	1000.00	1.852s
EU-152	4447.76	1112.07	36.	6.	0.004	136.00	1.863s
ZN-65	4461.66	1115.55	42.	6.	0.004	146.68	1.866s
BI-214	4480.63	1120.29	25.	7.	0.004	116.17	1.870s
Sc-46	4481.68	1120.55	32.	7.	0.004	128.71	1.870s
Ta-182	4484.69	1121.30	37.	7.	0.004	138.69	1.871s
CO-60	4692.57	1173.24	21.	-8.	-0.005	130.66	1.916s
Ta-182	4755.86	1189.05	5.	7.	0.004	87.20	1.930
Ta-182	4885.39	1221.41	0.	22.	0.012	21.32	1.957
Co-56	4952.92	1238.28	34.	-10.	-0.006	140.36	1.972s
NA-22	5098.03	1274.53	28.	-10.	-0.006	79.21	2.003s
EU-154	5098.09	1274.54	39.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	7.	0.004	88.04	2.017s
TL-210	5252.04	1313.00	23.	-10.	-0.005	119.90	2.036s
CO-60	5330.11	1332.50	6.	3.	0.002	176.21	2.052s
AG-110M	5537.48	1384.30	11.	-2.	-0.001	344.64	2.096s
EU-152	5632.39	1408.00	6.	3.	0.002	205.48	2.115s
K-40	5843.83	1460.81	0.	264.	0.147	6.15	2.060
La-140	6386.02	1596.21	6.	-2.	-0.001	304.14	2.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7060.00	1764.49	0.	11.	0.006	30.15	2.403s
Co-56	7087.48	1771.35	11.	0.	0.000	1000.00	2.408s
y-88	7346.69	1836.06	7.	-3.	-0.001	254.34	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.5622E+00				5.31E+01	
			477.60	-4.562E+00	?(	1.624E+01 1.06E+02 1.05E+01	G
NA-22	C	-7.2584E-01				9.50E+02	
			1274.53	-7.258E-01	?(	1.933E+00 7.92E+01 9.99E+01	G
K-40	N	1.9327E+02				4.66E+11	
			1460.83	1.933E+02	(	5.395E+00 6.15E+00 1.07E+01	G
Sc-46	F	6.0876E-02				8.38E+01	
			889.28	-2.928E-01	?(	2.212E+00 2.18E+02 1.00E+02	G
			1120.55	4.145E-01	&(	1.847E+00 1.29E+02 1.00E+02	G
CR-51	F	-3.1303E+00				2.77E+01	
			320.08	-3.130E+00	?(	1.964E+01 1.86E+02 9.94E+00	G
MN-54	C	-1.0282E-01				3.12E+02	
			834.85	-1.028E-01	&(	1.036E+00 4.03E+02 1.00E+02	G
FE-59	F	4.9930E-01				4.45E+01	
			1099.25	0.000E+00	&(	2.373E+00 1.00E+03 5.65E+01	G
			1291.60	1.152E+00	?(	2.266E+00 8.80E+01 4.32E+01	G
Co-56	C	-2.5982E-01				7.73E+01	
			846.77	-2.598E-01	?(	1.224E+00 2.02E+02 9.99E+01	G
			1238.28	-1.039E+00	+	3.106E+00 1.40E+02 6.61E+01	G
			1037.84	-4.261E-01	+	9.096E+00 9.15E+02 1.41E+01	G
			1771.35	0.000E+00	+	1.077E+01 1.00E+03 1.55E+01	A
CO-57	C	-3.1296E-01				2.72E+02	
			122.06	-3.130E-01	(	1.115E+00 1.06E+02 8.56E+01	G
			136.47	-2.469E+00	+	1.424E+01 1.72E+02 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	3.9640E-01					7.09E+01	
			810.78	3.964E-01	?(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F	2.4221E-01					1.93E+03	
			1332.50	2.422E-01	?(	1.003E+00	1.76E+02	1.00E+02 G
			1173.24	-5.500E-01	+	1.599E+00	1.31E+02	9.99E+01 G
ZN-65	F	8.1449E-01					2.44E+02	
			1115.55	8.145E-01	?(	4.133E+00	1.47E+02	5.06E+01 G
NB-94	I	6.1370E-02					7.41E+06	
			702.63	-2.009E-01	&(	1.169E+00	2.41E+02	9.79E+01 G
			871.10	3.184E-01	?(	1.000E+00	9.13E+01	9.99E+01 G
ZR-95	I	2.6837E-01					6.40E+01	
			756.73	-4.103E-01	?(	2.008E+00	2.02E+02	5.45E+01 G
			724.20	1.106E+00	?(	3.735E+00	9.96E+01	4.42E+01 G
NB-95	I	4.8397E-02					6.40E+01	
			765.79	4.840E-02	?(	1.503E+00	8.66E+02	9.98E+01 G
RU-103	I	3.0239E-01					3.93E+01	
			497.05	3.024E-01	?(	7.292E-01	9.38E+01	9.09E+01 G
			610.30	4.924E+00	?	3.873E+01	2.30E+02	5.75E+00 GA
RH-106	I	-2.8552E+00					3.74E+02	
			621.92	-2.855E+00	?(	2.599E+01	2.67E+02	9.93E+00 G
			1050.36	-5.840E+00	+	1.279E+02	6.15E+02	1.56E+00 G
			511.86	7.249E+00	?	6.208E+00	4.60E+01	2.00E+01 GA
AG-108M	C	-4.5588E-01					1.53E+05	
			433.94	-4.559E-01	?(	1.227E+00	1.08E+02	9.05E+01 G
			722.94	-4.487E-01	+	2.176E+00	1.42E+02	9.08E+01 G
			614.28	3.175E-01	+	2.556E+00	2.36E+02	8.98E+01 G
AG-110M	F	2.6253E-01					2.50E+02	
			884.68	4.259E-01	?(	2.051E+00	1.38E+02	7.27E+01 G
			657.76	1.371E-01	?(	1.123E+00	2.29E+02	9.46E+01 G
			937.49	-2.115E+00	+	4.231E+00	8.90E+01	3.44E+01 G
			1384.30	-7.190E-01	+	5.669E+00	3.45E+02	2.43E+01 G
			763.94	-2.164E-01	&	6.552E+00	8.43E+02	2.23E+01 G
SN-113	F	-6.8744E-01					1.15E+02	
			391.69	-6.874E-01	&(	2.697E+00	1.16E+02	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	2.8408E-01					6.02E+01	
			602.73	2.841E-01	?(	2.123E+00	2.18E+02	9.83E+01 G
			1690.98	-6.148E-02	%	2.663E+00	1.88E+03	4.78E+01 G
			722.79	-6.370E+00	+	1.645E+01	7.73E+01	1.08E+01 G
SB-125	I	2.4528E-01					1.01E+03	
			427.88	-1.436E+00	?(	3.413E+00	9.54E+01	2.96E+01 G
			600.50	1.556E+00	+	1.129E+01	2.12E+02	1.79E+01 G
			635.89	2.624E+00	?(	6.417E+00	7.30E+01	1.13E+01 G
			463.37	2.428E+00	?(	7.825E+00	9.43E+01	1.05E+01 G
I-131	I	3.0900E-01					8.02E+00	
			364.48	3.090E-01	?(	8.004E-01	1.02E+02	8.17E+01 G
			284.30	-6.022E+00	+	1.519E+01	9.77E+01	6.14E+00 G
			636.97	-1.002E+00	+	1.605E+01	4.45E+02	7.17E+00 G
Gd-153	F	7.5693E-01					2.42E+02	
			97.50	7.569E-01	?(	3.690E+00	1.45E+02	3.00E+01 G
			103.20	0.000E+00	-	5.217E+00	1.00E+03	2.18E+01 G
Ga-68	C	1.1673E+01					4.71E-02	
			1077.40	1.167E+01	&(	3.924E+01	1.46E+02	3.30E+00 G
Tc-99m	I	-1.1099E-01					2.51E-01	
			140.51	-1.110E-01	?(	1.802E+00	4.81E+02	8.93E+01 G
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	?(	2.782E+00	1.40E+02	6.20E+01 G
			302.85	0.000E+00	+	9.831E+00	1.00E+03	1.83E+01 G
			383.84	-4.625E+00	+	1.681E+01	1.08E+02	8.94E+00 GA
			80.99	-9.168E-01	+	2.660E+00	1.08E+02	3.41E+01 GA
CS-134	I	5.3541E-01					7.54E+02	
			604.71	2.870E-01	?(	2.205E+00	2.24E+02	9.76E+01 G
			795.87	5.516E-01	&(	1.524E+00	8.19E+01	8.55E+01 G
			569.32	-2.361E+00	+	7.888E+00	9.82E+01	1.54E+01 G
			801.95	3.167E+00	?(	1.302E+01	1.18E+02	8.69E+00 G
			563.24	-3.236E+00	+	1.224E+01	1.53E+02	8.35E+00 G
CE-139	F	2.7600E-01					1.38E+02	
			165.85	2.760E-01	?(	1.051E+00	1.13E+02	7.99E+01 G
Ba-140	I	9.1677E-01					1.28E+01	
			537.26	9.168E-01	?(	2.981E+00	1.29E+02	2.44E+01 G
			162.66	-2.253E+00	+	1.434E+01	1.87E+02	6.22E+00 G
			304.85	0.000E+00	-	4.222E+01	1.00E+03	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	2.8550E-01					1.28E+01	
			1596.21	-1.760E-01	?(	1.243E+00	3.04E+02	9.54E+01 G
			487.02	-1.078E+00	&	4.262E+00	1.17E+02	4.55E+01 G
			328.76	1.495E+00	?(	5.073E+00	1.00E+02	2.03E+01 G
			815.77	1.122E+00	?(	5.830E+00	1.48E+02	2.33E+01 G
CE-141	I	5.0986E-01					3.25E+01	
			145.44	5.099E-01	?(	3.031E+00	1.77E+02	4.82E+01 G
CE-144	I	-2.3589E+00					2.85E+02	
			133.54	-2.359E+00	(	1.310E+01	1.66E+02	1.11E+01 G
PM-144	C	-1.8219E-01					3.63E+02	
			696.54	-1.822E-01	?(	1.247E+00	2.85E+02	9.90E+01 G
			618.06	-4.583E-01	+	2.774E+00	1.79E+02	9.91E+01 G
EU-152	F	1.3894E+00					4.94E+03	
			344.29	0.000E+00	&(	4.946E+00	1.00E+03	2.65E+01 G
			1112.07	3.009E+00	?(	1.417E+01	1.36E+02	1.36E+01 G
			121.78	-9.369E-01	+	3.169E+00	1.01E+02	2.86E+01 G
			778.92	1.385E+00	?(	6.403E+00	1.84E+02	1.29E+01 G
			964.11	2.401E+00	?(	6.043E+00	7.48E+01	1.46E+01 G
			244.69	-4.331E+00	+	2.172E+01	1.49E+02	7.58E+00 G
			1408.00	1.083E+00	?	5.101E+00	2.05E+02	2.10E+01 GA
EU-154	I	5.5521E-02					3.14E+03	
			873.23	-2.813E+00	&(	1.136E+01	1.17E+02	1.23E+01 G
			123.10	5.286E-01	+	1.962E+00	1.10E+02	4.08E+01 G
			1274.54	0.000E+00	+	6.321E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	+	1.031E+01	1.00E+03	2.02E+01 G
			1004.77	1.710E+00	+	8.142E+00	1.36E+02	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
HF-181	F	-2.0778E-01					4.24E+01	
			482.00	-5.715E-01	?(	2.159E+00	1.12E+02	8.05E+01 G
			133.02	-5.925E-01	+	3.304E+00	1.66E+02	4.33E+01 G
			345.83	1.735E+00	&(	7.454E+00	1.26E+02	1.51E+01 G
			136.30	-4.507E+00	+	2.548E+01	1.69E+02	5.85E+00 G
Ta-182	F	3.0180E+00					1.14E+02	
			1121.30	1.189E+00	?(	5.705E+00	1.39E+02	3.49E+01 G
			1221.41	5.537E+00	(	1.855E+00	2.13E+01	2.70E+01 G
			1189.05	2.760E+00	(	5.538E+00	8.72E+01	1.62E+01 G
Hg-203	F	-4.4579E-01					4.66E+01	
			279.20	-4.458E-01	?(	1.136E+00	9.88E+01	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	1.0697E+00					6.98E+02	
			583.02	1.070E+00	(P	8.233E-01	3.16E+01	8.45E+01 G
			277.28	-2.980E-01	%	1.273E+01	1.20E+03	6.31E+00 G
			860.56	5.922E+00	&	5.554E+00	4.41E+01	1.24E+01 G
pm-146	C	-1.6745E+00					2.02E+03	
			747.16	-1.674E+00	&(	3.819E+00	9.79E+01	3.40E+01 G
			735.72	-1.112E+00	+	5.259E+00	1.97E+02	2.25E+01 G
			453.88	2.525E-01	+	9.522E-01	1.43E+02	6.50E+01 G
y-88	F	-6.3611E-01					1.07E+02	
			898.04	-6.361E-01	?(	1.504E+00	1.04E+02	9.37E+01 G
			1836.06	-2.546E-01	+	1.407E+00	2.54E+02	9.92E+01 G
Cd-113m		-1.3292E+03					5.33E+03	
			263.70	-1.329E+03	?(	1.548E+04	3.35E+02	6.00E-03 K
Cf-251	T	1.9791E-01					3.28E+05	
			176.60	1.979E-01	?(	3.688E+00	6.97E+02	1.70E+01 G
			227.00	3.314E+00	?	1.004E+01	1.16E+02	6.30E+00 GA
Cf-249	T	-4.1286E-01					1.28E+05	
			387.95	-4.129E-01	?(	2.237E+00	1.59E+02	6.60E+01 G
			333.44	-2.388E+00	+	8.356E+00	1.04E+02	1.55E+01 G
Sn-126		-7.2380E-01					3.65E+07	
			87.57	0.000E+00	+	3.661E+00	1.00E+03	3.75E+01 GA
			64.28	-7.238E-01	?(	1.385E+01	5.61E+02	9.70E+00 G
			86.94	0.000E+00	+	1.522E+01	1.00E+03	9.04E+00 GA
PB-210	N	-1.2066E+01					8.14E+03	
			46.54	-1.207E+01	(P	4.580E+01	1.08E+02	4.25E+00 G
PB-212	N	3.7964E+00					6.98E+02	
			238.63	3.796E+00	(P	1.337E+00	1.48E+01	4.33E+01 G
			300.03	0.000E+00	-	5.456E+01	1.00E+03	3.28E+00 GA
PB-214	N	5.9200E+00					5.84E+05	
			351.93	5.364E+00	(P	1.883E+00	1.75E+01	3.76E+01 G
			295.09	7.002E+00	(	2.937E+00	2.25E+01	1.93E+01 G
			242.00	7.639E+00	P	8.885E+00	3.76E+01	7.43E+00 GA
BI-207	C	1.1863E-01					1.18E+04	
			569.70	0.000E+00	(	1.376E+00	1.00E+03	9.77E+01 G
			1063.66	2.743E-01	?(	1.475E+00	2.29E+02	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	1.9373E+00					6.98E+02	
			727.17	1.937E+00	?(	2.375E+01	3.50E+02	7.55E+00 G
			785.42	3.074E+01	?	2.832E+01	3.54E+01	1.28E+00 GA
U-235	N	1.3990E+00					2.57E+11	
			143.79	0.000E+00	&(	1.444E+01	1.00E+03	1.10E+01 G
			205.33	4.459E+00	(	1.231E+01	1.06E+02	5.01E+00 G
			163.38	-4.094E+00	+	1.661E+01	1.20E+02	5.08E+00 G
			185.72	-5.344E-02	% P	1.505E+00	1.02E+03	5.40E+01 GA
BI-214	N	5.9370E+00					5.84E+05	
			609.31	5.738E+00	(	1.101E+00	1.37E+01	4.61E+01 G
			1120.29	2.744E+00	-	1.103E+01	1.16E+02	1.51E+01 G
			1764.49	6.532E+00	?(	4.376E+00	3.02E+01	1.54E+01 G
BI-210M	T	-6.7235E-01					1.10E+09	
			265.83	-6.723E-01	(	2.039E+00	9.03E+01	5.00E+01 G
			304.90	0.000E+00	+	6.469E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1724E+00					2.10E+03	
			911.07	2.212E+00	?(	4.446E+00	8.89E+01	2.90E+01 G
			968.97	1.810E+00	&(	8.134E+00	1.29E+02	1.75E+01 G
			338.32	2.605E+00	?(	9.835E+00	1.12E+02	1.20E+01 G
			93.35	3.060E+00		2.257E+01	2.19E+02	5.56E+00 XA
TH-227	N	3.1477E+00					7.95E+03	
			50.14	2.495E+00	?(	1.964E+01	2.31E+02	8.00E+00 G
			256.24	3.894E+00	(	1.023E+01	1.01E+02	7.00E+00 G
TH-229	N	1.3996E+00					2.68E+06	
			193.51	9.382E-01	&(	1.243E+01	4.90E+02	4.40E+00 G
			210.85	2.079E+00	?(	2.175E+01	3.91E+02	2.99E+00 G
TH-234	N	-3.5758E+00					1.63E+12	
			63.29	-3.576E+00	(P	3.305E+01	2.68E+02	3.81E+00 G
			92.59	-8.595E+00	+ P	2.417E+01	5.20E+01	5.58E+00 G
PA-234	N	-1.6607E+00					1.63E+12	
			131.29	-1.661E+00	?(	6.732E+00	1.21E+02	1.80E+01 G
			946.02	-4.199E-01	+	7.326E+00	7.02E+02	1.34E+01 G
			569.47	0.000E+00	+	1.639E+01	1.00E+03	8.20E+00 G
			883.24	-3.691E+00	+	2.252E+01	1.77E+02	9.60E+00 G
			880.53	-1.147E+01	+	3.247E+01	8.43E+01	6.00E+00 GA
PA-234M	N	6.3152E+01					1.63E+12	
			1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
			766.41	1.205E+02	?(	4.756E+02	1.15E+02	2.94E-01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T	9.1873E-01					1.58E+05	
			59.54	9.187E-01	&(	4.009E+00	1.30E+02	3.59E+01 G
Np-237	F	-9.9293E-01					2.14E+06	
			86.49	-9.929E-01	?(	1.040E+01	3.10E+02	1.31E+01 G
Ir-192	F	1.8520E-01					7.40E+01	
			316.49	0.000E+00	?(	2.141E+00	1.00E+03	8.70E+01 G
			468.06	4.967E-01	?(	1.809E+00	1.06E+02	5.18E+01 G
			308.44	0.000E+00	&	5.755E+00	1.00E+03	3.18E+01 G
Cs-136	F	1.1148E-01					1.30E+01	
			818.50	1.689E-02	%(	1.487E+00	2.43E+03	1.00E+02 G
			1048.07	-5.811E-01	+	2.193E+00	1.10E+02	8.00E+01 G
			340.57	3.132E-01	?(	2.698E+00	2.50E+02	4.69E+01 G
Np-239	T	-5.2515E-01					2.36E+00	
			103.70	0.000E+00	+	4.736E+00	1.00E+03	2.40E+01 X
			106.13	-5.252E-01	?(	4.857E+00	2.73E+02	2.27E+01 G
			99.50	2.953E-01		7.580E+00	7.53E+02	1.50E+01 X
Nd-147		-1.1367E+00					1.11E+01	
			531.00	-1.137E+00	?(	7.523E+00	2.65E+02	1.30E+01 G
			91.10	2.259E-01	&	4.599E+00	6.00E+02	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	169.	-17.	-0.009	107.88	-1.207E+01	P
AM-241	59.54	227.	17.	0.009	129.82	9.187E-01	
TH-234	63.29	193.	-7.	-0.004	267.82	-3.576E+00	P
Sn-126	64.28	227.	-4.	-0.002	561.29	-7.238E-01	
BA-133	80.99	133.	-19.	-0.011	107.88	-9.168E-01	
Np-237	86.49	329.	-8.	-0.005	309.92	-9.929E-01	
Nd-147	91.10	310.	4.	0.002	600.08	2.259E-01	
TH-234	92.59	338.	-31.	-0.017	51.99	-8.595E+00	P
AC-228	93.35	292.	11.	0.006	218.53	3.060E+00	
Gd-153	97.50	230.	15.	0.008	144.80	7.569E-01	
Np-239	99.50	245.	3.	0.002	753.41	2.953E-01	
Np-239	106.13	234.	-8.	-0.004	272.72	-5.252E-01	
EU-152	121.78	155.	-18.	-0.010	100.87	-9.369E-01	
CO-57	122.06	173.	-18.	-0.010	106.22	-3.130E-01	
EU-154	123.10	119.	14.	0.008	110.14	5.286E-01	
PA-234	131.29	278.	-20.	-0.011	120.98	-1.661E+00	
HF-181	133.02	389.	-17.	-0.009	166.20	-5.925E-01	
CE-144	133.54	401.	-17.	-0.010	165.59	-2.359E+00	
HF-181	136.30	418.	-17.	-0.010	168.55	-4.507E+00	
CO-57	136.47	435.	-17.	-0.010	171.94	-2.469E+00	
Tc-99m	140.51	453.	-6.	-0.003	481.16	-1.110E-01	
CE-141	145.44	386.	16.	0.009	177.04	5.099E-01	
Ba-140	162.66	127.	-9.	-0.005	186.77	-2.253E+00	
U-235	163.38	112.	-13.	-0.007	120.00	-4.094E+00	
CE-139	165.85	110.	14.	0.008	112.81	2.760E-01	
Cf-251	176.60	55.	2.	0.001	697.32	1.979E-01	
TH-229	193.51	37.	2.	0.001	489.90	9.382E-01	
U-235	205.33	44.	12.	0.007	105.80	4.459E+00	
TH-229	210.85	48.	3.	0.002	391.34	2.079E+00	
Cf-251	227.00	40.	11.	0.006	115.52	3.314E+00	
EU-152	244.69	274.	-16.	-0.009	149.12	-4.331E+00	
Cd-113m	263.70	74.	-4.	-0.002	335.13	-1.329E+03	
BI-210M	265.83	89.	-15.	-0.009	90.34	-6.723E-01	
Hg-203	279.20	67.	-16.	-0.009	98.75	-4.458E-01	
I-131	284.30	66.	-16.	-0.009	97.74	-6.022E+00	
TL-210	296.00	249.	-10.	-0.006	221.80	-3.049E-01	
CR-51	320.08	259.	-12.	-0.007	185.97	-3.130E+00	
La-140	328.76	64.	12.	0.007	100.31	1.495E+00	
Cf-249	333.44	103.	-14.	-0.008	103.87	-2.388E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	338.32	82.	12.	0.007	111.51	2.605E+00	
Cs-136	340.57	94.	6.	0.003	250.27	3.132E-01	
HF-181	345.83	72.	10.	0.005	126.10	1.735E+00	
BA-133	356.00	169.	-13.	-0.007	140.01	-5.884E-01	
I-131	364.48	20.	9.	0.005	101.86	3.090E-01	
BA-133	383.84	112.	-14.	-0.008	107.87	-4.625E+00	
Cf-249	387.95	106.	-9.	-0.005	159.02	-4.129E-01	
SN-113	391.69	145.	-15.	-0.008	116.47	-6.874E-01	
SB-125	427.88	40.	-14.	-0.008	95.43	-1.436E+00	
AG-108M	433.94	48.	-13.	-0.007	107.97	-4.559E-01	
pm-146	453.88	12.	5.	0.003	142.83	2.525E-01	
SB-125	463.37	22.	8.	0.004	94.27	2.428E+00	
Ir-192	468.06	29.	8.	0.004	106.12	4.967E-01	
BE-7	477.60	103.	-14.	-0.008	105.62	-4.562E+00	
HF-181	482.00	106.	-13.	-0.007	111.91	-5.715E-01	
La-140	487.02	131.	-14.	-0.008	117.21	-1.078E+00	
RU-103	497.05	12.	8.	0.004	93.84	3.024E-01	
RH-106	511.86	47.	40.	0.022	45.96	7.249E+00	
Nd-147	531.00	26.	-4.	-0.002	264.97	-1.137E+00	
Ba-140	537.26	13.	6.	0.003	129.28	9.168E-01	
CS-134	563.24	26.	-7.	-0.004	153.42	-3.236E+00	
CS-134	569.32	37.	-9.	-0.005	98.20	-2.361E+00	
SB-125	600.50	102.	7.	0.004	211.73	1.556E+00	
SB-124	602.73	109.	7.	0.004	218.17	2.841E-01	
CS-134	604.71	116.	7.	0.004	224.44	2.870E-01	
RU-103	610.30	123.	7.	0.004	229.97	4.924E+00	
AG-108M	614.28	130.	7.	0.004	235.55	3.175E-01	
PM-144	618.06	187.	-11.	-0.006	178.76	-4.583E-01	
RH-106	621.92	163.	-7.	-0.004	267.01	-2.855E+00	
SB-125	635.89	10.	7.	0.004	73.01	2.624E+00	
I-131	636.97	28.	-2.	-0.001	444.58	-1.002E+00	
AG-110M	657.76	22.	3.	0.002	228.52	1.371E-01	
PM-144	696.54	28.	-4.	-0.002	285.04	-1.822E-01	
NB-94	702.63	23.	-4.	-0.002	241.30	-2.009E-01	
SB-124	722.79	59.	-15.	-0.008	77.34	-6.370E+00	
AG-108M	722.94	74.	-9.	-0.005	141.89	-4.487E-01	
ZR-95	724.20	50.	11.	0.006	99.61	1.106E+00	
BI-212	727.17	59.	3.	0.002	350.50	1.937E+00	
pm-146	735.72	23.	-5.	-0.003	196.95	-1.112E+00	
pm-146	747.16	28.	-12.	-0.007	97.89	-1.674E+00	
ZR-95	756.73	19.	-5.	-0.003	201.78	-4.103E-01	
AG-110M	763.94	35.	-1.	-0.001	842.61	-2.164E-01	
NB-95	765.79	37.	1.	0.001	866.03	4.840E-02	
PA-234M	766.41	32.	7.	0.004	114.63	1.205E+02	
EU-152	778.92	9.	4.	0.002	184.30	1.385E+00	
BI-212	785.42	0.	8.	0.004	35.36	3.074E+01	
CS-134	795.87	26.	10.	0.005	81.88	5.516E-01	
CS-134	801.95	18.	6.	0.003	117.84	3.167E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	27.	5.	0.003	148.47	1.122E+00	
MN-54	834.85	14.	-2.	-0.001	403.11	-1.028E-01	
Co-56	846.77	20.	-5.	-0.003	201.66	-2.598E-01	
NB-94	871.10	12.	6.	0.003	91.29	3.184E-01	
EU-154	873.23	26.	-6.	-0.004	116.66	-2.813E+00	
PA-234	880.53	52.	-13.	-0.007	84.28	-1.147E+01	
PA-234	883.24	65.	-7.	-0.004	177.10	-3.691E+00	
AG-110M	884.68	29.	6.	0.003	138.30	4.259E-01	
Sc-46	889.28	68.	-5.	-0.003	218.41	-2.928E-01	
y-88	898.04	25.	-11.	-0.006	104.38	-6.361E-01	
AC-228	911.07	20.	12.	0.007	88.87	2.212E+00	
AG-110M	937.49	25.	-13.	-0.007	88.99	-2.115E+00	
PA-234	946.02	10.	-1.	-0.001	702.38	-4.199E-01	
EU-152	964.11	8.	6.	0.003	74.80	2.401E+00	
AC-228	968.97	22.	6.	0.003	128.75	1.810E+00	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	16.	6.	0.003	101.37	4.300E+01	
EU-154	1004.77	23.	5.	0.003	136.03	1.710E+00	
Co-56	1037.84	16.	-1.	-0.001	914.69	-4.261E-01	
Cs-136	1048.07	32.	-8.	-0.004	109.91	-5.811E-01	
RH-106	1050.36	42.	-2.	-0.001	615.24	-5.840E+00	
BI-207	1063.66	11.	3.	0.002	229.35	2.743E-01	
Ga-68	1077.40	11.	5.	0.003	145.77	1.167E+01	
EU-152	1112.07	36.	6.	0.004	136.00	3.009E+00	
ZN-65	1115.55	42.	6.	0.004	146.68	8.145E-01	
Sc-46	1120.55	32.	7.	0.004	128.71	4.145E-01	
CO-60	1173.24	21.	-8.	-0.005	130.66	-5.500E-01	
Co-56	1238.28	34.	-10.	-0.006	140.36	-1.039E+00	
NA-22	1274.53	28.	-10.	-0.006	79.21	-7.258E-01	
FE-59	1291.60	6.	7.	0.004	88.04	1.152E+00	
TL-210	1313.00	23.	-10.	-0.005	119.90	-3.306E+00	
CO-60	1332.50	6.	3.	0.002	176.21	2.422E-01	
AG-110M	1384.30	11.	-2.	-0.001	344.64	-7.190E-01	
EU-152	1408.00	6.	3.	0.002	205.48	1.083E+00	
La-140	1596.21	6.	-2.	-0.001	304.14	-1.760E-01	
y-88	1836.06	7.	-3.	-0.001	254.34	-2.546E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-4.5621E+00	-4.5622E+00	1.056E+02%	1.62E+01
NA-22	#A	-7.2583E-01	-7.2584E-01	7.921E+01%	1.93E+00
K-40		1.9327E+02	1.9327E+02	6.155E+00%	5.40E+00
Sc-46	#A	6.0876E-02	6.0876E-02	1.268E+02%	2.21E+00
CR-51	#A	-3.1302E+00	-3.1303E+00	1.860E+02%	1.96E+01
MN-54	#A	-1.0282E-01	-1.0282E-01	4.031E+02%	1.04E+00
FE-59	#A	4.9929E-01	4.9930E-01	8.804E+01%	2.37E+00
Co-56	#A	-2.5982E-01	-2.5982E-01	2.017E+02%	1.22E+00
CO-57	#A	-3.1296E-01	-3.1296E-01	1.062E+02%	1.12E+00
CO-58	#A	3.9640E-01	3.9640E-01	8.642E+01%	1.16E+00
CO-60	#A	2.4221E-01	2.4221E-01	1.762E+02%	1.00E+00
ZN-65	#A	8.1448E-01	8.1449E-01	1.467E+02%	4.13E+00
NB-94	#A	6.1370E-02	6.1370E-02	9.129E+01%	1.17E+00
ZR-95	#A	2.6837E-01	2.6837E-01	9.961E+01%	2.01E+00
NB-95	#A	4.8397E-02	4.8397E-02	8.660E+02%	1.50E+00
RU-103	#A	3.0239E-01	3.0239E-01	9.384E+01%	7.29E-01
RH-106	#A	-2.8552E+00	-2.8552E+00	2.670E+02%	2.60E+01
AG-108M	#A	-4.5588E-01	-4.5588E-01	1.080E+02%	1.23E+00
AG-110M	#A	2.6253E-01	2.6253E-01	1.336E+02%	2.05E+00
SN-113	#A	-6.8744E-01	-6.8744E-01	1.165E+02%	2.70E+00
SB-124	#A	2.8408E-01	2.8408E-01	2.182E+02%	2.12E+00
SB-125	#A	2.4528E-01	2.4528E-01	5.091E+01%	3.41E+00
I-131	#A	3.0899E-01	3.0900E-01	1.019E+02%	8.00E-01
Gd-153	#A	7.5693E-01	7.5693E-01	1.448E+02%	3.69E+00
Ga-68	#A	1.1614E+01	1.1673E+01	1.458E+02%	3.92E+01
Tc-99m	#A	-1.1088E-01	-1.1099E-01	4.812E+02%	1.80E+00
BA-133	#A	-5.8842E-01	-5.8842E-01	1.400E+02%	2.78E+00
CS-134	#A	5.3541E-01	5.3541E-01	8.188E+01%	2.20E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
CE-139	#A	2.7600E-01	2.7600E-01	1.128E+02%	1.05E+00
Ba-140	#A	9.1675E-01	9.1677E-01	1.293E+02%	2.98E+00
La-140	#A	2.8549E-01	2.8550E-01	1.003E+02%	1.24E+00
CE-141	#A	5.0986E-01	5.0986E-01	1.770E+02%	3.03E+00
CE-144	#A	-2.3589E+00	-2.3589E+00	1.656E+02%	1.31E+01
PM-144	#A	-1.8219E-01	-1.8219E-01	2.850E+02%	1.25E+00
EU-152	#A	1.3894E+00	1.3894E+00	7.480E+01%	4.95E+00
EU-154	#A	5.5521E-02	5.5521E-02	7.187E+01%	1.14E+01
EU-155	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.35E+00
HF-181	#A	-2.0778E-01	-2.0778E-01	8.430E+01%	2.16E+00
Ta-182	A	3.0179E+00	3.0180E+00	2.132E+01%	5.71E+00
Hg-203	#A	-4.4578E-01	-4.4579E-01	9.875E+01%	1.14E+00
TL-208		1.0697E+00	1.0697E+00	3.159E+01%	8.23E-01
pm-146	#A	-1.6745E+00	-1.6745E+00	9.789E+01%	3.82E+00

y-88	#A	-6.3610E-01	-6.3611E-01	1.044E+02%	1.50E+00
Cd-113m	#A	-1.3292E+03	-1.3292E+03	3.351E+02%	1.55E+04
Cd-109	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.62E+01
Cf-251	#A	1.9791E-01	1.9791E-01	6.973E+02%	3.69E+00
Cf-249	#A	-4.1286E-01	-4.1286E-01	1.590E+02%	2.24E+00
Sn-126	#A	-7.2380E-01	-7.2380E-01	5.613E+02%	1.38E+01
PB-210	#A	-1.2066E+01	-1.2066E+01	1.079E+02%	4.58E+01
PB-212		3.7964E+00	3.7964E+00	1.478E+01%	1.34E+00
PB-214		5.9200E+00	5.9200E+00	1.425E+01%	1.88E+00
BI-207	#A	1.1863E-01	1.1863E-01	2.293E+02%	1.38E+00
BI-212	#A	1.9373E+00	1.9373E+00	3.505E+02%	2.38E+01
U-235	#A	1.3990E+00	1.3990E+00	1.058E+02%	1.44E+01
BI-214		5.9370E+00	5.9370E+00	1.369E+01%	1.10E+00
BI-210M	#A	-6.7235E-01	-6.7235E-01	9.034E+01%	2.04E+00
AC-228	#A	2.1724E+00	2.1724E+00	6.404E+01%	4.45E+00
TH-227	A	3.1477E+00	3.1477E+00	1.009E+02%	1.96E+01
TH-229	#A	1.3996E+00	1.3996E+00	3.135E+02%	1.24E+01
TH-234	#A	-3.5758E+00	-3.5758E+00	2.678E+02%	3.31E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.25E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.12E+00
PA-234	#A	-1.6607E+00	-1.6607E+00	1.210E+02%	6.73E+00
PA-234M	#A	6.3152E+01	6.3152E+01	7.651E+01%	1.51E+02
AM-241	#A	9.1873E-01	9.1873E-01	1.298E+02%	4.01E+00
Np-237	#A	-9.9293E-01	-9.9293E-01	3.099E+02%	1.04E+01
Ir-192	#A	1.8520E-01	1.8520E-01	1.061E+02%	2.14E+00
Cs-136	#A	1.1148E-01	1.1148E-01	2.503E+02%	1.49E+00
Np-239	#A	-5.2510E-01	-5.2515E-01	2.727E+02%	4.86E+00
Nd-147	#A	-1.1367E+00	-1.1367E+00	2.650E+02%	7.52E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.52E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 2.100E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.0999216E+02 Bq/Sample

Test America St. Louis Spectrum ID: 12_Gamma_20181534

Sample Description: 379959_Gamma_160-29881-A-37-C DU
Detector: Detector #12
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-37-C DU

Decay to Time: 8/23/2018 17:34 Live Time: 1800 sec
Acquisition Time: 8/23/2018 17:34:30 Real Time: 1801 sec
Analysis Time: 8/28/2018 19:36 Dead Time: 0.05 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Extra_Long_Rev7.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.562E+00	105.6	4.819E+00	4.824E+00	1.624E+01
NA-22	-7.258E-01	79.2	5.750E-01	5.761E-01	1.933E+00
K-40	1.933E+02	6.2	1.189E+01	1.539E+01	5.395E+00
Sc-46	8.919E-02	121.4	1.083E-01	1.084E-01	2.212E+00
CR-51	-3.130E+00	186.0	5.821E+00	5.824E+00	1.964E+01
MN-54	-1.028E-01	403.1	4.145E-01	4.145E-01	1.036E+00
FE-59	4.592E-01	88.0	4.043E-01	4.049E-01	4.292E+00
Co-56	2.390E-01	88.7	2.120E-01	2.124E-01	1.224E+00
CO-57	-1.207E-02	2819.6	3.403E-01	3.403E-01	1.168E+00
CO-58	3.964E-01	86.4	3.426E-01	3.432E-01	1.165E+00
CO-60	2.422E-01	176.2	4.268E-01	4.270E-01	1.003E+00
ZN-65	9.833E-01	127.7	1.256E+00	1.257E+00	4.313E+00
ZR-95	2.684E-01	99.6	2.673E-01	2.677E-01	2.008E+00
NB-95	4.840E-02	866.0	4.191E-01	4.191E-01	1.503E+00
RU-103	3.024E-01	93.8	2.838E-01	2.842E-01	7.292E-01
RH-106	-4.121E+00	189.7	7.815E+00	7.818E+00	2.652E+01
AG-108M	-4.559E-01	108.0	4.922E-01	4.927E-01	1.227E+00
AG-110M	2.625E-01	133.6	3.506E-01	3.509E-01	1.123E+00
SN-113	-6.874E-01	116.5	8.007E-01	8.014E-01	2.697E+00
SB-124	2.841E-01	218.2	6.198E-01	6.199E-01	2.123E+00
SB-125	2.453E-01	51.2	1.256E-01	1.262E-01	3.413E+00
I-131	3.090E-01	88.1	2.721E-01	2.725E-01	9.227E-01
Gd-153	8.561E-01	151.2	1.295E+00	1.296E+00	5.253E+00
Ga-68	1.167E+01	145.8	1.702E+01	1.703E+01	3.924E+01
Tc-99m	0.000E+00	1.#INF	7.504E-02	7.504E-02	1.814E+00
BA-133	-5.884E-01	140.0	8.238E-01	8.244E-01	2.782E+00
CS-134	5.354E-01	81.9	4.384E-01	4.392E-01	1.524E+00
CS-137	0.000E+00	1.#INF	1.907E-01	1.908E-01	1.302E+00
CE-139	2.760E-01	112.8	3.114E-01	3.117E-01	1.051E+00
Ba-140	9.168E-01	129.3	1.185E+00	1.186E+00	2.981E+00
La-140	2.855E-01	100.3	2.864E-01	2.868E-01	1.243E+00
CE-141	5.099E-01	177.0	9.027E-01	9.030E-01	3.031E+00
CE-144	-2.359E+00	165.4	3.902E+00	3.904E+00	1.309E+01

PM-144	6.534E-02	180.5	1.179E-01	1.180E-01	1.507E+00
EU-152	5.766E-01	59.1	3.408E-01	3.421E-01	3.337E+00
EU-154	1.282E+00	67.2	8.614E-01	8.639E-01	2.270E+00
EU-155	8.638E-01	161.5	1.395E+00	1.396E+00	7.777E+00
HF-181	-2.078E-01	84.3	1.752E-01	1.755E-01	2.159E+00
Ta-182	2.596E+00	21.3	5.534E-01	5.683E-01	6.119E+00
Hg-203	-2.413E-01	139.4	3.365E-01	3.367E-01	1.151E+00
TL-208	1.086E+00	31.6	3.433E-01	3.477E-01	8.233E-01
PM-146	2.525E-01	142.8	3.607E-01	3.609E-01	9.522E-01
Y-88	-2.546E-01	254.3	6.475E-01	6.477E-01	1.407E+00
Cd-113m	-1.813E+03	201.0	3.643E+03	3.645E+03	1.269E+04
Cd-109	5.961E+00	243.0	1.448E+01	1.449E+01	4.855E+01
Se-75	-1.818E-01	85.6	1.556E-01	1.560E-01	1.642E+00
Cf-251	1.979E-01	697.3	1.380E+00	1.380E+00	3.688E+00
Cf-249	-4.129E-01	159.0	6.565E-01	6.569E-01	2.237E+00
Sn-126	-3.143E+00	138.4	4.349E+00	4.353E+00	1.462E+01
PB-210	4.502E+00	200.0	9.002E+00	9.006E+00	2.827E+01
PB-212	3.796E+00	14.8	5.611E-01	5.950E-01	1.337E+00
PB-214	5.920E+00	14.2	8.436E-01	8.954E-01	1.883E+00
BI-207	-5.681E-01	84.8	4.816E-01	4.825E-01	1.616E+00
BI-212	1.937E+00	350.5	6.790E+00	6.791E+00	2.375E+01
BI-214	5.937E+00	13.7	8.129E-01	8.673E-01	1.101E+00
BI-210M	-2.034E-01	315.7	6.421E-01	6.422E-01	2.212E+00
AC-228	2.172E+00	64.0	1.391E+00	1.396E+00	4.446E+00
TH-227	3.894E+00	100.9	3.930E+00	3.936E+00	1.023E+01
TH-229	1.400E+00	313.5	4.388E+00	4.388E+00	1.243E+01
TH-234	1.607E+01	27.6	4.432E+00	4.520E+00	1.248E+01
PA-231	0.000E+00	1.#INF	2.049E+00	2.049E+00	6.254E+01
PA-233	0.000E+00	1.#INF	2.166E-01	2.166E-01	5.120E+00
PA-234	-1.592E+00	119.8	1.907E+00	1.908E+00	6.393E+00
PA-234M	6.315E+01	76.5	4.832E+01	4.842E+01	1.507E+02
U-235	1.399E+00	105.8	1.480E+00	1.482E+00	1.444E+01
AM-241	-7.233E-01	163.9	1.185E+00	1.186E+00	3.999E+00
Np-237	1.732E+00	231.9	4.016E+00	4.017E+00	1.347E+01
Ir-192	1.852E-01	106.1	1.965E-01	1.968E-01	2.141E+00
Cs-136	1.115E-01	250.3	2.790E-01	2.791E-01	1.487E+00
Np-239	-9.532E-01	168.4	1.605E+00	1.606E+00	5.402E+00
Nd-147	-1.042E+00	290.4	3.026E+00	3.027E+00	7.566E+00
Mo-99	-3.041E+00	116.7	3.548E+00	3.551E+00	1.218E+01
Ge-69	2.229E+00	116.3	2.593E+00	2.596E+00	8.852E+00
Br-82	4.383E-01	128.7	5.642E-01	5.648E-01	1.338E+00
V-48	3.735E-01	70.8	2.642E-01	2.651E-01	1.010E+00
Sr-85	3.320E-01	107.8	3.579E-01	3.584E-01	1.221E+00
Rb-83	2.792E-01	229.0	6.394E-01	6.396E-01	1.540E+00
Kr-85	7.664E+01	117.5	9.008E+01	9.018E+01	3.076E+02
Cm-247	4.700E-01	90.2	4.238E-01	4.245E-01	9.314E-01
Hf-175	0.000E+00	1.#INF	1.615E-01	1.615E-01	1.505E+00
Lu-172	-7.114E-01	71.3	5.070E-01	5.086E-01	4.412E+00
Kr-85m	-1.370E-01	243.9	3.341E-01	3.342E-01	9.218E-01
NB-94	-3.423E-02	78.9	2.699E-02	2.705E-02	1.735E+00
TL-210	0.000E+00	1.#INF	1.233E-01	1.233E-01	1.525E+00
Total	4.183E+02				

Analyst: Rachel Mueller

Sample description
379959_Gamma_160-29881-A-37-C DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181534.An1

Acquisition information
Start time: 8/23/2018 5:34:30 PM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration
Created: 4/20/2018 11:13:27 AM
Zero offset: 0.059 keV
Gain: 0.250 keV/channel
Quadratic: -3.735E-08 keV/channel^2

Efficiency Calibration
Created: 4/20/2018 11:53:09 AM
Type: Polynomial
Uncertainty: 1.020 %
Coefficients: -0.363508 -4.707999 0.462125
-0.051256 0.002384 -0.000043

Library Files
Main analysis library: Client_Extra_Long_Rev7.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.08keV)
Stop channel: 8000 (1999.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 5:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1217

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.76	6.	199.95	1.57	1.805E-02	46.54	4.250	PBC<MDA	PB210
63.45	50.	31.50	1.47	2.978E-02	63.29	3.810	2.430E+01	TH234
74.52	46.	28.69	0.88	3.324E-02				
77.06	77.	18.22	0.88	3.383E-02				
80.99	14.	227.23	0.89	3.466E-02	80.99	34.060	PBC<MDA	BA133
84.00	14.	229.47	0.89	3.520E-02	84.00	23.000	PBC<MDA	Cm247
86.49	15.	231.86	0.89	3.559E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.388E-01	EU155
86.54	15.	234.74	0.89	3.560E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.390E-01	EU155
					86.94	9.040	2.506E+00	Sn126
86.94	15.	237.59	0.89	3.566E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	2.506E+00	Sn126
87.57	15.	240.26	0.89	3.575E-02	87.57	37.500	PBC<MDA	Sn126
88.04	15.	242.96	0.89	3.582E-02	88.04	3.790	PBC<MDA	Cd109
89.36	15.	245.43	0.89	3.599E-02	89.36	2.350	PBC<MDA	Hf175
92.88	38.	45.27	1.15	3.637E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
96.73	15.	208.35	0.90	3.677E-02	96.73	3.420	PBC<MDA	Se75
97.50	15.	211.35	0.90	3.683E-02	97.50	30.000	PBC<MDA	Gd153
99.50	15.	214.12	0.91	3.697E-02	99.50	15.000	PBC<MDA	Np239
103.20	15.	216.36	0.91	3.717E-02	103.20	21.800	PBC<MDA	Gd153
103.70	15.	219.33	0.91	3.720E-02	103.70	24.000	PBC<MDA	Np239
105.31	15.	221.96	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
123.10	15.	122.75	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
145.44	16.	177.04	0.95	3.586E-02	145.44	48.200	PBC<MDA	CE141
165.85	14.	112.81	0.97	3.405E-02	165.85	79.900	PBC<MDA	CE139

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
176.60	2.	697.32	0.98	3.303E-02	176.60	17.000	PBC<MDA	Cf251
181.47	13.	91.16	0.99	3.256E-02	181.07	5.990	3.784E+00	Mo99
					181.47	19.200	1.182E+00	Lu172
193.51	2.	489.90	1.00	3.140E-02	193.51	4.400	PBC<MDA	TH229
205.33	12.	105.80	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
210.85	3.	391.34	1.02	2.980E-02	210.85	2.990	PBC<MDA	TH229
227.00	11.	115.52	1.03	2.839E-02	227.00	6.300	PBC<MDA	Cf251
238.38	76.	17.58	1.01	2.745E-02	238.63	43.300	3.569E+00	PB212
241.77	28.	37.63	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
256.24	13.	100.93	1.06	2.608E-02	256.24	7.000	PBC<MDA	TH227
277.28	4.	281.23	1.08	2.462E-02	277.28	6.310	PBC<MDA	TL208
294.95	57.	22.46	1.39	2.350E-02	295.09	19.300	7.002E+00	PB214
328.76	12.	100.31	1.13	2.165E-02	328.76	20.300	PBC<MDA	La140
338.32	12.	111.51	1.14	2.118E-02	338.32	12.010	PBC<MDA	AC228
340.57	6.	250.27	1.15	2.108E-02	340.57	46.900	PBC<MDA	Cs136
345.83	10.	126.10	1.15	2.083E-02	345.83	15.070	PBC<MDA	HF181
351.61	75.	17.55	1.13	2.055E-02	351.93	37.600	5.364E+00	PB214
364.48	9.	88.06	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
366.42	8.	108.36	1.17	1.993E-02	366.42	1.190	PBC<MDA	Mo99
402.40	7.	90.18	1.21	1.855E-02	402.40	72.000	PBC<MDA	Cm247
453.88	5.	142.83	1.26	1.692E-02	453.88	65.000	PBC<MDA	PM146
463.37	8.	94.27	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	106.12	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
497.05	8.	93.84	1.30	1.580E-02	497.05	90.900	PBC<MDA	RU103
511.86	16.	102.70	2.56	1.546E-02	511.86	20.000	PBC<MDA	RH106
513.98	9.	117.54	1.31	1.541E-02	513.98	0.430	PBC<MDA	Kr85
					513.99	99.280	3.320E-01	Sr85
513.99	9.	107.83	1.31	1.541E-02	513.98	0.430	7.664E+01	Kr85
					513.99	99.280	3.320E-01	Sr85
520.35	2.	374.72	1.32	1.527E-02	520.35	46.110	PBC<MDA	Rb83
537.26	6.	129.28	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
552.50	3.	263.39	1.35	1.460E-02	552.50	16.300	PBC<MDA	Rb83
583.03	23.	31.59	1.26	1.403E-02	583.02	84.500	1.070E+00	TL208
600.50	7.	211.73	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	7.	218.17	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
604.71	7.	224.44	1.40	1.366E-02	604.71	97.620	PBC<MDA	CS134
609.34	65.	13.69	1.66	1.358E-02	609.31	46.090	5.738E+00	BI214
610.30	7.	229.97	1.41	1.357E-02	610.30	5.750	PBC<MDA	RU103
614.28	7.	235.55	1.41	1.350E-02	614.28	89.850	PBC<MDA	AG108M
618.06	7.	241.00	1.41	1.344E-02	618.06	99.100	PBC<MDA	PM144
635.89	7.	74.83	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
657.76	3.	228.52	1.45	1.284E-02	657.76	94.640	PBC<MDA	AG110M
724.20	11.	99.61	1.51	1.198E-02	724.20	44.150	PBC<MDA	ZR95
727.17	3.	350.50	1.52	1.194E-02	727.17	7.550	PBC<MDA	BI212
765.79	1.	866.03	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.644E+01	PA234M
766.41	7.	114.63	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.205E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
776.50	2.	413.66	1.56	1.139E-02	776.50	83.400	PBC<MDA	Br82
778.92	5.	119.15	1.56	1.136E-02	778.92	12.940	PBC<MDA	EU152
785.42	8.	35.36	1.57	1.129E-02	785.42	1.280	3.074E+01	BI212
795.87	10.	81.88	1.58	1.119E-02	795.87	85.530	PBC<MDA	CS134
801.95	6.	117.84	1.58	1.113E-02	801.95	8.690	PBC<MDA	CS134
810.78	8.	86.42	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	5.	148.47	1.60	1.099E-02	815.77	23.280	PBC<MDA	La140
857.25	14.	44.13	1.64	1.057E-02	860.56	12.420	5.922E+00	TL208
871.10	6.	91.29	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
884.68	6.	138.30	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
911.07	12.	88.87	1.68	1.015E-02	911.07	29.000	PBC<MDA	AC228
964.11	6.	74.80	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.97	6.	128.75	1.74	9.703E-03	968.97	17.460	PBC<MDA	AC228
983.50	4.	180.85	1.75	9.598E-03	983.50	100.000	PBC<MDA	V48
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154
1001.00	6.	101.37	1.76	9.476E-03	1001.00	0.837	PBC<MDA	PA234M
1004.77	5.	136.03	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	9.	88.70	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1044.00	7.	128.73	1.80	9.188E-03	1044.00	28.000	PBC<MDA	Br82
1063.66	3.	229.35	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1077.40	5.	145.77	1.83	8.978E-03	1077.40	3.300	PBC<MDA	Ga68
1106.50	9.	116.34	1.86	8.803E-03	1106.50	26.000	PBC<MDA	Ge69
1115.55	8.	127.71	1.87	8.750E-03	1115.55	50.600	PBC<MDA	ZN65
1120.06	9.	93.09	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.862E-01	Sc46
1120.55	7.	121.41	1.87	8.721E-03	1120.29	15.100	3.119E+00	BI214
					1120.55	99.987	4.712E-01	Sc46
					1121.30	34.900	1.351E+00	Ta182
1121.04	1.	706.22	1.87	8.716E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	2.435E-01	Ta182
1189.05	7.	87.20	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1221.41	22.	21.32	1.96	8.175E-03	1221.41	27.000	5.537E+00	Ta182
1291.60	7.	88.04	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1311.60	7.	70.75	2.03	7.741E-03	1311.60	98.000	PBC<MDA	V48
1313.00	1.	623.91	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	3.	176.21	2.05	7.647E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	3.	205.48	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.81	264.	6.15	2.06	7.112E-03	1460.83	10.670	1.933E+02	K40
1764.34	11.	30.15	2.40	6.075E-03	1764.49	15.400	6.532E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.65	74.48	63.	46.	1.376E+03	28.69	0.880	- sD
307.79	77.01	60.	77.	2.283E+03	18.22	0.882	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Extra_Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.65	46.76	61.	6.	0.003	199.95	1.567s
TH-227	200.18	50.14	182.	-15.	-0.009	126.11	0.855s
AM-241	237.74	59.54	226.	-13.	-0.007	163.86	0.865s
TH-234	253.38	63.45	62.	50.	0.028	31.50	1.469s
Sn-126	256.71	64.28	254.	-17.	-0.009	138.38	0.869s
BA-133	323.50	80.99	532.	14.	0.008	227.23	0.887s
Cm-247	335.53	84.00	546.	14.	0.008	229.47	0.890s
Np-237	345.49	86.49	561.	15.	0.008	231.86	0.892s
EU-155	345.70	86.54	575.	15.	0.008	234.74	0.892
Sn-126	347.29	86.94	590.	15.	0.008	237.59	0.892
Sn-126	349.81	87.57	604.	15.	0.008	240.26	0.893
Cd-109	351.68	88.04	619.	15.	0.008	242.96	0.894s
Hf-175	356.96	89.36	633.	15.	0.008	245.43	0.895
TH-234	371.02	92.88	85.	38.	0.021	45.27	1.149s
Se-75	386.42	96.73	462.	15.	0.008	208.35	0.902s
Gd-153	389.50	97.50	477.	15.	0.008	211.35	0.903
Np-239	397.50	99.50	491.	15.	0.008	214.12	0.905s
Gd-153	412.29	103.20	506.	15.	0.008	216.36	0.909s
Np-239	414.29	103.70	521.	15.	0.008	219.33	0.909s
EU-155	420.73	105.31	536.	15.	0.008	221.96	0.911s
Np-239	424.00	106.13	292.	-15.	-0.008	168.38	0.912s
Se-75	483.92	121.12	155.	-18.	-0.010	102.58	0.927s
EU-152	486.56	121.78	173.	-18.	-0.010	107.87	0.928s
EU-154	491.84	123.10	162.	15.	0.008	122.75	0.929s
PA-234	524.60	131.29	249.	-19.	-0.011	119.77	0.938s
HF-181	531.51	133.02	388.	-17.	-0.009	166.03	0.939s
CE-144	533.57	133.54	400.	-17.	-0.010	165.42	0.940s
Se-75	543.41	136.00	417.	-17.	-0.010	168.48	0.942s
HF-181	544.61	136.30	435.	-17.	-0.010	171.78	0.943s
CO-57	545.30	136.47	452.	-7.	-0.004	424.78	0.943s
Tc-99m	561.44	140.51	459.	0.	0.000	1000.00	0.947D
Mo-99	561.44	140.51	459.	0.	0.000	1000.00	0.947D
U-235	574.53	143.79	459.	0.	0.000	1000.00	0.950s
CE-141	581.15	145.44	386.	16.	0.009	177.04	0.952s
Kr-85m	603.38	151.00	73.	-6.	-0.004	243.87	0.957s
Ba-140	649.99	162.66	127.	-9.	-0.005	186.77	0.969s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	652.87	163.38	112.	-13.	-0.007	120.00	0.970
CE-139	662.76	165.85	110.	14.	0.008	112.81	0.973s
Cf-251	705.72	176.60	55.	2.	0.001	697.32	0.983s
Mo-99	723.59	181.07	73.	-9.	-0.005	133.82	0.988s
Lu-172	725.19	181.47	67.	13.	0.007	91.16	0.988s
TH-229	773.32	193.51	37.	2.	0.001	489.90	1.000s
U-235	820.59	205.33	44.	12.	0.007	105.80	1.012s
TH-229	842.65	210.85	48.	3.	0.002	391.34	1.018s
Cf-251	907.22	227.00	40.	11.	0.006	115.52	1.034s
TH-227	943.09	235.97	401.	-19.	-0.011	149.38	1.043
PB-212	953.73	238.63	31.	81.	0.045	14.78	1.045D
PB-214	967.18	242.00	40.	28.	0.015	37.63	1.049D
EU-152	977.96	244.69	315.	-17.	-0.010	148.45	1.051s
TH-227	1024.13	256.24	44.	13.	0.007	100.93	1.063s
Cd-113m	1053.96	263.70	48.	-5.	-0.003	201.00	1.070s
Se-75	1057.80	264.66	79.	-15.	-0.009	85.60	1.071s
BI-210M	1062.48	265.83	105.	-5.	-0.003	315.67	1.072s
TL-208	1108.27	277.28	51.	4.	0.002	281.23	1.084
Hg-203	1115.93	279.20	69.	-9.	-0.005	139.42	1.086s
Se-75	1117.29	279.54	77.	-5.	-0.003	237.17	1.086s
I-131	1136.32	284.30	66.	-16.	-0.009	97.74	1.091s
PB-214	1178.92	294.95	21.	57.	0.032	22.46	1.395s
TL-210	1183.11	296.00	249.	-10.	-0.006	221.80	1.102s
PB-212	1199.22	300.03	239.	0.	0.000	1000.00	1.106
PA-231	1199.38	300.07	239.	0.	0.000	1000.00	1.106s
PA-233	1199.82	300.18	239.	0.	0.000	1000.00	1.107s
PA-231	1209.70	302.65	239.	0.	0.000	1000.00	1.109s
BA-133	1210.50	302.85	239.	0.	0.000	1000.00	1.109s
Kr-85m	1216.97	304.47	239.	0.	0.000	1000.00	1.111s
Ba-140	1218.49	304.85	239.	0.	0.000	1000.00	1.111s
BI-210M	1218.68	304.90	239.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	239.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	239.	0.	0.000	1000.00	1.118s
Ir-192	1265.04	316.49	239.	0.	0.000	1000.00	1.123s
CR-51	1279.41	320.08	259.	-12.	-0.007	185.97	1.126s
La-140	1314.10	328.76	64.	12.	0.007	100.31	1.135s
Cf-249	1332.81	333.44	103.	-14.	-0.008	103.87	1.139s
AC-228	1352.33	338.32	82.	12.	0.007	111.51	1.144
Cs-136	1361.32	340.57	94.	6.	0.003	250.27	1.146s
Hf-175	1372.64	343.40	100.	0.	0.000	1000.00	1.149s
EU-152	1376.18	344.29	100.	0.	0.000	1000.00	1.150s
HF-181	1382.35	345.83	72.	10.	0.005	126.10	1.151
PB-214	1405.47	351.61	25.	75.	0.041	17.55	1.125
BA-133	1423.02	356.00	169.	-13.	-0.007	140.01	1.162s
I-131	1456.95	364.48	28.	9.	0.005	88.06	1.170s
Mo-99	1464.69	366.42	36.	8.	0.005	108.36	1.172s
BA-133	1534.35	383.84	112.	-14.	-0.008	107.87	1.189s
Cf-249	1550.79	387.95	106.	-9.	-0.005	159.02	1.193s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SN-113	1565.74	391.69	145.	-15.	-0.008	116.47	1.196s
Se-75	1601.61	400.66	37.	-2.	-0.001	376.07	1.205s
Cm-247	1608.57	402.40	18.	7.	0.004	90.18	1.207
SB-125	1710.45	427.88	40.	-14.	-0.008	95.43	1.232s
AG-108M	1734.69	433.94	48.	-13.	-0.007	107.97	1.238s
PM-146	1814.45	453.88	12.	5.	0.003	142.83	1.257
SB-125	1852.39	463.37	22.	8.	0.004	94.27	1.266
Ir-192	1871.16	468.06	29.	8.	0.004	106.12	1.271s
BE-7	1909.29	477.60	103.	-14.	-0.008	105.62	1.280s
HF-181	1926.90	482.00	106.	-13.	-0.007	111.91	1.284s
La-140	1946.98	487.02	131.	-14.	-0.008	117.21	1.289s
RU-103	1987.11	497.05	12.	8.	0.004	93.84	1.298s
RH-106	2046.35	511.86	127.	16.	0.009	102.70	2.563s
Kr-85	2054.81	513.98	53.	9.	0.005	117.54	1.315s
Sr-85	2054.85	513.99	44.	9.	0.005	107.83	1.315s
Rb-83	2080.29	520.35	13.	2.	0.001	374.72	1.321s
Nd-147	2122.88	531.00	26.	-4.	-0.002	290.41	1.331s
Ba-140	2147.92	537.26	13.	6.	0.003	129.28	1.337s
Rb-83	2208.88	552.50	23.	3.	0.001	263.39	1.352s
Br-82	2216.24	554.34	30.	-4.	-0.002	192.75	1.353s
CS-134	2251.82	563.24	26.	-7.	-0.004	153.42	1.362s
CS-134	2276.15	569.32	45.	-3.	-0.002	321.46	1.367s
PA-234	2276.75	569.47	48.	0.	0.000	1000.00	1.368s
BI-207	2277.68	569.70	66.	-14.	-0.008	84.77	1.368s
TL-208	2330.98	583.03	10.	23.	0.013	31.59	1.257
SB-125	2400.87	600.50	102.	7.	0.004	211.73	1.397
SB-124	2409.79	602.73	109.	7.	0.004	218.17	1.399s
CS-134	2417.71	604.71	116.	7.	0.004	224.44	1.401s
BI-214	2436.22	609.34	4.	65.	0.036	13.69	1.661
RU-103	2440.06	610.30	123.	7.	0.004	229.97	1.406s
AG-108M	2455.99	614.28	130.	7.	0.004	235.55	1.410s
PM-144	2471.12	618.06	137.	7.	0.004	241.00	1.414s
Br-82	2475.27	619.10	194.	-11.	-0.006	181.83	1.415s
RH-106	2486.54	621.92	170.	-10.	-0.005	189.65	1.417s
SB-125	2542.43	635.89	10.	7.	0.004	74.83	1.430s
I-131	2546.77	636.97	28.	-2.	-0.001	444.58	1.432s
AG-110M	2629.91	657.76	22.	3.	0.002	228.52	1.451s
CS-137	2645.51	661.66	24.	0.	0.000	1000.00	1.455s
PM-144	2785.05	696.54	42.	-4.	-0.002	268.78	1.487s
Br-82	2792.32	698.36	46.	0.	0.000	1000.00	1.489s
NB-94	2809.41	702.63	56.	-8.	-0.005	128.61	1.493s
SB-124	2890.04	722.79	59.	-15.	-0.008	77.34	1.512s
AG-108M	2890.65	722.94	74.	-9.	-0.005	141.89	1.512s
EU-154	2892.34	723.36	82.	0.	0.000	1000.00	1.512
ZR-95	2895.69	724.20	50.	11.	0.006	99.61	1.513s
BI-212	2907.58	727.17	59.	3.	0.002	350.50	1.516s
PM-146	2941.78	735.72	28.	-2.	-0.001	380.79	1.524s
Mo-99	2956.91	739.50	38.	-8.	-0.004	116.65	1.527

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-146	2987.55	747.16	28.	-12.	-0.007	97.89	1.535s
ZR-95	3025.83	756.73	19.	-5.	-0.003	201.78	1.543s
AG-110M	3054.69	763.94	35.	-1.	-0.001	842.61	1.550s
NB-95	3062.08	765.79	37.	1.	0.001	866.03	1.552s
PA-234M	3064.57	766.41	32.	7.	0.004	114.63	1.552s
Br-82	3104.93	776.50	18.	2.	0.001	413.66	1.561s
Mo-99	3110.61	777.92	20.	0.	0.000	1000.00	1.563s
EU-152	3114.61	778.92	14.	5.	0.003	119.15	1.564s
BI-212	3140.62	785.42	0.	8.	0.004	35.36	1.570
CS-134	3182.43	795.87	26.	10.	0.005	81.88	1.579s
TL-210	3197.35	799.60	35.	0.	0.000	1000.00	1.583s
CS-134	3206.76	801.95	18.	6.	0.003	117.84	1.585s
CO-58	3242.06	810.78	19.	8.	0.004	86.42	1.593s
La-140	3262.05	815.77	27.	5.	0.003	148.47	1.598s
Br-82	3310.14	827.79	33.	-13.	-0.007	99.76	1.609s
MN-54	3338.38	834.85	14.	-2.	-0.001	403.11	1.615s
Co-56	3386.08	846.77	20.	-5.	-0.003	201.66	1.626s
TL-208	3441.27	860.56	5.	14.	0.008	44.13	1.638s
NB-94	3483.41	871.10	12.	6.	0.003	91.29	1.648s
Ge-69	3487.03	872.00	23.	-5.	-0.003	142.83	1.649s
EU-154	3491.95	873.23	20.	-2.	-0.001	434.61	1.650s
PA-234	3521.16	880.53	52.	-13.	-0.007	84.28	1.657s
PA-234	3532.00	883.24	65.	-7.	-0.004	177.10	1.659s
AG-110M	3537.78	884.68	29.	6.	0.003	138.30	1.660s
Sc-46	3556.17	889.28	68.	-5.	-0.003	218.41	1.664s
Y-88	3591.22	898.04	25.	-11.	-0.006	71.00	1.672s
Lu-172	3601.83	900.69	52.	-7.	-0.004	150.51	1.675s
AC-228	3643.36	911.07	20.	12.	0.007	88.87	1.684s
AG-110M	3749.09	937.49	25.	-13.	-0.007	88.99	1.708s
V-48	3776.33	944.30	23.	-9.	-0.005	80.18	1.714s
EU-152	3855.60	964.11	8.	6.	0.003	74.80	1.732s
AC-228	3875.05	968.97	22.	6.	0.003	128.75	1.736s
V-48	3933.20	983.50	10.	4.	0.002	180.85	1.749s
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	16.	6.	0.003	101.37	1.765s
EU-154	4018.33	1004.77	23.	5.	0.003	136.03	1.768s
Co-56	4150.66	1037.84	26.	9.	0.005	88.70	1.798s
Br-82	4175.31	1044.00	35.	7.	0.004	128.73	1.803s
Cs-136	4191.60	1048.07	42.	0.	0.000	1000.00	1.807s
RH-106	4200.76	1050.36	43.	0.	0.000	1000.00	1.809s
BI-207	4253.99	1063.66	11.	3.	0.002	229.35	1.820s
Ga-68	4308.98	1077.40	11.	5.	0.003	145.77	1.833s
Lu-172	4373.98	1093.64	117.	-14.	-0.008	109.57	1.847
Ge-69	4425.45	1106.50	52.	9.	0.005	116.34	1.858s
ZN-65	4461.66	1115.55	46.	8.	0.004	127.71	1.866s
BI-214	4480.63	1120.29	32.	9.	0.005	93.09	1.870s
Sc-46	4481.68	1120.55	37.	7.	0.004	121.41	1.870s
Ta-182	4484.69	1121.30	44.	1.	0.001	706.22	1.871s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.57	1173.24	21.	-8.	-0.005	130.66	1.916s
Ta-182	4755.86	1189.05	5.	7.	0.004	87.20	1.930
Ta-182	4885.39	1221.41	0.	22.	0.012	21.32	1.957
Co-56	4952.92	1238.28	34.	-10.	-0.006	140.36	1.972s
NA-22	5098.03	1274.53	28.	-10.	-0.006	79.21	2.003s
EU-154	5098.08	1274.54	39.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	6.	7.	0.004	88.04	2.017s
V-48	5246.44	1311.60	9.	7.	0.004	70.75	2.034s
TL-210	5252.04	1313.00	16.	1.	0.001	623.91	2.036s
Br-82	5269.78	1317.43	27.	-7.	-0.004	107.37	2.039s
CO-60	5330.11	1332.50	6.	3.	0.002	176.21	2.052s
AG-110M	5537.48	1384.30	11.	-2.	-0.001	344.64	2.096s
EU-152	5632.39	1408.00	6.	3.	0.002	205.48	2.115s
K-40	5843.83	1460.81	0.	264.	0.147	6.15	2.060
Br-82	5900.17	1474.88	0.	0.	0.000	1000.00	2.171s
La-140	6386.02	1596.21	6.	-2.	-0.001	304.14	2.269s
BI-214	7060.00	1764.49	0.	11.	0.006	30.15	2.403s
Co-56	7087.48	1771.35	11.	0.	0.000	1000.00	2.408s
Y-88	7346.69	1836.06	7.	-3.	-0.001	254.34	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.5622E+00				5.31E+01	
			477.60	-4.562E+00	?(	1.624E+01 1.06E+02 1.05E+01	G
NA-22	C	-7.2584E-01				9.50E+02	
			1274.53	-7.258E-01	?(	1.933E+00 7.92E+01 9.99E+01	G
K-40	N	1.9327E+02				4.66E+11	
			1460.83	1.933E+02	(	5.395E+00 6.15E+00 1.07E+01	G
Sc-46	F	8.9192E-02				8.38E+01	
			889.28	-2.928E-01	?(	2.212E+00 2.18E+02 1.00E+02	G
			1120.55	4.712E-01	&(	1.969E+00 1.21E+02 1.00E+02	G
CR-51	F	-3.1303E+00				2.77E+01	
			320.08	-3.130E+00	?(	1.964E+01 1.86E+02 9.94E+00	G
MN-54	C	-1.0282E-01				3.12E+02	
			834.85	-1.028E-01	&(	1.036E+00 4.03E+02 1.00E+02	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	4.5921E-01					4.45E+01	
			1099.25	-7.074E-02	&(	4.292E+00	1.72E+03	5.65E+01 G
			1291.60	1.152E+00	?(	2.266E+00	8.80E+01	4.32E+01 G
Co-56	C	2.3905E-01					7.73E+01	
			846.77	-2.598E-01	?(	1.224E+00	2.02E+02	9.99E+01 G
			1238.28	-1.039E+00	+	3.106E+00	1.40E+02	6.61E+01 G
			1037.84	3.767E+00	?(	1.134E+01	8.87E+01	1.41E+01 G
			1771.35	0.000E+00	-	1.077E+01	1.00E+03	1.55E+01 A
CO-57	C	-1.2070E-02					2.72E+02	
			122.06	-1.207E-02	%(	1.168E+00	2.82E+03	8.56E+01 G
			136.47	-1.012E+00	+	1.450E+01	4.25E+02	1.07E+01 G
CO-58	C	3.9640E-01					7.09E+01	
			810.78	3.964E-01	?(	1.165E+00	8.64E+01	9.95E+01 G
CO-60	F	2.4221E-01					1.93E+03	
			1332.50	2.422E-01	?(	1.003E+00	1.76E+02	1.00E+02 G
			1173.24	-5.500E-01	+	1.599E+00	1.31E+02	9.99E+01 G
ZN-65	F	9.8335E-01					2.44E+02	
			1115.55	9.833E-01	?(	4.313E+00	1.28E+02	5.06E+01 G
ZR-95	I	2.6837E-01					6.40E+01	
			756.73	-4.103E-01	?(	2.008E+00	2.02E+02	5.45E+01 G
			724.20	1.106E+00	?(	3.735E+00	9.96E+01	4.42E+01 G
NB-95	I	4.8397E-02					6.40E+01	
			765.79	4.840E-02	?(	1.503E+00	8.66E+02	9.98E+01 G
RU-103	I	3.0239E-01					3.93E+01	
			497.05	3.024E-01	?(	7.292E-01	9.38E+01	9.09E+01 G
			610.30	4.924E+00	?	3.873E+01	2.30E+02	5.75E+00 GA
RH-106	I	-4.1208E+00					3.74E+02	
			621.92	-4.121E+00	?(	2.652E+01	1.90E+02	9.93E+00 G
			1050.36	0.000E+00	+	1.295E+02	1.00E+03	1.56E+00 G
			511.86	2.875E+00	?	9.925E+00	1.03E+02	2.00E+01 GA
AG-108M	C	-4.5588E-01					1.53E+05	
			433.94	-4.559E-01	?(	1.227E+00	1.08E+02	9.05E+01 G
			722.94	-4.487E-01	+	2.176E+00	1.42E+02	9.08E+01 G
			614.28	3.175E-01	+	2.556E+00	2.36E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.6253E-01					2.50E+02	
			657.76	1.371E-01	?(	1.123E+00	2.29E+02	9.46E+01 G
			884.68	4.259E-01	?(	2.051E+00	1.38E+02	7.27E+01 G
			937.49	-2.115E+00	+	4.231E+00	8.90E+01	3.44E+01 G
			1384.30	-7.190E-01	+	5.669E+00	3.45E+02	2.43E+01 G
			763.94	-2.164E-01	&	6.552E+00	8.43E+02	2.23E+01 G
SN-113	F	-6.8744E-01					1.15E+02	
			391.69	-6.874E-01	&(	2.697E+00	1.16E+02	6.40E+01 G
SB-124	F	2.8408E-01					6.02E+01	
			602.73	2.841E-01	?(	2.123E+00	2.18E+02	9.83E+01 G
			1690.98	-6.148E-02	%	2.663E+00	1.88E+03	4.78E+01 G
			722.79	-6.370E+00	+	1.645E+01	7.73E+01	1.08E+01 G
SB-125	I	2.4528E-01					1.01E+03	
			427.88	-1.436E+00	?(	3.413E+00	9.54E+01	2.96E+01 G
			600.50	1.556E+00	+	1.129E+01	2.12E+02	1.79E+01 G
			635.89	2.624E+00	?(	6.600E+00	7.48E+01	1.13E+01 G
			463.37	2.428E+00	?(	7.825E+00	9.43E+01	1.05E+01 G
I-131	I	3.0900E-01					8.02E+00	
			364.48	3.090E-01	?(	9.227E-01	8.81E+01	8.17E+01 G
			284.30	-6.022E+00	+	1.519E+01	9.77E+01	6.14E+00 G
			636.97	-1.002E+00	+	1.605E+01	4.45E+02	7.17E+00 G
Gd-153	F	8.5611E-01					2.42E+02	
			97.50	7.403E-01	?(	5.253E+00	2.11E+02	3.00E+01 G
			103.20	1.015E+00	?(	7.373E+00	2.16E+02	2.18E+01 G
Ga-68	C	1.1673E+01					4.71E-02	
			1077.40	1.167E+01	&(	3.924E+01	1.46E+02	3.30E+00 G
BA-133	F	-5.8842E-01					3.85E+03	
			356.00	-5.884E-01	?(	2.782E+00	1.40E+02	6.20E+01 G
			302.85	0.000E+00	+	9.831E+00	1.00E+03	1.83E+01 G
			383.84	-4.625E+00	+	1.681E+01	1.08E+02	8.94E+00 GA
			80.99	6.800E-01	?	5.184E+00	2.27E+02	3.41E+01 GA
CS-134	I	5.3541E-01					7.54E+02	
			795.87	5.516E-01	&(	1.524E+00	8.19E+01	8.55E+01 G
			604.71	2.870E-01	?(	2.205E+00	2.24E+02	9.76E+01 G
			569.32	-7.588E-01	+	8.593E+00	3.21E+02	1.54E+01 G
			801.95	3.167E+00	?(	1.302E+01	1.18E+02	8.69E+00 G
			563.24	-3.236E+00	+	1.224E+01	1.53E+02	8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	F	2.7600E-01					1.38E+02	
			165.85	2.760E-01	?(	1.051E+00	1.13E+02	7.99E+01 G
Ba-140	I	9.1677E-01					1.28E+01	
			537.26	9.168E-01	?(	2.981E+00	1.29E+02	2.44E+01 G
			162.66	-2.253E+00	+	1.434E+01	1.87E+02	6.22E+00 G
			304.85	0.000E+00	-	4.222E+01	1.00E+03	4.29E+00 G
La-140	I	2.8550E-01					1.28E+01	
			1596.21	-1.760E-01	?(	1.243E+00	3.04E+02	9.54E+01 G
			487.02	-1.078E+00	&	4.262E+00	1.17E+02	4.55E+01 G
			328.76	1.495E+00	?(	5.073E+00	1.00E+02	2.03E+01 G
			815.77	1.122E+00	?(	5.830E+00	1.48E+02	2.33E+01 G
CE-141	I	5.0986E-01					3.25E+01	
			145.44	5.099E-01	?(	3.031E+00	1.77E+02	4.82E+01 G
CE-144	I	-2.3589E+00					2.85E+02	
			133.54	-2.359E+00	(	1.309E+01	1.65E+02	1.11E+01 G
PM-144	C	6.5338E-02					3.63E+02	
			696.54	-1.594E-01	?(	1.507E+00	2.69E+02	9.90E+01 G
			618.06	2.899E-01	?(	2.386E+00	2.41E+02	9.91E+01 G
EU-152	F	5.7663E-01					4.94E+03	
			121.78	-9.216E-01	(	3.337E+00	1.08E+02	2.86E+01 G
			344.29	0.000E+00	&	4.946E+00	1.00E+03	2.65E+01 G
			1112.07	4.190E-01	%	1.817E+01	1.23E+03	1.36E+01 G
			778.92	1.826E+00	?(	7.651E+00	1.19E+02	1.29E+01 G
			964.11	2.401E+00	?(	6.043E+00	7.48E+01	1.46E+01 G
			244.69	-4.661E+00	+	2.323E+01	1.48E+02	7.58E+00 G
			1408.00	1.083E+00	?	5.101E+00	2.05E+02	2.10E+01 GA
EU-154	I	1.2821E+00					3.14E+03	
			123.10	5.491E-01	?(	2.270E+00	1.23E+02	4.08E+01 G
			1274.54	0.000E+00	-	6.321E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.031E+01	1.00E+03	2.02E+01 G
			873.23	-6.491E-01	&	1.030E+01	4.35E+02	1.23E+01 G
			1004.77	1.710E+00	?(	8.142E+00	1.36E+02	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
EU-155	I	8.6381E-01					1.81E+03	
			105.31	1.044E+00	?(	7.777E+00	2.22E+02	2.12E+01 G
			86.54	7.390E-01	&(	5.819E+00	2.35E+02	3.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F -2.0778E-01					4.24E+01	
		482.00	-5.715E-01	?(	2.159E+00	1.12E+02	8.05E+01 G
		133.02	-5.925E-01	+	3.301E+00	1.66E+02	4.33E+01 G
		345.83	1.735E+00	&(	7.454E+00	1.26E+02	1.51E+01 G
		136.30	-4.507E+00	+	2.596E+01	1.72E+02	5.85E+00 G
Ta-182	F 2.5956E+00					1.14E+02	
		1121.30	2.435E-01	?(	6.119E+00	7.06E+02	3.49E+01 G
		1221.41	5.537E+00	(	1.855E+00	2.13E+01	2.70E+01 G
		1189.05	2.760E+00	(	5.538E+00	8.72E+01	1.62E+01 G
Hg-203	F -2.4133E-01					4.66E+01	
		279.20	-2.413E-01	?(	1.151E+00	1.39E+02	8.15E+01 G
TL-208	N 1.0865E+00					6.98E+02	
		583.02	1.070E+00	(P	8.233E-01	3.16E+01	8.45E+01 G
		277.28	1.311E+00	(	1.291E+01	2.81E+02	6.31E+00 G
		860.56	5.922E+00	&	5.554E+00	4.41E+01	1.24E+01 G
PM-146	C 2.5254E-01					2.02E+03	
		453.88	2.525E-01	?(	9.522E-01	1.43E+02	6.50E+01 G
		747.16	-1.674E+00	&	3.819E+00	9.79E+01	3.40E+01 G
		735.72	-4.170E-01	+	5.707E+00	3.81E+02	2.25E+01 G
Y-88	F -2.5458E-01					1.07E+02	
		1836.06	-2.546E-01	?(	1.407E+00	2.54E+02	9.92E+01 G
		898.04	-6.361E-01	+	1.504E+00	7.10E+01	9.37E+01 G
Cd-113m	-1.8125E+03					5.33E+03	
		263.70	-1.813E+03	?(	1.269E+04	2.01E+02	6.00E-03 K
Cd-109	F 5.9607E+00					4.53E+02	
		88.04	5.961E+00	?(	4.855E+01	2.43E+02	3.79E+00 G
Se-75	-1.8181E-01					1.20E+02	
		264.66	-5.723E-01	&(	1.642E+00	8.56E+01	5.85E+01 G
		136.00	-4.517E-01	+	2.553E+00	1.68E+02	5.83E+01 G
		279.54	-4.885E-01	+	4.001E+00	2.37E+02	2.48E+01 G
		121.12	-1.535E+00	+	5.281E+00	1.03E+02	1.71E+01 G
		400.66	-6.127E-01	+	8.188E+00	3.76E+02	1.14E+01 G
		96.73	6.497E+00	&(	4.545E+01	2.08E+02	3.42E+00 G
Cf-251	T 1.9791E-01					3.28E+05	
		176.60	1.979E-01	?(	3.688E+00	6.97E+02	1.70E+01 G
		227.00	3.314E+00	?	1.004E+01	1.16E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	-4.1286E-01					1.28E+05	
			387.95	-4.129E-01	?(	2.237E+00	1.59E+02	6.60E+01 G
			333.44	-2.388E+00	+	8.356E+00	1.04E+02	1.55E+01 G
Sn-126		-3.1428E+00					3.65E+07	
			87.57	6.032E-01	+	4.859E+00	2.40E+02	3.75E+01 GA
			64.28	-3.143E+00	?(	1.462E+01	1.38E+02	9.70E+00 G
			86.94	2.506E+00	?	1.997E+01	2.38E+02	9.04E+00 GA
PB-210	N	4.5019E+00					8.14E+03	
			46.54	4.502E+00	(P	2.827E+01	2.00E+02	4.25E+00 G
PB-212	N	3.7964E+00					6.98E+02	
			238.63	3.796E+00	(P	1.337E+00	1.48E+01	4.33E+01 G
			300.03	0.000E+00	-	5.456E+01	1.00E+03	3.28E+00 GA
PB-214	N	5.9200E+00					5.84E+05	
			351.93	5.364E+00	(P	1.883E+00	1.75E+01	3.76E+01 G
			295.09	7.002E+00	(	2.937E+00	2.25E+01	1.93E+01 G
			242.00	7.639E+00	P	8.885E+00	3.76E+01	7.43E+00 GA
BI-207	C	-5.6815E-01					1.18E+04	
			569.70	-5.681E-01	(	1.616E+00	8.48E+01	9.77E+01 G
			1063.66	2.743E-01	+	1.475E+00	2.29E+02	7.45E+01 G
BI-212	N	1.9373E+00					6.98E+02	
			727.17	1.937E+00	?(	2.375E+01	3.50E+02	7.55E+00 G
			785.42	3.074E+01	?	2.832E+01	3.54E+01	1.28E+00 GA
BI-214	N	5.9370E+00					5.84E+05	
			609.31	5.738E+00	(	1.101E+00	1.37E+01	4.61E+01 G
			1120.29	3.881E+00	-	1.228E+01	9.31E+01	1.51E+01 G
			1764.49	6.532E+00	?(	4.376E+00	3.02E+01	1.54E+01 G
BI-210M	T	-2.0342E-01					1.10E+09	
			265.83	-2.034E-01	(	2.212E+00	3.16E+02	5.00E+01 G
			304.90	0.000E+00	+	6.469E+00	1.00E+03	2.80E+01 G
AC-228	N	2.1724E+00					2.10E+03	
			911.07	2.212E+00	?(	4.446E+00	8.89E+01	2.90E+01 G
			968.97	1.810E+00	&(	8.134E+00	1.29E+02	1.75E+01 G
			338.32	2.605E+00	?(	9.835E+00	1.12E+02	1.20E+01 G
			93.35	-4.182E-06	%	3.325E+01	2.36E+08	5.56E+00 XA
TH-227	N	3.8941E+00					7.95E+03	
			256.24	3.894E+00	?(	1.023E+01	1.01E+02	7.00E+00 G
			235.97	-3.133E+00	-	1.568E+01	1.49E+02	1.23E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		50.14	-4.886E+00	+	2.074E+01	1.26E+02	8.00E+00 G
TH-229	N 1.3996E+00					2.68E+06	
		193.51	9.382E-01	&(	1.243E+01	4.90E+02	4.40E+00 G
		210.85	2.079E+00	?(	2.175E+01	3.91E+02	2.99E+00 G
TH-234	N 1.6072E+01					1.63E+12	
		92.59	1.046E+01	(P	1.248E+01	4.53E+01	5.58E+00 G
		63.29	2.430E+01	*(P	1.935E+01	3.15E+01	3.81E+00 G
PA-234	N -1.5920E+00					1.63E+12	
		131.29	-1.592E+00	?(	6.393E+00	1.20E+02	1.80E+01 G
		946.02	-1.400E-01	%	1.255E+01	2.48E+03	1.34E+01 G
		569.47	0.000E+00	+	1.661E+01	1.00E+03	8.20E+00 G
		883.24	-3.691E+00	+	2.252E+01	1.77E+02	9.60E+00 G
		880.53	-1.147E+01	+	3.247E+01	8.43E+01	6.00E+00 GA
PA-234M	N 6.3152E+01					1.63E+12	
		1001.00	4.300E+01	?(	1.507E+02	1.01E+02	8.37E-01 G
		766.41	1.205E+02	?(	4.756E+02	1.15E+02	2.94E-01 G
U-235	N 1.3990E+00					2.57E+11	
		143.79	0.000E+00	&(	1.444E+01	1.00E+03	1.10E+01 G
		205.33	4.459E+00	(	1.231E+01	1.06E+02	5.01E+00 G
		163.38	-4.094E+00	+	1.661E+01	1.20E+02	5.08E+00 G
		185.72	-5.344E-02	% P	1.505E+00	1.02E+03	5.40E+01 GA
AM-241	T -7.2329E-01					1.58E+05	
		59.54	-7.233E-01	&(	3.999E+00	1.64E+02	3.59E+01 G
Np-237	F 1.7319E+00					2.14E+06	
		86.49	1.732E+00	?(	1.347E+01	2.32E+02	1.31E+01 G
Ir-192	F 1.8520E-01					7.40E+01	
		316.49	0.000E+00	?(	2.141E+00	1.00E+03	8.70E+01 G
		468.06	4.967E-01	?(	1.809E+00	1.06E+02	5.18E+01 G
		308.44	0.000E+00	&	5.755E+00	1.00E+03	3.18E+01 G
Cs-136	F 1.1148E-01					1.30E+01	
		818.50	1.689E-02	%(	1.487E+00	2.43E+03	1.00E+02 G
		1048.07	0.000E+00	-	2.494E+00	1.00E+03	8.00E+01 G
		340.57	3.132E-01	?(	2.698E+00	2.50E+02	4.69E+01 G
Np-239	T -9.5324E-01					2.36E+00	
		103.70	9.225E-01	?	6.789E+00	2.19E+02	2.40E+01 X
		106.13	-9.532E-01	?(	5.402E+00	1.68E+02	2.27E+01 G
		99.50	1.478E+00		1.062E+01	2.14E+02	1.50E+01 X

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Nd-147		-1.0420E+00					1.11E+01	
			531.00	-1.042E+00	?(	7.566E+00	2.90E+02	1.30E+01 G
			91.10	3.600E-03	&	6.578E+00	5.42E+04	2.83E+01 G
Mo-99	I	-3.0413E+00					2.75E+00	
			739.50	-3.041E+00	?(	1.218E+01	1.17E+02	1.21E+01 G
			181.07	-2.656E+00	+	1.213E+01	1.34E+02	5.99E+00 G
							Energy duplication	
			140.51	0.000E+00	+	3.479E+01	1.00E+03	4.52E+00 G
			777.92	0.000E+00	+	2.701E+01	1.00E+03	4.26E+00 G
			366.42	1.931E+01	?	7.164E+01	1.08E+02	1.19E+00 GA
Ge-69	C	2.2287E+00					1.62E+00	
			1106.50	2.229E+00	?(	8.852E+00	1.16E+02	2.60E+01 G
			574.00	8.895E-02	%	1.455E+01	4.66E+03	1.18E+01 G
			872.00	-2.778E+00	+	1.392E+01	1.43E+02	9.59E+00 G
Br-82	F	4.3830E-01					1.47E+00	
			776.50	8.818E-02	?(	1.338E+00	4.14E+02	8.34E+01 G
			554.34	-2.263E-01	&	1.537E+00	1.93E+02	7.06E+01 G
			619.10	-1.061E+00	+	6.532E+00	1.82E+02	4.31E+01 G
			1044.00	1.481E+00	?(	6.587E+00	1.29E+02	2.80E+01 G
			698.36	0.000E+00	-	5.585E+00	1.00E+03	2.79E+01 G
			1317.43	-1.966E+00	+	7.257E+00	1.07E+02	2.70E+01 G
			827.79	-2.688E+00	+	6.226E+00	9.98E+01	2.42E+01 G
			1474.88	0.000E+00	-	3.513E+00	1.00E+03	1.66E+01 G
V-48	C	3.7349E-01					1.61E+01	
			983.50	2.315E-01	?(	1.010E+00	1.81E+02	1.00E+02 G
			1311.60	5.183E-01	?(	1.222E+00	7.08E+01	9.80E+01 G
			944.30	-6.556E+00	+	1.772E+01	8.02E+01	8.00E+00 G
Sr-85	C	3.3195E-01					6.47E+01	
			513.99	3.320E-01	?(	1.221E+00	1.08E+02	9.93E+01 G
Rb-83	P	2.7918E-01					8.62E+01	
			520.35	1.578E-01	?(	1.540E+00	3.75E+02	4.61E+01 G
			529.54	-4.096E-02	&	2.717E+00	1.77E+03	3.00E+01 G
			552.50	6.225E-01	?(	5.887E+00	2.63E+02	1.63E+01 G
Kr-85	I	7.6641E+01					3.92E+03	
			513.98	7.664E+01	?(	3.076E+02	1.18E+02	4.30E-01 G
Cm-247	T	4.6998E-01					5.70E+09	
			402.40	3.023E-01	?(	9.314E-01	9.02E+01	7.20E+01 G
			84.00	9.949E-01	*(	7.659E+00	2.29E+02	2.30E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Lu-172      -7.1142E-01                                      7.00E+01
                         1093.64-1.195E+00 ?(  4.412E+00 1.10E+02 7.52E+01 G
                          900.69-1.372E+00 +   7.116E+00 1.51E+02 2.77E+01 G
                          181.47 1.182E+00 ?(  3.627E+00 9.12E+01 1.92E+01 G

Kr-85m   I  -1.3699E-01                                      1.87E-01
                          151.00-1.370E-01 ?(  9.218E-01 2.44E+02 7.55E+01 G
                          304.47 0.000E+00 +   1.345E+01 1.00E+03 1.40E+01 G

NB-94    I  -3.4225E-02                                      7.41E+06
                          702.63-3.940E-01 &(  1.735E+00 1.29E+02 9.79E+01 G
                          871.10 3.184E-01 ?(  1.000E+00 9.13E+01 9.99E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.14	182.	-15.	-0.009	126.11	-4.886E+00
AM-241	59.54	226.	-13.	-0.007	163.86	-7.233E-01
Sn-126	64.28	254.	-17.	-0.009	138.38	-3.143E+00
BA-133	80.99	532.	14.	0.008	227.23	6.800E-01
Cm-247	84.00	546.	14.	0.008	229.47	9.949E-01
Np-237	86.49	561.	15.	0.008	231.86	1.732E+00
EU-155	86.54	575.	15.	0.008	234.74	7.390E-01
Sn-126	86.94	590.	15.	0.008	237.59	2.506E+00
Sn-126	87.57	604.	15.	0.008	240.26	6.032E-01
Cd-109	88.04	619.	15.	0.008	242.96	5.961E+00
Hf-175	89.36	633.	15.	0.008	245.43	9.580E+00
Se-75	96.73	462.	15.	0.008	208.35	6.497E+00
Gd-153	97.50	477.	15.	0.008	211.35	7.403E-01
Np-239	99.50	491.	15.	0.008	214.12	1.478E+00
Gd-153	103.20	506.	15.	0.008	216.36	1.015E+00
Np-239	103.70	521.	15.	0.008	219.33	9.225E-01
EU-155	105.31	536.	15.	0.008	221.96	1.044E+00
Np-239	106.13	292.	-15.	-0.008	168.38	-9.532E-01
Se-75	121.12	155.	-18.	-0.010	102.58	-1.535E+00
EU-152	121.78	173.	-18.	-0.010	107.87	-9.216E-01
EU-154	123.10	162.	15.	0.008	122.75	5.491E-01
PA-234	131.29	249.	-19.	-0.011	119.77	-1.592E+00
HF-181	133.02	388.	-17.	-0.009	166.03	-5.925E-01
CE-144	133.54	400.	-17.	-0.010	165.42	-2.359E+00
Se-75	136.00	417.	-17.	-0.010	168.48	-4.517E-01
HF-181	136.30	435.	-17.	-0.010	171.78	-4.507E+00
CO-57	136.47	452.	-7.	-0.004	424.78	-1.012E+00
CE-141	145.44	386.	16.	0.009	177.04	5.099E-01
Kr-85m	151.00	73.	-6.	-0.004	243.87	-1.370E-01
Ba-140	162.66	127.	-9.	-0.005	186.77	-2.253E+00
U-235	163.38	112.	-13.	-0.007	120.00	-4.094E+00
CE-139	165.85	110.	14.	0.008	112.81	2.760E-01
Cf-251	176.60	55.	2.	0.001	697.32	1.979E-01
Mo-99	181.07	73.	-9.	-0.005	133.82	-2.656E+00
Lu-172	181.47	67.	13.	0.007	91.16	1.182E+00
TH-229	193.51	37.	2.	0.001	489.90	9.382E-01
U-235	205.33	44.	12.	0.007	105.80	4.459E+00
TH-229	210.85	48.	3.	0.002	391.34	2.079E+00
Cf-251	227.00	40.	11.	0.006	115.52	3.314E+00
TH-227	235.97	401.	-19.	-0.011	149.38	-3.133E+00
EU-152	244.69	315.	-17.	-0.010	148.45	-4.661E+00
TH-227	256.24	44.	13.	0.007	100.93	3.894E+00
Cd-113m	263.70	48.	-5.	-0.003	201.00	-1.813E+03
Se-75	264.66	79.	-15.	-0.009	85.60	-5.723E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	265.83	105.	-5.	-0.003	315.67	-2.034E-01	
Hg-203	279.20	69.	-9.	-0.005	139.42	-2.413E-01	
Se-75	279.54	77.	-5.	-0.003	237.17	-4.885E-01	
I-131	284.30	66.	-16.	-0.009	97.74	-6.022E+00	
TL-210	296.00	249.	-10.	-0.006	221.80	-3.049E-01	
CR-51	320.08	259.	-12.	-0.007	185.97	-3.130E+00	
La-140	328.76	64.	12.	0.007	100.31	1.495E+00	
Cf-249	333.44	103.	-14.	-0.008	103.87	-2.388E+00	
AC-228	338.32	82.	12.	0.007	111.51	2.605E+00	
Cs-136	340.57	94.	6.	0.003	250.27	3.132E-01	
HF-181	345.83	72.	10.	0.005	126.10	1.735E+00	
BA-133	356.00	169.	-13.	-0.007	140.01	-5.884E-01	
I-131	364.48	28.	9.	0.005	88.06	3.090E-01	
Mo-99	366.42	36.	8.	0.005	108.36	1.931E+01	
BA-133	383.84	112.	-14.	-0.008	107.87	-4.625E+00	
Cf-249	387.95	106.	-9.	-0.005	159.02	-4.129E-01	
SN-113	391.69	145.	-15.	-0.008	116.47	-6.874E-01	
Se-75	400.66	37.	-2.	-0.001	376.07	-6.127E-01	
Cm-247	402.40	18.	7.	0.004	90.18	3.023E-01	
SB-125	427.88	40.	-14.	-0.008	95.43	-1.436E+00	
AG-108M	433.94	48.	-13.	-0.007	107.97	-4.559E-01	
PM-146	453.88	12.	5.	0.003	142.83	2.525E-01	
SB-125	463.37	22.	8.	0.004	94.27	2.428E+00	
Ir-192	468.06	29.	8.	0.004	106.12	4.967E-01	
BE-7	477.60	103.	-14.	-0.008	105.62	-4.562E+00	
HF-181	482.00	106.	-13.	-0.007	111.91	-5.715E-01	
La-140	487.02	131.	-14.	-0.008	117.21	-1.078E+00	
RU-103	497.05	12.	8.	0.004	93.84	3.024E-01	
RH-106	511.86	127.	16.	0.009	102.70	2.875E+00	
Kr-85	513.98	53.	9.	0.005	117.54	7.664E+01	
Sr-85	513.99	44.	9.	0.005	107.83	3.320E-01	
Rb-83	520.35	13.	2.	0.001	374.72	1.578E-01	
Nd-147	531.00	26.	-4.	-0.002	290.41	-1.042E+00	
Ba-140	537.26	13.	6.	0.003	129.28	9.168E-01	
Rb-83	552.50	23.	3.	0.001	263.39	6.225E-01	
Br-82	554.34	30.	-4.	-0.002	192.75	-2.263E-01	
CS-134	563.24	26.	-7.	-0.004	153.42	-3.236E+00	
CS-134	569.32	45.	-3.	-0.002	321.46	-7.588E-01	
BI-207	569.70	66.	-14.	-0.008	84.77	-5.681E-01	
SB-125	600.50	102.	7.	0.004	211.73	1.556E+00	
SB-124	602.73	109.	7.	0.004	218.17	2.841E-01	
CS-134	604.71	116.	7.	0.004	224.44	2.870E-01	
RU-103	610.30	123.	7.	0.004	229.97	4.924E+00	
AG-108M	614.28	130.	7.	0.004	235.55	3.175E-01	
PM-144	618.06	137.	7.	0.004	241.00	2.899E-01	
Br-82	619.10	194.	-11.	-0.006	181.83	-1.061E+00	
RH-106	621.92	170.	-10.	-0.005	189.65	-4.121E+00	
SB-125	635.89	10.	7.	0.004	74.83	2.624E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	636.97	28.	-2.	-0.001	444.58	-1.002E+00	
AG-110M	657.76	22.	3.	0.002	228.52	1.371E-01	
PM-144	696.54	42.	-4.	-0.002	268.78	-1.594E-01	
NB-94	702.63	56.	-8.	-0.005	128.61	-3.940E-01	
SB-124	722.79	59.	-15.	-0.008	77.34	-6.370E+00	
AG-108M	722.94	74.	-9.	-0.005	141.89	-4.487E-01	
ZR-95	724.20	50.	11.	0.006	99.61	1.106E+00	
BI-212	727.17	59.	3.	0.002	350.50	1.937E+00	
PM-146	735.72	28.	-2.	-0.001	380.79	-4.170E-01	
Mo-99	739.50	38.	-8.	-0.004	116.65	-3.041E+00	
PM-146	747.16	28.	-12.	-0.007	97.89	-1.674E+00	
ZR-95	756.73	19.	-5.	-0.003	201.78	-4.103E-01	
AG-110M	763.94	35.	-1.	-0.001	842.61	-2.164E-01	
NB-95	765.79	37.	1.	0.001	866.03	4.840E-02	
PA-234M	766.41	32.	7.	0.004	114.63	1.205E+02	
Br-82	776.50	18.	2.	0.001	413.66	8.818E-02	
EU-152	778.92	14.	5.	0.003	119.15	1.826E+00	
BI-212	785.42	0.	8.	0.004	35.36	3.074E+01	
CS-134	795.87	26.	10.	0.005	81.88	5.516E-01	
CS-134	801.95	18.	6.	0.003	117.84	3.167E+00	
CO-58	810.78	19.	8.	0.004	86.42	3.964E-01	
La-140	815.77	27.	5.	0.003	148.47	1.122E+00	
Br-82	827.79	33.	-13.	-0.007	99.76	-2.688E+00	
MN-54	834.85	14.	-2.	-0.001	403.11	-1.028E-01	
Co-56	846.77	20.	-5.	-0.003	201.66	-2.598E-01	
NB-94	871.10	12.	6.	0.003	91.29	3.184E-01	
Ge-69	872.00	23.	-5.	-0.003	142.83	-2.778E+00	
EU-154	873.23	20.	-2.	-0.001	434.61	-6.491E-01	
PA-234	880.53	52.	-13.	-0.007	84.28	-1.147E+01	
PA-234	883.24	65.	-7.	-0.004	177.10	-3.691E+00	
AG-110M	884.68	29.	6.	0.003	138.30	4.259E-01	
Sc-46	889.28	68.	-5.	-0.003	218.41	-2.928E-01	
Y-88	898.04	25.	-11.	-0.006	71.00	-6.361E-01	
Lu-172	900.69	52.	-7.	-0.004	150.51	-1.372E+00	
AC-228	911.07	20.	12.	0.007	88.87	2.212E+00	
AG-110M	937.49	25.	-13.	-0.007	88.99	-2.115E+00	
V-48	944.30	23.	-9.	-0.005	80.18	-6.556E+00	
EU-152	964.11	8.	6.	0.003	74.80	2.401E+00	
AC-228	968.97	22.	6.	0.003	128.75	1.810E+00	
V-48	983.50	10.	4.	0.002	180.85	2.315E-01	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	16.	6.	0.003	101.37	4.300E+01	
EU-154	1004.77	23.	5.	0.003	136.03	1.710E+00	
Co-56	1037.84	26.	9.	0.005	88.70	3.767E+00	
Br-82	1044.00	35.	7.	0.004	128.73	1.481E+00	
BI-207	1063.66	11.	3.	0.002	229.35	2.743E-01	
Ga-68	1077.40	11.	5.	0.003	145.77	1.167E+01	
Lu-172	1093.64	117.	-14.	-0.008	109.57	-1.195E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ge-69	1106.50	52.	9.	0.005	116.34	2.229E+00	
ZN-65	1115.55	46.	8.	0.004	127.71	9.833E-01	
Sc-46	1120.55	37.	7.	0.004	121.41	4.712E-01	
CO-60	1173.24	21.	-8.	-0.005	130.66	-5.500E-01	
Co-56	1238.28	34.	-10.	-0.006	140.36	-1.039E+00	
NA-22	1274.53	28.	-10.	-0.006	79.21	-7.258E-01	
FE-59	1291.60	6.	7.	0.004	88.04	1.152E+00	
V-48	1311.60	9.	7.	0.004	70.75	5.183E-01	
TL-210	1313.00	16.	1.	0.001	623.91	3.153E-01	
Br-82	1317.43	27.	-7.	-0.004	107.37	-1.966E+00	
CO-60	1332.50	6.	3.	0.002	176.21	2.422E-01	
AG-110M	1384.30	11.	-2.	-0.001	344.64	-7.190E-01	
EU-152	1408.00	6.	3.	0.002	205.48	1.083E+00	
La-140	1596.21	6.	-2.	-0.001	304.14	-1.760E-01	
Y-88	1836.06	7.	-3.	-0.001	254.34	-2.546E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	-4.5621E+00	-4.5622E+00	1.056E+02%	1.62E+01
NA-22	#A	-7.2583E-01	-7.2584E-01	7.921E+01%	1.93E+00
K-40		1.9327E+02	1.9327E+02	6.155E+00%	5.40E+00
Sc-46	#A	8.9192E-02	8.9192E-02	1.214E+02%	2.21E+00
CR-51	#A	-3.1302E+00	-3.1303E+00	1.860E+02%	1.96E+01
MN-54	#A	-1.0282E-01	-1.0282E-01	4.031E+02%	1.04E+00
FE-59	#A	4.5921E-01	4.5921E-01	8.804E+01%	4.29E+00
Co-56	#A	2.3905E-01	2.3905E-01	8.870E+01%	1.22E+00
CO-57	#A	-1.2070E-02	-1.2070E-02	2.820E+03%	1.17E+00
CO-58	#A	3.9640E-01	3.9640E-01	8.642E+01%	1.16E+00
CO-60	#A	2.4221E-01	2.4221E-01	1.762E+02%	1.00E+00
ZN-65	#A	9.8335E-01	9.8335E-01	1.277E+02%	4.31E+00
ZR-95	#A	2.6837E-01	2.6837E-01	9.961E+01%	2.01E+00
NB-95	#A	4.8397E-02	4.8397E-02	8.660E+02%	1.50E+00
RU-103	#A	3.0239E-01	3.0239E-01	9.384E+01%	7.29E-01
RH-106	#A	-4.1208E+00	-4.1208E+00	1.897E+02%	2.65E+01
AG-108M	#A	-4.5588E-01	-4.5588E-01	1.080E+02%	1.23E+00
AG-110M	#A	2.6253E-01	2.6253E-01	1.336E+02%	1.12E+00
SN-113	#A	-6.8744E-01	-6.8744E-01	1.165E+02%	2.70E+00
SB-124	#A	2.8408E-01	2.8408E-01	2.182E+02%	2.12E+00
SB-125	#A	2.4528E-01	2.4528E-01	5.120E+01%	3.41E+00
I-131	#A	3.0899E-01	3.0900E-01	8.806E+01%	9.23E-01
Gd-153	#A	8.5610E-01	8.5611E-01	1.512E+02%	5.25E+00
Ga-68	#A	1.1614E+01	1.1673E+01	1.458E+02%	3.92E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.81E+00

BA-133	#A	-5.8842E-01	-5.8842E-01	1.400E+02%	2.78E+00
CS-134	#A	5.3541E-01	5.3541E-01	8.188E+01%	1.52E+00
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
CE-139	#A	2.7600E-01	2.7600E-01	1.128E+02%	1.05E+00
Ba-140	#A	9.1675E-01	9.1677E-01	1.293E+02%	2.98E+00
La-140	#A	2.8549E-01	2.8550E-01	1.003E+02%	1.24E+00
CE-141	#A	5.0986E-01	5.0986E-01	1.770E+02%	3.03E+00
CE-144	#A	-2.3589E+00	-2.3589E+00	1.654E+02%	1.31E+01
PM-144	#A	6.5338E-02	6.5338E-02	1.805E+02%	1.51E+00
EU-152	#A	5.7663E-01	5.7663E-01	5.909E+01%	3.34E+00
EU-154	#A	1.2821E+00	1.2821E+00	6.719E+01%	2.27E+00
EU-155	#A	8.6381E-01	8.6381E-01	1.615E+02%	7.78E+00
HF-181	#A	-2.0778E-01	-2.0778E-01	8.430E+01%	2.16E+00
Ta-182	A	2.5956E+00	2.5956E+00	2.132E+01%	6.12E+00
Hg-203	#A	-2.4133E-01	-2.4133E-01	1.394E+02%	1.15E+00
TL-208		1.0865E+00	1.0865E+00	3.159E+01%	8.23E-01
PM-146	#A	2.5254E-01	2.5254E-01	1.428E+02%	9.52E-01
Y-88	#A	-2.5458E-01	-2.5458E-01	2.543E+02%	1.41E+00
Cd-113m	#A	-1.8125E+03	-1.8125E+03	2.010E+02%	1.27E+04
Cd-109	#A	5.9607E+00	5.9607E+00	2.430E+02%	4.86E+01
Se-75	#A	-1.8181E-01	-1.8181E-01	8.560E+01%	1.64E+00
Cf-251	#A	1.9791E-01	1.9791E-01	6.973E+02%	3.69E+00
Cf-249	#A	-4.1286E-01	-4.1286E-01	1.590E+02%	2.24E+00
Sn-126	#A	-3.1428E+00	-3.1428E+00	1.384E+02%	1.46E+01
PB-210	A	4.5019E+00	4.5019E+00	2.000E+02%	2.83E+01
PB-212		3.7964E+00	3.7964E+00	1.478E+01%	1.34E+00
PB-214		5.9200E+00	5.9200E+00	1.425E+01%	1.88E+00
BI-207	#A	-5.6815E-01	-5.6815E-01	8.477E+01%	1.62E+00
BI-212	#A	1.9373E+00	1.9373E+00	3.505E+02%	2.38E+01
BI-214		5.9370E+00	5.9370E+00	1.369E+01%	1.10E+00
BI-210M	#A	-2.0342E-01	-2.0342E-01	3.157E+02%	2.21E+00
AC-228	#A	2.1724E+00	2.1724E+00	6.404E+01%	4.45E+00
TH-227	#A	3.8941E+00	3.8941E+00	1.009E+02%	1.02E+01
TH-229	#A	1.3996E+00	1.3996E+00	3.135E+02%	1.24E+01
TH-234	#	1.6072E+01	1.6072E+01	2.757E+01%	1.25E+01
PA-231	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.25E+01
PA-233	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.12E+00
PA-234	#A	-1.5920E+00	-1.5920E+00	1.198E+02%	6.39E+00
PA-234M	#A	6.3152E+01	6.3152E+01	7.651E+01%	1.51E+02
U-235	#A	1.3990E+00	1.3990E+00	1.058E+02%	1.44E+01
AM-241	#A	-7.2329E-01	-7.2329E-01	1.639E+02%	4.00E+00
Np-237	#A	1.7319E+00	1.7319E+00	2.319E+02%	1.35E+01
Ir-192	#A	1.8520E-01	1.8520E-01	1.061E+02%	2.14E+00
Cs-136	#A	1.1148E-01	1.1148E-01	2.503E+02%	1.49E+00
Np-239	#A	-9.5314E-01	-9.5324E-01	1.684E+02%	5.40E+00
Nd-147	#A	-1.0420E+00	-1.0420E+00	2.904E+02%	7.57E+00
Mo-99	#A	-3.0411E+00	-3.0413E+00	1.167E+02%	1.22E+01
Ge-69	#A	2.2284E+00	2.2287E+00	1.163E+02%	8.85E+00
Br-82	#A	4.3822E-01	4.3830E-01	1.287E+02%	1.34E+00

V-48	#A	3.7348E-01	3.7349E-01	7.075E+01%	1.01E+00
Sr-85	#A	3.3195E-01	3.3195E-01	1.078E+02%	1.22E+00
Rb-83	#A	2.7918E-01	2.7918E-01	2.290E+02%	1.54E+00
Kr-85	#A	7.6641E+01	7.6641E+01	1.175E+02%	3.08E+02
Cm-247	#A	4.6998E-01	4.6998E-01	9.018E+01%	9.31E-01
Hf-175	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.50E+00
Lu-172	#A	-7.1142E-01	-7.1142E-01	7.127E+01%	4.41E+00
Kr-85m	#A	-1.3682E-01	-1.3699E-01	2.439E+02%	9.22E-01
NB-94	#A	-3.4225E-02	-3.4225E-02	7.886E+01%	1.73E+00
TL-210	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.52E+00

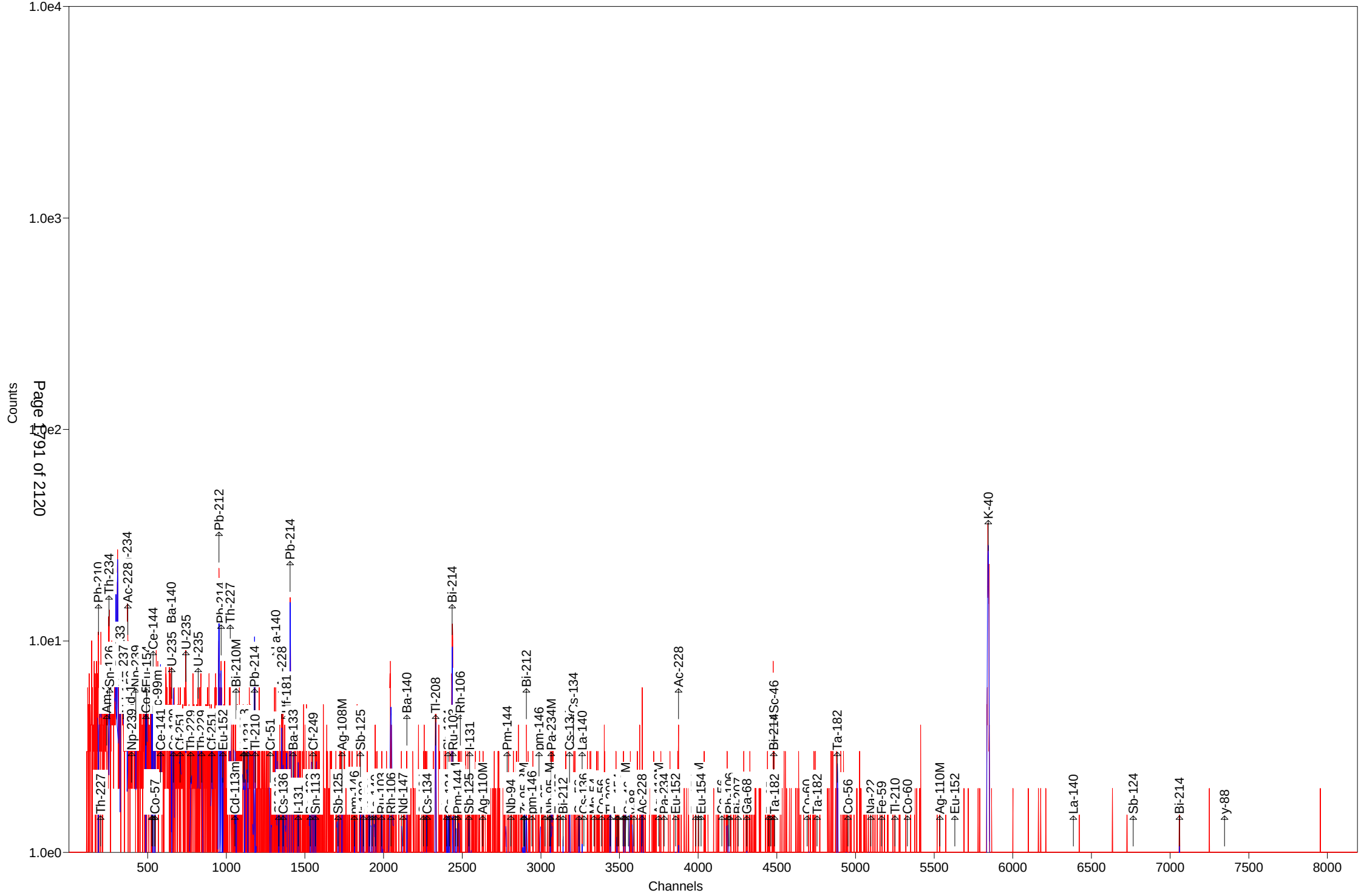
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

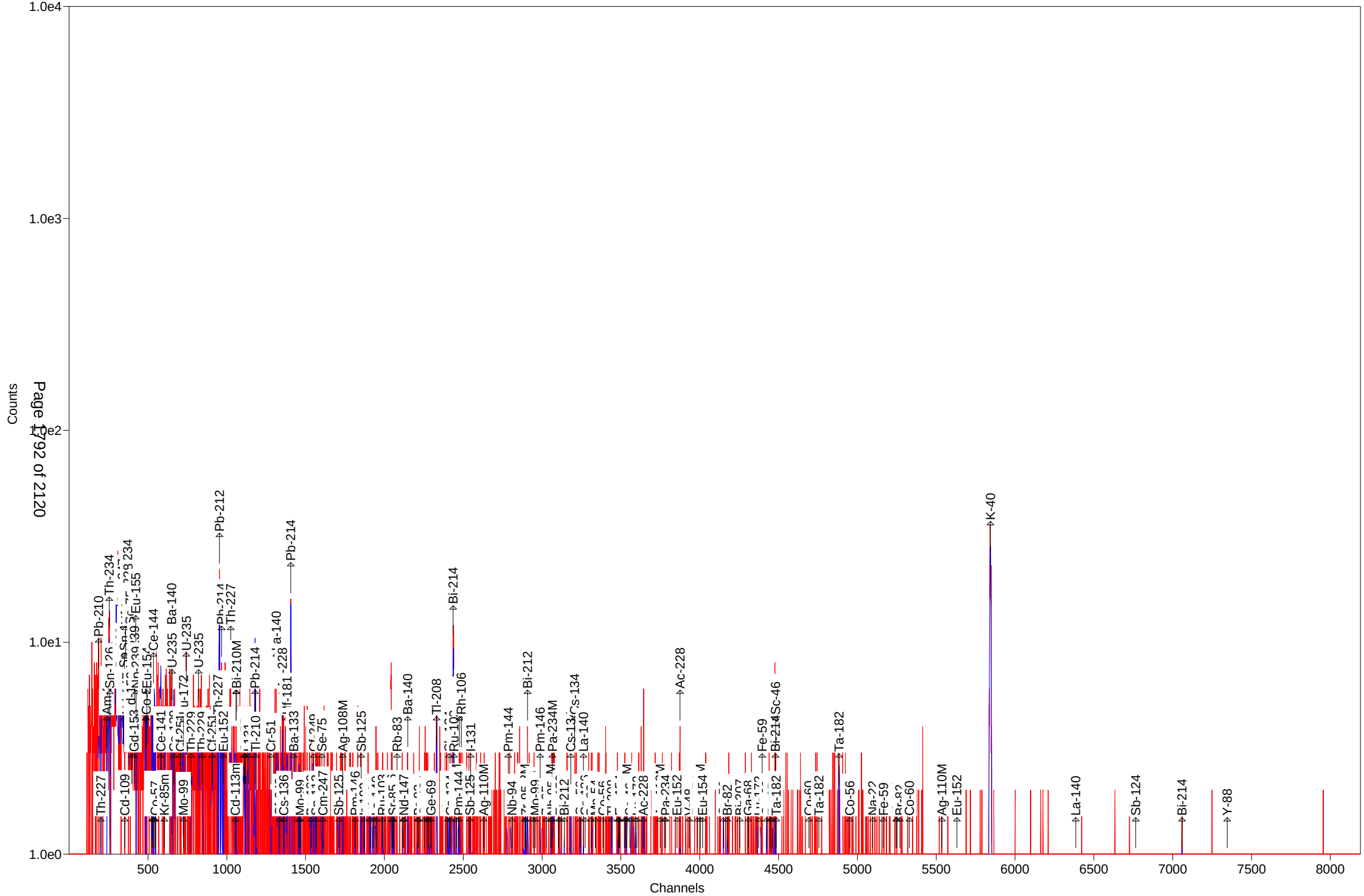
Total Activity (25.1 to 1999.1 keV) 2.261E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 2.2608044E+02 Bq/Sample

The library has energies which are not separable.

379959_Gamma_160-29881-A-37-C DU. 12_Gamma_20181534.spc.



379959_Gamma_160-29881-A-37-C DU. 12_Gamma_20181534.spc.



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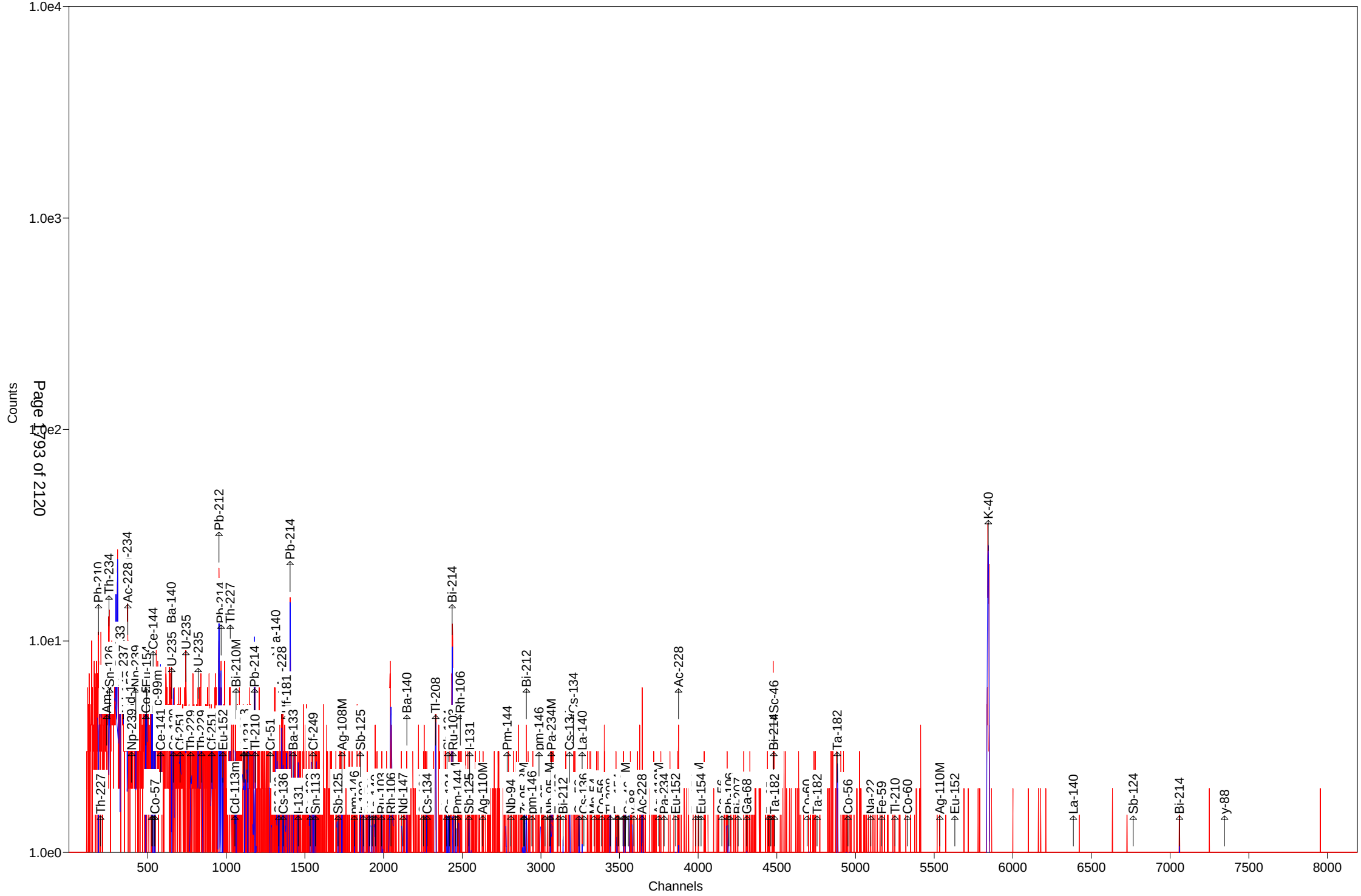

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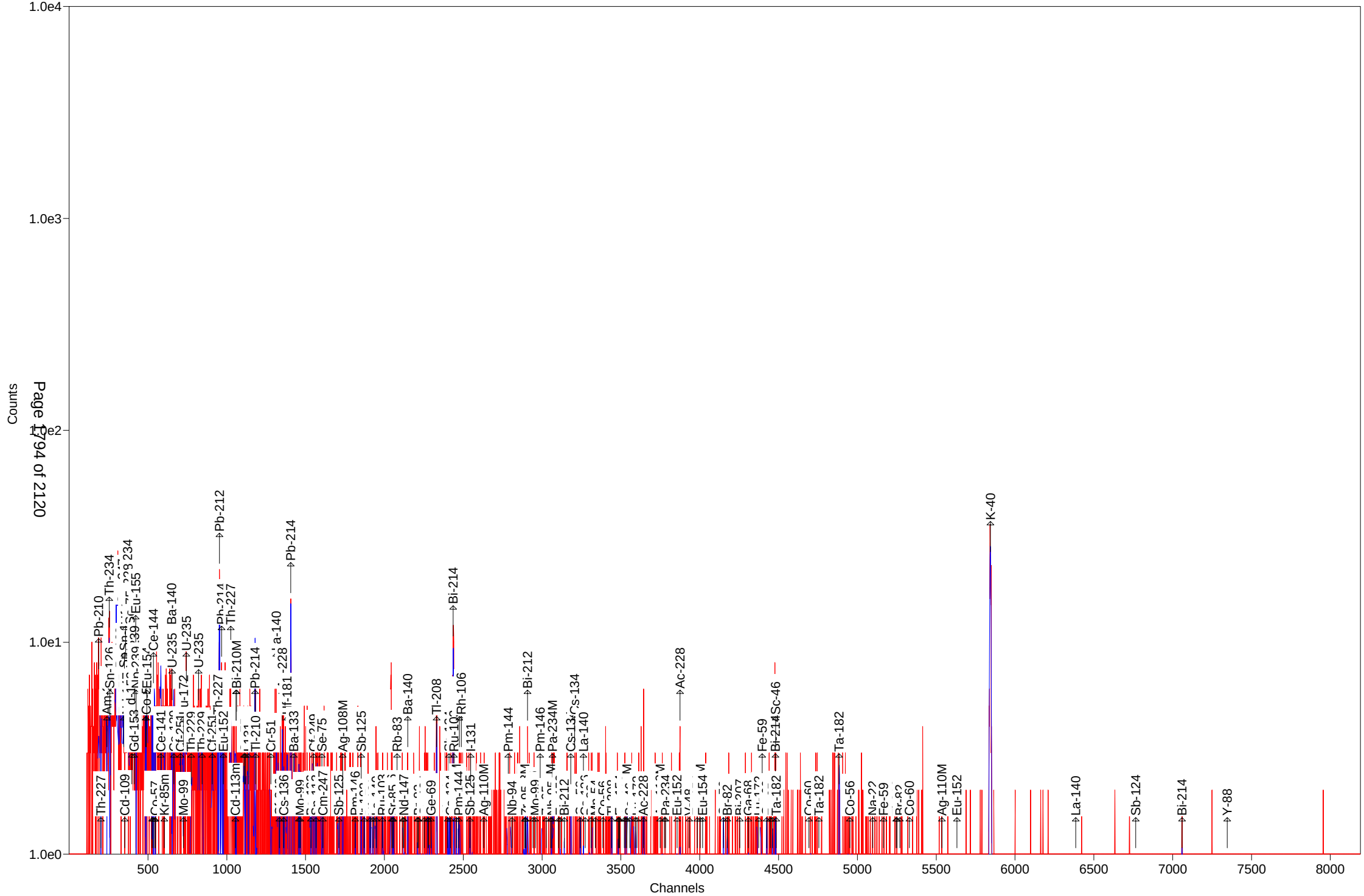

Test America St. Louis Spectrum ID: 7_Gamma_20183084

Sample Description: 379959_Gamma_160-29881-B-38-C
Detector: Detector # 7
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-B-38-C

Decay to Time: 8/23/2018 07:52 Live Time: 1800 sec
Acquisition Time: 8/23/2018 07:52:35 Real Time: 1827 sec
Analysis Time: 8/23/2018 08:23 Dead Time: 1.50 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Long_Rev14.lib
Bkgd Correction File: 7_2018-08-11_1303.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.553E+00	105.6	3.752E+00	3.757E+00	1.266E+01
NA-22	4.581E-01	62.4	2.861E-01	2.870E-01	9.266E-01
K-40	1.731E+02	6.5	1.125E+01	1.432E+01	7.673E+00
Sc-46	-2.602E-02	1539.5	4.007E-01	4.007E-01	1.419E+00
CR-51	-1.593E+00	193.6	3.085E+00	3.086E+00	1.053E+01
MN-54	-9.158E-02	403.1	3.692E-01	3.692E-01	9.225E-01
FE-59	6.905E-01	30.2	2.082E-01	2.110E-01	2.216E+00
Co-56	-6.341E-01	92.7	5.881E-01	5.890E-01	1.361E+00
CO-57	-1.884E-01	91.2	1.718E-01	1.721E-01	5.763E-01
CO-58	-6.726E-02	509.9	3.430E-01	3.430E-01	1.237E+00
CO-60	7.171E-02	558.6	4.006E-01	4.006E-01	9.854E-01
ZN-65	0.000E+00	1.#INF	2.349E-01	2.349E-01	4.031E+00
NB-94	3.208E-01	105.3	3.379E-01	3.383E-01	8.079E-01
ZR-95	-5.647E-01	144.5	8.162E-01	8.167E-01	1.942E+00
NB-95	4.576E-01	83.4	3.817E-01	3.825E-01	1.286E+00
RU-103	7.431E-02	412.4	3.065E-01	3.065E-01	7.771E-01
RH-106	3.048E+00	93.6	2.852E+00	2.856E+00	2.025E+01
AG-108M	-1.990E-01	172.0	3.423E-01	3.425E-01	8.719E-01
AG-110M	3.154E-01	49.1	1.550E-01	1.558E-01	1.939E+00
SN-113	3.383E-03	12585.3	4.258E-01	4.258E-01	1.502E+00
SB-124	-9.815E-02	91.3	8.966E-02	8.980E-02	2.184E+00
SB-125	1.545E+00	32.1	4.956E-01	5.019E-01	1.033E+00
I-131	1.299E-01	243.2	3.159E-01	3.160E-01	6.377E-01
Gd-153	5.460E-02	133.9	7.312E-02	7.320E-02	2.577E+00
Ga-68	1.294E+01	123.8	1.602E+01	1.603E+01	3.663E+01
Tc-99m	1.753E-01	116.3	2.039E-01	2.042E-01	6.872E-01
BA-133	-4.233E-01	149.5	6.329E-01	6.333E-01	2.141E+00
CS-134	2.684E-01	35.4	9.491E-02	9.593E-02	2.127E+00
CS-137	9.588E-02	301.6	2.891E-01	2.892E-01	1.047E+00
CE-139	2.761E-01	46.4	1.281E-01	1.307E-01	3.400E-01
Ba-140	8.047E-01	102.9	8.277E-01	8.288E-01	2.087E+00
La-140	3.340E-01	89.3	2.983E-01	2.988E-01	6.371E-01
CE-141	-1.284E-01	304.5	3.909E-01	3.910E-01	1.336E+00

CE-144	4.939E-01	346.7	1.712E+00	1.713E+00	5.847E+00
PM-144	1.570E-01	205.4	3.225E-01	3.226E-01	7.931E-01
EU-152	1.085E+00	105.3	1.143E+00	1.144E+00	4.307E+00
EU-154	1.692E+00	55.0	9.311E-01	9.351E-01	6.010E+00
EU-155	2.494E-01	161.0	4.015E-01	4.018E-01	3.391E+00
HF-181	-1.155E-01	80.8	9.327E-02	9.346E-02	1.777E+00
Ta-182	7.164E-01	107.8	7.720E-01	7.728E-01	5.901E+00
Hg-203	8.290E-02	288.3	2.390E-01	2.391E-01	8.337E-01
TL-208	9.065E-01	35.8	3.248E-01	3.282E-01	7.116E-01
pm-146	6.739E-01	125.3	8.441E-01	8.448E-01	2.472E+00
y-88	-2.183E-01	198.3	4.330E-01	4.331E-01	1.089E+00
Cd-113m	2.098E+03	137.6	2.887E+03	2.890E+03	9.929E+03
Cd-109	3.954E+00	153.8	6.079E+00	6.083E+00	2.048E+01
Cf-251	2.351E-01	391.3	9.200E-01	9.203E-01	2.460E+00
Cf-249	2.226E-01	112.7	2.508E-01	2.511E-01	1.455E+00
Sn-126	2.046E+00	115.4	2.361E+00	2.364E+00	7.958E+00
PB-210	1.106E+01	73.6	8.135E+00	8.161E+00	2.690E+01
PB-212	2.126E+00	22.7	4.827E-01	5.019E-01	1.396E+00
PB-214	5.718E+00	11.3	6.474E-01	7.123E-01	1.057E+00
BI-207	-1.113E-01	247.4	2.752E-01	2.753E-01	9.749E-01
BI-212	-3.574E-01	1181.1	4.221E+00	4.222E+00	1.529E+01
U-235	1.398E+00	78.3	1.095E+00	1.097E+00	5.764E+00
BI-214	4.881E+00	12.4	6.055E-01	6.564E-01	5.535E-01
BI-210M	2.816E-01	117.4	3.305E-01	3.310E-01	1.132E+00
AC-228	2.733E+00	62.1	1.697E+00	1.702E+00	4.021E+00
TH-227	3.193E+00	134.2	4.286E+00	4.289E+00	1.448E+01
TH-229	5.602E+00	60.9	3.411E+00	3.440E+00	8.669E+00
TH-234	7.790E+00	73.3	5.713E+00	5.728E+00	1.889E+01
PA-231	-9.093E+00	172.4	1.568E+01	1.569E+01	5.281E+01
PA-233	-7.236E-01	167.8	1.214E+00	1.215E+00	4.093E+00
PA-234	-1.005E+00	72.1	7.252E-01	7.270E-01	4.081E+00
PA-234M	9.440E+00	114.7	1.083E+01	1.084E+01	2.355E+02
AM-241	-4.599E-01	164.6	7.568E-01	7.572E-01	2.062E+00
Np-237	1.003E+00	155.9	1.564E+00	1.565E+00	5.287E+00
Ir-192	7.373E-02	101.2	7.465E-02	7.478E-02	1.758E+00
Cs-136	-5.580E-01	86.0	4.797E-01	4.808E-01	1.614E+00
Np-239	8.676E-02	1048.8	9.099E-01	9.099E-01	3.109E+00
Nd-147	8.452E-01	93.2	7.881E-01	7.896E-01	3.876E+00
TL-210	0.000E+00	1.#INF	8.903E-02	8.903E-02	1.094E+00
Total	2.362E+03				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-B-38-C

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20183084.An1

Acquisition information
Start time: 8/23/2018 7:52:35 AM
Live time: 1800
Real time: 1827
Dead time: 1.50 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.13keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 7:52:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2018-08-11_1303.PBC 8/11/2018 1:03:03 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.63	21.	73.56	0.84	2.483E-02	46.54	4.250	PBC<MDA	PB210
50.14	13.	134.23	0.84	2.841E-02	50.14	8.000	PBC<MDA	TH227
63.29	21.	73.34	0.85	4.005E-02	63.29	3.810	PBC<MDA	TH234
64.28	15.	115.43	0.86	4.080E-02	64.28	9.700	PBC<MDA	Sn126
86.49	12.	155.93	0.88	5.279E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.279E-01	EU155
86.54	12.	160.98	0.88	5.281E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	4.279E-01	EU155
					86.94	9.040	1.450E+00	Sn126
86.94	14.	144.65	0.88	5.294E-02	86.54	30.700	PBC<MDA	EU155
					86.94	9.040	1.666E+00	Sn126
87.57	14.	149.25	0.88	5.314E-02	87.57	37.500	PBC<MDA	Sn126
88.04	14.	153.75	0.88	5.329E-02	88.04	3.790	PBC<MDA	Cd109
91.10	14.	157.64	0.88	5.415E-02	91.10	28.300	PBC<MDA	Nd147
103.20	14.	160.81	0.90	5.622E-02	103.20	21.800	PBC<MDA	Gd153
121.78	11.	122.31	0.92	5.608E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	1.274E-01	CO57
123.10	13.	98.90	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
133.54	5.	346.71	0.93	5.459E-02	133.54	11.090	PBC<MDA	CE144
140.51	15.	116.35	0.94	5.336E-02	140.51	89.300	PBC<MDA	Tc99m
143.79	4.	418.60	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
163.38	10.	136.65	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.48	19.	46.37	1.28	4.881E-02	165.85	79.900	PBC<MDA	CE139
176.60	3.	391.34	0.98	4.633E-02	176.60	17.000	PBC<MDA	Cf251
185.72	3.	647.17	0.99	4.443E-02	185.72	54.000	PBC<MDA	U235
193.51	19.	60.89	0.99	4.294E-02	193.51	4.400	PBC<MDA	TH229
205.33	10.	78.31	1.01	4.086E-02	205.33	5.010	PBC<MDA	U235
227.00	12.	105.96	1.03	3.757E-02	227.00	6.300	PBC<MDA	Cf251
238.61	60.	22.70	1.04	3.602E-02	238.63	43.300	2.126E+00	PB212
241.97	24.	36.40	1.04	3.560E-02	242.00	7.430	PBC<MDA	PB214
244.69	13.	157.05	1.05	3.526E-02	244.69	7.580	PBC<MDA	EU152
263.70	8.	137.60	1.07	3.310E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	8.	117.37	1.07	3.288E-02	265.83	50.000	PBC<MDA	BI210M
279.20	4.	288.34	1.08	3.154E-02	279.20	81.460	PBC<MDA	Hg203
284.30	3.	384.87	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
295.16	64.	18.70	0.85	3.009E-02	295.09	19.300	6.123E+00	PB214
328.76	11.	89.29	1.13	2.744E-02	328.76	20.300	PBC<MDA	La140
333.44	9.	112.68	1.14	2.711E-02	333.44	15.510	PBC<MDA	Cf249
345.83	13.	116.29	1.15	2.627E-02	345.83	15.070	PBC<MDA	HF181
352.19	96.	12.78	1.58	2.588E-02	351.93	37.600	5.510E+00	PB214
364.48	3.	297.52	1.17	2.511E-02	364.48	81.700	PBC<MDA	I131
383.84	3.	433.01	1.19	2.402E-02	383.84	8.940	PBC<MDA	BA133
427.88	18.	32.08	1.23	2.186E-02	427.88	29.600	1.545E+00	SB125
468.06	6.	101.24	1.27	2.022E-02	468.06	51.750	PBC<MDA	Ir192
487.02	11.	124.91	1.29	1.954E-02	487.02	45.500	PBC<MDA	La140
497.05	2.	412.43	1.30	1.919E-02	497.05	90.900	PBC<MDA	RU103
511.86	30.	42.16	2.56	1.870E-02	511.86	20.000	4.455E+00	RH106
531.00	7.	99.65	1.33	1.811E-02	531.00	13.000	PBC<MDA	Nd147
537.26	6.	102.87	1.34	1.793E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	35.36	1.36	1.720E-02	563.24	8.350	3.094E+00	CS134
569.32	8.	70.96	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.280E+00	PA234
					569.70	97.740	2.753E-01	BI207
569.47	1.	968.73	1.37	1.704E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	2.996E-01	PA234
					569.70	97.740	2.514E-02	BI207
583.69	22.	35.83	1.38	1.669E-02	583.02	84.500	8.727E-01	TL208
609.80	65.	12.40	1.58	1.605E-02	609.31	46.090	4.881E+00	BI214
					610.30	5.750	3.918E+01	RU103
657.76	7.	83.82	1.45	1.500E-02	657.76	94.640	PBC<MDA	AG110M
661.66	2.	301.56	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137
696.54	4.	205.36	1.49	1.426E-02	696.54	99.000	PBC<MDA	PM144
702.63	8.	105.33	1.49	1.415E-02	702.63	97.900	PBC<MDA	NB94
722.79	8.	96.61	1.51	1.380E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.325E-01	AG108M
					723.36	20.220	1.494E+00	EU154
735.72	5.	126.84	1.52	1.358E-02	735.72	22.500	PBC<MDA	pm146
747.16	4.	216.03	1.53	1.340E-02	747.16	34.000	PBC<MDA	pm146
765.79	11.	83.42	1.55	1.311E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.554E+02	PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.41	6.	114.74	1.55	1.310E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	8.262E+01	PA234M
795.87	5.	124.90	1.58	1.266E-02	795.87	85.530	PBC<MDA	CS134
801.95	5.	104.75	1.58	1.258E-02	801.95	8.690	PBC<MDA	CS134
858.36	3.	238.82	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
871.10	1.	608.28	1.64	1.168E-02	871.10	99.890	PBC<MDA	NB94
873.23	6.	79.67	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
911.10	12.	89.36	1.68	1.122E-02	911.07	29.000	PBC<MDA	AC228
937.49	2.	212.94	1.70	1.094E-02	937.49	34.360	PBC<MDA	AG110M
969.06	13.	86.24	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
1004.77	9.	104.18	1.75	1.027E-02	1004.77	18.010	PBC<MDA	EU154
1050.36	6.	93.55	1.79	9.871E-03	1050.36	1.560	PBC<MDA	RH106
1077.40	6.	123.77	1.81	9.646E-03	1077.40	3.300	PBC<MDA	Ga68
1112.07	9.	105.33	1.84	9.373E-03	1112.07	13.644	PBC<MDA	EU152
1120.26	3.	282.49	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.990E-01	Sc46
1221.41	7.	107.76	1.92	8.608E-03	1221.41	27.000	PBC<MDA	Ta182
1274.53	7.	62.45	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.301E+00	EU154
1274.54	6.	100.22	1.96	8.280E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.051E+00	EU154
1291.60	11.	30.15	1.98	8.180E-03	1291.60	43.200	1.729E+00	FE59
1313.00	4.	137.50	1.99	8.059E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	1.	558.62	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1384.30	5.	49.14	2.04	7.678E-03	1384.30	24.290	PBC<MDA	AG110M
1461.20	243.	6.50	1.87	7.309E-03	1460.83	10.670	1.731E+02	K40
1764.05	16.	25.00	2.29	6.141E-03	1764.49	15.400	9.399E+00	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.71	46.54	108.	21.	0.012	73.56	0.836
TH-227	200.12	50.14	147.	13.	0.007	134.23	0.840s
AM-241	237.70	59.54	100.	-11.	-0.006	164.56	0.850s
TH-234	252.71	63.29	111.	21.	0.012	73.34	0.854s
Sn-126	256.68	64.28	134.	15.	0.008	115.43	0.856s
BA-133	323.52	80.99	131.	-20.	-0.011	79.39	0.874s
Np-237	345.53	86.49	183.	12.	0.007	155.93	0.880s
EU-155	345.74	86.54	196.	12.	0.007	160.98	0.880s
Sn-126	347.33	86.94	208.	14.	0.008	144.65	0.880s
Sn-126	349.85	87.57	223.	14.	0.008	149.25	0.881s
Cd-109	351.73	88.04	237.	14.	0.008	153.75	0.881s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Nd-147	363.97	91.10	251.	14.	0.008	157.64	0.885s
TH-234	369.93	92.59	379.	-44.	-0.024	39.74	0.886s
AC-228	372.97	93.35	338.	-18.	-0.010	144.38	0.887
Gd-153	389.57	97.50	256.	-11.	-0.006	214.19	0.892s
Np-239	397.57	99.50	266.	0.	0.000	1000.00	0.894s
Gd-153	412.38	103.20	235.	14.	0.008	160.81	0.898s
Np-239	414.38	103.70	227.	0.	0.000	1000.00	0.898s
EU-152	486.69	121.78	85.	11.	0.006	122.31	0.918s
CO-57	487.83	122.06	102.	-16.	-0.009	91.18	0.918s
EU-154	491.98	123.10	76.	13.	0.007	98.90	0.919s
PA-234	524.77	131.29	225.	-18.	-0.010	72.13	0.928s
HF-181	531.68	133.02	243.	-18.	-0.010	126.65	0.930
CE-144	533.74	133.54	171.	5.	0.003	346.71	0.930
HF-181	544.79	136.30	203.	-17.	-0.009	124.32	0.933s
Tc-99m	561.63	140.51	137.	15.	0.008	116.35	0.938s
U-235	574.73	143.79	151.	4.	0.002	418.60	0.941
CE-141	581.35	145.44	155.	-6.	-0.003	304.50	0.943s
Ba-140	650.24	162.66	166.	-16.	-0.009	107.61	0.961s
U-235	653.11	163.38	87.	10.	0.006	136.65	0.962s
CE-139	661.50	165.48	21.	19.	0.011	46.37	1.276s
Cf-251	706.00	176.60	48.	3.	0.002	391.34	0.976s
U-235	742.49	185.72	84.	3.	0.001	647.17	0.986s
TH-229	773.64	193.51	33.	19.	0.011	60.89	0.994s
U-235	820.94	205.33	15.	10.	0.006	78.31	1.007s
TH-229	843.01	210.85	84.	-17.	-0.009	104.65	1.012s
Cf-251	907.62	227.00	40.	12.	0.006	105.96	1.029
PB-212	954.15	238.63	61.	60.	0.033	22.70	1.041D
PB-214	967.61	242.00	27.	24.	0.013	36.40	1.045D
EU-152	978.39	244.69	202.	13.	0.007	157.05	1.048s
Cd-113m	1054.43	263.70	50.	8.	0.004	137.60	1.067s
BI-210M	1062.96	265.83	44.	8.	0.005	117.37	1.070s
TL-208	1108.77	277.28	66.	-6.	-0.003	195.79	1.081
Hg-203	1116.44	279.20	59.	4.	0.002	288.34	1.083s
I-131	1136.83	284.30	29.	3.	0.001	384.87	1.089s
PB-214	1180.28	295.16	19.	64.	0.036	18.70	0.850s
TL-210	1183.64	296.00	335.	-14.	-0.008	189.48	1.101s
PB-212	1199.76	300.03	321.	-14.	-0.008	145.71	1.105
PA-231	1199.92	300.07	307.	-14.	-0.008	180.99	1.105s
PA-233	1200.36	300.18	293.	-14.	-0.008	176.95	1.105s
PA-231	1210.24	302.65	279.	-14.	-0.008	172.43	1.107s
BA-133	1211.05	302.85	276.	-14.	-0.008	171.36	1.108s
Ba-140	1219.04	304.85	290.	-14.	-0.008	175.19	1.110s
BI-210M	1219.23	304.90	304.	-4.	-0.002	647.98	1.110s
PA-233	1247.69	312.01	248.	-13.	-0.007	167.78	1.117s
Ir-192	1265.61	316.49	261.	-4.	-0.002	646.84	1.122s
CR-51	1279.99	320.08	116.	-8.	-0.004	193.65	1.125
La-140	1314.69	328.76	44.	11.	0.006	89.29	1.134
Cf-249	1333.41	333.44	45.	9.	0.005	112.68	1.139s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1352.93	338.32	110.	-12.	-0.007	126.93	1.144
Cs-136	1361.93	340.57	122.	0.	0.000	1000.00	1.146s
EU-152	1376.80	344.29	122.	0.	0.000	1000.00	1.150s
HF-181	1382.97	345.83	102.	13.	0.007	116.29	1.151s
PB-214	1408.41	352.19	12.	96.	0.054	12.78	1.578s
BA-133	1423.66	356.00	158.	-12.	-0.007	149.51	1.162
I-131	1457.59	364.48	20.	3.	0.002	297.52	1.170
BA-133	1535.03	383.84	65.	3.	0.001	433.01	1.189s
Cf-249	1551.47	387.95	68.	0.	0.000	1000.00	1.193s
SB-125	1711.18	427.88	4.	18.	0.010	32.08	1.233s
AG-108M	1735.43	433.94	36.	-7.	-0.004	172.02	1.239s
pm-146	1815.20	453.88	32.	-4.	-0.002	279.09	1.258s
Ir-192	1871.93	468.06	9.	6.	0.003	101.24	1.272s
BE-7	1910.07	477.60	93.	-13.	-0.007	105.63	1.282s
HF-181	1927.68	482.00	106.	-13.	-0.007	112.12	1.286s
La-140	1947.77	487.02	89.	11.	0.006	124.91	1.291s
RU-103	1987.91	497.05	22.	2.	0.001	412.43	1.301s
RH-106	2047.15	511.86	20.	30.	0.017	42.16	2.565s
Nd-147	2123.70	531.00	9.	7.	0.004	99.65	1.333s
Ba-140	2148.74	537.26	9.	6.	0.004	102.87	1.339s
CS-134	2252.65	563.24	0.	8.	0.004	35.36	1.364s
CS-134	2276.99	569.32	13.	8.	0.005	70.96	1.369s
PA-234	2277.59	569.47	26.	1.	0.000	968.73	1.370s
BI-207	2278.51	569.70	32.	-3.	-0.002	247.39	1.370s
TL-208	2331.79	583.02	11.	22.	0.012	35.83	1.382s
SB-125	2401.71	600.50	159.	-11.	-0.006	166.85	1.399s
SB-124	2410.64	602.73	165.	-12.	-0.007	155.05	1.401s
CS-134	2418.55	604.71	153.	-12.	-0.007	149.35	1.403s
BI-214	2438.92	609.80	0.	65.	0.036	12.40	1.583s
RU-103	2440.91	610.30	141.	-5.	-0.003	323.21	1.408s
AG-108M	2456.84	614.28	136.	0.	0.000	1000.00	1.412s
PM-144	2471.96	618.06	136.	0.	0.000	1000.00	1.415s
RH-106	2487.38	621.92	136.	0.	0.000	1000.00	1.419s
SB-125	2543.28	635.89	41.	-14.	-0.008	69.87	1.432
I-131	2547.62	636.97	61.	-10.	-0.006	110.06	1.433s
AG-110M	2630.77	657.76	14.	7.	0.004	83.82	1.452s
CS-137	2646.36	661.66	21.	2.	0.001	301.56	1.455s
PM-144	2785.90	696.54	14.	4.	0.002	205.36	1.487s
NB-94	2810.25	702.63	14.	8.	0.004	105.33	1.493s
SB-124	2890.87	722.79	22.	8.	0.004	96.61	1.511s
AG-108M	2891.48	722.94	30.	0.	0.000	1000.00	1.511s
EU-154	2893.15	723.36	37.	-7.	-0.004	131.30	1.511s
pm-146	2942.61	735.72	10.	5.	0.003	126.84	1.523s
pm-146	2988.37	747.16	14.	4.	0.002	216.03	1.533s
ZR-95	3026.65	756.73	23.	-7.	-0.004	144.53	1.541s
AG-110M	3055.51	763.94	34.	-11.	-0.006	80.80	1.548s
NB-95	3062.89	765.79	35.	11.	0.006	83.42	1.549s
PA-234M	3065.38	766.41	19.	6.	0.003	114.74	1.550s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	3115.41	778.92	23.	-1.	-0.001	773.39	1.561s
BI-212	3141.41	785.42	28.	-12.	-0.007	97.89	1.567
CS-134	3183.20	795.87	17.	5.	0.003	124.90	1.576s
TL-210	3198.14	799.60	22.	0.	0.000	1000.00	1.579s
CS-134	3207.54	801.95	14.	5.	0.003	104.75	1.581s
CO-58	3242.84	810.78	28.	-2.	-0.001	509.90	1.589s
La-140	3262.82	815.77	30.	0.	0.000	1000.00	1.593s
Cs-136	3273.74	818.50	51.	-12.	-0.007	85.97	1.596s
MN-54	3339.13	834.85	14.	-2.	-0.001	403.11	1.610s
Co-56	3386.82	846.77	33.	-14.	-0.008	92.75	1.620s
TL-208	3442.00	860.56	10.	3.	0.002	238.82	1.632s
NB-94	3484.13	871.10	18.	1.	0.001	608.28	1.641s
EU-154	3492.66	873.23	8.	6.	0.003	79.67	1.643s
PA-234	3521.86	880.53	32.	0.	0.000	1000.00	1.649s
PA-234	3532.70	883.24	32.	0.	0.000	1000.00	1.652s
y-88	3591.90	898.04	15.	-4.	-0.002	198.31	1.664s
AC-228	3644.02	911.07	20.	12.	0.006	89.36	1.675s
AG-110M	3749.71	937.49	6.	2.	0.001	212.94	1.697s
PA-234	3783.82	946.02	10.	-2.	-0.001	354.73	1.704s
EU-152	3856.18	964.11	52.	-17.	-0.009	65.03	1.719s
AC-228	3875.62	968.97	59.	13.	0.007	86.24	1.724s
EU-154	3985.06	996.33	41.	-12.	-0.007	79.64	1.746s
PA-234M	4003.73	1001.00	53.	-3.	-0.001	411.61	1.750s
EU-154	4018.84	1004.77	36.	9.	0.005	104.18	1.753s
Co-56	4151.10	1037.84	20.	-2.	-0.001	252.42	1.780s
Cs-136	4192.02	1048.07	26.	-7.	-0.004	109.73	1.788s
RH-106	4201.18	1050.36	14.	6.	0.003	93.55	1.790s
BI-207	4254.38	1063.66	32.	-15.	-0.009	87.67	1.801s
Ga-68	4309.34	1077.40	11.	6.	0.004	123.77	1.812s
FE-59	4396.74	1099.25	16.	-1.	-0.001	914.69	1.829s
EU-152	4448.04	1112.07	37.	9.	0.005	105.33	1.839s
ZN-65	4461.92	1115.55	46.	0.	0.000	1000.00	1.842s
BI-214	4480.88	1120.29	43.	3.	0.002	282.49	1.845s
Sc-46	4481.94	1120.55	46.	0.	0.000	1000.00	1.846s
CO-60	4692.68	1173.24	27.	-8.	-0.004	157.30	1.886s
Ta-182	4755.93	1189.05	32.	-9.	-0.005	146.71	1.899s
Ta-182	4885.37	1221.41	11.	7.	0.004	107.76	1.923s
Co-56	4952.84	1238.28	27.	-7.	-0.004	180.28	1.936s
NA-22	5097.84	1274.53	6.	7.	0.004	62.45	1.963s
EU-154	5097.89	1274.54	12.	6.	0.003	100.22	1.963s
FE-59	5166.10	1291.60	0.	11.	0.006	30.15	1.975s
TL-210	5251.71	1313.00	6.	4.	0.002	137.50	1.991s
CO-60	5329.71	1332.50	6.	1.	0.001	558.62	2.005s
AG-110M	5536.89	1384.30	0.	5.	0.003	49.14	2.042s
EU-152	5631.70	1408.00	6.	-1.	0.000	846.32	2.059s
K-40	5844.47	1461.20	3.	243.	0.135	6.50	1.866
La-140	6384.49	1596.21	0.	0.	0.000	1000.00	2.185s
SB-124	6763.55	1690.98	6.	-2.	-0.001	304.14	2.245s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	7057.56	1764.49	0.	16.	0.009	25.00	2.290
Co-56	7084.99	1771.35	27.	-8.	-0.004	98.47	2.294s
y-88	7343.81	1836.06	6.	-2.	-0.001	275.72	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.5526E+00				5.31E+01	
			477.60	-3.553E+00	?(	1.266E+01 1.06E+02 1.05E+01	G
NA-22	C	4.5809E-01				9.50E+02	
			1274.53	4.581E-01	?(	9.266E-01 6.24E+01 9.99E+01	G
K-40	N	1.7312E+02				4.66E+11	
			1460.83	1.731E+02	(P	7.673E+00 6.50E+00 1.07E+01	G
Sc-46	F	-2.6025E-02				8.38E+01	
			889.28	-2.602E-02	&(P	1.419E+00 1.54E+03 1.00E+02	G
			1120.55	0.000E+00	+	2.048E+00 1.00E+03 1.00E+02	G
CR-51	F	-1.5929E+00				2.77E+01	
			320.08	-1.593E+00	?(	1.053E+01 1.94E+02 9.94E+00	G
MN-54	C	-9.1582E-02				3.12E+02	
			834.85	-9.158E-02	?(	9.225E-01 4.03E+02 1.00E+02	G
FE-59	F	6.9046E-01				4.45E+01	
			1099.25	-1.038E-01	?(	2.216E+00 9.15E+02 5.65E+01	G
			1291.60	1.729E+00	?(	1.159E+00 3.02E+01 4.32E+01	G
Co-56	C	-6.3409E-01				7.73E+01	
			846.77	-6.341E-01	?(	1.361E+00 9.27E+01 9.99E+01	G
			1238.28	-6.594E-01	+	2.648E+00 1.80E+02 6.61E+01	G
			1037.84	-8.280E-01	+ P	9.300E+00 2.52E+02 1.41E+01	G
			1771.35	-4.676E+00	+	1.575E+01 9.85E+01 1.55E+01	A
CO-57	C	-1.8845E-01				2.72E+02	
			122.06	-1.884E-01	?(	5.763E-01 9.12E+01 8.56E+01	G
			136.47	-1.717E-01	%	6.905E+00 1.18E+03 1.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-58	C	-6.7263E-02					7.09E+01	
			810.78	-6.726E-02	?(	1.237E+00	5.10E+02	9.95E+01 G
CO-60	F	7.1709E-02					1.93E+03	
			1332.50	7.171E-02	?(P	9.854E-01	5.59E+02	1.00E+02 G
			1173.24	-4.775E-01	+	1.668E+00	1.57E+02	9.99E+01 G
NB-94	I	3.2083E-01					7.41E+06	
			702.63	3.208E-01	?(	8.079E-01	1.05E+02	9.79E+01 G
			871.10	4.761E-02	-	1.070E+00	6.08E+02	9.99E+01 G
ZR-95	I	-5.6472E-01					6.40E+01	
			756.73	-5.647E-01	?(	1.942E+00	1.45E+02	5.45E+01 G
			724.20	5.445E-09	%	2.579E+00	1.30E+10	4.42E+01 G
NB-95	I	4.5758E-01					6.40E+01	
			765.79	4.576E-01	?(	1.286E+00	8.34E+01	9.98E+01 G
RU-103	I	7.4311E-02					3.93E+01	
			497.05	7.431E-02	?(	7.771E-01	4.12E+02	9.09E+01 G
			610.30	-3.164E+00	+	3.502E+01	3.23E+02	5.75E+00 GA
RH-106	I	3.0481E+00					3.74E+02	
			621.92	0.000E+00	?(	2.025E+01	1.00E+03	9.93E+00 G
			1050.36	2.245E+01	?(	7.231E+01	9.36E+01	1.56E+00 G
			511.86	4.455E+00	?	3.497E+00	4.22E+01	2.00E+01 GA
AG-108M	C	-1.9900E-01					1.53E+05	
			433.94	-1.990E-01	?(	8.719E-01	1.72E+02	9.05E+01 G
			722.94	0.000E+00	+	1.252E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	2.214E+00	1.00E+03	8.98E+01 G
AG-110M	F	3.1539E-01					2.50E+02	
			884.68	-2.457E-02	%(P	1.939E+00	2.23E+03	7.27E+01 G
			657.76	2.793E-01	?(	7.964E-01	8.38E+01	9.46E+01 G
			937.49	3.660E-01	?(P	2.020E+00	2.13E+02	3.44E+01 G
			1384.30	1.402E+00	?(P	2.195E+00	4.91E+01	2.43E+01 G
			763.94	-2.088E+00	+	5.673E+00	8.08E+01	2.23E+01 G
SN-113	F	3.3833E-03					1.15E+02	
			391.69	3.383E-03	%(P	1.502E+00	1.26E+04	6.40E+01 G
SB-124	F	-9.8153E-02					6.02E+01	
			602.73	-4.163E-01	?(	2.184E+00	1.55E+02	9.83E+01 G
			1690.98	-3.640E-01	+	2.571E+00	3.04E+02	4.78E+01 G
			722.79	2.793E+00	?(	9.242E+00	9.66E+01	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	1.5452E+00					1.01E+03	
			427.88	1.545E+00	&(	1.033E+00	3.21E+01	2.96E+01 G
			600.50	-2.081E+00	-	1.177E+01	1.67E+02	1.79E+01 G
			635.89	-4.474E+00	-	1.038E+01	6.99E+01	1.13E+01 G
			463.37	-2.167E-01	%	7.960E+00	1.02E+03	1.05E+01 G
I-131	I	1.2987E-01					8.02E+00	
			364.48	8.124E-02	?(	6.377E-01	2.98E+02	8.17E+01 G
			284.30	7.769E-01	?(	8.143E+00	3.85E+02	6.14E+00 G
			636.97	-5.232E+00	+	1.957E+01	1.10E+02	7.17E+00 G
Gd-153	F	5.4603E-02					2.42E+02	
			97.50	-3.559E-01	?(	2.577E+00	2.14E+02	3.00E+01 G
			103.20	6.196E-01	?(	3.359E+00	1.61E+02	2.18E+01 G
Ga-68	C	1.2940E+01					4.71E-02	
			1077.40	1.294E+01	?(	3.663E+01	1.24E+02	3.30E+00 G
Tc-99m	I	1.7526E-01					2.51E-01	
			140.51	1.753E-01	?(	6.872E-01	1.16E+02	8.93E+01 G
BA-133	F	-4.2330E-01					3.85E+03	
			356.00	-4.233E-01	?(	2.141E+00	1.50E+02	6.20E+01 G
			302.85	-1.430E+00	+	8.253E+00	1.71E+02	1.83E+01 G
			383.84	6.900E-01	?	1.045E+01	4.33E+02	8.94E+00 GA
			80.99	-6.389E-01	+ P	1.803E+00	7.94E+01	3.41E+01 GA
CS-134	I	2.6844E-01					7.54E+02	
			604.71	-4.208E-01	?(	2.127E+00	1.49E+02	9.76E+01 G
			795.87	2.564E-01	?(	1.124E+00	1.25E+02	8.55E+01 G
			569.32	1.748E+00	?(	4.136E+00	7.10E+01	1.54E+01 G
			801.95	2.794E+00	?(	1.019E+01	1.05E+02	8.69E+00 G
			563.24	3.094E+00	(	2.851E+00	3.54E+01	8.35E+00 G
CS-137	I	9.5885E-02					1.10E+04	
			661.66	9.588E-02	?(	1.047E+00	3.02E+02	8.52E+01 G
CE-139	F	2.7613E-01					1.38E+02	
			165.85	2.761E-01	(P	3.400E-01	4.64E+01	7.99E+01 G
Ba-140	I	8.0467E-01					1.28E+01	
			537.26	8.047E-01	?(	2.087E+00	1.03E+02	2.44E+01 G
			162.66	-3.003E+00	+ P	1.157E+01	1.08E+02	6.22E+00 G
			304.85	-6.155E+00	+	3.631E+01	1.75E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	3.3403E-01					1.28E+01	
			1596.21	0.000E+00	?(	6.371E-01	1.00E+03	9.54E+01 G
			487.02	6.871E-01	?(	2.914E+00	1.25E+02	4.55E+01 G
			328.76	1.112E+00	?(	3.354E+00	8.93E+01	2.03E+01 G
			815.77	0.000E+00	-	5.439E+00	1.00E+03	2.33E+01 G
CE-141	I	-1.2838E-01					3.25E+01	
			145.44	-1.284E-01	?(	1.336E+00	3.04E+02	4.82E+01 G
CE-144	I	4.9388E-01					2.85E+02	
			133.54	4.939E-01	?(	5.847E+00	3.47E+02	1.11E+01 G
PM-144	C	1.5702E-01					3.63E+02	
			696.54	1.570E-01	&(P	7.931E-01	2.05E+02	9.90E+01 G
			618.06	0.000E+00	-	2.018E+00	1.00E+03	9.91E+01 G
EU-152	F	1.0848E+00					4.94E+03	
			344.29	0.000E+00	?(	4.307E+00	1.00E+03	2.65E+01 G
			1112.07	3.765E+00	?(	1.355E+01	1.05E+02	1.36E+01 G
			121.78	3.813E-01	?(	1.583E+00	1.22E+02	2.86E+01 G
			778.92	-4.434E-01	+	8.387E+00	7.73E+02	1.29E+01 G
			964.11	-6.031E+00	+	1.295E+01	6.50E+01	1.46E+01 G
			244.69	2.705E+00	&(P	1.434E+01	1.57E+02	7.58E+00 G
			1408.00	-2.332E-01	+	4.829E+00	8.46E+02	2.10E+01 GA
EU-154	I	1.6923E+00					3.14E+03	
			873.23	2.219E+00	?(	6.010E+00	7.97E+01	1.23E+01 G
			123.10	3.168E-01	- P	1.056E+00	9.89E+01	4.08E+01 G
			1274.54	1.051E+00	?(	3.657E+00	1.00E+02	3.52E+01 G
			723.36	-1.362E+00	-	6.175E+00	1.31E+02	2.02E+01 G
			1004.77	2.588E+00	?(	9.208E+00	1.04E+02	1.80E+01 G
			996.33	-6.146E+00	+	1.642E+01	7.96E+01	1.06E+01 G
EU-155	I	2.4943E-01					1.81E+03	
			105.31	-9.059E-03	%(P	3.391E+00	8.97E+03	2.12E+01 G
			86.54	4.279E-01	&(	2.327E+00	1.61E+02	3.07E+01 G
HF-181	F	-1.1548E-01					4.24E+01	
			482.00	-4.696E-01	?(	1.777E+00	1.12E+02	8.05E+01 G
			133.02	-4.156E-01	&	1.767E+00	1.27E+02	4.33E+01 G
			345.83	1.776E+00	?(	6.985E+00	1.16E+02	1.51E+01 G
			136.30	-2.903E+00	+	1.213E+01	1.24E+02	5.85E+00 G
Ta-182	F	7.1638E-01					1.14E+02	
			1121.30	-8.555E-02	%(	5.901E+00	1.93E+03	3.49E+01 G
			1221.41	1.753E+00	?(	4.286E+00	1.08E+02	2.70E+01 G
			1189.05	-3.499E+00	+	1.130E+01	1.47E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	8.2896E-02					4.66E+01	
			279.20	8.290E-02	&(	8.337E-01	2.88E+02	8.15E+01 G
TL-208	N	9.0650E-01					6.98E+02	
			583.02	8.727E-01	?(P	7.116E-01	3.58E+01	8.45E+01 G
			277.28	-1.665E+00	-	1.126E+01	1.96E+02	6.31E+00 G
			860.56	1.136E+00	&(	6.608E+00	2.39E+02	1.24E+01 G
pm-146	C	6.7387E-01					2.02E+03	
			747.16	4.631E-01	?(P	2.472E+00	2.16E+02	3.40E+01 G
			735.72	9.924E-01	&(P	3.109E+00	1.27E+02	2.25E+01 G
			453.88	-1.711E-01	- P	1.199E+00	2.79E+02	6.50E+01 G
y-88	F	-2.1835E-01					1.07E+02	
			898.04	-2.183E-01	?(P	1.089E+00	1.98E+02	9.37E+01 G
			1836.06	-2.208E-01	+	1.366E+00	2.76E+02	9.92E+01 G
Cd-113m		2.0978E+03					5.33E+03	
			263.70	2.098E+03	(	9.929E+03	1.38E+02	6.00E-03 K
Cd-109	F	3.9540E+00					4.53E+02	
			88.04	3.954E+00	?(	2.048E+01	1.54E+02	3.79E+00 G
Cf-251	T	2.3510E-01					3.28E+05	
			176.60	2.351E-01	?(	2.460E+00	3.91E+02	1.70E+01 G
			227.00	2.739E+00	?	7.583E+00	1.06E+02	6.30E+00 GA
Cf-249	T	2.2258E-01					1.28E+05	
			387.95	0.000E+00	?(	1.455E+00	1.00E+03	6.60E+01 G
			333.44	1.170E+00	&(	4.504E+00	1.13E+02	1.55E+01 G
Sn-126		2.0456E+00					3.65E+07	
			87.57	4.005E-01	-	2.014E+00	1.49E+02	3.75E+01 GA
			64.28	2.046E+00	&(	7.958E+00	1.15E+02	9.70E+00 G
			86.94	1.666E+00	&	8.122E+00	1.45E+02	9.04E+00 GA
PB-210	N	1.1059E+01					8.14E+03	
			46.54	1.106E+01	?(P	2.690E+01	7.36E+01	4.25E+00 G
PB-212	N	2.1265E+00					6.98E+02	
			238.63	2.126E+00	(P	1.396E+00	2.27E+01	4.33E+01 G
			300.03	-8.018E+00	- P	4.924E+01	1.46E+02	3.28E+00 GA
PB-214	N	5.7176E+00					5.84E+05	
			351.93	5.510E+00	(	1.057E+00	1.28E+01	3.76E+01 G
			295.09	6.123E+00	@(	2.203E+00	1.87E+01	1.93E+01 G
			242.00	5.090E+00		5.634E+00	3.64E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	-1.1126E-01					1.18E+04	
			569.70	-1.113E-01	?(	9.749E-01	2.47E+02	9.77E+01 G
			1063.66	-1.172E+00	+	2.221E+00	8.77E+01	7.45E+01 G
BI-212	N	-3.5742E-01					6.98E+02	
			727.17	-3.574E-01	%(	1.529E+01	1.18E+03	7.55E+00 G
			785.42	-4.064E+01	+	9.269E+01	9.79E+01	1.28E+00 GA
U-235	N	1.3985E+00					2.57E+11	
			143.79	4.019E-01	?(P	5.764E+00	4.19E+02	1.10E+01 G
			205.33	2.714E+00	?(	5.578E+00	7.83E+01	5.01E+00 G
			163.38	2.251E+00	?(P	1.047E+01	1.37E+02	5.08E+00 G
			185.72	6.174E-02	&	1.054E+00	6.47E+02	5.40E+01 GA
BI-214	N	4.8813E+00					5.84E+05	
			609.31	4.881E+00	*(	5.535E-01	1.24E+01	4.61E+01 G
			1120.29	1.317E+00	-	1.310E+01	2.82E+02	1.51E+01 G
			1764.49	9.399E+00	+	4.329E+00	2.50E+01	1.54E+01 G
BI-210M	T	2.8162E-01					1.10E+09	
			265.83	2.816E-01	?(	1.132E+00	1.17E+02	5.00E+01 G
			304.90	-2.588E-01	+	5.692E+00	6.48E+02	2.80E+01 G
AC-228	N	2.7327E+00					2.10E+03	
			911.07	1.989E+00	?(	4.021E+00	8.94E+01	2.90E+01 G
			968.97	3.969E+00	?(	1.150E+01	8.62E+01	1.75E+01 G
			338.32	-2.074E+00	-	8.914E+00	1.27E+02	1.20E+01 G
			93.35	-3.333E+00	-	1.614E+01	1.44E+02	5.56E+00 XA
TH-227	N	3.1929E+00					7.95E+03	
			50.14	3.193E+00	?(	1.448E+01	1.34E+02	8.00E+00 G
			256.24	2.340E-01	&	6.898E+00	1.08E+03	7.00E+00 G
TH-229	N	5.6018E+00					2.68E+06	
			193.51	5.602E+00	&(	8.669E+00	6.09E+01	4.40E+00 G
			210.85	-7.847E+00	-	2.116E+01	1.05E+02	2.99E+00 G
TH-234	N	7.7898E+00					1.63E+12	
			63.29	7.790E+00	*(P	1.889E+01	7.33E+01	3.81E+00 G
			92.59	-8.017E+00	- P	1.705E+01	3.97E+01	5.58E+00 G
PA-231	N	-9.0933E+00					1.20E+07	
			302.65	-9.093E+00	?(	5.281E+01	1.72E+02	2.88E+00 G
			300.07	-1.054E+01	+	6.425E+01	1.81E+02	2.46E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-233   C  -7.2361E-01                                      7.82E+08
                         312.01-7.236E-01 ?(  4.093E+00 1.68E+02 3.60E+01 G
                         300.18-4.185E+00 +   2.494E+01 1.77E+02 6.20E+00 G

PA-234   N  -1.0053E+00                                      1.63E+12
                         131.29-1.005E+00 ?(P 4.081E+00 7.21E+01 1.80E+01 G
                         946.02-7.644E-01 +   6.668E+00 3.55E+02 1.34E+01 G
                         569.47 2.996E-01 +   1.057E+01 9.69E+02 8.20E+00 G
                         883.24 0.000E+00 &   1.458E+01 1.00E+03 9.60E+00 G
                         880.53 0.000E+00 +   2.327E+01 1.00E+03 6.00E+00 GA

PA-234M  N   9.4398E+00                                      1.63E+12
                        1001.00-1.627E+01 ?(  2.355E+02 4.12E+02 8.37E-01 G
                         766.41 8.262E+01 ?(  3.300E+02 1.15E+02 2.94E-01 G

AM-241   T  -4.5991E-01                                      1.58E+05
                          59.54-4.599E-01 ?(  2.062E+00 1.65E+02 3.59E+01 G

Np-237   F   1.0032E+00                                      2.14E+06
                          86.49 1.003E+00 &(  5.287E+00 1.56E+02 1.31E+01 G

Ir-192   F   7.3734E-02                                      7.40E+01
                         316.49-7.988E-02 ?(  1.758E+00 6.47E+02 8.70E+01 G
                         468.06 3.321E-01 ?(  8.791E-01 1.01E+02 5.18E+01 G
                         308.44 4.608E-07 %   5.100E+00 3.25E+08 3.18E+01 G

Cs-136   F  -5.5799E-01                                      1.30E+01
                         818.50-5.580E-01 ?(  1.614E+00 8.60E+01 1.00E+02 G
                        1048.07-4.915E-01 +   1.859E+00 1.10E+02 8.00E+01 G
                         340.57 0.000E+00 +   2.411E+00 1.00E+03 4.69E+01 G

Np-239   T   8.6755E-02                                      2.36E+00
                         103.70 0.000E+00 -   3.001E+00 1.00E+03 2.40E+01 X
                         106.13 8.676E-02 %(  3.109E+00 1.05E+03 2.27E+01 G
                          99.50 0.000E+00 -   5.229E+00 1.00E+03 1.50E+01 X

Nd-147       8.4518E-01                                      1.11E+01
                         531.00 1.547E+00 ?(  3.876E+00 9.96E+01 1.30E+01 G
                          91.10 5.230E-01 &(  2.777E+00 1.58E+02 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
```

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	147.	13.	0.007	134.23	3.193E+00	
AM-241	59.54	100.	-11.	-0.006	164.56	-4.599E-01	
TH-234	63.29	111.	21.	0.012	73.34	7.790E+00	P
Sn-126	64.28	134.	15.	0.008	115.43	2.046E+00	
BA-133	80.99	131.	-20.	-0.011	79.39	-6.389E-01	P
Np-237	86.49	183.	12.	0.007	155.93	1.003E+00	
EU-155	86.54	196.	12.	0.007	160.98	4.279E-01	
Sn-126	86.94	208.	14.	0.008	144.65	1.666E+00	
Sn-126	87.57	223.	14.	0.008	149.25	4.005E-01	
Cd-109	88.04	237.	14.	0.008	153.75	3.954E+00	
Nd-147	91.10	251.	14.	0.008	157.64	5.230E-01	
TH-234	92.59	379.	-44.	-0.024	39.74	-8.017E+00	P
Gd-153	97.50	256.	-11.	-0.006	214.19	-3.559E-01	
Gd-153	103.20	235.	14.	0.008	160.81	6.196E-01	
EU-152	121.78	85.	11.	0.006	122.31	3.813E-01	
CO-57	122.06	102.	-16.	-0.009	91.18	-1.884E-01	
EU-154	123.10	76.	13.	0.007	98.90	3.168E-01	P
PA-234	131.29	225.	-18.	-0.010	72.13	-1.005E+00	P
HF-181	133.02	243.	-18.	-0.010	126.65	-4.156E-01	
CE-144	133.54	171.	5.	0.003	346.71	4.939E-01	
HF-181	136.30	203.	-17.	-0.009	124.32	-2.903E+00	
Tc-99m	140.51	137.	15.	0.008	116.35	1.753E-01	
U-235	143.79	151.	4.	0.002	418.60	4.019E-01	P
CE-141	145.44	155.	-6.	-0.003	304.50	-1.284E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	162.66	166.	-16.	-0.009	107.61	-3.003E+00	P
U-235	163.38	87.	10.	0.006	136.65	2.251E+00	P
Cf-251	176.60	48.	3.	0.002	391.34	2.351E-01	
U-235	185.72	84.	3.	0.001	647.17	6.174E-02	
TH-229	193.51	33.	19.	0.011	60.89	5.602E+00	
U-235	205.33	15.	10.	0.006	78.31	2.714E+00	
TH-229	210.85	84.	-17.	-0.009	104.65	-7.847E+00	
Cf-251	227.00	40.	12.	0.006	105.96	2.739E+00	
EU-152	244.69	202.	13.	0.007	157.05	2.705E+00	P
Cd-113m	263.70	50.	8.	0.004	137.60	2.098E+03	
BI-210M	265.83	44.	8.	0.005	117.37	2.816E-01	
Hg-203	279.20	59.	4.	0.002	288.34	8.290E-02	
I-131	284.30	29.	3.	0.001	384.87	7.769E-01	
TL-210	296.00	335.	-14.	-0.008	189.48	-3.233E-01	
PA-231	300.07	307.	-14.	-0.008	180.99	-1.054E+01	
PA-233	300.18	293.	-14.	-0.008	176.95	-4.185E+00	
PA-231	302.65	279.	-14.	-0.008	172.43	-9.093E+00	
BA-133	302.85	276.	-14.	-0.008	171.36	-1.430E+00	
Ba-140	304.85	290.	-14.	-0.008	175.19	-6.155E+00	
BI-210M	304.90	304.	-4.	-0.002	647.98	-2.588E-01	
PA-233	312.01	248.	-13.	-0.007	167.78	-7.236E-01	
Ir-192	316.49	261.	-4.	-0.002	646.84	-7.988E-02	
CR-51	320.08	116.	-8.	-0.004	193.65	-1.593E+00	
La-140	328.76	44.	11.	0.006	89.29	1.112E+00	
Cf-249	333.44	45.	9.	0.005	112.68	1.170E+00	
HF-181	345.83	102.	13.	0.007	116.29	1.776E+00	
BA-133	356.00	158.	-12.	-0.007	149.51	-4.233E-01	
I-131	364.48	20.	3.	0.002	297.52	8.124E-02	
BA-133	383.84	65.	3.	0.001	433.01	6.900E-01	
AG-108M	433.94	36.	-7.	-0.004	172.02	-1.990E-01	
pm-146	453.88	32.	-4.	-0.002	279.09	-1.711E-01	P
Ir-192	468.06	9.	6.	0.003	101.24	3.321E-01	
BE-7	477.60	93.	-13.	-0.007	105.63	-3.553E+00	
HF-181	482.00	106.	-13.	-0.007	112.12	-4.696E-01	
La-140	487.02	89.	11.	0.006	124.91	6.871E-01	
RU-103	497.05	22.	2.	0.001	412.43	7.431E-02	
RH-106	511.86	20.	30.	0.017	42.16	4.455E+00	
Nd-147	531.00	9.	7.	0.004	99.65	1.547E+00	
Ba-140	537.26	9.	6.	0.004	102.87	8.047E-01	
CS-134	563.24	0.	8.	0.004	35.36	3.094E+00	
CS-134	569.32	13.	8.	0.005	70.96	1.748E+00	
PA-234	569.47	26.	1.	0.000	968.73	2.996E-01	
BI-207	569.70	32.	-3.	-0.002	247.39	-1.113E-01	
SB-124	602.73	165.	-12.	-0.007	155.05	-4.163E-01	
CS-134	604.71	153.	-12.	-0.007	149.35	-4.208E-01	
RU-103	610.30	141.	-5.	-0.003	323.21	-3.164E+00	
I-131	636.97	61.	-10.	-0.006	110.06	-5.232E+00	
AG-110M	657.76	14.	7.	0.004	83.82	2.793E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	661.66	21.	2.	0.001	301.56	9.588E-02	
PM-144	696.54	14.	4.	0.002	205.36	1.570E-01	P
NB-94	702.63	14.	8.	0.004	105.33	3.208E-01	
SB-124	722.79	22.	8.	0.004	96.61	2.793E+00	
EU-154	723.36	37.	-7.	-0.004	131.30	-1.362E+00	
pm-146	735.72	10.	5.	0.003	126.84	9.924E-01	P
pm-146	747.16	14.	4.	0.002	216.03	4.631E-01	P
ZR-95	756.73	23.	-7.	-0.004	144.53	-5.647E-01	
AG-110M	763.94	34.	-11.	-0.006	80.80	-2.088E+00	
NB-95	765.79	35.	11.	0.006	83.42	4.576E-01	
PA-234M	766.41	19.	6.	0.003	114.74	8.262E+01	
EU-152	778.92	23.	-1.	-0.001	773.39	-4.434E-01	
BI-212	785.42	28.	-12.	-0.007	97.89	-4.064E+01	
CS-134	795.87	17.	5.	0.003	124.90	2.564E-01	
CS-134	801.95	14.	5.	0.003	104.75	2.794E+00	
CO-58	810.78	28.	-2.	-0.001	509.90	-6.726E-02	
Cs-136	818.50	51.	-12.	-0.007	85.97	-5.580E-01	
MN-54	834.85	14.	-2.	-0.001	403.11	-9.158E-02	
Co-56	846.77	33.	-14.	-0.008	92.75	-6.341E-01	
NB-94	871.10	18.	1.	0.001	608.28	4.761E-02	
EU-154	873.23	8.	6.	0.003	79.67	2.219E+00	
y-88	898.04	15.	-4.	-0.002	198.31	-2.183E-01	P
AG-110M	937.49	6.	2.	0.001	212.94	3.660E-01	P
PA-234	946.02	10.	-2.	-0.001	354.73	-7.644E-01	
EU-152	964.11	52.	-17.	-0.009	65.03	-6.031E+00	
EU-154	996.33	41.	-12.	-0.007	79.64	-6.146E+00	
PA-234M	1001.00	53.	-3.	-0.001	411.61	-1.627E+01	
EU-154	1004.77	36.	9.	0.005	104.18	2.588E+00	
Co-56	1037.84	20.	-2.	-0.001	252.42	-8.280E-01	P
Cs-136	1048.07	26.	-7.	-0.004	109.73	-4.915E-01	
RH-106	1050.36	14.	6.	0.003	93.55	2.245E+01	
BI-207	1063.66	32.	-15.	-0.009	87.67	-1.172E+00	
Ga-68	1077.40	11.	6.	0.004	123.77	1.294E+01	
FE-59	1099.25	16.	-1.	-0.001	914.69	-1.038E-01	
EU-152	1112.07	37.	9.	0.005	105.33	3.765E+00	
CO-60	1173.24	27.	-8.	-0.004	157.30	-4.775E-01	
Ta-182	1189.05	32.	-9.	-0.005	146.71	-3.499E+00	
Ta-182	1221.41	11.	7.	0.004	107.76	1.753E+00	
Co-56	1238.28	27.	-7.	-0.004	180.28	-6.594E-01	
NA-22	1274.53	6.	7.	0.004	62.45	4.581E-01	
EU-154	1274.54	12.	6.	0.003	100.22	1.051E+00	
FE-59	1291.60	0.	11.	0.006	30.15	1.729E+00	
TL-210	1313.00	6.	4.	0.002	137.50	1.423E+00	
CO-60	1332.50	6.	1.	0.001	558.62	7.171E-02	P
AG-110M	1384.30	0.	5.	0.003	49.14	1.402E+00	P
EU-152	1408.00	6.	-1.	0.000	846.32	-2.332E-01	
SB-124	1690.98	6.	-2.	-0.001	304.14	-3.640E-01	
Co-56	1771.35	27.	-8.	-0.004	98.47	-4.676E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
y-88	1836.06	6.	-2.	-0.001	275.72	-2.208E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-3.5526E+00	-3.5526E+00	1.056E+02%	1.27E+01
NA-22	#A	4.5809E-01	4.5809E-01	6.245E+01%	9.27E-01
K-40		1.7312E+02	1.7312E+02	6.498E+00%	7.67E+00
Sc-46	#A	-2.6025E-02	-2.6025E-02	1.540E+03%	1.42E+00
CR-51	#A	-1.5929E+00	-1.5929E+00	1.936E+02%	1.05E+01
MN-54	#A	-9.1582E-02	-9.1582E-02	4.031E+02%	9.23E-01
FE-59	#A	6.9046E-01	6.9046E-01	3.015E+01%	2.22E+00
Co-56	#A	-6.3409E-01	-6.3409E-01	9.275E+01%	1.36E+00
CO-57	#A	-1.8845E-01	-1.8845E-01	9.118E+01%	5.76E-01
CO-58	#A	-6.7263E-02	-6.7263E-02	5.099E+02%	1.24E+00
CO-60	#A	7.1709E-02	7.1709E-02	5.586E+02%	9.85E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.03E+00
NB-94	#A	3.2083E-01	3.2083E-01	1.053E+02%	8.08E-01
ZR-95	#A	-5.6472E-01	-5.6472E-01	1.445E+02%	1.94E+00
NB-95	#A	4.5758E-01	4.5758E-01	8.342E+01%	1.29E+00
RU-103	#A	7.4310E-02	7.4311E-02	4.124E+02%	7.77E-01
RH-106	#A	3.0481E+00	3.0481E+00	9.355E+01%	2.02E+01
AG-108M	#A	-1.9900E-01	-1.9900E-01	1.720E+02%	8.72E-01
AG-110M	#A	3.1539E-01	3.1539E-01	4.914E+01%	1.94E+00
SN-113	#A	3.3833E-03	3.3833E-03	1.259E+04%	1.50E+00
SB-124	#A	-9.8153E-02	-9.8153E-02	9.134E+01%	2.18E+00
SB-125	#	1.5452E+00	1.5452E+00	3.208E+01%	1.03E+00
I-131	#A	1.2987E-01	1.2987E-01	2.432E+02%	6.38E-01
Gd-153	#A	5.4603E-02	5.4603E-02	1.339E+02%	2.58E+00
Ga-68	#A	1.2863E+01	1.2940E+01	1.238E+02%	3.66E+01
Tc-99m	#A	1.7506E-01	1.7526E-01	1.163E+02%	6.87E-01
BA-133	#A	-4.2330E-01	-4.2330E-01	1.495E+02%	2.14E+00
CS-134	#A	2.6844E-01	2.6844E-01	3.536E+01%	2.13E+00
CS-137	#A	9.5885E-02	9.5885E-02	3.016E+02%	1.05E+00
CE-139	A	2.7613E-01	2.7613E-01	4.637E+01%	3.40E-01
Ba-140	#A	8.0465E-01	8.0467E-01	1.029E+02%	2.09E+00
La-140	#A	3.3402E-01	3.3403E-01	8.929E+01%	6.37E-01
CE-141	#A	-1.2838E-01	-1.2838E-01	3.045E+02%	1.34E+00
CE-144	#A	4.9388E-01	4.9388E-01	3.467E+02%	5.85E+00
PM-144	#A	1.5702E-01	1.5702E-01	2.054E+02%	7.93E-01
EU-152	#A	1.0848E+00	1.0848E+00	1.053E+02%	4.31E+00
EU-154	#A	1.6923E+00	1.6923E+00	5.502E+01%	6.01E+00
EU-155	#A	2.4943E-01	2.4943E-01	1.610E+02%	3.39E+00
HF-181	#A	-1.1547E-01	-1.1548E-01	8.077E+01%	1.78E+00

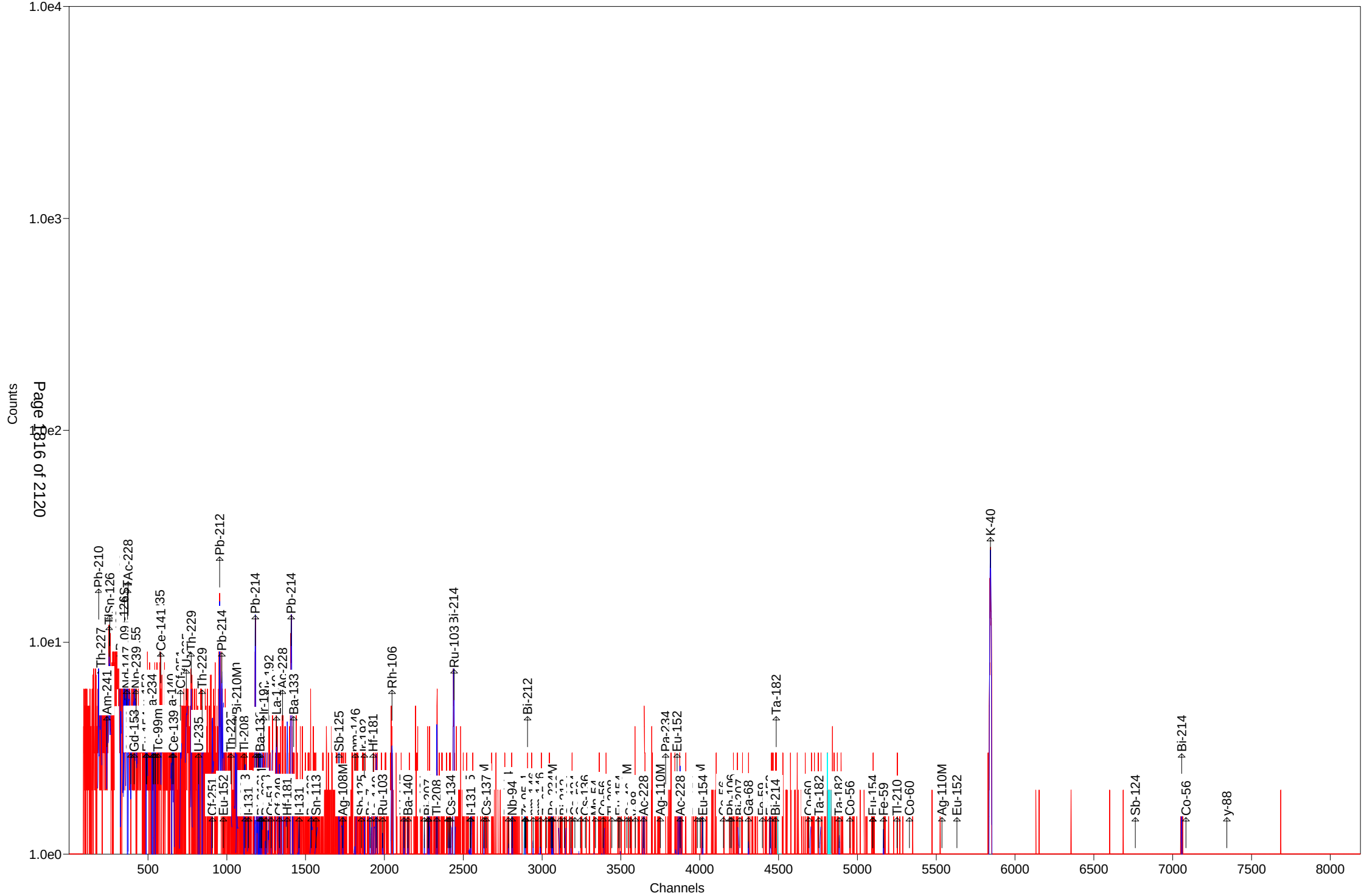
Ta-182 #A	7.1638E-01	7.1638E-01	1.078E+02%	5.90E+00
Hg-203 #A	8.2895E-02	8.2896E-02	2.883E+02%	8.34E-01
TL-208 #	9.0650E-01	9.0650E-01	3.583E+01%	7.12E-01
pm-146 #A	6.7387E-01	6.7387E-01	1.253E+02%	2.47E+00
y-88 #A	-2.1834E-01	-2.1835E-01	1.983E+02%	1.09E+00
Cd-113m#A	2.0978E+03	2.0978E+03	1.376E+02%	9.93E+03
Cd-109 #A	3.9540E+00	3.9540E+00	1.538E+02%	2.05E+01
Cf-251 #A	2.3510E-01	2.3510E-01	3.913E+02%	2.46E+00
Cf-249 #A	2.2258E-01	2.2258E-01	1.127E+02%	1.46E+00
Sn-126 #A	2.0456E+00	2.0456E+00	1.154E+02%	7.96E+00
PB-210 #A	1.1059E+01	1.1059E+01	7.356E+01%	2.69E+01
PB-212 #	2.1265E+00	2.1265E+00	2.270E+01%	1.40E+00
PB-214	5.7176E+00	5.7176E+00	1.132E+01%	1.06E+00
BI-207 #A	-1.1126E-01	-1.1126E-01	2.474E+02%	9.75E-01
BI-212 #A	-3.5742E-01	-3.5742E-01	1.181E+03%	1.53E+01
U-235 #A	1.3985E+00	1.3985E+00	7.831E+01%	5.76E+00
BI-214 #	4.8813E+00	4.8813E+00	1.240E+01%	5.53E-01
BI-210M#A	2.8162E-01	2.8162E-01	1.174E+02%	1.13E+00
AC-228 #A	2.7327E+00	2.7327E+00	6.209E+01%	4.02E+00
TH-227 #A	3.1929E+00	3.1929E+00	1.342E+02%	1.45E+01
TH-229 #A	5.6018E+00	5.6018E+00	6.089E+01%	8.67E+00
TH-234 #A	7.7898E+00	7.7898E+00	7.334E+01%	1.89E+01
PA-231 #A	-9.0933E+00	-9.0933E+00	1.724E+02%	5.28E+01
PA-233 #A	-7.2361E-01	-7.2361E-01	1.678E+02%	4.09E+00
PA-234 #A	-1.0053E+00	-1.0053E+00	7.213E+01%	4.08E+00
PA-234M#A	9.4398E+00	9.4398E+00	1.147E+02%	2.35E+02
AM-241 #A	-4.5991E-01	-4.5991E-01	1.646E+02%	2.06E+00
Np-237 #A	1.0032E+00	1.0032E+00	1.559E+02%	5.29E+00
Ir-192 #A	7.3734E-02	7.3734E-02	1.012E+02%	1.76E+00
Cs-136 #A	-5.5798E-01	-5.5799E-01	8.597E+01%	1.61E+00
Np-239 #A	8.6745E-02	8.6755E-02	1.049E+03%	3.11E+00
Nd-147 #A	8.4516E-01	8.4518E-01	9.325E+01%	3.88E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%	1.09E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 1.898E+02 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 1.8975963E+02 Bq/Sample

379959_Gamma_160-29881-B-38-C. 7_Gamma_20183084.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20181530

Sample Description: 379959_Gamma_160-29881-B-39-C
Detector: Detector #12
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-B-39-C

Decay to Time: 8/23/2018 08:47 Live Time: 1800 sec
Acquisition Time: 8/23/2018 08:47:27 Real Time: 1801 sec
Analysis Time: 8/23/2018 09:17 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: Client_Long_Rev14.lib
Bkgd Correction File: 12_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.499E+00	108.4	2.708E+00	2.711E+00	9.294E+00
NA-22	-4.917E-01	91.5	4.498E-01	4.504E-01	1.540E+00
K-40	1.479E+02	7.0	1.040E+01	1.281E+01	5.395E+00
Sc-46	-6.965E-01	93.8	6.530E-01	6.540E-01	2.201E+00
CR-51	-3.834E+00	180.5	6.918E+00	6.921E+00	2.325E+01
MN-54	6.855E-02	692.8	4.749E-01	4.749E-01	1.174E+00
FE-59	1.012E+00	88.0	8.908E-01	8.923E-01	1.993E+00
Co-56	-4.699E-01	90.7	4.263E-01	4.269E-01	1.573E+00
CO-57	0.000E+00	1.#INF	1.102E-01	1.102E-01	1.008E+00
CO-58	3.433E-01	38.4	1.318E-01	1.330E-01	3.729E-01
CO-60	6.637E-01	30.2	2.001E-01	2.028E-01	5.355E-01
ZN-65	0.000E+00	1.#INF	5.324E-01	5.324E-01	4.475E+00
NB-94	-3.046E-02	124.2	3.783E-02	3.786E-02	1.269E+00
ZR-95	-6.448E-01	144.5	9.319E-01	9.324E-01	2.217E+00
NB-95	3.693E-01	84.2	3.110E-01	3.116E-01	1.056E+00
RU-103	-3.868E-02	1040.8	4.026E-01	4.026E-01	1.059E+00
RH-106	8.844E+00	84.7	7.489E+00	7.503E+00	2.778E+01
AG-108M	-5.003E-01	94.8	4.743E-01	4.750E-01	1.179E+00
AG-110M	2.212E-01	344.8	7.629E-01	7.629E-01	2.678E+00
SN-113	-5.720E-01	118.2	6.761E-01	6.768E-01	2.287E+00
SB-124	6.285E-01	121.2	7.621E-01	7.627E-01	2.818E+00
SB-125	1.623E+00	70.1	1.138E+00	1.141E+00	2.498E+00
I-131	3.929E-01	101.4	3.983E-01	3.988E-01	1.042E+00
Gd-153	-8.048E-01	144.7	1.164E+00	1.165E+00	3.915E+00
Ga-68	-4.375E+00	460.1	2.013E+01	2.013E+01	4.671E+01
Tc-99m	-2.850E-01	166.9	4.757E-01	4.760E-01	1.598E+00
BA-133	-5.494E-01	159.9	8.784E-01	8.789E-01	2.968E+00
CS-134	9.382E-01	22.3	2.089E-01	2.142E-01	2.906E+00
CS-137	-2.974E-01	204.4	6.078E-01	6.080E-01	2.100E+00
CE-139	-3.236E-01	110.1	3.563E-01	3.567E-01	1.198E+00
Ba-140	1.545E+00	86.1	1.330E+00	1.332E+00	3.378E+00
La-140	3.810E-01	23.5	8.939E-02	9.156E-02	1.979E+00
CE-141	-6.014E-01	155.5	9.351E-01	9.356E-01	3.134E+00

CE-144	1.943E+00	170.9	3.321E+00	3.323E+00	1.118E+01
PM-144	-1.518E-02	3079.0	4.675E-01	4.675E-01	1.149E+00
EU-152	1.247E-01	117.2	1.462E-01	1.463E-01	5.712E+00
EU-154	1.053E+00	84.0	8.843E-01	8.859E-01	1.095E+01
EU-155	9.959E-01	109.8	1.093E+00	1.094E+00	3.685E+00
HF-181	5.700E-01	88.6	5.053E-01	5.061E-01	1.450E+00
Ta-182	1.973E+00	79.5	1.568E+00	1.571E+00	5.707E+00
Hg-203	-2.506E-01	151.9	3.808E-01	3.810E-01	1.300E+00
TL-208	1.585E+00	29.5	4.678E-01	4.747E-01	1.058E+00
pm-146	2.510E-01	403.1	1.012E+00	1.012E+00	2.811E+00
y-88	5.783E-02	857.3	4.958E-01	4.958E-01	1.200E+00
Cd-113m	3.927E+03	99.9	3.924E+03	3.930E+03	1.330E+04
Cd-109	0.000E+00	1.#INF	2.166E+00	2.166E+00	4.259E+01
Cf-251	-1.121E+00	154.5	1.732E+00	1.733E+00	4.503E+00
Cf-249	4.091E-01	118.7	4.856E-01	4.861E-01	1.657E+00
Sn-126	-2.088E-01	2100.4	4.387E+00	4.387E+00	1.495E+01
PB-210	9.088E+00	110.3	1.003E+01	1.004E+01	3.009E+01
PB-212	3.825E+00	17.4	6.669E-01	6.961E-01	1.818E+00
PB-214	8.156E+00	12.4	1.010E+00	1.091E+00	1.953E+00
BI-207	1.230E-01	291.1	3.579E-01	3.579E-01	1.042E+00
BI-212	1.807E+01	22.3	4.025E+00	4.129E+00	9.084E+00
U-235	5.723E-01	85.9	4.916E-01	4.925E-01	1.250E+01
BI-214	9.938E+00	12.0	1.195E+00	1.298E+00	1.731E+00
BI-210M	7.293E-03	6889.1	5.024E-01	5.024E-01	1.773E+00
AC-228	7.146E+00	20.0	1.430E+00	1.475E+00	2.308E+00
TH-227	3.430E+00	176.9	6.067E+00	6.070E+00	2.055E+01
TH-229	-5.763E+00	122.7	7.073E+00	7.080E+00	1.830E+01
TH-234	2.054E+01	46.0	9.449E+00	9.520E+00	2.369E+01
PA-231	0.000E+00	1.#INF	4.099E+00	4.099E+00	7.288E+01
PA-233	5.452E-01	264.6	1.443E+00	1.443E+00	5.966E+00
PA-234	1.257E+00	123.8	1.557E+00	1.558E+00	5.243E+00
PA-234M	-2.273E+01	104.7	2.380E+01	2.383E+01	2.040E+02
AM-241	-1.057E+00	142.3	1.504E+00	1.505E+00	5.040E+00
Np-237	9.091E-07	403139613.5	3.665E+00	3.665E+00	1.240E+01
Ir-192	1.852E-01	109.6	2.030E-01	2.033E-01	2.495E+00
Cs-136	-2.820E-01	173.5	4.893E-01	4.896E-01	1.701E+00
Np-239	5.803E-01	186.0	1.080E+00	1.080E+00	3.677E+00
Nd-147	-3.945E+00	95.7	3.774E+00	3.781E+00	9.040E+00
TL-210	1.149E+00	34.8	4.002E-01	4.055E-01	1.190E+00
Total	4.188E+03				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-B-39-C

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20181530.An1

Acquisition information

Start time:	8/23/2018 8:47:27 AM
Live time:	1800
Real time:	1801
Dead time:	0.06 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 8:47:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2018-08-11_1245.PBC 8/11/2018 12:45:26 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1820

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.45	13.	110.33	0.86	1.799E-02	46.54	4.250	PBC<MDA	PB210
50.14	11.	176.88	0.85	2.193E-02	50.14	8.000	PBC<MDA	TH227
63.07	42.	46.00	0.56	2.978E-02	63.29	3.810	PBC<MDA	TH234
74.49	85.	17.24	0.88	3.323E-02				
77.09	93.	16.91	0.88	3.384E-02				
84.08	29.	38.14	0.74	3.521E-02				
92.49	18.	83.70	0.90	3.637E-02	92.59	5.584	PBC<MDA	TH234
93.25	17.	167.89	0.90	3.645E-02	93.35	5.561	PBC<MDA	AC228
105.31	14.	109.75	0.91	3.726E-02	105.31	21.200	PBC<MDA	EU155
106.13	9.	186.05	0.91	3.729E-02	106.13	22.700	PBC<MDA	Np239
123.10	11.	106.23	0.93	3.721E-02	123.10	40.790	PBC<MDA	EU154
131.29	15.	123.83	0.94	3.683E-02	131.29	18.000	PBC<MDA	PA234
133.02	14.	166.85	0.94	3.673E-02	133.02	43.300	PBC<MDA	HF181
133.54	14.	170.92	0.94	3.670E-02	133.54	11.090	PBC<MDA	CE144
136.30	14.	174.47	0.94	3.652E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.034E+00	CO57
162.66	14.	109.03	0.97	3.435E-02	162.66	6.220	PBC<MDA	Ba140
163.38	9.	168.21	0.97	3.428E-02	163.38	5.080	PBC<MDA	U235
185.72	25.	69.35	0.99	3.215E-02	185.72	54.000	PBC<MDA	U235
205.33	13.	119.95	1.01	3.030E-02	205.33	5.010	PBC<MDA	U235
238.39	82.	17.44	1.05	2.743E-02	238.63	43.300	3.825E+00	PB212
241.76	33.	34.81	1.05	2.716E-02	242.00	7.430	PBC<MDA	PB214
244.69	5.	480.80	1.05	2.695E-02	244.69	7.580	PBC<MDA	EU152
263.70	11.	99.92	1.07	2.554E-02	263.70	0.006	PBC<MDA	Cd113m
295.21	95.	16.73	1.13	2.350E-02	295.09	19.300	1.164E+01	PB214
300.18	10.	264.65	1.11	2.320E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	9.349E+00	PA231

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					300.18	6.200	3.711E+00	PA233
338.13	31.	37.43	1.61	2.118E-02	338.32	12.010	6.697E+00	AC228
351.61	113.	12.38	1.14	2.057E-02	351.93	37.600	8.156E+00	PB214
364.48	5.	239.17	1.17	2.001E-02	364.48	81.700	PBC<MDA	I131
383.84	9.	109.63	1.19	1.923E-02	383.84	8.940	PBC<MDA	BA133
387.95	9.	118.70	1.19	1.907E-02	387.95	66.000	PBC<MDA	Cf249
427.88	6.	151.54	1.23	1.770E-02	427.88	29.600	PBC<MDA	SB125
463.37	10.	92.69	1.27	1.666E-02	463.37	10.470	PBC<MDA	SB125
468.06	8.	109.63	1.27	1.653E-02	468.06	51.750	PBC<MDA	Ir192
477.60	8.	108.37	1.28	1.628E-02	477.60	10.520	PBC<MDA	BE7
482.00	9.	111.47	1.28	1.617E-02	482.00	80.500	PBC<MDA	HF181
487.02	5.	218.41	1.29	1.604E-02	487.02	45.500	PBC<MDA	La140
511.86	74.	21.17	2.56	1.546E-02	511.86	20.000	1.336E+01	RH106
537.26	7.	133.23	1.34	1.491E-02	537.26	24.390	PBC<MDA	Ba140
563.24	8.	96.31	1.36	1.439E-02	563.24	8.350	PBC<MDA	CS134
569.32	16.	36.44	1.37	1.428E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.592E+00	PA234
					569.70	97.740	6.372E-01	BI207
583.02	34.	29.51	1.38	1.403E-02	583.02	84.500	1.585E+00	TL208
600.50	10.	202.17	1.40	1.373E-02	600.50	17.860	PBC<MDA	SB125
602.73	9.	216.65	1.40	1.369E-02	602.73	98.260	PBC<MDA	SB124
609.15	112.	12.02	1.40	1.358E-02	609.31	46.090	9.938E+00	BI214
621.92	9.	229.14	1.42	1.338E-02	621.92	9.930	PBC<MDA	RH106
635.89	5.	78.99	1.43	1.317E-02	635.89	11.310	PBC<MDA	SB125
636.97	5.	101.38	1.43	1.315E-02	636.97	7.170	PBC<MDA	I131
722.79	7.	121.24	1.51	1.199E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.400E-01	AG108M
					723.36	20.220	1.528E+00	EU154
727.17	29.	22.27	1.52	1.194E-02	727.17	7.550	1.807E+01	BI212
735.72	1.	800.00	1.52	1.184E-02	735.72	22.500	PBC<MDA	pm146
747.16	2.	403.11	1.53	1.171E-02	747.16	34.000	PBC<MDA	pm146
765.79	8.	84.22	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.254E+02	PA234M
766.41	5.	188.93	1.55	1.150E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	7.457E+01	PA234M
795.87	20.	22.26	1.58	1.119E-02	795.87	85.530	1.171E+00	CS134
799.60	23.	34.83	1.58	1.115E-02	799.60	98.960	PBC<MDA	TL210
810.78	7.	38.39	1.59	1.104E-02	810.78	99.460	PBC<MDA	CO58
815.77	27.	23.47	1.60	1.099E-02	815.77	23.280	5.910E+00	La140
834.85	1.	692.82	1.61	1.081E-02	834.85	99.980	PBC<MDA	MN54
860.56	1.	857.32	1.64	1.057E-02	860.56	12.420	PBC<MDA	TL208
871.10	4.	158.11	1.65	1.048E-02	871.10	99.890	PBC<MDA	NB94
884.68	3.	344.80	1.66	1.036E-02	884.68	72.680	PBC<MDA	AG110M
898.04	1.	857.32	1.67	1.025E-02	898.04	93.700	PBC<MDA	y88
910.89	39.	20.01	1.52	1.015E-02	911.07	29.000	7.332E+00	AC228
964.11	6.	163.52	1.73	9.739E-03	964.11	14.605	PBC<MDA	EU152
968.69	46.	16.57	1.74	9.703E-03	968.97	17.460	1.508E+01	AC228
996.33	6.	83.99	1.76	9.508E-03	996.33	10.600	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1004.77	6.	90.75	1.77	9.450E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	4.	232.74	1.80	9.228E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	11.	84.69	1.81	9.147E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	4.	291.05	1.82	9.063E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	9.	87.98	1.85	8.846E-03	1099.25	56.500	PBC<MDA	FE59
1120.22	9.	83.00	1.87	8.722E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.862E-01	Sc46
1120.55	9.	91.25	1.87	8.721E-03	1120.29	15.100	3.881E+00	BI214
					1120.55	99.987	5.862E-01	Sc46
1121.66	9.	99.71	1.87	8.716E-03	1121.30	34.900	PBC<MDA	Ta182
1173.24	8.	119.02	1.92	8.426E-03	1173.24	99.900	PBC<MDA	CO60
1189.05	6.	123.77	1.93	8.342E-03	1189.05	16.200	PBC<MDA	Ta182
1238.28	5.	198.49	1.97	8.090E-03	1238.28	66.070	PBC<MDA	Co56
1291.60	2.	480.00	2.02	7.834E-03	1291.60	43.200	PBC<MDA	FE59
1313.00	7.	87.32	2.04	7.735E-03	1313.00	21.000	PBC<MDA	TL210
1332.50	11.	30.15	2.05	7.647E-03	1332.50	99.980	7.993E-01	CO60
1408.00	3.	205.48	2.12	7.324E-03	1408.00	21.005	PBC<MDA	EU152
1460.71	202.	7.04	1.89	7.112E-03	1460.83	10.670	1.479E+02	K40
1764.38	8.	64.04	2.40	6.075E-03	1764.49	15.400	PBC<MDA	BI214
1771.35	7.	98.85	2.41	6.055E-03	1771.35	15.480	PBC<MDA	Co56

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
297.53	74.43	65.	85.	2.560E+03	17.24	0.880	- D
307.93	77.03	76.	93.	2.743E+03	16.91	0.882	- D
335.85	84.08	35.	29.	8.236E+02	38.14	0.735	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.45	46.45	69.	13.	0.007	110.33	0.857
TH-227	200.18	50.14	178.	11.	0.006	176.88	0.855
AM-241	237.74	59.54	365.	-19.	-0.011	142.31	0.865s
TH-234	251.88	63.07	96.	42.	0.023	46.00	0.563s
BA-133	323.50	80.99	488.	-15.	-0.008	213.78	0.887s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	345.70	86.54	473.	0.	0.000	1000.00	0.892s
Sn-126	347.29	86.94	473.	0.	0.000	1000.00	0.892s
Sn-126	349.81	87.57	473.	0.	0.000	1000.00	0.893s
Cd-109	351.68	88.04	473.	0.	0.000	1000.00	0.894s
Nd-147	363.92	91.10	456.	-4.	-0.002	672.38	0.897s
TH-234	369.87	92.59	100.	18.	0.010	83.70	0.898D
AC-228	372.91	93.35	404.	17.	0.010	167.89	0.899s
Gd-153	389.50	97.50	260.	-16.	-0.009	144.66	0.903s
Gd-153	412.29	103.20	261.	-16.	-0.009	144.93	0.909s
Np-239	414.29	103.70	277.	0.	0.000	1000.00	0.909s
EU-155	420.73	105.31	114.	14.	0.008	109.75	0.911s
Np-239	424.00	106.13	131.	9.	0.005	186.05	0.912s
EU-152	486.55	121.78	125.	-15.	-0.008	108.53	0.928s
CO-57	487.69	122.06	140.	0.	0.000	1000.00	0.928s
EU-154	491.84	123.10	65.	11.	0.006	106.23	0.929s
PA-234	524.60	131.29	165.	15.	0.008	123.83	0.938s
HF-181	531.51	133.02	275.	14.	0.008	166.85	0.939
CE-144	533.57	133.54	289.	14.	0.008	170.92	0.940
HF-181	544.61	136.30	303.	14.	0.008	174.47	0.943s
CO-57	545.30	136.47	370.	-16.	-0.009	171.29	0.943s
Tc-99m	561.44	140.51	354.	-16.	-0.009	166.90	0.947s
U-235	574.53	143.79	341.	-17.	-0.010	154.02	0.950
CE-141	581.15	145.44	414.	-19.	-0.010	155.49	0.952s
Ba-140	649.99	162.66	108.	14.	0.008	109.03	0.969s
U-235	652.87	163.38	122.	9.	0.005	168.21	0.970s
CE-139	662.76	165.85	144.	-16.	-0.009	110.10	0.973s
Cf-251	705.72	176.60	84.	-11.	-0.006	154.47	0.983s
U-235	742.18	185.72	87.	25.	0.014	69.35	0.992s
TH-229	773.32	193.51	84.	-14.	-0.008	122.74	1.000
U-235	820.59	205.33	62.	13.	0.007	119.95	1.012s
TH-229	842.65	210.85	70.	-2.	-0.001	940.11	1.018
Cf-251	907.22	227.00	92.	-18.	-0.010	102.48	1.034s
PB-212	953.73	238.63	60.	82.	0.045	17.44	1.045D
PB-214	967.18	242.00	50.	33.	0.018	34.81	1.049D
EU-152	977.96	244.69	270.	5.	0.003	480.80	1.051s
TH-227	1024.13	256.24	70.	-16.	-0.009	100.13	1.063s
Cd-113m	1053.96	263.70	53.	11.	0.006	99.92	1.070s
TL-208	1108.27	277.28	64.	-4.	-0.002	287.23	1.084s
Hg-203	1115.93	279.20	89.	-9.	-0.005	151.94	1.086s
I-131	1136.32	284.30	44.	-4.	-0.002	314.25	1.091s
PB-214	1179.94	295.21	35.	95.	0.053	16.73	1.134s
TL-210	1183.11	296.00	387.	-14.	-0.008	195.79	1.102s
PB-212	1199.22	300.03	372.	-14.	-0.008	191.51	1.106
PA-231	1199.38	300.07	358.	-14.	-0.008	187.85	1.106s
PA-233	1199.82	300.18	318.	10.	0.005	264.65	1.107s
PA-231	1209.70	302.65	328.	0.	0.000	1000.00	1.109
BA-133	1210.50	302.85	328.	0.	0.000	1000.00	1.109
Ba-140	1218.49	304.85	328.	0.	0.000	1000.00	1.111s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1218.68	304.90	328.	0.	0.000	1000.00	1.111s
Ir-192	1232.85	308.44	328.	0.	0.000	1000.00	1.115s
PA-233	1247.13	312.01	328.	0.	0.000	1000.00	1.118
Ir-192	1265.04	316.49	328.	0.	0.000	1000.00	1.123
CR-51	1279.41	320.08	366.	-15.	-0.008	180.46	1.126s
La-140	1314.10	328.76	86.	-13.	-0.007	104.63	1.135s
Cf-249	1332.81	333.44	104.	-8.	-0.004	183.71	1.139s
AC-228	1351.59	338.13	23.	31.	0.017	37.43	1.607s
Cs-136	1361.32	340.57	150.	-14.	-0.008	123.37	1.146s
EU-152	1376.18	344.29	135.	-14.	-0.008	117.22	1.150s
HF-181	1382.35	345.83	110.	-3.	-0.002	515.92	1.151s
PB-214	1405.45	351.61	28.	113.	0.063	12.38	1.135
BA-133	1423.02	356.00	194.	-12.	-0.007	159.90	1.162s
I-131	1456.95	364.48	36.	5.	0.003	239.17	1.170s
BA-133	1534.35	383.84	47.	9.	0.005	109.63	1.189s
Cf-249	1550.79	387.95	56.	9.	0.005	118.70	1.193
SN-113	1565.74	391.69	103.	-12.	-0.007	118.21	1.196s
SB-125	1710.45	427.88	20.	6.	0.003	151.54	1.232s
AG-108M	1734.69	433.94	44.	-14.	-0.008	94.80	1.238s
SB-125	1852.39	463.37	37.	10.	0.005	92.69	1.266
Ir-192	1871.16	468.06	31.	8.	0.004	109.63	1.271s
BE-7	1909.29	477.60	31.	8.	0.004	108.37	1.280s
HF-181	1926.90	482.00	45.	9.	0.005	111.47	1.284s
La-140	1946.98	487.02	58.	5.	0.003	218.41	1.289s
RH-106	2046.35	511.86	27.	74.	0.041	21.17	2.563s
Nd-147	2122.88	531.00	39.	-14.	-0.008	95.68	1.331s
Ba-140	2147.92	537.26	17.	7.	0.004	133.23	1.337s
CS-134	2251.82	563.24	13.	8.	0.005	96.31	1.362s
CS-134	2276.15	569.32	9.	16.	0.009	36.44	1.367s
PA-234	2276.75	569.47	25.	0.	0.000	1000.00	1.368s
TL-208	2330.96	583.02	18.	34.	0.019	29.51	1.381s
SB-125	2400.87	600.50	188.	10.	0.005	202.17	1.397s
SB-124	2409.79	602.73	198.	9.	0.005	216.65	1.399s
CS-134	2417.71	604.71	207.	0.	0.000	1000.00	1.401s
BI-214	2435.46	609.15	13.	112.	0.062	12.02	1.396
RU-103	2440.06	610.30	207.	0.	0.000	1000.00	1.406s
AG-108M	2455.99	614.28	207.	0.	0.000	1000.00	1.410s
PM-144	2471.12	618.06	207.	0.	0.000	1000.00	1.414s
RH-106	2486.54	621.92	187.	9.	0.005	229.14	1.417s
SB-125	2542.43	635.89	6.	5.	0.003	78.99	1.430
I-131	2546.77	636.97	10.	5.	0.003	101.38	1.432s
AG-110M	2629.92	657.76	50.	-12.	-0.007	87.18	1.451s
CS-137	2645.51	661.66	68.	-6.	-0.003	204.40	1.455s
NB-94	2809.41	702.63	28.	-6.	-0.003	191.49	1.493s
SB-124	2890.04	722.79	29.	7.	0.004	121.24	1.512s
AG-108M	2890.65	722.94	36.	0.	0.000	1000.00	1.512s
EU-154	2892.32	723.36	36.	0.	0.000	1000.00	1.512s
ZR-95	2895.69	724.20	36.	0.	0.000	1000.00	1.513

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	2907.58	727.17	7.	29.	0.016	22.27	1.516s
pm-146	2941.78	735.72	14.	1.	0.001	800.00	1.524s
pm-146	2987.55	747.16	14.	2.	0.001	403.11	1.535
ZR-95	3025.83	756.73	23.	-7.	-0.004	144.53	1.543s
AG-110M	3054.69	763.94	41.	-5.	-0.003	192.42	1.550s
NB-95	3062.08	765.79	17.	8.	0.004	84.22	1.552s
PA-234M	3064.57	766.41	34.	5.	0.003	188.93	1.552s
EU-152	3114.61	778.92	23.	-1.	-0.001	773.39	1.564s
BI-212	3140.62	785.42	28.	-6.	-0.003	191.49	1.570s
CS-134	3182.42	795.87	0.	20.	0.011	22.26	1.579s
TL-210	3197.35	799.60	20.	23.	0.013	34.83	1.583s
CS-134	3206.76	801.95	52.	-6.	-0.003	189.58	1.585s
CO-58	3242.06	810.78	0.	7.	0.004	38.39	1.593s
La-140	3262.05	815.77	7.	27.	0.015	23.47	1.598s
Cs-136	3272.97	818.50	44.	-6.	-0.003	173.53	1.600s
MN-54	3338.38	834.85	19.	1.	0.001	692.82	1.615s
Co-56	3386.08	846.77	35.	-15.	-0.008	90.71	1.626s
TL-208	3441.27	860.56	15.	1.	0.001	857.32	1.638s
NB-94	3483.41	871.10	18.	4.	0.002	158.11	1.648s
PA-234	3521.16	880.53	42.	-12.	-0.006	84.83	1.657s
PA-234	3532.00	883.24	54.	-4.	-0.002	235.82	1.659s
AG-110M	3537.78	884.68	52.	3.	0.002	344.80	1.660s
Sc-46	3556.17	889.28	67.	-13.	-0.007	93.76	1.664s
y-88	3591.22	898.04	15.	1.	0.001	857.32	1.672s
AC-228	3642.62	910.89	4.	39.	0.022	20.01	1.519s
AG-110M	3749.09	937.49	25.	-10.	-0.006	114.38	1.708s
PA-234	3783.21	946.02	15.	-3.	-0.002	289.64	1.716s
EU-152	3855.60	964.11	46.	6.	0.003	163.52	1.732
AC-228	3875.05	968.97	6.	46.	0.026	16.57	1.736
EU-154	3984.54	996.33	10.	6.	0.003	83.99	1.761s
PA-234M	4003.22	1001.00	32.	-8.	-0.005	104.71	1.765s
EU-154	4018.33	1004.77	12.	6.	0.003	90.75	1.768s
Co-56	4150.66	1037.84	16.	4.	0.002	232.74	1.798s
Cs-136	4191.60	1048.07	44.	-17.	-0.009	61.72	1.807s
RH-106	4200.76	1050.36	37.	11.	0.006	84.69	1.809s
BI-207	4253.99	1063.66	21.	4.	0.002	291.05	1.820s
Ga-68	4308.98	1077.40	16.	-2.	-0.001	460.07	1.833s
FE-59	4396.44	1099.25	11.	9.	0.005	87.98	1.852s
EU-152	4447.76	1112.07	54.	-4.	-0.002	271.77	1.863s
ZN-65	4461.66	1115.55	50.	0.	0.000	1000.00	1.866s
BI-214	4480.63	1120.29	25.	9.	0.005	83.00	1.870s
Sc-46	4481.68	1120.55	31.	9.	0.005	91.25	1.870s
Ta-182	4484.69	1121.30	38.	9.	0.005	99.71	1.871s
CO-60	4692.57	1173.24	16.	8.	0.004	119.02	1.916s
Ta-182	4755.86	1189.05	11.	6.	0.004	123.77	1.930
Ta-182	4885.39	1221.41	40.	-18.	-0.010	85.30	1.957s
Co-56	4952.92	1238.28	17.	5.	0.003	198.49	1.972s
NA-22	5098.03	1274.53	17.	-7.	-0.004	91.47	2.003s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	5098.09	1274.54	24.	0.	0.000	1000.00	2.003s
FE-59	5166.35	1291.60	11.	2.	0.001	480.00	2.017s
TL-210	5252.04	1313.00	6.	7.	0.004	87.32	2.036s
CO-60	5330.11	1332.50	0.	11.	0.006	30.15	2.052s
AG-110M	5537.48	1384.30	11.	-6.	-0.004	130.84	2.096s
EU-152	5632.39	1408.00	6.	3.	0.002	205.48	2.115s
K-40	5843.43	1460.71	0.	202.	0.112	7.04	1.888
La-140	6386.02	1596.21	18.	-11.	-0.006	97.91	2.269s
SB-124	6765.58	1690.98	0.	0.	0.000	1000.00	2.345s
BI-214	7060.00	1764.49	10.	8.	0.005	64.04	2.403s
Co-56	7087.48	1771.35	19.	7.	0.004	98.85	2.408s
y-88	7346.69	1836.06	0.	0.	0.000	1000.00	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.4988E+00					5.31E+01	
			477.60	2.499E+00	&(	9.294E+00	1.08E+02	1.05E+01 G
NA-22	C	-4.9169E-01					9.50E+02	
			1274.53	-4.917E-01	?(	1.540E+00	9.15E+01	9.99E+01 G
K-40	N	1.4788E+02					4.66E+11	
			1460.83	1.479E+02	(	5.395E+00	7.04E+00	1.07E+01 G
Sc-46	F	-6.9650E-01					8.38E+01	
			889.28	-6.965E-01	?(	2.201E+00	9.38E+01	1.00E+02 G
			1120.55	5.862E-01	+	1.816E+00	9.13E+01	1.00E+02 G
CR-51	F	-3.8338E+00					2.77E+01	
			320.08	-3.834E+00	?(	2.325E+01	1.80E+02	9.94E+00 G
MN-54	C	6.8550E-02					3.12E+02	
			834.85	6.855E-02	?(	1.174E+00	6.93E+02	1.00E+02 G
FE-59	F	1.0125E+00					4.45E+01	
			1099.25	1.012E+00	?(	1.993E+00	8.80E+01	5.65E+01 G
			1291.60	2.736E-01	-	3.020E+00	4.80E+02	4.32E+01 G
Co-56	C	-4.6994E-01					7.73E+01	
			846.77	-7.774E-01	?(	1.573E+00	9.07E+01	9.99E+01 G
			1238.28	5.197E-01	+	2.279E+00	1.98E+02	6.61E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1037.84	1.704E+00	?(	9.096E+00	2.33E+02	1.41E+01 G
			1771.35	4.031E+00	?	1.371E+01	9.89E+01	1.55E+01 A
CO-58	C	3.4330E-01						7.09E+01
			810.78	3.433E-01	?(	3.729E-01	3.84E+01	9.95E+01 G
CO-60	F	6.6369E-01						1.93E+03
			1332.50	7.993E-01	?(	5.355E-01	3.02E+01	1.00E+02 G
			1173.24	5.280E-01	?(	1.409E+00	1.19E+02	9.99E+01 G
NB-94	I	-3.0465E-02						7.41E+06
			702.63	-2.781E-01	?(	1.269E+00	1.91E+02	9.79E+01 G
			871.10	2.122E-01	?(	1.193E+00	1.58E+02	9.99E+01 G
ZR-95	I	-6.4476E-01						6.40E+01
			756.73	-6.448E-01	?(	2.217E+00	1.45E+02	5.45E+01 G
			724.20	0.000E+00	+	3.222E+00	1.00E+03	4.42E+01 G
NB-95	I	3.6927E-01						6.40E+01
			765.79	3.693E-01	?(	1.056E+00	8.42E+01	9.98E+01 G
RU-103	I	-3.8681E-02						3.93E+01
			497.05	-3.868E-02	%(	1.059E+00	1.04E+03	9.09E+01 G
			610.30	0.000E+00	+	4.968E+01	1.00E+03	5.75E+00 GA
RH-106	I	8.8438E+00						3.74E+02
			621.92	3.569E+00	&(	2.778E+01	2.29E+02	9.93E+00 G
			1050.36	4.242E+01	(	1.211E+02	8.47E+01	1.56E+00 G
			511.86	1.336E+01	?	4.812E+00	2.12E+01	2.00E+01 GA
AG-108M	C	-5.0032E-01						1.53E+05
			433.94	-5.003E-01	?(	1.179E+00	9.48E+01	9.05E+01 G
			722.94	0.000E+00	+	1.564E+00	1.00E+03	9.08E+01 G
			614.28	0.000E+00	+	3.194E+00	1.00E+03	8.98E+01 G
AG-110M	F	2.2125E-01						2.50E+02
			884.68	2.212E-01	?(	2.678E+00	3.45E+02	7.27E+01 G
			657.76	-5.560E-01	+	1.632E+00	8.72E+01	9.46E+01 G
			937.49	-1.627E+00	+	4.231E+00	1.14E+02	3.44E+01 G
			1384.30	-1.952E+00	+	5.669E+00	1.31E+02	2.43E+01 G
			763.94	-1.046E+00	+	7.030E+00	1.92E+02	2.23E+01 G
SN-113	F	-5.7198E-01						1.15E+02
			391.69	-5.720E-01	?(	2.287E+00	1.18E+02	6.40E+01 G
SB-124	F	6.2853E-01						6.02E+01
			602.73	3.834E-01	?(	2.818E+00	2.17E+02	9.83E+01 G
			1690.98	0.000E+00	-	1.359E+00	1.00E+03	4.78E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			722.79	2.857E+00	?(	1.198E+01	1.21E+02	1.08E+01 G
SB-125	I	1.6230E+00					1.01E+03	
			427.88	6.363E-01	?(	2.498E+00	1.52E+02	2.96E+01 G
			600.50	2.201E+00	?(	1.509E+01	2.02E+02	1.79E+01 G
			635.89	1.894E+00	&(	5.089E+00	7.90E+01	1.13E+01 G
			463.37	3.134E+00	&(	9.851E+00	9.27E+01	1.05E+01 G
I-131	I	3.9286E-01					8.02E+00	
			364.48	1.699E-01	?(	1.042E+00	2.39E+02	8.17E+01 G
			284.30	-1.498E+00	+	1.259E+01	3.14E+02	6.14E+00 G
			636.97	2.933E+00	*(	1.039E+01	1.01E+02	7.17E+00 G
Gd-153	F	-8.0478E-01					2.42E+02	
			97.50	-8.048E-01	?(	3.915E+00	1.45E+02	3.00E+01 G
			103.20	-1.097E+00	+	5.347E+00	1.45E+02	2.18E+01 G
Ga-68	C	-4.3753E+00					4.71E-02	
			1077.40	-4.375E+00	?(	4.671E+01	4.60E+02	3.30E+00 G
Tc-99m	I	-2.8501E-01					2.51E-01	
			140.51	-2.850E-01	?(	1.598E+00	1.67E+02	8.93E+01 G
BA-133	F	-5.4936E-01					3.85E+03	
			356.00	-5.494E-01	?(	2.968E+00	1.60E+02	6.20E+01 G
			302.85	0.000E+00	+	1.146E+01	1.00E+03	1.83E+01 G
			383.84	2.985E+00	?	1.116E+01	1.10E+02	8.94E+00 GA
			80.99	-6.927E-01	&	4.971E+00	2.14E+02	3.41E+01 GA
CS-134	I	9.3816E-01					7.54E+02	
			604.71	0.000E+00	?(	2.906E+00	1.00E+03	9.76E+01 G
			795.87	1.171E+00	?(	4.279E-01	2.23E+01	8.55E+01 G
			569.32	4.047E+00	&(	4.222E+00	3.64E+01	1.54E+01 G
			801.95	-3.167E+00	+	2.083E+01	1.90E+02	8.69E+00 G
			563.24	3.790E+00	?(	9.019E+00	9.63E+01	8.35E+00 G
CS-137	I	-2.9738E-01					1.10E+04	
			661.66	-2.974E-01	?(	2.100E+00	2.04E+02	8.52E+01 G
CE-139	F	-3.2364E-01					1.38E+02	
			165.85	-3.236E-01	?(	1.198E+00	1.10E+02	7.99E+01 G
Ba-140	I	1.5453E+00					1.28E+01	
			537.26	1.019E+00	&(	3.378E+00	1.33E+02	2.44E+01 G
			162.66	3.611E+00	?(	1.328E+01	1.09E+02	6.22E+00 G
			304.85	0.000E+00	-	4.919E+01	1.00E+03	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	3.8095E-01					1.28E+01	
			1596.21	-9.682E-01	?(	1.979E+00	9.79E+01	9.54E+01 G
			487.02	3.832E-01	+	2.906E+00	2.18E+02	4.55E+01 G
			328.76	-1.643E+00	+	5.805E+00	1.05E+02	2.03E+01 G
			815.77	5.910E+00	?(	3.224E+00	2.35E+01	2.33E+01 G
CE-141	I	-6.0140E-01					3.25E+01	
			145.44	-6.014E-01	&(	3.134E+00	1.55E+02	4.82E+01 G
CE-144	I	1.9432E+00					2.85E+02	
			133.54	1.943E+00	&(	1.118E+01	1.71E+02	1.11E+01 G
PM-144	C	-1.5183E-02					3.63E+02	
			696.54	-1.518E-02	%(	1.149E+00	3.08E+03	9.90E+01 G
			618.06	0.000E+00	+	2.909E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2472E-01					4.94E+03	
			344.29	-1.445E+00	?(	5.712E+00	1.17E+02	2.65E+01 G
			1112.07	-1.805E+00	+	1.714E+01	2.72E+02	1.36E+01 G
			121.78	-7.828E-01	+	2.860E+00	1.09E+02	2.86E+01 G
			778.92	-5.038E-01	+	9.529E+00	7.73E+02	1.29E+01 G
			964.11	2.353E+00	?(	1.334E+01	1.64E+02	1.46E+01 G
			244.69	1.321E+00	&(	2.157E+01	4.81E+02	7.58E+00 G
			1408.00	1.083E+00	?	5.101E+00	2.05E+02	2.10E+01 GA
EU-154	I	1.0528E+00					3.14E+03	
			873.23	-2.164E-01	%(	1.095E+01	1.38E+03	1.23E+01 G
			123.10	4.095E-01	*(	1.475E+00	1.06E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.095E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	7.030E+00	1.00E+03	2.02E+01 G
			1004.77	2.007E+00	?(	6.263E+00	9.08E+01	1.80E+01 G
			996.33	3.376E+00	?(	9.684E+00	8.40E+01	1.06E+01 G
EU-155	I	9.9586E-01					1.81E+03	
			105.31	9.959E-01	(	3.685E+00	1.10E+02	2.12E+01 G
			86.54	0.000E+00	-	5.289E+00	1.00E+03	3.07E+01 G
HF-181	F	5.7004E-01					4.24E+01	
			482.00	3.810E-01	?(	1.450E+00	1.11E+02	8.05E+01 G
			133.02	4.970E-01	?(	2.792E+00	1.67E+02	4.33E+01 G
			345.83	-5.119E-01	+	9.125E+00	5.16E+02	1.51E+01 G
			136.30	3.712E+00	?(	2.180E+01	1.74E+02	5.85E+00 G
Ta-182	F	1.9734E+00					1.14E+02	
			1121.30	1.681E+00	?(	5.707E+00	9.97E+01	3.49E+01 G
			1221.41	-4.535E+00	+	8.069E+00	8.53E+01	2.70E+01 G
			1189.05	2.604E+00	(	7.371E+00	1.24E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-2.5062E-01					4.66E+01	
			279.20	-2.506E-01	?(	1.300E+00	1.52E+02	8.15E+01 G
TL-208	N	1.5851E+00					6.98E+02	
			583.02	1.585E+00	*(P	1.058E+00	2.95E+01	8.45E+01 G
			277.28	-1.431E+00	-	1.430E+01	2.87E+02	6.31E+00 G
			860.56	4.230E-01	&	8.781E+00	8.57E+02	1.24E+01 G
pm-146	C	2.5098E-01					2.02E+03	
			747.16	2.791E-01	?(	2.811E+00	4.03E+02	3.40E+01 G
			735.72	2.085E-01	?(	4.201E+00	8.00E+02	2.25E+01 G
			453.88	5.051E-02	%	1.382E+00	1.04E+03	6.50E+01 G
y-88	F	5.7828E-02					1.07E+02	
			898.04	5.783E-02	?(	1.200E+00	8.57E+02	9.37E+01 G
			1836.06	0.000E+00	-	7.036E-01	1.00E+03	9.92E+01 G
Cd-113m		3.9272E+03					5.33E+03	
			263.70	3.927E+03	?(	1.330E+04	9.99E+01	6.00E-03 K
Cf-251	T	-1.1215E+00					3.28E+05	
			176.60	-1.121E+00	?(	4.503E+00	1.54E+02	1.70E+01 G
			227.00	-5.580E+00	+	1.470E+01	1.02E+02	6.30E+00 GA
Cf-249	T	4.0913E-01					1.28E+05	
			387.95	4.091E-01	?(	1.657E+00	1.19E+02	6.60E+01 G
			333.44	-1.338E+00	+	8.400E+00	1.84E+02	1.55E+01 G
Sn-126		-2.0884E-01					3.65E+07	
			87.57	0.000E+00	&	4.312E+00	1.00E+03	3.75E+01 GA
			64.28	-2.088E-01	%(	1.495E+01	2.10E+03	9.70E+00 G
			86.94	0.000E+00	+	1.793E+01	1.00E+03	9.04E+00 GA
PB-210	N	9.0883E+00					8.14E+03	
			46.54	9.088E+00	(P	3.009E+01	1.10E+02	4.25E+00 G
PB-212	N	3.8251E+00					6.98E+02	
			238.63	3.825E+00	(P	1.818E+00	1.74E+01	4.33E+01 G
			300.03	-1.050E+01	-	6.760E+01	1.92E+02	3.28E+00 GA
PB-214	N	8.1561E+00					5.84E+05	
			351.93	8.156E+00	(P	1.953E+00	1.24E+01	3.76E+01 G
			295.09	1.164E+01	+	3.709E+00	1.67E+01	1.93E+01 G
			242.00	9.140E+00	P	9.799E+00	3.48E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	1.2296E-01					1.18E+04	
			569.70	-1.327E-02	%(	1.042E+00	2.14E+03	9.77E+01 G
			1063.66	3.017E-01	?(	1.994E+00	2.91E+02	7.45E+01 G
BI-212	N	1.8075E+01					6.98E+02	
			727.17	1.807E+01	?(	9.084E+00	2.23E+01	7.55E+00 G
			785.42	-2.306E+01	-	1.052E+02	1.91E+02	1.28E+00 GA
U-235	N	5.7230E-01					2.57E+11	
			143.79	-2.417E+00	(	1.250E+01	1.54E+02	1.10E+01 G
			205.33	4.636E+00	?(	1.446E+01	1.20E+02	5.01E+00 G
			163.38	3.014E+00	?(	1.725E+01	1.68E+02	5.08E+00 G
			185.72	8.078E-01	* P	1.476E+00	6.94E+01	5.40E+01 GA
BI-214	N	9.9385E+00					5.84E+05	
			609.31	9.938E+00	(	1.731E+00	1.20E+01	4.61E+01 G
			1120.29	3.881E+00	-	1.088E+01	8.30E+01	1.51E+01 G
			1764.49	4.968E+00	-	1.043E+01	6.40E+01	1.54E+01 G
BI-210M	T	7.2929E-03					1.10E+09	
			265.83	7.293E-03	%(	1.773E+00	6.89E+03	5.00E+01 G
			304.90	0.000E+00	-	7.538E+00	1.00E+03	2.80E+01 G
AC-228	N	7.1459E+00					2.10E+03	
			911.07	7.332E+00	(	2.308E+00	2.00E+01	2.90E+01 G
			968.97	1.508E+01	+	4.639E+00	1.66E+01	1.75E+01 G
			338.32	6.697E+00	(	5.507E+00	3.74E+01	1.20E+01 G
			93.35	4.689E+00	-	2.641E+01	1.68E+02	5.56E+00 XA
TH-227	N	3.4299E+00					7.95E+03	
			50.14	3.430E+00	?(	2.055E+01	1.77E+02	8.00E+00 G
			256.24	-4.900E+00	+	1.266E+01	1.00E+02	7.00E+00 G
TH-229	N	-5.7630E+00					2.68E+06	
			193.51	-5.763E+00	?(	1.830E+01	1.23E+02	4.40E+00 G
			210.85	-1.039E+00	+	2.594E+01	9.40E+02	2.99E+00 G
TH-234	N	2.0542E+01					1.63E+12	
			63.29	2.054E+01	*(P	2.369E+01	4.60E+01	3.81E+00 G
			92.59	4.860E+00	- P	1.350E+01	8.37E+01	5.58E+00 G
PA-233	C	5.4516E-01					7.82E+08	
			312.01	0.000E+00	?(	5.966E+00	1.00E+03	3.60E+01 G
			300.18	3.711E+00	&(	3.316E+01	2.65E+02	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	1.2570E+00					1.63E+12	
			131.29	1.257E+00	?(	5.243E+00	1.24E+02	1.80E+01 G
			946.02	-1.260E+00	+	8.716E+00	2.90E+02	1.34E+01 G
			569.47	0.000E+00	-	1.234E+01	1.00E+03	8.20E+00 G
			883.24	-2.497E+00	+	2.052E+01	2.36E+02	9.60E+00 G
			880.53	-1.026E+01	+	2.930E+01	8.48E+01	6.00E+00 GA
PA-234M	N	-2.2731E+01					1.63E+12	
			1001.00	-5.691E+01	?(	2.040E+02	1.05E+02	8.37E-01 G
			766.41	7.457E+01	?(	4.942E+02	1.89E+02	2.94E-01 G
AM-241	T	-1.0566E+00					1.58E+05	
			59.54	-1.057E+00	?(	5.040E+00	1.42E+02	3.59E+01 G
Np-237	F	9.0905E-07					2.14E+06	
			86.49	9.091E-07	%(	1.240E+01	4.03E+08	1.31E+01 G
Ir-192	F	1.8520E-01					7.40E+01	
			316.49	0.000E+00	(	2.495E+00	1.00E+03	8.70E+01 G
			468.06	4.967E-01	?(	1.870E+00	1.10E+02	5.18E+01 G
			308.44	0.000E+00	-	6.706E+00	1.00E+03	3.18E+01 G
Cs-136	F	-2.8196E-01					1.30E+01	
			818.50	-2.820E-01	?(	1.701E+00	1.74E+02	1.00E+02 G
			1048.07	-1.260E+00	&	2.557E+00	6.17E+01	8.00E+01 G
			340.57	-8.074E-01	+	3.358E+00	1.23E+02	4.69E+01 G
Np-239	T	5.8033E-01					2.36E+00	
			103.70	0.000E+00	-	4.996E+00	1.00E+03	2.40E+01 X
			106.13	5.803E-01	&(	3.677E+00	1.86E+02	2.27E+01 G
			99.50	-9.975E-02	%	8.028E+00	2.36E+03	1.50E+01 X
Nd-147		-3.9446E+00					1.11E+01	
			531.00	-3.945E+00	?(	9.040E+00	9.57E+01	1.30E+01 G
			91.10	-2.440E-01	+	5.539E+00	6.72E+02	2.83E+01 G
TL-210	N	1.1491E+00					5.84E+05	
			799.60	1.149E+00	&(	1.190E+00	3.48E+01	9.90E+01 G
			296.00	-4.300E-01	-	2.830E+00	1.96E+02	7.90E+01 G
			1313.00	2.422E+00	?	4.721E+00	8.73E+01	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.14	178.	11.	0.006	176.88	3.430E+00	
AM-241	59.54	365.	-19.	-0.011	142.31	-1.057E+00	
BA-133	80.99	488.	-15.	-0.008	213.78	-6.927E-01	
Nd-147	91.10	456.	-4.	-0.002	672.38	-2.440E-01	
Gd-153	97.50	260.	-16.	-0.009	144.66	-8.048E-01	
Gd-153	103.20	261.	-16.	-0.009	144.93	-1.097E+00	
EU-155	105.31	114.	14.	0.008	109.75	9.959E-01	
Np-239	106.13	131.	9.	0.005	186.05	5.803E-01	
EU-152	121.78	125.	-15.	-0.008	108.53	-7.828E-01	
EU-154	123.10	65.	11.	0.006	106.23	4.095E-01	
PA-234	131.29	165.	15.	0.008	123.83	1.257E+00	
HF-181	133.02	275.	14.	0.008	166.85	4.970E-01	
CE-144	133.54	289.	14.	0.008	170.92	1.943E+00	
HF-181	136.30	303.	14.	0.008	174.47	3.712E+00	
CO-57	136.47	370.	-16.	-0.009	171.29	-2.286E+00	
Tc-99m	140.51	354.	-16.	-0.009	166.90	-2.850E-01	
U-235	143.79	341.	-17.	-0.010	154.02	-2.417E+00	
CE-141	145.44	414.	-19.	-0.010	155.49	-6.014E-01	
Ba-140	162.66	108.	14.	0.008	109.03	3.611E+00	
U-235	163.38	122.	9.	0.005	168.21	3.014E+00	
CE-139	165.85	144.	-16.	-0.009	110.10	-3.236E-01	
Cf-251	176.60	84.	-11.	-0.006	154.47	-1.121E+00	
U-235	185.72	87.	25.	0.014	69.35	8.078E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-229	193.51	84.	-14.	-0.008	122.74	-5.763E+00	
U-235	205.33	62.	13.	0.007	119.95	4.636E+00	
TH-229	210.85	70.	-2.	-0.001	940.11	-1.039E+00	
Cf-251	227.00	92.	-18.	-0.010	102.48	-5.580E+00	
EU-152	244.69	270.	5.	0.003	480.80	1.321E+00	
TH-227	256.24	70.	-16.	-0.009	100.13	-4.900E+00	
Cd-113m	263.70	53.	11.	0.006	99.92	3.927E+03	
Hg-203	279.20	89.	-9.	-0.005	151.94	-2.506E-01	
I-131	284.30	44.	-4.	-0.002	314.25	-1.498E+00	
TL-210	296.00	387.	-14.	-0.008	195.79	-4.300E-01	
PA-231	300.07	358.	-14.	-0.008	187.85	-1.400E+01	
PA-233	300.18	318.	10.	0.005	264.65	3.711E+00	
CR-51	320.08	366.	-15.	-0.008	180.46	-3.834E+00	
La-140	328.76	86.	-13.	-0.007	104.63	-1.643E+00	
Cf-249	333.44	104.	-8.	-0.004	183.71	-1.338E+00	
Cs-136	340.57	150.	-14.	-0.008	123.37	-8.074E-01	
EU-152	344.29	135.	-14.	-0.008	117.22	-1.445E+00	
HF-181	345.83	110.	-3.	-0.002	515.92	-5.119E-01	
BA-133	356.00	194.	-12.	-0.007	159.90	-5.494E-01	
I-131	364.48	36.	5.	0.003	239.17	1.699E-01	
BA-133	383.84	47.	9.	0.005	109.63	2.985E+00	
Cf-249	387.95	56.	9.	0.005	118.70	4.091E-01	
SN-113	391.69	103.	-12.	-0.007	118.21	-5.720E-01	
SB-125	427.88	20.	6.	0.003	151.54	6.363E-01	
AG-108M	433.94	44.	-14.	-0.008	94.80	-5.003E-01	
SB-125	463.37	37.	10.	0.005	92.69	3.134E+00	
Ir-192	468.06	31.	8.	0.004	109.63	4.967E-01	
BE-7	477.60	31.	8.	0.004	108.37	2.499E+00	
HF-181	482.00	45.	9.	0.005	111.47	3.810E-01	
La-140	487.02	58.	5.	0.003	218.41	3.832E-01	
RH-106	511.86	27.	74.	0.041	21.17	1.336E+01	
Nd-147	531.00	39.	-14.	-0.008	95.68	-3.945E+00	
Ba-140	537.26	17.	7.	0.004	133.23	1.019E+00	
CS-134	563.24	13.	8.	0.005	96.31	3.790E+00	
CS-134	569.32	9.	16.	0.009	36.44	4.047E+00	
SB-125	600.50	188.	10.	0.005	202.17	2.201E+00	
SB-124	602.73	198.	9.	0.005	216.65	3.834E-01	
RH-106	621.92	187.	9.	0.005	229.14	3.569E+00	
SB-125	635.89	6.	5.	0.003	78.99	1.894E+00	
I-131	636.97	10.	5.	0.003	101.38	2.933E+00	
AG-110M	657.76	50.	-12.	-0.007	87.18	-5.560E-01	
CS-137	661.66	68.	-6.	-0.003	204.40	-2.974E-01	
NB-94	702.63	28.	-6.	-0.003	191.49	-2.781E-01	
SB-124	722.79	29.	7.	0.004	121.24	2.857E+00	
pm-146	735.72	14.	1.	0.001	800.00	2.085E-01	
pm-146	747.16	14.	2.	0.001	403.11	2.791E-01	
ZR-95	756.73	23.	-7.	-0.004	144.53	-6.448E-01	
AG-110M	763.94	41.	-5.	-0.003	192.42	-1.046E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
NB-95	765.79	17.	8.	0.004	84.22	3.693E-01	
PA-234M	766.41	34.	5.	0.003	188.93	7.457E+01	
EU-152	778.92	23.	-1.	-0.001	773.39	-5.038E-01	
CS-134	795.87	0.	20.	0.011	22.26	1.171E+00	
TL-210	799.60	20.	23.	0.013	34.83	1.149E+00	
CS-134	801.95	52.	-6.	-0.003	189.58	-3.167E+00	
CO-58	810.78	0.	7.	0.004	38.39	3.433E-01	
La-140	815.77	7.	27.	0.015	23.47	5.910E+00	
Cs-136	818.50	44.	-6.	-0.003	173.53	-2.820E-01	
MN-54	834.85	19.	1.	0.001	692.82	6.855E-02	
Co-56	846.77	35.	-15.	-0.008	90.71	-7.774E-01	
NB-94	871.10	18.	4.	0.002	158.11	2.122E-01	
PA-234	880.53	42.	-12.	-0.006	84.83	-1.026E+01	
PA-234	883.24	54.	-4.	-0.002	235.82	-2.497E+00	
AG-110M	884.68	52.	3.	0.002	344.80	2.212E-01	
Sc-46	889.28	67.	-13.	-0.007	93.76	-6.965E-01	
y-88	898.04	15.	1.	0.001	857.32	5.783E-02	
AG-110M	937.49	25.	-10.	-0.006	114.38	-1.627E+00	
PA-234	946.02	15.	-3.	-0.002	289.64	-1.260E+00	
EU-152	964.11	46.	6.	0.003	163.52	2.353E+00	
EU-154	996.33	10.	6.	0.003	83.99	3.376E+00	
PA-234M	1001.00	32.	-8.	-0.005	104.71	-5.691E+01	
EU-154	1004.77	12.	6.	0.003	90.75	2.007E+00	
Co-56	1037.84	16.	4.	0.002	232.74	1.704E+00	
Cs-136	1048.07	44.	-17.	-0.009	61.72	-1.260E+00	
RH-106	1050.36	37.	11.	0.006	84.69	4.242E+01	
BI-207	1063.66	21.	4.	0.002	291.05	3.017E-01	
Ga-68	1077.40	16.	-2.	-0.001	460.07	-4.375E+00	
FE-59	1099.25	11.	9.	0.005	87.98	1.012E+00	
EU-152	1112.07	54.	-4.	-0.002	271.77	-1.805E+00	
Sc-46	1120.55	31.	9.	0.005	91.25	5.862E-01	
Co-56	1238.28	17.	5.	0.003	198.49	5.197E-01	
NA-22	1274.53	17.	-7.	-0.004	91.47	-4.917E-01	
FE-59	1291.60	11.	2.	0.001	480.00	2.736E-01	
TL-210	1313.00	6.	7.	0.004	87.32	2.422E+00	
AG-110M	1384.30	11.	-6.	-0.004	130.84	-1.952E+00	
EU-152	1408.00	6.	3.	0.002	205.48	1.083E+00	
La-140	1596.21	18.	-11.	-0.006	97.91	-9.682E-01	
Co-56	1771.35	19.	7.	0.004	98.85	4.031E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.4988E+00	2.4988E+00	1.084E+02%	9.29E+00
NA-22	#A	-4.9169E-01	-4.9169E-01	9.147E+01%	1.54E+00
K-40		1.4788E+02	1.4788E+02	7.036E+00%	5.40E+00
Sc-46	#A	-6.9650E-01	-6.9650E-01	9.376E+01%	2.20E+00
CR-51	#A	-3.8337E+00	-3.8338E+00	1.805E+02%	2.33E+01
MN-54	#A	6.8550E-02	6.8550E-02	6.928E+02%	1.17E+00
FE-59	#A	1.0125E+00	1.0125E+00	8.798E+01%	1.99E+00
Co-56	#A	-4.6994E-01	-4.6994E-01	9.071E+01%	1.57E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.01E+00
CO-58	#A	3.4329E-01	3.4330E-01	3.839E+01%	3.73E-01
CO-60	#	6.6369E-01	6.6369E-01	3.015E+01%	5.36E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.47E+00
NB-94	#A	-3.0465E-02	-3.0465E-02	1.242E+02%	1.27E+00
ZR-95	#A	-6.4476E-01	-6.4476E-01	1.445E+02%	2.22E+00
NB-95	#A	3.6927E-01	3.6927E-01	8.422E+01%	1.06E+00
RU-103	#A	-3.8680E-02	-3.8681E-02	1.041E+03%	1.06E+00
RH-106	#A	8.8438E+00	8.8438E+00	8.469E+01%	2.78E+01
AG-108M	#A	-5.0032E-01	-5.0032E-01	9.480E+01%	1.18E+00
AG-110M	#A	2.2125E-01	2.2125E-01	3.448E+02%	2.68E+00
SN-113	#A	-5.7198E-01	-5.7198E-01	1.182E+02%	2.29E+00
SB-124	#A	6.2853E-01	6.2853E-01	1.212E+02%	2.82E+00
SB-125	#A	1.6230E+00	1.6230E+00	7.012E+01%	2.50E+00
I-131	#A	3.9285E-01	3.9286E-01	1.014E+02%	1.04E+00
Gd-153	#A	-8.0478E-01	-8.0478E-01	1.447E+02%	3.91E+00
Ga-68	#A	-4.3552E+00	-4.3753E+00	4.601E+02%	4.67E+01
Tc-99m	#A	-2.8476E-01	-2.8501E-01	1.669E+02%	1.60E+00
BA-133	#A	-5.4936E-01	-5.4936E-01	1.599E+02%	2.97E+00
CS-134	#A	9.3816E-01	9.3816E-01	2.226E+01%	2.91E+00
CS-137	#A	-2.9738E-01	-2.9738E-01	2.044E+02%	2.10E+00
CE-139	#A	-3.2364E-01	-3.2364E-01	1.101E+02%	1.20E+00
Ba-140	#A	1.5453E+00	1.5453E+00	8.608E+01%	3.38E+00
La-140	#A	3.8095E-01	3.8095E-01	2.347E+01%	1.98E+00
CE-141	#A	-6.0139E-01	-6.0140E-01	1.555E+02%	3.13E+00
CE-144	#A	1.9432E+00	1.9432E+00	1.709E+02%	1.12E+01
PM-144	#A	-1.5183E-02	-1.5183E-02	3.079E+03%	1.15E+00
EU-152	#A	1.2472E-01	1.2472E-01	1.172E+02%	5.71E+00
EU-154	#A	1.0528E+00	1.0528E+00	8.399E+01%	1.09E+01
EU-155	#A	9.9586E-01	9.9586E-01	1.098E+02%	3.68E+00
HF-181	#A	5.7004E-01	5.7004E-01	8.863E+01%	1.45E+00
Ta-182	A	1.9734E+00	1.9734E+00	7.947E+01%	5.71E+00
Hg-203	#A	-2.5061E-01	-2.5062E-01	1.519E+02%	1.30E+00
TL-208	#	1.5851E+00	1.5851E+00	2.951E+01%	1.06E+00
pm-146	#A	2.5098E-01	2.5098E-01	4.031E+02%	2.81E+00

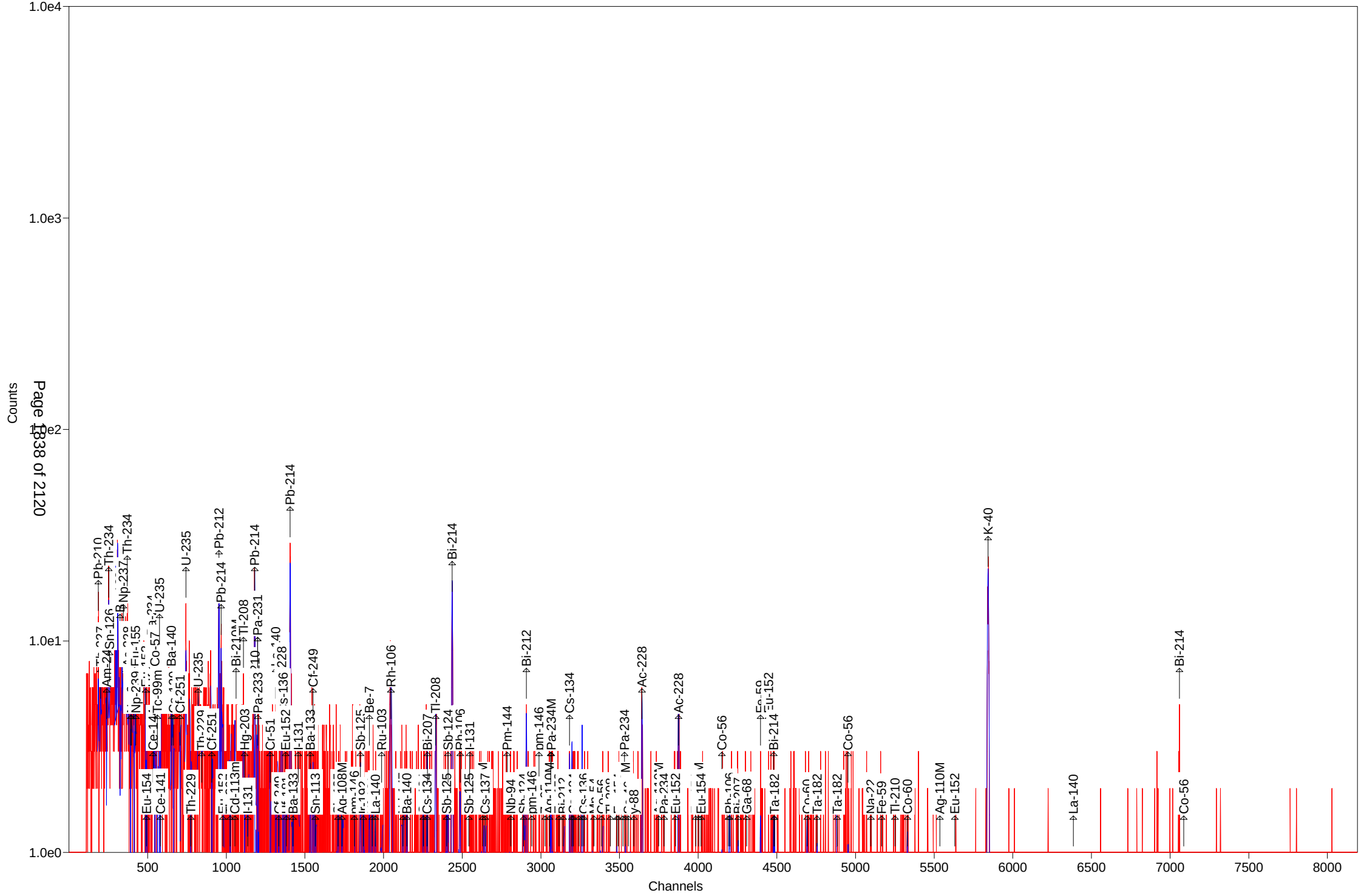
y-88 #A	5.7828E-02	5.7828E-02	8.573E+02%		1.20E+00
Cd-113m#A	3.9272E+03	3.9272E+03	9.992E+01%		1.33E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		4.26E+01
Cf-251 #A	-1.1215E+00	-1.1215E+00	1.545E+02%		4.50E+00
Cf-249 #A	4.0913E-01	4.0913E-01	1.187E+02%		1.66E+00
Sn-126 #A	-2.0884E-01	-2.0884E-01	2.100E+03%		1.50E+01
PB-210 A	9.0883E+00	9.0883E+00	1.103E+02%		3.01E+01
PB-212	3.8251E+00	3.8251E+00	1.744E+01%		1.82E+00
PB-214	8.1561E+00	8.1561E+00	1.238E+01%		1.95E+00
BI-207 #A	1.2296E-01	1.2296E-01	2.911E+02%		1.04E+00
BI-212 #	1.8075E+01	1.8075E+01	2.227E+01%		9.08E+00
U-235 #A	5.7230E-01	5.7230E-01	8.590E+01%		1.25E+01
BI-214	9.9385E+00	9.9385E+00	1.202E+01%		1.73E+00
BI-210M#A	7.2929E-03	7.2929E-03	6.889E+03%		1.77E+00
AC-228	7.1459E+00	7.1459E+00	2.001E+01%		2.31E+00
TH-227 #A	3.4299E+00	3.4299E+00	1.769E+02%		2.06E+01
TH-229 #A	-5.7630E+00	-5.7630E+00	1.227E+02%		1.83E+01
TH-234 A	2.0542E+01	2.0542E+01	4.600E+01%		2.37E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.29E+01
PA-233 #A	5.4516E-01	5.4516E-01	2.646E+02%		5.97E+00
PA-234 #A	1.2570E+00	1.2570E+00	1.238E+02%		5.24E+00
PA-234M#A	-2.2731E+01	-2.2731E+01	1.047E+02%		2.04E+02
AM-241 #A	-1.0566E+00	-1.0566E+00	1.423E+02%		5.04E+00
Np-237 #A	9.0905E-07	9.0905E-07	4.031E+08%		1.24E+01
Ir-192 #A	1.8520E-01	1.8520E-01	1.096E+02%		2.49E+00
Cs-136 #A	-2.8195E-01	-2.8196E-01	1.735E+02%		1.70E+00
Np-239 #A	5.8027E-01	5.8033E-01	1.860E+02%		3.68E+00
Nd-147 #A	-3.9445E+00	-3.9446E+00	9.568E+01%		9.04E+00
TL-210 #A	1.1491E+00	1.1491E+00	3.483E+01%		1.19E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 1.975E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 1.9748732E+02 Bq/Sample

379959_Gamma_160-29881-B-39-C. 12_Gamma_20181530.spc.


Counts
Channels
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
Pb-210
Th-234
Np-237
Th-234
U-235
Pb-212
Pb-214
Pb-214
Pb-214
Bi-214
K-40
Bi-214
Co-56
Co-56
La-140
Co-56
Eu-152
Ac-228
Ac-228
Bi-212
Cs-134
Pa-234
Pa-234M
Pm-146
Pm-144
Nb-94
Co-56
Bi-214
Eu-152
Ta-182
Ta-182
Ta-182
Ag-110M
Eu-152
Na-22
Fe-59
Tl-210
Co-60
Tl-208
Bi-207
Ga-68
Ru-103
Rh-106
Sb-124
Sb-125
Be-7
Cf-249
Ba-133
Sn-113
Cf-251
U-235
Th-229
Cd-113m
Hg-203
Pa-231
Cr-51
Eu-152
Ba-133
Cs-137
Cs-134
Bi-207
Ce-141
Eu-154
Tc-99m
Co-57
Ba-140
Np-239
Eu-155
Sn-126
Am-241
Ce-144
Pa-233
Pa-234
Ba-140
Cs-134
Sb-125
Sb-125
Eu-154
Eu-152
Co-60
Co-60
Co-56
Co-56
Co-56

Test America St. Louis Spectrum ID: 15_Gamma_20182800

Sample Description: 379959_Gamma_160-29881-A-40-C
Detector: Detector #15
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-40-C

Decay to Time: 8/23/2018 08:41 Live Time: 1800 sec
Acquisition Time: 8/23/2018 08:41:53 Real Time: 1801 sec
Analysis Time: 8/23/2018 09:12 Dead Time: 0.06 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Long_Rev14.lib
Bkgd Correction File: 15_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.947E+00	104.7	4.132E+00	4.137E+00	1.400E+01
NA-22	-3.380E-01	150.0	5.070E-01	5.073E-01	1.804E+00
K-40	1.788E+02	7.2	1.290E+01	1.581E+01	1.062E+01
Sc-46	3.398E-01	118.3	4.021E-01	4.025E-01	1.508E+00
CR-51	-6.188E-01	376.0	2.327E+00	2.327E+00	8.716E+00
MN-54	-5.853E-02	800.0	4.682E-01	4.682E-01	1.179E+00
FE-59	-1.313E-01	914.7	1.201E+00	1.201E+00	2.802E+00
Co-56	1.415E-02	176.4	2.496E-02	2.497E-02	1.194E+00
CO-57	0.000E+00	1.#INF	1.412E-01	1.412E-01	8.779E-01
CO-58	7.054E-01	46.4	3.273E-01	3.293E-01	1.005E+00
CO-60	4.875E-01	50.2	2.448E-01	2.460E-01	1.623E+00
ZN-65	0.000E+00	1.#INF	2.100E-01	2.100E-01	3.544E+00
NB-94	5.440E-02	69.9	3.801E-02	3.812E-02	1.181E+00
ZR-95	4.843E-01	168.6	8.165E-01	8.169E-01	1.998E+00
NB-95	-6.583E-01	97.7	6.432E-01	6.441E-01	2.173E+00
RU-103	7.775E-02	519.8	4.041E-01	4.042E-01	1.031E+00
RH-106	4.589E+00	126.0	5.784E+00	5.789E+00	2.151E+01
AG-108M	-3.958E-01	79.3	3.140E-01	3.146E-01	1.103E+00
AG-110M	-2.229E-01	72.5	1.615E-01	1.619E-01	2.943E+00
SN-113	6.549E-02	883.2	5.784E-01	5.784E-01	2.030E+00
SB-124	0.000E+00	1.#INF	4.533E-02	4.533E-02	2.503E+00
SB-125	6.632E-01	100.0	6.634E-01	6.643E-01	2.941E+00
I-131	3.234E-01	158.0	5.111E-01	5.114E-01	7.768E-01
Gd-153	8.221E-01	107.8	8.858E-01	8.873E-01	4.736E+00
Ga-68	-7.764E+00	289.6	2.249E+01	2.249E+01	5.372E+01
Tc-99m	-1.270E-01	419.5	5.327E-01	5.327E-01	1.796E+00
BA-133	-5.280E-01	145.7	7.690E-01	7.695E-01	2.608E+00
CS-134	3.367E-01	96.7	3.257E-01	3.261E-01	2.526E+00
CS-137	2.308E-01	144.9	3.343E-01	3.346E-01	1.186E+00
CE-139	2.255E-01	115.7	2.609E-01	2.618E-01	8.856E-01
Ba-140	-9.075E-01	65.5	5.942E-01	5.960E-01	4.474E+00
La-140	5.221E-01	90.6	4.728E-01	4.736E-01	1.497E+00
CE-141	5.601E-01	164.6	9.217E-01	9.221E-01	3.091E+00

CE-144	-2.518E+00	152.8	3.848E+00	3.851E+00	1.290E+01
PM-144	1.716E-01	243.3	4.177E-01	4.178E-01	1.041E+00
EU-152	1.236E+00	37.8	4.671E-01	4.715E-01	5.480E+00
EU-154	9.286E-01	86.4	8.022E-01	8.036E-01	6.839E+00
EU-155	7.987E-01	148.9	1.189E+00	1.190E+00	4.023E+00
HF-181	-2.640E-01	218.3	5.763E-01	5.764E-01	1.989E+00
Ta-182	1.356E+00	103.1	1.398E+00	1.400E+00	4.833E+00
Hg-203	-1.515E-01	198.5	3.007E-01	3.008E-01	1.142E+00
TL-208	8.743E-01	76.6	6.700E-01	6.716E-01	1.509E+00
pm-146	-2.271E-02	127.3	2.892E-02	2.894E-02	3.651E+00
y-88	1.329E-01	255.8	3.400E-01	3.401E-01	8.727E-01
Cd-113m	2.185E+03	142.9	3.123E+03	3.126E+03	1.088E+04
Cd-109	0.000E+00	1.#INF	1.938E+00	1.938E+00	3.947E+01
Cf-251	9.077E-01	124.0	1.125E+00	1.128E+00	2.973E+00
Cf-249	2.435E-01	138.7	3.378E-01	3.381E-01	1.984E+00
Sn-126	2.812E+00	120.9	3.399E+00	3.402E+00	1.146E+01
PB-210	1.908E+00	494.6	9.437E+00	9.437E+00	3.251E+01
PB-212	2.402E+00	21.5	5.172E-01	5.401E-01	1.386E+00
PB-214	5.392E+00	16.2	8.733E-01	9.172E-01	1.677E+00
BI-207	3.449E-01	90.8	3.131E-01	3.136E-01	1.288E+00
BI-212	7.564E+00	106.9	8.087E+00	8.096E+00	2.742E+01
U-235	2.516E+00	115.4	2.905E+00	2.908E+00	1.349E+01
BI-214	5.738E+00	14.4	8.270E-01	8.791E-01	1.391E+00
BI-210M	1.238E-01	430.6	5.332E-01	5.332E-01	1.865E+00
AC-228	2.693E+00	50.1	1.350E+00	1.357E+00	2.855E+00
TH-227	-5.013E+00	112.5	5.639E+00	5.646E+00	1.897E+01
TH-229	-6.945E-01	863.3	5.995E+00	5.995E+00	1.600E+01
TH-234	3.657E+00	91.0	3.328E+00	3.334E+00	1.965E+01
PA-231	0.000E+00	1.#INF	5.353E+00	5.353E+00	6.194E+01
PA-233	-3.778E-01	426.5	1.611E+00	1.611E+00	5.479E+00
PA-234	2.631E-01	91.1	2.395E-01	2.399E-01	7.537E+00
PA-234M	7.427E+01	100.5	7.464E+01	7.473E+01	1.857E+02
AM-241	7.309E-02	1586.7	1.160E+00	1.160E+00	3.969E+00
Np-237	-1.969E+00	186.8	3.679E+00	3.681E+00	1.233E+01
Ir-192	-5.829E-08	1162138871.8	6.774E-01	6.774E-01	2.315E+00
Cs-136	5.947E-02	65.8	3.912E-02	3.927E-02	2.002E+00
Np-239	-1.120E+00	111.4	1.247E+00	1.249E+00	4.186E+00
Nd-147	1.029E-01	2855.7	2.939E+00	2.939E+00	7.535E+00
TL-210	-6.250E-01	83.7	5.228E-01	5.241E-01	1.761E+00
Total	2.491E+03				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-40-C

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20182800.An1

Acquisition information
Start time: 8/23/2018 8:41:53 AM
Live time: 1800
Real time: 1801
Dead time: 0.06 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.06keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 8:41:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2018-08-11_1245.PBC 8/11/2018 12:45:21 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1654

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	3.	494.64	0.95	1.957E-02	46.54	4.250	PBC<MDA	PB210
63.61	10.	116.19	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
64.28	15.	120.88	0.96	2.970E-02	64.28	9.700	PBC<MDA	Sn126
74.68	25.	41.65	0.53	3.377E-02				
80.99	6.	320.99	0.98	3.557E-02	80.99	34.060	PBC<MDA	BA133
92.28	10.	140.08	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
93.04	17.	171.22	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
97.50	17.	176.82	0.99	3.829E-02	97.50	30.000	PBC<MDA	Gd153
103.20	13.	123.19	1.00	3.867E-02	103.20	21.800	PBC<MDA	Gd153
103.70	13.	129.23	1.00	3.870E-02	103.70	24.000	PBC<MDA	Np239
105.31	12.	148.86	1.00	3.876E-02	105.31	21.200	PBC<MDA	EU155
123.10	13.	94.13	1.02	3.840E-02	123.10	40.790	PBC<MDA	EU154
143.79	16.	185.07	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
145.44	18.	164.56	1.04	3.618E-02	145.44	48.200	PBC<MDA	CE141
162.66	13.	102.52	1.05	3.378E-02	162.66	6.220	PBC<MDA	Ba140
163.38	10.	138.07	1.05	3.367E-02	163.38	5.080	PBC<MDA	U235
165.85	11.	115.69	1.06	3.392E-02	165.85	79.900	PBC<MDA	CE139
176.60	9.	123.98	1.07	3.240E-02	176.60	17.000	PBC<MDA	Cf251
185.72	15.	99.50	1.07	3.123E-02	185.72	54.000	PBC<MDA	U235
227.00	12.	97.43	1.11	2.691E-02	227.00	6.300	PBC<MDA	Cf251
238.57	50.	27.99	0.73	2.592E-02	238.63	43.300	2.463E+00	PB212
242.07	20.	43.77	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
244.69	7.	249.90	1.13	2.543E-02	244.69	7.580	PBC<MDA	EU152
263.70	6.	142.88	1.14	2.403E-02	263.70	0.006	PBC<MDA	Cd113m
265.83	3.	430.59	1.14	2.388E-02	265.83	50.000	PBC<MDA	BI210M
277.28	11.	95.01	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
295.58	23.	36.29	1.48	2.205E-02	295.09	19.300	3.033E+00	PB214
					296.00	79.000	PBC<MDA	TL210
296.00	7.	309.04	1.17	2.200E-02	295.09	19.300	PBC<MDA	PB214
					296.00	79.000	2.078E-01	TL210
300.03	-1.	902.41	1.17	2.177E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
328.76	10.	90.55	1.20	2.028E-02	328.76	20.300	PBC<MDA	La140
333.44	7.	138.72	1.20	2.006E-02	333.44	15.510	PBC<MDA	Cf249
338.32	9.	146.47	1.21	1.983E-02	338.32	12.010	PBC<MDA	AC228
340.57	9.	160.69	1.21	1.973E-02	340.57	46.900	PBC<MDA	Cs136
351.86	70.	16.20	1.03	1.923E-02	351.93	37.600	5.392E+00	PB214
364.48	5.	164.17	1.23	1.871E-02	364.48	81.700	PBC<MDA	I131
383.84	3.	353.27	1.25	1.796E-02	383.84	8.940	PBC<MDA	BA133
391.69	1.	883.18	1.25	1.767E-02	391.69	64.000	PBC<MDA	SN113
453.88	6.	127.33	1.30	1.571E-02	453.88	65.000	PBC<MDA	pm146
463.37	7.	100.04	1.31	1.545E-02	463.37	10.470	PBC<MDA	SB125
497.05	2.	519.81	1.34	1.460E-02	497.05	90.900	PBC<MDA	RU103
511.86	39.	34.64	2.60	1.426E-02	511.86	20.000	7.597E+00	RH106
563.24	1.	717.85	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
569.70	4.	228.72	1.40	1.307E-02	569.47	8.200	1.901E+00	PA234
					569.70	97.740	1.595E-01	BI207
583.02	9.	129.82	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
600.50	5.	292.78	1.42	1.251E-02	600.50	17.860	PBC<MDA	SB125
609.48	59.	14.41	0.88	1.236E-02	609.31	46.090	5.738E+00	BI214
621.92	5.	282.94	1.44	1.215E-02	621.92	9.930	PBC<MDA	RH106
636.97	3.	270.12	1.45	1.192E-02	636.97	7.170	PBC<MDA	I131
657.76	7.	82.97	1.47	1.160E-02	657.76	94.640	PBC<MDA	AG110M
661.66	4.	144.87	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
696.54	3.	243.35	1.50	1.106E-02	696.54	99.000	PBC<MDA	PM144
727.17	11.	106.91	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
756.73	5.	168.60	1.54	1.032E-02	756.73	54.460	PBC<MDA	ZR95
766.41	11.	111.82	1.55	1.021E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	7.	37.80	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
785.42	5.	94.45	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
795.87	5.	96.74	1.57	9.887E-03	795.87	85.530	PBC<MDA	CS134
801.95	5.	105.95	1.58	9.823E-03	801.95	8.690	PBC<MDA	CS134
810.78	12.	46.40	1.59	9.733E-03	810.78	99.460	PBC<MDA	CO58
815.77	6.	128.36	1.59	9.682E-03	815.77	23.280	PBC<MDA	La140
860.56	4.	164.26	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
871.10	6.	69.87	1.63	9.156E-03	871.10	99.890	PBC<MDA	NB94
880.53	6.	91.38	1.64	9.072E-03	880.53	6.000	PBC<MDA	PA234
883.24	6.	108.81	1.64	9.048E-03	883.24	9.600	PBC<MDA	PA234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
889.28	3.	204.21	1.64	8.996E-03	889.28	99.984	PBC<MDA	Sc46
898.04	2.	255.77	1.65	8.921E-03	898.04	93.700	PBC<MDA	y88
910.82	12.	50.12	1.66	8.811E-03	911.07	29.000	PBC<MDA	AC228
964.11	6.	92.99	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
968.97	8.	87.52	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
996.33	6.	86.38	1.72	8.158E-03	996.33	10.600	PBC<MDA	EU154
1001.00	4.	167.02	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1048.07	6.	65.78	1.75	7.808E-03	1048.07	80.000	PBC<MDA	Cs136
1050.36	4.	126.04	1.76	7.793E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	6.	90.79	1.76	7.709E-03	1063.66	74.500	PBC<MDA	BI207
1120.16	-2.	299.00	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	6.	119.56	1.80	7.367E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	4.729E-01	Sc46
					1121.30	34.900	1.356E+00	Ta182
1121.18	6.	103.10	1.80	7.362E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.356E+00	Ta182
1173.24	13.	50.22	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
1238.28	2.	226.17	1.88	6.748E-03	1238.28	66.070	PBC<MDA	Co56
1384.30	5.	113.28	1.97	6.114E-03	1384.30	24.290	PBC<MDA	AG110M
1461.20	200.	7.21	1.79	5.828E-03	1460.83	10.670	1.788E+02	K40
1596.21	1.	437.35	2.09	5.382E-03	1596.21	95.400	PBC<MDA	La140
1764.13	6.	56.95	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.34	74.68	37.	25.	7.305E+02	41.65	0.531	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.84	46.54	97.	3.	0.002	494.64	0.946s
TH-227	200.23	50.14	150.	-16.	-0.009	112.50	0.950s
TH-234	252.78	63.29	62.	10.	0.006	116.19	0.962D
Sn-126	256.75	64.28	148.	15.	0.008	120.88	0.963

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	323.54	80.99	103.	6.	0.003	320.99	0.978s
Np-237	345.53	86.49	500.	-17.	-0.009	186.80	0.983
EU-155	345.74	86.54	483.	-17.	-0.009	183.64	0.983
Sn-126	347.33	86.94	437.	-3.	-0.002	996.51	0.984s
Sn-126	349.84	87.57	434.	0.	0.000	1000.00	0.984s
Cd-109	351.72	88.04	434.	0.	0.000	1000.00	0.985s
Nd-147	363.95	91.10	434.	0.	0.000	1000.00	0.987s
TH-234	369.91	92.59	99.	10.	0.006	140.08	0.989D
AC-228	372.95	93.35	407.	17.	0.009	171.22	0.990s
Gd-153	389.54	97.50	417.	17.	0.009	176.82	0.993s
Gd-153	412.32	103.20	121.	13.	0.007	123.19	0.998s
Np-239	414.32	103.70	134.	13.	0.007	129.23	0.999
EU-155	420.77	105.31	148.	12.	0.007	148.86	1.001s
Np-239	424.03	106.13	186.	-18.	-0.010	111.39	1.001s
EU-152	486.57	121.78	105.	-7.	-0.004	210.44	1.016s
CO-57	487.72	122.06	112.	0.	0.000	1000.00	1.016s
EU-154	491.87	123.10	66.	13.	0.007	94.13	1.017s
PA-234	524.63	131.29	369.	-19.	-0.010	146.04	1.024s
HF-181	531.54	133.02	387.	-19.	-0.010	149.40	1.026s
CE-144	533.60	133.54	406.	-19.	-0.010	152.84	1.026s
HF-181	544.63	136.30	425.	-19.	-0.011	155.89	1.029s
CO-57	545.33	136.47	444.	-19.	-0.011	159.25	1.029s
Tc-99m	561.46	140.51	463.	-7.	-0.004	419.51	1.032s
U-235	574.56	143.79	408.	16.	0.009	185.07	1.036
CE-141	581.17	145.44	409.	18.	0.010	164.56	1.037s
Ba-140	650.01	162.66	78.	13.	0.007	102.52	1.053s
U-235	652.88	163.38	91.	10.	0.006	138.07	1.053s
CE-139	662.77	165.85	76.	11.	0.006	115.69	1.055s
Cf-251	705.73	176.60	33.	9.	0.005	123.98	1.065s
U-235	742.19	185.72	59.	15.	0.008	99.50	1.073s
TH-229	773.33	193.51	59.	-2.	-0.001	863.25	1.080s
TH-229	842.65	210.85	63.	-13.	-0.007	91.42	1.096s
Cf-251	907.22	227.00	33.	12.	0.006	97.43	1.110s
PB-212	953.72	238.63	29.	49.	0.027	21.53	1.120D
PB-214	967.17	242.00	27.	20.	0.011	43.77	1.123D
EU-152	977.95	244.69	151.	7.	0.004	249.90	1.126s
TH-227	1024.12	256.24	40.	-3.	-0.002	360.62	1.136
Cd-113m	1053.94	263.70	30.	6.	0.003	142.88	1.142s
BI-210M	1062.46	265.83	64.	3.	0.001	430.59	1.144s
TL-208	1108.25	277.28	45.	11.	0.006	95.01	1.154s
Hg-203	1115.91	279.20	59.	-5.	-0.003	198.46	1.156s
I-131	1136.30	284.30	48.	-9.	-0.005	154.36	1.160s
PB-214	1181.39	295.58	17.	23.	0.013	36.29	1.480s
TL-210	1183.08	296.00	198.	7.	0.004	309.04	1.170s
PB-212	1199.19	300.03	206.	-1.	-0.001	902.41	1.174
PA-231	1199.35	300.07	205.	0.	0.000	1000.00	1.174s
PA-233	1199.79	300.18	205.	0.	0.000	1000.00	1.174s
PA-231	1209.66	302.65	205.	0.	0.000	1000.00	1.176s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1210.47	302.85	258.	-14.	-0.008	169.58	1.176s
Ba-140	1218.46	304.85	244.	-14.	-0.008	164.93	1.178s
BI-210M	1218.64	304.90	230.	-14.	-0.008	160.37	1.178s
Ir-192	1232.81	308.44	227.	-14.	-0.008	158.79	1.181s
PA-233	1247.09	312.01	240.	-5.	-0.003	426.50	1.184s
CR-51	1279.37	320.08	40.	-2.	-0.001	375.97	1.191s
La-140	1314.06	328.76	36.	10.	0.006	90.55	1.199
Cf-249	1332.77	333.44	46.	7.	0.004	138.72	1.203s
AC-228	1352.28	338.32	90.	9.	0.005	146.47	1.207
Cs-136	1361.28	340.57	99.	9.	0.005	160.69	1.209s
EU-152	1376.13	344.29	108.	0.	0.000	1000.00	1.212s
HF-181	1382.30	345.83	158.	-12.	-0.007	151.91	1.213s
PB-214	1406.41	351.86	17.	70.	0.039	16.20	1.026
BA-133	1422.97	356.00	128.	-11.	-0.006	145.66	1.222s
I-131	1456.89	364.48	16.	5.	0.003	164.17	1.229s
BA-133	1534.29	383.84	68.	3.	0.002	353.27	1.246s
Cf-249	1550.72	387.95	71.	0.	0.000	1000.00	1.249s
SN-113	1565.67	391.69	69.	1.	0.001	883.18	1.253s
SB-125	1710.36	427.88	25.	-4.	-0.002	230.72	1.283s
AG-108M	1734.60	433.94	33.	-11.	-0.006	79.33	1.288s
pm-146	1814.35	453.88	14.	6.	0.003	127.33	1.304s
SB-125	1852.29	463.37	24.	7.	0.004	100.04	1.312s
Ir-192	1871.05	468.06	38.	-2.	-0.001	463.94	1.316s
BE-7	1909.18	477.60	64.	-11.	-0.006	104.69	1.324s
HF-181	1926.79	482.00	75.	-6.	-0.003	218.27	1.328s
La-140	1946.87	487.02	81.	0.	0.000	1000.00	1.332
RU-103	1987.00	497.05	22.	2.	0.001	519.81	1.340s
RH-106	2046.22	511.86	21.	39.	0.022	34.64	2.602s
Ba-140	2147.78	537.26	27.	-12.	-0.007	81.48	1.373s
CS-134	2251.67	563.24	22.	1.	0.001	717.85	1.394
CS-134	2276.00	569.32	22.	-6.	-0.003	123.53	1.399
PA-234	2276.59	569.47	33.	-4.	-0.002	192.62	1.399s
BI-207	2277.52	569.70	33.	4.	0.002	228.72	1.399s
TL-208	2330.79	583.02	33.	9.	0.005	129.82	1.410s
SB-125	2400.69	600.50	122.	5.	0.003	292.78	1.424
SB-124	2409.62	602.73	127.	0.	0.000	1000.00	1.425s
CS-134	2417.53	604.71	127.	0.	0.000	1000.00	1.427s
BI-214	2436.62	609.48	6.	59.	0.033	14.41	0.875s
RU-103	2439.88	610.30	127.	0.	0.000	1000.00	1.431s
AG-108M	2455.81	614.28	127.	0.	0.000	1000.00	1.435s
PM-144	2470.93	618.06	127.	0.	0.000	1000.00	1.437s
RH-106	2486.35	621.92	89.	5.	0.003	282.94	1.440s
SB-125	2542.23	635.89	22.	-11.	-0.006	68.89	1.451s
I-131	2546.57	636.97	31.	3.	0.002	270.12	1.452s
AG-110M	2629.71	657.76	14.	7.	0.004	82.97	1.469s
CS-137	2645.30	661.66	15.	4.	0.002	144.87	1.472s
PM-144	2784.82	696.54	15.	3.	0.002	243.35	1.499s
NB-94	2809.17	702.63	19.	-5.	-0.003	201.78	1.503s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2889.79	722.79	55.	-14.	-0.008	79.60	1.519s
AG-108M	2890.40	722.94	69.	-11.	-0.006	112.16	1.519s
EU-154	2892.07	723.36	80.	0.	0.000	1000.00	1.519s
ZR-95	2895.44	724.20	80.	0.	0.000	1000.00	1.520s
BI-212	2907.33	727.17	63.	11.	0.006	106.91	1.522s
pm-146	2941.53	735.72	23.	-10.	-0.006	112.78	1.529s
pm-146	2987.29	747.16	20.	-5.	-0.003	260.92	1.537s
ZR-95	3025.56	756.73	14.	5.	0.003	168.60	1.544s
AG-110M	3054.42	763.94	42.	-14.	-0.008	69.53	1.550s
NB-95	3061.80	765.79	64.	-12.	-0.007	97.71	1.551s
PA-234M	3064.30	766.41	65.	11.	0.006	111.82	1.552s
EU-152	3114.33	778.92	0.	7.	0.004	37.80	1.561s
BI-212	3140.33	785.42	5.	5.	0.003	94.45	1.566s
CS-134	3182.12	795.87	11.	5.	0.003	96.74	1.574s
TL-210	3197.05	799.60	37.	-11.	-0.006	83.66	1.577s
CS-134	3206.46	801.95	14.	5.	0.003	105.95	1.578s
CO-58	3241.75	810.78	10.	12.	0.007	46.40	1.585s
La-140	3261.74	815.77	22.	6.	0.003	128.36	1.589s
Cs-136	3272.66	818.50	47.	-10.	-0.005	106.65	1.591s
MN-54	3338.05	834.85	14.	-1.	-0.001	800.00	1.603s
Co-56	3385.75	846.77	14.	-3.	-0.002	270.80	1.612s
TL-208	3440.93	860.56	10.	4.	0.002	164.26	1.622s
NB-94	3483.06	871.10	5.	6.	0.003	69.87	1.629s
EU-154	3491.60	873.23	6.	0.	0.000	1000.00	1.631s
PA-234	3520.80	880.53	11.	6.	0.003	91.38	1.636s
PA-234	3531.64	883.24	16.	6.	0.003	108.81	1.638s
AG-110M	3537.42	884.68	47.	-11.	-0.006	90.40	1.639s
Sc-46	3555.81	889.28	22.	3.	0.002	204.21	1.642s
y-88	3590.85	898.04	5.	2.	0.001	255.77	1.649s
AC-228	3642.98	911.07	5.	12.	0.007	50.12	1.658s
AG-110M	3748.69	937.49	15.	0.	0.000	1000.00	1.677s
PA-234	3782.81	946.02	10.	-3.	-0.002	238.82	1.683s
EU-152	3855.18	964.11	5.	6.	0.003	92.99	1.696s
AC-228	3874.63	968.97	23.	8.	0.005	87.52	1.699
EU-154	3984.09	996.33	10.	6.	0.003	86.38	1.718s
PA-234M	4002.77	1001.00	18.	4.	0.002	167.02	1.722s
EU-154	4017.88	1004.77	33.	-6.	-0.003	135.61	1.724s
Co-56	4150.18	1037.84	10.	-3.	-0.002	199.88	1.747s
Cs-136	4191.11	1048.07	5.	6.	0.003	65.78	1.754s
RH-106	4200.27	1050.36	13.	4.	0.002	126.04	1.755s
BI-207	4253.49	1063.66	5.	6.	0.003	90.79	1.765s
Ga-68	4308.47	1077.40	15.	-3.	-0.002	289.64	1.774s
FE-59	4395.90	1099.25	16.	-1.	-0.001	914.69	1.789s
EU-152	4447.22	1112.07	21.	0.	0.000	1000.00	1.797s
ZN-65	4461.11	1115.55	21.	0.	0.000	1000.00	1.800s
BI-214	4480.08	1120.29	16.	-2.	-0.001	299.00	1.803s
Sc-46	4481.13	1120.55	25.	6.	0.003	119.56	1.803s
Ta-182	4484.13	1121.30	18.	6.	0.003	103.10	1.803s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4691.97	1173.24	6.	13.	0.007	50.22	1.838s
Ta-182	4755.25	1189.05	21.	-1.	-0.001	792.15	1.848s
Ta-182	4884.75	1221.41	16.	-3.	-0.002	308.52	1.869s
Co-56	4952.26	1238.28	6.	2.	0.001	226.17	1.879s
NA-22	5097.34	1274.53	16.	-4.	-0.002	150.00	1.902s
EU-154	5097.40	1274.54	20.	0.	0.000	1000.00	1.902s
TL-210	5251.31	1313.00	11.	-2.	-0.001	452.11	1.926s
AG-110M	5536.68	1384.30	6.	5.	0.003	113.28	1.970s
EU-152	5631.56	1408.00	11.	-4.	-0.002	188.42	1.984s
K-40	5844.50	1461.20	4.	200.	0.111	7.21	1.790
La-140	6384.98	1596.21	6.	1.	0.001	437.35	2.092s
SB-124	6764.43	1690.98	6.	-2.	-0.001	304.14	2.142s
BI-214	7058.76	1764.49	2.	6.	0.003	56.95	2.181s
Co-56	7086.23	1771.35	8.	0.	0.000	1000.00	2.184s
y-88	7345.35	1836.06	6.	-1.	-0.001	287.06	2.216s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.9470E+00				5.31E+01	
			477.60	-3.947E+00	?(	1.400E+01 1.05E+02 1.05E+01	G
NA-22	C	-3.3798E-01				9.50E+02	
			1274.53	-3.380E-01	?(	1.804E+00 1.50E+02 9.99E+01	G
K-40	N	1.7880E+02				4.66E+11	
			1460.83	1.788E+02	(P	1.062E+01 7.21E+00 1.07E+01	G
Sc-46	F	3.3982E-01				8.38E+01	
			889.28	2.067E-01	?(	1.508E+00 2.04E+02 1.00E+02	G
			1120.55	4.729E-01	?(	1.961E+00 1.20E+02 1.00E+02	G
CR-51	F	-6.1884E-01				2.77E+01	
			320.08	-6.188E-01	?(P	8.716E+00 3.76E+02 9.94E+00	G
MN-54	C	-5.8530E-02				3.12E+02	
			834.85	-5.853E-02	?(	1.179E+00 8.00E+02 1.00E+02	G
FE-59	F	-1.3126E-01				4.45E+01	
			1099.25	-1.313E-01	&(	2.802E+00 9.15E+02 5.65E+01	G
			1291.60	6.593E-02	%	3.546E+00 2.23E+03 4.32E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C	1.4151E-02					7.73E+01	
			846.77	-1.778E-01	?(	1.194E+00	2.71E+02	9.99E+01 G
			1238.28	3.045E-01	?(P	1.706E+00	2.26E+02	6.61E+01 G
			1037.84	-1.613E+00	+ P	8.794E+00	2.00E+02	1.41E+01 G
			1771.35	0.000E+00	-	1.164E+01	1.00E+03	1.55E+01 A
CO-58	C	7.0538E-01					7.09E+01	
			810.78	7.054E-01	&(P	1.005E+00	4.64E+01	9.95E+01 G
CO-60	F	4.8751E-01					1.93E+03	
			1332.50	-3.968E-02	%(P	1.623E+00	1.66E+03	1.00E+02 G
			1173.24	1.015E+00	&(P	1.116E+00	5.02E+01	9.99E+01 G
NB-94	I	5.4405E-02					7.41E+06	
			702.63	-2.412E-01	&(	1.181E+00	2.02E+02	9.79E+01 G
			871.10	3.441E-01	?(	7.976E-01	6.99E+01	9.99E+01 G
ZR-95	I	4.8430E-01					6.40E+01	
			756.73	4.843E-01	?(P	1.998E+00	1.69E+02	5.45E+01 G
			724.20	0.000E+00	-	5.207E+00	1.00E+03	4.42E+01 G
NB-95	I	-6.5829E-01					6.40E+01	
			765.79	-6.583E-01	?(	2.173E+00	9.77E+01	9.98E+01 G
RU-103	I	7.7746E-02					3.93E+01	
			497.05	7.775E-02	?(P	1.031E+00	5.20E+02	9.09E+01 G
			610.30	0.000E+00	-	4.322E+01	1.00E+03	5.75E+00 GA
RH-106	I	4.5891E+00					3.74E+02	
			621.92	2.203E+00	?(P	2.151E+01	2.83E+02	9.93E+00 G
			1050.36	1.978E+01	?(P	8.818E+01	1.26E+02	1.56E+00 G
			511.86	7.597E+00	?	4.688E+00	3.46E+01	2.00E+01 GA
AG-108M	C	-3.9579E-01					1.53E+05	
			433.94	-3.958E-01	?(P	1.103E+00	7.93E+01	9.05E+01 G
			722.94	-6.197E-01	+	2.359E+00	1.12E+02	9.08E+01 G
			614.28	0.000E+00	+	2.781E+00	1.00E+03	8.98E+01 G
AG-110M	F	-2.2293E-01					2.50E+02	
			884.68	-9.642E-01	?(	2.943E+00	9.04E+01	7.27E+01 G
			657.76	3.653E-01	+	1.030E+00	8.30E+01	9.46E+01 G
			937.49	0.000E+00	&	3.904E+00	1.00E+03	3.44E+01 G
			1384.30	1.995E+00	?(	5.163E+00	1.13E+02	2.43E+01 G
			763.94	-3.473E+00	+	8.018E+00	6.95E+01	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	6.5487E-02					1.15E+02	
			391.69	6.549E-02	?(	2.030E+00	8.83E+02	6.40E+01 G
SB-125	I	6.6319E-01					1.01E+03	
			427.88	-4.072E-01	?(P	2.941E+00	2.31E+02	2.96E+01 G
			600.50	1.339E+00	?(P	1.345E+01	2.93E+02	1.79E+01 G
			635.89	-4.391E+00	+	1.004E+01	6.89E+01	1.13E+01 G
			463.37	2.536E+00	?(P	8.689E+00	1.00E+02	1.05E+01 G
I-131	I	3.2340E-01					8.02E+00	
			364.48	1.806E-01	?(P	7.768E-01	1.64E+02	8.17E+01 G
			284.30	-3.589E+00	+	1.396E+01	1.54E+02	6.14E+00 G
			636.97	1.951E+00	?(	1.872E+01	2.70E+02	7.17E+00 G
Gd-153	F	8.2212E-01					2.42E+02	
			97.50	7.980E-01	?(	4.736E+00	1.77E+02	3.00E+01 G
			103.20	8.552E-01	?(	3.561E+00	1.23E+02	2.18E+01 G
Ga-68	C	-7.7635E+00					4.71E-02	
			1077.40	-7.764E+00	?(	5.372E+01	2.90E+02	3.30E+00 G
Tc-99m	I	-1.2698E-01					2.51E-01	
			140.51	-1.270E-01	?(	1.796E+00	4.20E+02	8.93E+01 G
BA-133	F	-5.2796E-01					3.85E+03	
			356.00	-5.280E-01	(	2.608E+00	1.46E+02	6.20E+01 G
			302.85	-1.901E+00	+	1.087E+01	1.70E+02	1.83E+01 G
			383.84	1.153E+00	?	1.420E+01	3.53E+02	8.94E+00 GA
			80.99	2.734E-01	+ P	2.293E+00	3.21E+02	3.41E+01 GA
CS-134	I	3.3666E-01					7.54E+02	
			604.71	0.000E+00	&(	2.526E+00	1.00E+03	9.76E+01 G
			795.87	3.595E-01	?(	1.206E+00	9.67E+01	8.55E+01 G
			569.32	-1.566E+00	&	6.742E+00	1.24E+02	1.54E+01 G
			801.95	3.571E+00	?(	1.317E+01	1.06E+02	8.69E+00 G
			563.24	6.726E-01	(	1.231E+01	7.18E+02	8.35E+00 G
CS-137	I	2.3079E-01					1.10E+04	
			661.66	2.308E-01	?(P	1.186E+00	1.45E+02	8.52E+01 G
CE-139	F	2.2553E-01					1.38E+02	
			165.85	2.255E-01	?(	8.856E-01	1.16E+02	7.99E+01 G
Ba-140	I	-9.0748E-01					1.28E+01	
			537.26	-1.993E+00	?(P	4.474E+00	8.15E+01	2.44E+01 G
			162.66	3.350E+00	?(	1.160E+01	1.03E+02	6.22E+00 G
			304.85	-8.178E+00	&	4.547E+01	1.65E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	5.2209E-01					1.28E+01	
			1596.21	1.412E-01	?(P	1.497E+00	4.37E+02	9.54E+01 G
			487.02	0.000E+00	-	3.672E+00	1.00E+03	4.55E+01 G
			328.76	1.350E+00	(	4.139E+00	9.06E+01	2.03E+01 G
			815.77	1.361E+00	?(	6.101E+00	1.28E+02	2.33E+01 G
CE-141	I	5.6008E-01					3.25E+01	
			145.44	5.601E-01	(P	3.091E+00	1.65E+02	4.82E+01 G
CE-144	I	-2.5180E+00					2.85E+02	
			133.54	-2.518E+00	?(	1.290E+01	1.53E+02	1.11E+01 G
PM-144	C	1.7164E-01					3.63E+02	
			696.54	1.716E-01	?(P	1.041E+00	2.43E+02	9.90E+01 G
			618.06	0.000E+00	-	2.534E+00	1.00E+03	9.91E+01 G
EU-152	F	1.2358E+00					4.94E+03	
			344.29	0.000E+00	?(	5.480E+00	1.00E+03	2.65E+01 G
			1112.07	0.000E+00	?(	1.311E+01	1.00E+03	1.36E+01 G
			121.78	-3.536E-01	&	2.549E+00	2.10E+02	2.86E+01 G
			778.92	2.985E+00	?(	3.143E+00	3.78E+01	1.29E+01 G
			964.11	2.672E+00	?(	5.951E+00	9.30E+01	1.46E+01 G
			244.69	2.027E+00	?(	1.728E+01	2.50E+02	7.58E+00 G
			1408.00	-1.903E+00	+	8.080E+00	1.88E+02	2.10E+01 GA
EU-154	I	9.2865E-01					3.14E+03	
			873.23	0.000E+00	?(	6.839E+00	1.00E+03	1.23E+01 G
			123.10	4.518E-01	?(	1.434E+00	9.41E+01	4.08E+01 G
			1274.54	0.000E+00	-	5.651E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.136E+01	1.00E+03	2.02E+01 G
			1004.77	-2.398E+00	+	1.127E+01	1.36E+02	1.80E+01 G
			996.33	3.839E+00	?(	1.136E+01	8.64E+01	1.06E+01 G
EU-155	I	7.9874E-01					1.81E+03	
			105.31	7.987E-01	?(P	4.023E+00	1.49E+02	2.12E+01 G
			86.54	-8.402E-01	&	5.173E+00	1.84E+02	3.07E+01 G
HF-181	F	-2.6402E-01					4.24E+01	
			482.00	-2.640E-01	?(	1.989E+00	2.18E+02	8.05E+01 G
			133.02	-6.438E-01	+	3.224E+00	1.49E+02	4.33E+01 G
			345.83	-2.255E+00	+	1.160E+01	1.52E+02	1.51E+01 G
			136.30	-4.822E+00	+	2.519E+01	1.56E+02	5.85E+00 G
Ta-182	F	1.3561E+00					1.14E+02	
			1121.30	1.356E+00	?(	4.833E+00	1.03E+02	3.49E+01 G
			1221.41	-9.037E-01	-	6.431E+00	3.09E+02	2.70E+01 G
			1189.05	-6.538E-01	-	1.188E+01	7.92E+02	1.62E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Hg-203	F	-1.5152E-01					4.66E+01	
			279.20	-1.515E-01	?(P	1.142E+00	1.98E+02	8.15E+01 G
TL-208	N	8.7427E-01					6.98E+02	
			583.02	4.690E-01	(P	1.509E+00	1.30E+02	8.45E+01 G
			277.28	4.039E+00	?(P	1.298E+01	9.50E+01	6.31E+00 G
			860.56	2.023E+00	?(P	8.369E+00	1.64E+02	1.24E+01 G
pm-146	C	-2.2709E-02					2.02E+03	
			747.16	-7.099E-01	?(P	3.651E+00	2.61E+02	3.40E+01 G
			735.72	-2.433E+00	+ P	5.903E+00	1.13E+02	2.25E+01 G
			453.88	3.367E-01	?(P	1.089E+00	1.27E+02	6.50E+01 G
y-88	F	1.3293E-01					1.07E+02	
			898.04	1.329E-01	?(	8.727E-01	2.56E+02	9.37E+01 G
			1836.06	-1.354E-01	+ P	1.685E+00	2.87E+02	9.92E+01 G
Cd-113m		2.1854E+03					5.33E+03	
			263.70	2.185E+03	?(	1.088E+04	1.43E+02	6.00E-03 K
Cf-251	T	9.0767E-01					3.28E+05	
			176.60	9.077E-01	?(	2.973E+00	1.24E+02	1.70E+01 G
			227.00	3.791E+00	?	9.660E+00	9.74E+01	6.30E+00 GA
Cf-249	T	2.4354E-01					1.28E+05	
			387.95	0.000E+00	?(	1.984E+00	1.00E+03	6.60E+01 G
			333.44	1.280E+00	?(	6.118E+00	1.39E+02	1.55E+01 G
Sn-126		2.8116E+00					3.65E+07	
			87.57	0.000E+00	-	3.998E+00	1.00E+03	3.75E+01 GA
			64.28	2.812E+00	&(	1.146E+01	1.21E+02	9.70E+00 G
			86.94	-4.954E-01	-	1.669E+01	9.97E+02	9.04E+00 GA
PB-210	N	1.9078E+00					8.14E+03	
			46.54	1.908E+00	?(P	3.251E+01	4.95E+02	4.25E+00 G
PB-212	N	2.4023E+00					6.98E+02	
			238.63	2.402E+00	(P	1.386E+00	2.15E+01	4.33E+01 G
			300.03	-7.385E-01	- P	5.414E+01	9.02E+02	3.28E+00 GA
PB-214	N	5.3920E+00					5.84E+05	
			351.93	5.392E+00	(P	1.677E+00	1.62E+01	3.76E+01 G
			295.09	3.033E+00	- P	2.845E+00	3.63E+01	1.93E+01 G
			242.00	5.742E+00		7.889E+00	4.38E+01	7.43E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	3.4487E-01					1.18E+04	
			569.70	1.595E-01	?(	1.288E+00	2.29E+02	9.77E+01 G
			1063.66	5.880E-01	&(P	1.276E+00	9.08E+01	7.45E+01 G
BI-212	N	7.5638E+00					6.98E+02	
			727.17	7.564E+00	?(P	2.742E+01	1.07E+02	7.55E+00 G
			785.42	2.363E+01	&	5.546E+01	9.45E+01	1.28E+00 GA
U-235	N	2.5163E+00					2.57E+11	
			143.79	2.171E+00	&(P	1.349E+01	1.85E+02	1.10E+01 G
			205.33	7.294E-02	% P	1.242E+01	6.26E+03	5.01E+00 G
			163.38	3.262E+00	?(P	1.532E+01	1.38E+02	5.08E+00 G
			185.72	4.913E-01	-	1.265E+00	9.95E+01	5.40E+01 GA
BI-214	N	5.7382E+00					5.84E+05	
			609.31	5.738E+00	(P	1.391E+00	1.44E+01	4.61E+01 G
			1120.29	-1.236E+00	- P	1.079E+01	2.99E+02	1.51E+01 G
			1764.49	4.165E+00	- P	7.203E+00	5.70E+01	1.54E+01 G
BI-210M	T	1.2382E-01					1.10E+09	
			265.83	1.238E-01	?(	1.865E+00	4.31E+02	5.00E+01 G
			304.90	-1.253E+00	+	6.778E+00	1.60E+02	2.80E+01 G
AC-228	N	2.6935E+00					2.10E+03	
			911.07	2.609E+00	?(	2.855E+00	5.01E+01	2.90E+01 G
			968.97	3.182E+00	(	9.460E+00	8.75E+01	1.75E+01 G
			338.32	2.188E+00	(	1.093E+01	1.46E+02	1.20E+01 G
			93.35	4.445E+00	?	2.554E+01	1.71E+02	5.56E+00 XA
TH-227	N	-5.0126E+00					7.95E+03	
			50.14	-5.013E+00	?(	1.897E+01	1.12E+02	8.00E+00 G
			256.24	-1.077E+00	+	1.044E+01	3.61E+02	7.00E+00 G
TH-229	N	-6.9449E-01					2.68E+06	
			193.51	-6.945E-01	?(	1.600E+01	8.63E+02	4.40E+00 G
			210.85	-8.599E+00	+ P	2.597E+01	9.14E+01	2.99E+00 G
TH-234	N	3.6572E+00					1.63E+12	
			63.29	5.010E+00	(P	1.965E+01	1.16E+02	3.81E+00 G
			92.59	2.734E+00	(P	1.291E+01	1.40E+02	5.58E+00 G
PA-233	C	-3.7777E-01					7.82E+08	
			312.01	-3.778E-01	?(	5.479E+00	4.26E+02	3.60E+01 G
			300.18	0.000E+00	+	2.859E+01	1.00E+03	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	2.6307E-01					1.63E+12	
			131.29	-1.539E+00	&(	7.537E+00	1.46E+02	1.80E+01 G
			946.02	-1.458E+00	+	8.479E+00	2.39E+02	1.34E+01 G
			569.47	-2.246E+00	+	1.521E+01	1.93E+02	8.20E+00 G
			883.24	3.643E+00	&(	1.379E+01	1.09E+02	9.60E+00 G
			880.53	5.806E+00	?	1.830E+01	9.14E+01	6.00E+00 GA
PA-234M	N	7.4269E+01					1.63E+12	
			1001.00	3.134E+01	&(P	1.857E+02	1.67E+02	8.37E-01 G
			766.41	1.965E+02	?(P	7.460E+02	1.12E+02	2.94E-01 G
AM-241	T	7.3088E-02					1.58E+05	
			59.54	7.309E-02	&(	3.969E+00	1.59E+03	3.59E+01 G
Np-237	F	-1.9695E+00					2.14E+06	
			86.49	-1.969E+00	&(	1.233E+01	1.87E+02	1.31E+01 G
Ir-192	F	-5.8286E-08					7.40E+01	
			316.49	-5.829E-08	%(	2.315E+00	1.16E+09	8.70E+01 G
			468.06	-1.331E-01	+	2.199E+00	4.64E+02	5.18E+01 G
			308.44	-1.118E+00	+	5.987E+00	1.59E+02	3.18E+01 G
Cs-136	F	5.9472E-02					1.30E+01	
			818.50	-5.512E-01	?(	2.002E+00	1.07E+02	1.00E+02 G
			1048.07	5.425E-01	?(	1.168E+00	6.58E+01	8.00E+01 G
			340.57	5.377E-01	?(	2.947E+00	1.61E+02	4.69E+01 G
Np-239	T	-1.1196E+00					2.36E+00	
			103.70	7.769E-01	+	3.393E+00	1.29E+02	2.40E+01 X
			106.13	-1.120E+00	&(	4.186E+00	1.11E+02	2.27E+01 G
			99.50	-1.837E-07	%	9.613E+00	1.54E+09	1.50E+01 X
Nd-147		1.0293E-01					1.11E+01	
			531.00	1.029E-01	%(	7.535E+00	2.86E+03	1.30E+01 G
			91.10	0.000E+00	-	5.217E+00	1.00E+03	2.83E+01 G
TL-210	N	-6.2496E-01					5.84E+05	
			799.60	-6.250E-01	?(	1.761E+00	8.37E+01	9.90E+01 G
			296.00	2.078E-01	&	2.186E+00	3.09E+02	7.90E+01 G
			1313.00	-6.881E-01	+	7.402E+00	4.52E+02	2.10E+01 GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.54	97.	3.	0.002	494.64	1.908E+00	P
TH-227	50.14	150.	-16.	-0.009	112.50	-5.013E+00	
Sn-126	64.28	148.	15.	0.008	120.88	2.812E+00	
BA-133	80.99	103.	6.	0.003	320.99	2.734E-01	P
Np-237	86.49	500.	-17.	-0.009	186.80	-1.969E+00	
EU-155	86.54	483.	-17.	-0.009	183.64	-8.402E-01	
Sn-126	86.94	437.	-3.	-0.002	996.51	-4.954E-01	
Gd-153	97.50	417.	17.	0.009	176.82	7.980E-01	
Gd-153	103.20	121.	13.	0.007	123.19	8.552E-01	
Np-239	103.70	134.	13.	0.007	129.23	7.769E-01	
EU-155	105.31	148.	12.	0.007	148.86	7.987E-01	P
Np-239	106.13	186.	-18.	-0.010	111.39	-1.120E+00	
EU-152	121.78	105.	-7.	-0.004	210.44	-3.536E-01	
EU-154	123.10	66.	13.	0.007	94.13	4.518E-01	
PA-234	131.29	369.	-19.	-0.010	146.04	-1.539E+00	
HF-181	133.02	387.	-19.	-0.010	149.40	-6.438E-01	
CE-144	133.54	406.	-19.	-0.010	152.84	-2.518E+00	
HF-181	136.30	425.	-19.	-0.011	155.89	-4.822E+00	
CO-57	136.47	444.	-19.	-0.011	159.25	-2.642E+00	
Tc-99m	140.51	463.	-7.	-0.004	419.51	-1.270E-01	
U-235	143.79	408.	16.	0.009	185.07	2.171E+00	P
CE-141	145.44	409.	18.	0.010	164.56	5.601E-01	P
Ba-140	162.66	78.	13.	0.007	102.52	3.350E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	163.38	91.	10.	0.006	138.07	3.262E+00	P
CE-139	165.85	76.	11.	0.006	115.69	2.255E-01	
Cf-251	176.60	33.	9.	0.005	123.98	9.077E-01	
U-235	185.72	59.	15.	0.008	99.50	4.913E-01	
TH-229	193.51	59.	-2.	-0.001	863.25	-6.945E-01	
TH-229	210.85	63.	-13.	-0.007	91.42	-8.599E+00	P
Cf-251	227.00	33.	12.	0.006	97.43	3.791E+00	
EU-152	244.69	151.	7.	0.004	249.90	2.027E+00	
TH-227	256.24	40.	-3.	-0.002	360.62	-1.077E+00	
Cd-113m	263.70	30.	6.	0.003	142.88	2.185E+03	
BI-210M	265.83	64.	3.	0.001	430.59	1.238E-01	
TL-208	277.28	45.	11.	0.006	95.01	4.039E+00	P
Hg-203	279.20	59.	-5.	-0.003	198.46	-1.515E-01	P
I-131	284.30	48.	-9.	-0.005	154.36	-3.589E+00	
TL-210	296.00	198.	7.	0.004	309.04	2.078E-01	
BA-133	302.85	258.	-14.	-0.008	169.58	-1.901E+00	
Ba-140	304.85	244.	-14.	-0.008	164.93	-8.178E+00	
BI-210M	304.90	230.	-14.	-0.008	160.37	-1.253E+00	
Ir-192	308.44	227.	-14.	-0.008	158.79	-1.118E+00	
PA-233	312.01	240.	-5.	-0.003	426.50	-3.778E-01	
CR-51	320.08	40.	-2.	-0.001	375.97	-6.188E-01	P
La-140	328.76	36.	10.	0.006	90.55	1.350E+00	
Cf-249	333.44	46.	7.	0.004	138.72	1.280E+00	
Cs-136	340.57	99.	9.	0.005	160.69	5.377E-01	
HF-181	345.83	158.	-12.	-0.007	151.91	-2.255E+00	
BA-133	356.00	128.	-11.	-0.006	145.66	-5.280E-01	
I-131	364.48	16.	5.	0.003	164.17	1.806E-01	P
BA-133	383.84	68.	3.	0.002	353.27	1.153E+00	
SN-113	391.69	69.	1.	0.001	883.18	6.549E-02	
SB-125	427.88	25.	-4.	-0.002	230.72	-4.072E-01	P
AG-108M	433.94	33.	-11.	-0.006	79.33	-3.958E-01	P
pm-146	453.88	14.	6.	0.003	127.33	3.367E-01	P
SB-125	463.37	24.	7.	0.004	100.04	2.536E+00	P
Ir-192	468.06	38.	-2.	-0.001	463.94	-1.331E-01	
BE-7	477.60	64.	-11.	-0.006	104.69	-3.947E+00	
HF-181	482.00	75.	-6.	-0.003	218.27	-2.640E-01	
RU-103	497.05	22.	2.	0.001	519.81	7.775E-02	P
RH-106	511.86	21.	39.	0.022	34.64	7.597E+00	
Ba-140	537.26	27.	-12.	-0.007	81.48	-1.993E+00	P
PA-234	569.47	33.	-4.	-0.002	192.62	-2.246E+00	
BI-207	569.70	33.	4.	0.002	228.72	1.595E-01	
TL-208	583.02	33.	9.	0.005	129.82	4.690E-01	P
SB-125	600.50	122.	5.	0.003	292.78	1.339E+00	P
RH-106	621.92	89.	5.	0.003	282.94	2.203E+00	P
SB-125	635.89	22.	-11.	-0.006	68.89	-4.391E+00	
I-131	636.97	31.	3.	0.002	270.12	1.951E+00	
AG-110M	657.76	14.	7.	0.004	82.97	3.653E-01	
CS-137	661.66	15.	4.	0.002	144.87	2.308E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PM-144	696.54	15.	3.	0.002	243.35	1.716E-01	P
NB-94	702.63	19.	-5.	-0.003	201.78	-2.412E-01	
SB-124	722.79	55.	-14.	-0.008	79.60	-6.695E+00	
AG-108M	722.94	69.	-11.	-0.006	112.16	-6.197E-01	
BI-212	727.17	63.	11.	0.006	106.91	7.564E+00	P
pm-146	735.72	23.	-10.	-0.006	112.78	-2.433E+00	P
pm-146	747.16	20.	-5.	-0.003	260.92	-7.099E-01	P
ZR-95	756.73	14.	5.	0.003	168.60	4.843E-01	P
AG-110M	763.94	42.	-14.	-0.008	69.53	-3.473E+00	
NB-95	765.79	64.	-12.	-0.007	97.71	-6.583E-01	
PA-234M	766.41	65.	11.	0.006	111.82	1.965E+02	P
EU-152	778.92	0.	7.	0.004	37.80	2.985E+00	
BI-212	785.42	5.	5.	0.003	94.45	2.363E+01	
TL-210	799.60	37.	-11.	-0.006	83.66	-6.250E-01	
CO-58	810.78	10.	12.	0.007	46.40	7.054E-01	P
La-140	815.77	22.	6.	0.003	128.36	1.361E+00	
Cs-136	818.50	47.	-10.	-0.005	106.65	-5.512E-01	
MN-54	834.85	14.	-1.	-0.001	800.00	-5.853E-02	
Co-56	846.77	14.	-3.	-0.002	270.80	-1.778E-01	
TL-208	860.56	10.	4.	0.002	164.26	2.023E+00	P
NB-94	871.10	5.	6.	0.003	69.87	3.441E-01	
PA-234	880.53	11.	6.	0.003	91.38	5.806E+00	
PA-234	883.24	16.	6.	0.003	108.81	3.643E+00	
AG-110M	884.68	47.	-11.	-0.006	90.40	-9.642E-01	
Sc-46	889.28	22.	3.	0.002	204.21	2.067E-01	
y-88	898.04	5.	2.	0.001	255.77	1.329E-01	
PA-234	946.02	10.	-3.	-0.002	238.82	-1.458E+00	
EU-152	964.11	5.	6.	0.003	92.99	2.672E+00	
EU-154	996.33	10.	6.	0.003	86.38	3.839E+00	
PA-234M	1001.00	18.	4.	0.002	167.02	3.134E+01	P
EU-154	1004.77	33.	-6.	-0.003	135.61	-2.398E+00	
Co-56	1037.84	10.	-3.	-0.002	199.88	-1.613E+00	P
Cs-136	1048.07	5.	6.	0.003	65.78	5.425E-01	
RH-106	1050.36	13.	4.	0.002	126.04	1.978E+01	P
BI-207	1063.66	5.	6.	0.003	90.79	5.880E-01	P
Ga-68	1077.40	15.	-3.	-0.002	289.64	-7.764E+00	
FE-59	1099.25	16.	-1.	-0.001	914.69	-1.313E-01	
Sc-46	1120.55	25.	6.	0.003	119.56	4.729E-01	
CO-60	1173.24	6.	13.	0.007	50.22	1.015E+00	P
Co-56	1238.28	6.	2.	0.001	226.17	3.045E-01	P
NA-22	1274.53	16.	-4.	-0.002	150.00	-3.380E-01	
TL-210	1313.00	11.	-2.	-0.001	452.11	-6.881E-01	
AG-110M	1384.30	6.	5.	0.003	113.28	1.995E+00	
EU-152	1408.00	11.	-4.	-0.002	188.42	-1.903E+00	
La-140	1596.21	6.	1.	0.001	437.35	1.412E-01	P
SB-124	1690.98	6.	-2.	-0.001	304.14	-4.551E-01	
y-88	1836.06	6.	-1.	-0.001	287.06	-1.354E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.9469E+00	-3.9470E+00	1.047E+02%	1.40E+01
NA-22	#A	-3.3798E-01	-3.3798E-01	1.500E+02%	1.80E+00
K-40		1.7880E+02	1.7880E+02	7.212E+00%	1.06E+01
Sc-46	#A	3.3982E-01	3.3982E-01	1.183E+02%	1.51E+00
CR-51	#A	-6.1883E-01	-6.1884E-01	3.760E+02%	8.72E+00
MN-54	#A	-5.8530E-02	-5.8530E-02	8.000E+02%	1.18E+00
FE-59	#A	-1.3126E-01	-1.3126E-01	9.147E+02%	2.80E+00
Co-56	#A	1.4151E-02	1.4151E-02	1.764E+02%	1.19E+00
CO-57	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.78E-01
CO-58	#A	7.0537E-01	7.0538E-01	4.640E+01%	1.00E+00
CO-60	#A	4.8751E-01	4.8751E-01	5.022E+01%	1.62E+00
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.54E+00
NB-94	#A	5.4405E-02	5.4405E-02	6.987E+01%	1.18E+00
ZR-95	#A	4.8430E-01	4.8430E-01	1.686E+02%	2.00E+00
NB-95	#A	-6.5828E-01	-6.5829E-01	9.771E+01%	2.17E+00
RU-103	#A	7.7746E-02	7.7746E-02	5.198E+02%	1.03E+00
RH-106	#A	4.5891E+00	4.5891E+00	1.260E+02%	2.15E+01
AG-108M	#A	-3.9579E-01	-3.9579E-01	7.933E+01%	1.10E+00
AG-110M	#A	-2.2293E-01	-2.2293E-01	7.246E+01%	2.94E+00
SN-113	#A	6.5487E-02	6.5487E-02	8.832E+02%	2.03E+00
SB-124	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.50E+00
SB-125	#A	6.6319E-01	6.6319E-01	1.000E+02%	2.94E+00
I-131	#A	3.2338E-01	3.2340E-01	1.580E+02%	7.77E-01
Gd-153	#A	8.2211E-01	8.2212E-01	1.078E+02%	4.74E+00
Ga-68	#A	-7.6937E+00	-7.7635E+00	2.896E+02%	5.37E+01
Tc-99m	#A	-1.2677E-01	-1.2698E-01	4.195E+02%	1.80E+00
BA-133	#A	-5.2796E-01	-5.2796E-01	1.457E+02%	2.61E+00
CS-134	A	3.3666E-01	3.3666E-01	9.674E+01%	2.53E+00
CS-137	#A	2.3079E-01	2.3079E-01	1.449E+02%	1.19E+00
CE-139	#A	2.2553E-01	2.2553E-01	1.157E+02%	8.86E-01
Ba-140	#A	-9.0745E-01	-9.0748E-01	6.548E+01%	4.47E+00
La-140	#A	5.2207E-01	5.2209E-01	9.055E+01%	1.50E+00
CE-141	#A	5.6007E-01	5.6008E-01	1.646E+02%	3.09E+00
CE-144	#A	-2.5180E+00	-2.5180E+00	1.528E+02%	1.29E+01
PM-144	#A	1.7164E-01	1.7164E-01	2.433E+02%	1.04E+00
EU-152	#A	1.2358E+00	1.2358E+00	3.780E+01%	5.48E+00
EU-154	#A	9.2865E-01	9.2865E-01	8.638E+01%	6.84E+00
EU-155	#A	7.9874E-01	7.9874E-01	1.489E+02%	4.02E+00
HF-181	#A	-2.6401E-01	-2.6402E-01	2.183E+02%	1.99E+00
Ta-182	#A	1.3561E+00	1.3561E+00	1.031E+02%	4.83E+00
Hg-203	#A	-1.5151E-01	-1.5152E-01	1.985E+02%	1.14E+00
TL-208	#A	8.7427E-01	8.7427E-01	7.664E+01%	1.51E+00
pm-146	#A	-2.2709E-02	-2.2709E-02	1.273E+02%	3.65E+00

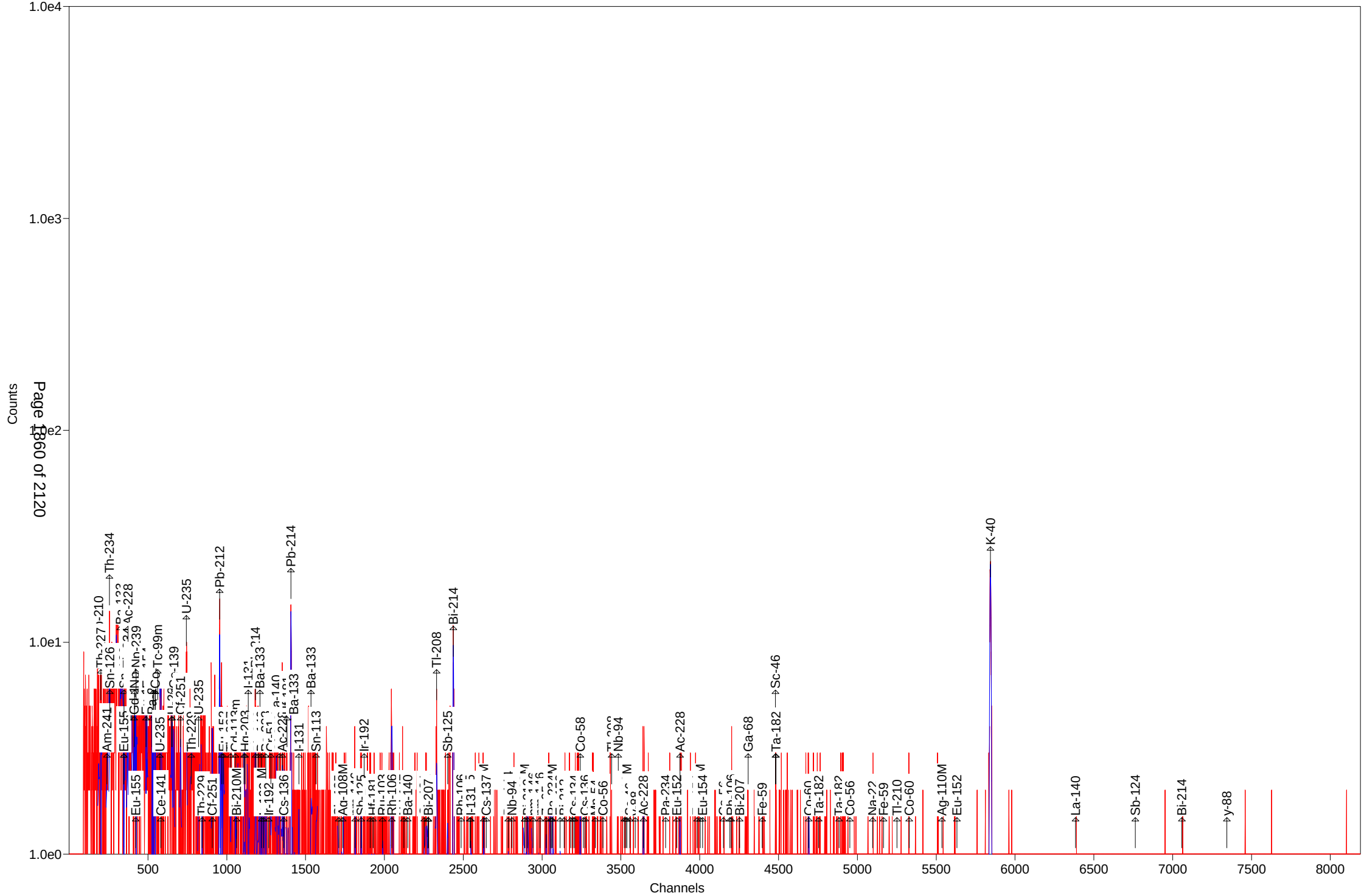
y-88 #A	1.3293E-01	1.3293E-01	2.558E+02%		8.73E-01
Cd-113m#A	2.1854E+03	2.1854E+03	1.429E+02%		1.09E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.95E+01
Cf-251 #A	9.0767E-01	9.0767E-01	1.240E+02%		2.97E+00
Cf-249 #A	2.4354E-01	2.4354E-01	1.387E+02%		1.98E+00
Sn-126 #A	2.8116E+00	2.8116E+00	1.209E+02%		1.15E+01
PB-210 #A	1.9078E+00	1.9078E+00	4.946E+02%		3.25E+01
PB-212	2.4023E+00	2.4023E+00	2.153E+01%		1.39E+00
PB-214	5.3920E+00	5.3920E+00	1.620E+01%		1.68E+00
BI-207 #A	3.4487E-01	3.4487E-01	9.079E+01%		1.29E+00
BI-212 #A	7.5638E+00	7.5638E+00	1.069E+02%		2.74E+01
U-235 #A	2.5163E+00	2.5163E+00	1.154E+02%		1.35E+01
BI-214	5.7382E+00	5.7382E+00	1.441E+01%		1.39E+00
BI-210M#A	1.2382E-01	1.2382E-01	4.306E+02%		1.86E+00
AC-228 A	2.6935E+00	2.6935E+00	5.012E+01%		2.85E+00
TH-227 #A	-5.0126E+00	-5.0126E+00	1.125E+02%		1.90E+01
TH-229 #A	-6.9449E-01	-6.9449E-01	8.633E+02%		1.60E+01
TH-234 A	3.6572E+00	3.6572E+00	9.100E+01%		1.96E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		6.19E+01
PA-233 #A	-3.7777E-01	-3.7777E-01	4.265E+02%		5.48E+00
PA-234 #A	2.6307E-01	2.6307E-01	9.106E+01%		7.54E+00
PA-234M#A	7.4269E+01	7.4269E+01	1.005E+02%		1.86E+02
AM-241 #A	7.3088E-02	7.3088E-02	1.587E+03%		3.97E+00
Np-237 #A	-1.9695E+00	-1.9695E+00	1.868E+02%		1.23E+01
Ir-192 #A	-5.8286E-08	-5.8286E-08	1.162E+09%		2.31E+00
Cs-136 #A	5.9470E-02	5.9472E-02	6.578E+01%		2.00E+00
Np-239 #A	-1.1194E+00	-1.1196E+00	1.114E+02%		4.19E+00
Nd-147 #A	1.0293E-01	1.0293E-01	2.856E+03%		7.53E+00
TL-210 #A	-6.2496E-01	-6.2496E-01	8.366E+01%		1.76E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.950E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.9502356E+02 Bq/Sample

379959_Gamma_160-29881-A-40-C. 15_Gamma_20182800.spc.



Test America St. Louis Spectrum ID: 17_Gamma_20182905

Sample Description: 379959_Gamma_160-29881-B-41-B
Detector: Detector #17
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-B-41-B

Decay to Time: 8/23/2018 08:44 Live Time: 1800 sec
Acquisition Time: 8/23/2018 08:44:47 Real Time: 1830 sec
Analysis Time: 8/23/2018 09:15 Dead Time: 1.63 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_TunaCan.Clb
Efficiency Cal Desc: 17_TunaCan_90099_032612
Efficiency Cal Date: 4/12/2012 09:28
Energy Cal Date: 2/29/2012 10:33
Library: Client_Long_Rev14.lib
Bkgd Correction File: 17_2018-08-11_1255.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.320E+00	96.5	3.204E+00	3.209E+00	1.084E+01
NA-22	-6.754E-01	75.0	5.066E-01	5.077E-01	1.695E+00
K-40	1.582E+02	6.7	1.053E+01	1.328E+01	1.002E+01
Sc-46	2.912E-01	103.1	3.003E-01	3.007E-01	1.188E+00
CR-51	1.114E+00	272.1	3.030E+00	3.031E+00	1.047E+01
MN-54	9.163E-02	403.1	3.694E-01	3.694E-01	9.230E-01
FE-59	-4.997E-01	201.7	1.008E+00	1.008E+00	2.353E+00
Co-56	3.465E-02	1240.3	4.298E-01	4.298E-01	1.073E+00
CO-57	2.141E-01	103.4	2.214E-01	2.217E-01	7.461E-01
CO-58	3.237E-01	97.6	3.160E-01	3.164E-01	7.635E-01
CO-60	-1.209E-01	576.3	6.968E-01	6.969E-01	1.183E+00
ZN-65	-1.326E-01	938.2	1.244E+00	1.244E+00	4.385E+00
NB-94	-3.446E-01	143.4	4.943E-01	4.946E-01	1.096E+00
ZR-95	8.335E-01	50.2	4.188E-01	4.210E-01	9.697E-01
NB-95	-7.372E-01	74.8	5.518E-01	5.531E-01	1.837E+00
RU-103	-1.763E-01	218.8	3.858E-01	3.859E-01	8.112E-01
RH-106	3.704E-01	789.5	2.925E+00	2.925E+00	7.909E+00
AG-108M	-5.472E-02	635.8	3.479E-01	3.480E-01	8.245E-01
AG-110M	-9.347E-03	266.4	2.490E-02	2.491E-02	2.204E+00
SN-113	3.637E-01	124.7	4.534E-01	4.538E-01	1.549E+00
SB-124	-4.313E-01	181.5	7.828E-01	7.831E-01	2.645E+00
SB-125	-2.474E-01	424.9	1.051E+00	1.051E+00	2.814E+00
I-131	-2.831E-01	139.9	3.961E-01	3.964E-01	8.669E-01
Gd-153	5.664E-02	107.8	6.104E-02	6.114E-02	2.712E+00
Ga-68	5.931E+00	238.8	1.416E+01	1.417E+01	3.449E+01
Tc-99m	2.596E-02	1011.7	2.626E-01	2.626E-01	9.050E-01
BA-133	-4.848E-01	164.5	7.976E-01	7.980E-01	2.696E+00
CS-134	1.781E-01	96.0	1.709E-01	1.712E-01	2.600E+00
CS-137	-5.130E-01	87.5	4.489E-01	4.497E-01	1.514E+00
CE-139	1.653E-02	1699.1	2.809E-01	2.809E-01	9.730E-01
Ba-140	6.773E-01	162.9	1.103E+00	1.104E+00	2.892E+00
La-140	3.581E-01	106.5	3.814E-01	3.819E-01	1.092E+00
CE-141	-4.612E-01	121.1	5.584E-01	5.588E-01	1.878E+00

CE-144	0.000E+00	1.#INF	5.605E-01	5.605E-01	7.836E+00
PM-144	-6.879E-02	703.2	4.837E-01	4.837E-01	9.018E-01
EU-152	8.223E-01	110.4	9.078E-01	9.088E-01	4.567E+00
EU-154	1.892E+00	100.1	1.894E+00	1.897E+00	5.071E+00
EU-155	2.703E-01	288.4	7.795E-01	7.796E-01	3.461E+00
HF-181	3.099E-01	114.3	3.542E-01	3.545E-01	1.214E+00
Ta-182	1.368E+00	82.8	1.133E+00	1.135E+00	4.732E+00
Hg-203	1.167E-01	246.0	2.871E-01	2.872E-01	9.978E-01
TL-208	1.565E+00	24.2	3.781E-01	3.867E-01	8.180E-01
pm-146	1.046E-01	177.4	1.855E-01	1.856E-01	3.027E+00
y-88	1.544E-01	272.0	4.201E-01	4.202E-01	1.041E+00
Cd-113m	5.532E+02	624.5	3.455E+03	3.455E+03	1.220E+04
Cd-109	0.000E+00	1.#INF	2.395E+00	2.395E+00	3.308E+01
Cf-251	1.111E+00	108.0	1.200E+00	1.204E+00	3.274E+00
Cf-249	-2.687E-01	118.2	3.176E-01	3.179E-01	1.990E+00
Sn-126	1.365E+00	233.5	3.187E+00	3.188E+00	1.086E+01
PB-210	1.318E+01	78.6	1.036E+01	1.038E+01	2.887E+01
PB-212	3.928E+00	13.4	5.262E-01	5.843E-01	1.184E+00
PB-214	7.243E+00	11.5	8.339E-01	9.149E-01	1.467E+00
BI-207	2.016E-01	142.5	2.873E-01	2.875E-01	9.585E-01
BI-212	6.930E+00	103.3	7.161E+00	7.170E+00	2.419E+01
U-235	3.424E+00	46.5	1.591E+00	1.600E+00	4.146E+00
BI-214	7.559E+00	12.4	9.373E-01	1.016E+00	1.576E+00
BI-210M	-5.101E-01	98.1	5.004E-01	5.013E-01	1.689E+00
AC-228	4.050E+00	38.9	1.574E+00	1.587E+00	3.399E+00
TH-227	2.947E-01	1573.2	4.636E+00	4.636E+00	1.361E+01
TH-229	-1.221E+00	428.4	5.229E+00	5.229E+00	1.457E+01
TH-234	7.901E+00	49.0	3.869E+00	3.891E+00	2.038E+01
PA-231	0.000E+00	1.#INF	2.848E+00	2.848E+00	5.309E+01
PA-233	6.456E-01	192.6	1.244E+00	1.244E+00	4.211E+00
PA-234	2.848E+00	48.1	1.370E+00	1.377E+00	4.676E+00
PA-234M	2.663E+01	103.5	2.757E+01	2.760E+01	1.949E+02
AM-241	-1.047E-01	877.5	9.185E-01	9.185E-01	2.676E+00
Np-237	1.709E+00	163.4	2.792E+00	2.793E+00	9.377E+00
Ir-192	-3.341E-01	102.4	3.420E-01	3.425E-01	1.155E+00
Cs-136	3.598E-01	74.2	2.669E-01	2.677E-01	1.157E+00
Np-239	6.177E-01	138.1	8.532E-01	8.541E-01	2.897E+00
Nd-147	-1.764E+00	152.8	2.694E+00	2.696E+00	6.897E+00
TL-210	-6.017E-02	222.7	1.340E-01	1.340E-01	1.984E+00
Total	8.188E+02				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-B-41-B

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20182905.An1

Acquisition information
Start time: 8/23/2018 8:44:47 AM
Live time: 1800
Real time: 1830
Dead time: 1.63 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: Client_Long_Rev14.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 100 (25.12keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 8:44:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2018-08-11_1255.PBC 8/11/2018 12:55:25 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.2322

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.89	21.	78.58	1.00	2.100E-02	46.54	4.250	PBC<MDA	PB210
63.45	48.	29.45	0.55	3.173E-02	63.29	3.810	PBC<MDA	TH234
64.28	8.	233.45	0.79	3.216E-02	64.28	9.700	PBC<MDA	Sn126
74.82	85.	17.34	0.80	3.679E-02				
77.27	89.	14.58	0.80	3.766E-02				
80.99	6.	278.73	0.81	3.884E-02	80.99	34.060	PBC<MDA	BA133
86.49	16.	163.38	0.81	4.026E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.289E-01	EU155
86.54	5.	562.54	0.81	4.027E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	2.148E-01	EU155
					86.94	9.040	7.279E-01	Sn126
92.45	27.	68.69	0.94	4.144E-02	92.59	5.584	PBC<MDA	TH234
103.20	13.	120.32	0.83	4.265E-02	103.20	21.800	PBC<MDA	Gd153
103.70	13.	126.70	0.83	4.269E-02	103.70	24.000	PBC<MDA	Np239
105.31	6.	288.35	0.83	4.278E-02	105.31	21.200	PBC<MDA	EU155
106.13	11.	138.13	0.83	4.282E-02	106.13	22.700	PBC<MDA	Np239
122.06	14.	103.44	0.85	4.276E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.141E-01	CO57
131.29	10.	188.15	0.85	4.212E-02	131.29	18.000	PBC<MDA	PA234
143.31	28.	46.46	0.29	4.080E-02	143.79	10.960	PBC<MDA	U235
163.54	10.	105.87	0.94	3.802E-02	163.38	5.080	PBC<MDA	U235
177.22	12.	108.00	0.90	3.667E-02	176.60	17.000	PBC<MDA	Cf251

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.91	34.	40.51	0.77	3.545E-02	185.72	54.000	PBC<MDA	U235
205.25	12.	110.16	0.92	3.312E-02	205.33	5.010	PBC<MDA	U235
238.36	97.	14.65	0.74	2.991E-02	238.63	43.300	3.748E+00	PB212
241.86	35.	28.05	0.96	2.960E-02	242.00	7.430	8.865E+00	PB214
263.70	2.	624.50	0.98	2.790E-02	263.70	0.006	PBC<MDA	Cd113m
277.44	11.	98.01	0.99	2.694E-02	277.28	6.310	PBC<MDA	TL208
279.20	5.	245.97	0.99	2.681E-02	279.20	81.460	PBC<MDA	Hg203
295.07	51.	28.22	0.61	2.580E-02	295.09	19.300	5.724E+00	PB214
					296.00	79.000	1.401E+00	TL210
299.94	6.	343.68	1.01	2.550E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
312.01	10.	192.61	1.02	2.481E-02	312.01	36.000	PBC<MDA	PA233
320.08	5.	272.10	1.03	2.437E-02	320.08	9.940	PBC<MDA	CR51
333.44	5.	258.77	1.04	2.368E-02	333.44	15.510	PBC<MDA	Cf249
351.88	112.	11.51	0.84	2.279E-02	351.93	37.600	7.243E+00	PB214
383.84	11.	118.38	1.09	2.143E-02	383.84	8.940	PBC<MDA	BA133
391.69	9.	124.68	1.09	2.112E-02	391.69	64.000	PBC<MDA	SN113
453.88	6.	177.43	1.15	1.900E-02	453.88	65.000	PBC<MDA	pm146
482.00	8.	114.30	1.18	1.820E-02	482.00	80.500	PBC<MDA	HF181
511.86	67.	20.95	2.45	1.742E-02	511.86	20.000	1.068E+01	RH106
536.91	5.	162.89	1.22	1.682E-02	537.26	24.390	PBC<MDA	Ba140
569.32	3.	204.30	1.25	1.612E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.121E+00	PA234
					569.70	97.740	9.407E-02	BI207
569.47	8.	83.73	1.25	1.611E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.171E+00	PA234
					569.70	97.740	2.661E-01	BI207
569.70	5.	142.54	1.25	1.611E-02	569.32	15.380	1.223E+00	CS134
					569.47	8.200	2.295E+00	PA234
					569.70	97.740	1.926E-01	BI207
583.24	38.	24.16	1.13	1.584E-02	583.02	84.500	1.565E+00	TL208
609.45	96.	12.40	1.17	1.533E-02	609.31	46.090	7.559E+00	BI214
					610.30	5.750	6.066E+01	RU103
621.92	1.	789.51	1.30	1.510E-02	621.92	9.930	PBC<MDA	RH106
657.76	3.	283.95	1.33	1.449E-02	657.76	94.640	PBC<MDA	AG110M
727.17	13.	103.34	1.39	1.345E-02	727.17	7.550	PBC<MDA	BI212
756.73	11.	50.24	1.41	1.306E-02	756.73	54.460	PBC<MDA	ZR95
766.41	11.	103.53	1.42	1.293E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	1.	583.88	1.43	1.278E-02	778.92	12.940	PBC<MDA	EU152
785.42	2.	412.43	1.44	1.270E-02	785.42	1.280	PBC<MDA	BI212
801.95	12.	99.93	1.45	1.250E-02	801.95	8.690	PBC<MDA	CS134
808.55	7.	97.62	1.46	1.240E-02	810.78	99.460	PBC<MDA	CO58
815.77	7.	106.53	1.47	1.234E-02	815.77	23.280	PBC<MDA	La140
818.50	5.	143.41	1.47	1.231E-02	818.50	100.000	PBC<MDA	Cs136
834.85	2.	403.11	1.48	1.213E-02	834.85	99.980	PBC<MDA	MN54
873.23	5.	100.11	1.51	1.172E-02	873.23	12.270	PBC<MDA	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
880.53	13.	27.79	1.52	1.165E-02	880.53	6.000	1.029E+01	PA234
883.24	13.	48.08	1.52	1.162E-02	883.24	9.600	PBC<MDA	PA234
898.04	3.	272.01	1.53	1.148E-02	898.04	93.700	PBC<MDA	y88
911.07	24.	38.86	1.55	1.135E-02	911.07	29.000	4.050E+00	AC228
937.49	1.	800.00	1.57	1.111E-02	937.49	34.360	PBC<MDA	AG110M
946.02	8.	91.09	1.57	1.103E-02	946.02	13.400	PBC<MDA	PA234
964.11	8.	110.40	1.59	1.088E-02	964.11	14.605	PBC<MDA	EU152
996.33	4.	229.46	1.62	1.061E-02	996.33	10.600	PBC<MDA	EU154
1048.07	8.	74.17	1.66	1.021E-02	1048.07	80.000	PBC<MDA	Cs136
1063.66	3.	301.44	1.67	1.009E-02	1063.66	74.500	PBC<MDA	BI207
1077.40	3.	238.82	1.68	9.992E-03	1077.40	3.300	PBC<MDA	Ga68
1120.29	8.	123.51	1.72	9.697E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	10.	103.12	1.72	9.696E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	5.824E-01	Sc46
					1121.30	34.900	1.669E+00	Ta182
1121.30	8.	99.85	1.72	9.691E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.388E+00	Ta182
1188.71	6.	168.87	1.77	9.263E-03	1189.05	16.200	PBC<MDA	Ta182
1221.16	4.	152.39	1.80	9.073E-03	1221.41	27.000	PBC<MDA	Ta182
1408.00	4.	152.39	1.94	8.125E-03	1408.00	21.005	PBC<MDA	EU152
1461.03	240.	6.66	1.93	7.893E-03	1460.83	10.670	1.582E+02	K40
1596.21	1.	427.57	2.09	7.364E-03	1596.21	95.400	PBC<MDA	La140
1764.72	19.	33.88	2.21	6.804E-03	1764.49	15.400	1.026E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.70	74.79	65.	85.	2.301E+03	17.34	0.802	- D
308.51	77.24	40.	89.	2.367E+03	14.58	0.804	- sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	187.05	46.89	88.	21.	0.012	78.58	1.002s
AM-241	237.59	59.54	108.	-2.	-0.001	877.50	0.787s
TH-234	253.24	63.45	79.	22.	0.012	69.81	0.548s
Sn-126	256.56	64.28	156.	8.	0.004	233.45	0.792s
BA-133	323.36	80.99	94.	6.	0.003	278.73	0.807
Np-237	345.35	86.49	343.	16.	0.009	163.38	0.813
EU-155	345.56	86.54	359.	5.	0.003	562.54	0.813s
Sn-126	347.15	86.94	364.	0.	0.000	1000.00	0.813s
Sn-126	349.67	87.57	364.	0.	0.000	1000.00	0.814
Cd-109	351.55	88.04	364.	0.	0.000	1000.00	0.814s
Nd-147	363.79	91.10	385.	-17.	-0.010	162.48	0.817s
TH-234	369.20	92.45	111.	27.	0.015	68.69	0.936s
AC-228	372.78	93.35	368.	-17.	-0.009	163.92	0.819s
Gd-153	389.37	97.50	160.	-10.	-0.006	178.82	0.823
Gd-153	412.16	103.20	108.	13.	0.007	120.32	0.828s
Np-239	414.16	103.70	120.	13.	0.007	126.70	0.829s
EU-155	420.61	105.31	133.	6.	0.003	288.35	0.830s
Np-239	423.88	106.13	106.	11.	0.006	138.13	0.831s
EU-152	486.43	121.78	140.	-15.	-0.008	114.50	0.846s
CO-57	487.57	122.06	99.	14.	0.008	103.44	0.846s
EU-154	491.73	123.10	122.	-3.	-0.002	458.40	0.847s
PA-234	524.49	131.29	172.	10.	0.006	188.15	0.855s
HF-181	531.41	133.02	182.	0.	0.000	1000.00	0.856s
CE-144	533.46	133.54	182.	0.	0.000	1000.00	0.857s
HF-181	544.50	136.30	182.	0.	0.000	1000.00	0.859s
CO-57	545.20	136.47	236.	-17.	-0.010	128.77	0.859s
U-235	572.54	143.31	43.	28.	0.015	46.46	0.291s
CE-141	581.05	145.44	185.	-16.	-0.009	121.05	0.868s
Ba-140	649.90	162.66	110.	-14.	-0.008	106.25	0.884
U-235	653.44	163.54	33.	10.	0.005	105.87	0.938
Cf-251	705.64	176.60	53.	12.	0.007	108.00	0.897s
U-235	742.87	185.91	52.	34.	0.019	40.51	0.766s
TH-229	773.25	193.51	63.	-3.	-0.002	428.37	0.913s
U-235	820.52	205.33	51.	12.	0.007	110.16	0.924s
TH-229	842.58	210.85	103.	-18.	-0.010	103.37	0.929s
Cf-251	907.16	227.00	70.	-8.	-0.004	189.43	0.944s
PB-212	953.67	238.63	29.	91.	0.051	13.40	0.954D
PB-214	967.13	242.00	31.	35.	0.019	28.05	0.957D
TH-227	1024.08	256.24	57.	-10.	-0.005	142.26	0.971
Cd-113m	1053.91	263.70	53.	2.	0.001	624.50	0.978s
BI-210M	1062.44	265.83	72.	-13.	-0.007	98.09	0.979s
TL-208	1108.23	277.28	57.	11.	0.006	98.01	0.990s
Hg-203	1115.89	279.20	61.	5.	0.003	245.97	0.992s
I-131	1136.28	284.30	33.	-3.	-0.002	362.86	0.996s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	1179.34	295.07	41.	51.	0.029	28.22	0.613s
TL-210	1183.07	296.00	202.	6.	0.003	367.48	1.007s
PB-212	1199.19	300.03	201.	6.	0.003	343.68	1.011
PA-231	1199.35	300.07	207.	0.	0.000	1000.00	1.011
PA-233	1199.79	300.18	207.	0.	0.000	1000.00	1.011
PA-231	1209.66	302.65	207.	0.	0.000	1000.00	1.013s
BA-133	1210.47	302.85	207.	0.	0.000	1000.00	1.013s
Ba-140	1218.46	304.85	207.	0.	0.000	1000.00	1.015
BI-210M	1218.64	304.90	207.	0.	0.000	1000.00	1.015s
Ir-192	1232.82	308.44	253.	-13.	-0.007	178.50	1.019s
PA-233	1247.10	312.01	195.	10.	0.006	192.61	1.022s
Ir-192	1265.01	316.49	80.	-13.	-0.007	102.37	1.026s
CR-51	1279.38	320.08	85.	5.	0.003	272.10	1.029s
Cf-249	1332.79	333.44	40.	5.	0.003	258.77	1.041s
AC-228	1352.30	338.32	95.	-8.	-0.005	169.28	1.046s
Cs-136	1361.30	340.57	104.	0.	0.000	1000.00	1.048s
PB-214	1406.54	351.88	18.	112.	0.062	11.51	0.844s
BA-133	1423.00	356.00	197.	-12.	-0.007	164.53	1.062s
I-131	1456.93	364.48	30.	-9.	-0.005	139.91	1.070s
BA-133	1534.34	383.84	75.	11.	0.006	118.38	1.087s
Cf-249	1550.77	387.95	104.	-13.	-0.007	118.21	1.091s
SN-113	1565.73	391.69	56.	9.	0.005	124.68	1.094
SB-125	1710.44	427.88	34.	-3.	-0.001	424.85	1.127s
AG-108M	1734.69	433.94	26.	-2.	-0.001	635.84	1.132s
pm-146	1814.44	453.88	28.	6.	0.003	177.43	1.150
SB-125	1852.38	463.37	53.	-4.	-0.002	259.70	1.158s
Ir-192	1871.15	468.06	82.	-12.	-0.007	107.87	1.163s
BE-7	1909.29	477.59	56.	-12.	-0.006	96.52	1.171s
HF-181	1926.89	482.00	40.	8.	0.005	114.30	1.175s
La-140	1946.98	487.02	28.	-6.	-0.003	177.43	1.180
RU-103	1987.11	497.05	20.	-5.	-0.003	218.83	1.188s
RH-106	2046.35	511.86	20.	67.	0.037	20.95	2.452
Nd-147	2122.88	531.00	28.	-7.	-0.004	152.75	1.219s
Ba-140	2147.92	537.26	16.	5.	0.003	162.89	1.224s
CS-134	2251.82	563.24	28.	-7.	-0.004	151.27	1.247s
CS-134	2276.15	569.32	14.	3.	0.001	204.30	1.252s
PA-234	2276.75	569.47	16.	8.	0.004	83.73	1.253s
BI-207	2277.67	569.70	28.	5.	0.003	142.54	1.253s
TL-208	2331.83	583.24	13.	38.	0.021	24.16	1.132
SB-125	2400.86	600.50	235.	-12.	-0.007	186.41	1.280s
SB-124	2409.78	602.73	223.	-12.	-0.007	181.52	1.282s
CS-134	2417.70	604.71	211.	-12.	-0.007	176.54	1.284s
BI-214	2436.66	609.45	14.	96.	0.053	12.40	1.166
RU-103	2440.05	610.30	199.	-12.	-0.007	171.04	1.288s
AG-108M	2455.98	614.28	188.	-8.	-0.004	256.82	1.292s
RH-106	2486.52	621.92	16.	1.	0.001	789.51	1.299s
SB-125	2542.41	635.89	34.	-12.	-0.007	75.35	1.311s
I-131	2546.75	636.97	48.	-1.	-0.001	739.93	1.312s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	2629.90	657.76	27.	3.	0.001	283.95	1.330s
CS-137	2645.49	661.66	44.	-11.	-0.006	87.52	1.333s
PM-144	2785.03	696.54	18.	-2.	-0.001	703.18	1.363s
NB-94	2809.38	702.63	26.	-8.	-0.005	143.43	1.368s
SB-124	2890.01	722.79	63.	-14.	-0.008	81.99	1.386s
AG-108M	2890.61	722.94	77.	-14.	-0.008	95.82	1.386s
EU-154	2892.29	723.36	91.	0.	0.000	1000.00	1.386s
ZR-95	2895.66	724.20	91.	0.	0.000	1000.00	1.387s
BI-212	2907.54	727.17	79.	13.	0.007	103.34	1.390s
pm-146	2941.74	735.72	30.	-12.	-0.007	95.50	1.397s
pm-146	2987.51	747.16	22.	-2.	-0.001	705.52	1.407s
ZR-95	3025.79	756.73	4.	11.	0.006	50.24	1.415s
AG-110M	3054.64	763.94	33.	-8.	-0.004	111.44	1.421
NB-95	3062.03	765.79	74.	-17.	-0.010	74.85	1.423s
PA-234M	3064.52	766.41	55.	11.	0.006	103.53	1.423s
EU-152	3114.56	778.92	18.	1.	0.001	583.88	1.434s
BI-212	3140.56	785.42	22.	2.	0.001	412.43	1.440s
CS-134	3182.35	795.87	65.	-14.	-0.008	84.52	1.448s
TL-210	3197.29	799.60	80.	-5.	-0.003	251.72	1.451s
CS-134	3206.69	801.95	70.	12.	0.007	99.93	1.454s
CO-58	3241.99	810.78	9.	7.	0.004	97.62	1.461s
La-140	3261.97	815.77	26.	7.	0.004	106.53	1.465
Cs-136	3272.90	818.50	24.	5.	0.003	143.41	1.467s
MN-54	3338.30	834.85	14.	2.	0.001	403.11	1.481s
EU-154	3491.85	873.23	5.	5.	0.003	100.11	1.514s
PA-234	3521.06	880.53	0.	13.	0.007	27.79	1.520s
PA-234	3531.90	883.24	13.	13.	0.007	48.08	1.522s
AG-110M	3537.67	884.68	44.	-4.	-0.002	266.42	1.523s
Sc-46	3556.06	889.28	22.	0.	0.000	1000.00	1.527s
y-88	3591.11	898.04	14.	3.	0.002	272.01	1.534s
AC-228	3643.24	911.07	14.	24.	0.013	38.86	1.545s
AG-110M	3748.95	937.49	14.	1.	0.001	800.00	1.567s
PA-234	3783.07	946.02	9.	8.	0.004	91.09	1.574s
EU-152	3855.45	964.11	35.	8.	0.004	110.40	1.589s
AC-228	3874.90	968.97	64.	-15.	-0.008	81.47	1.593s
EU-154	3984.36	996.33	30.	4.	0.002	229.46	1.616s
PA-234M	4003.04	1001.00	37.	-3.	-0.002	288.60	1.620s
EU-154	4018.15	1004.77	46.	-10.	-0.005	105.53	1.623s
Co-56	4150.45	1037.84	40.	-16.	-0.009	52.32	1.650s
Cs-136	4191.39	1048.07	12.	8.	0.004	74.17	1.658s
RH-106	4200.55	1050.36	34.	-12.	-0.006	77.55	1.661s
BI-207	4253.77	1063.66	15.	3.	0.002	301.44	1.671s
Ga-68	4308.74	1077.40	10.	3.	0.002	238.82	1.683s
FE-59	4396.18	1099.25	20.	-5.	-0.003	201.66	1.700
EU-152	4447.49	1112.07	72.	-12.	-0.007	104.99	1.711s
ZN-65	4461.38	1115.55	60.	-1.	-0.001	938.20	1.713s
BI-214	4480.35	1120.29	50.	8.	0.005	123.51	1.717s
Sc-46	4481.41	1120.55	50.	10.	0.006	103.12	1.717s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4484.41	1121.30	31.	8.	0.005	99.85	1.718s
Ta-182	4755.52	1189.05	20.	6.	0.003	168.87	1.772
Ta-182	4885.02	1221.41	5.	4.	0.002	152.39	1.798s
Co-56	4952.53	1238.28	38.	-15.	-0.008	69.51	1.812s
NA-22	5097.60	1274.53	27.	-11.	-0.006	75.00	1.840s
EU-154	5097.66	1274.54	37.	0.	0.000	1000.00	1.840s
FE-59	5165.90	1291.60	16.	-6.	-0.003	173.84	1.854s
TL-210	5251.56	1313.00	21.	-7.	-0.004	147.85	1.870s
CO-60	5329.61	1332.50	11.	-2.	-0.001	576.35	1.886s
EU-152	5631.79	1408.00	5.	4.	0.002	152.39	1.944
K-40	5844.06	1461.03	7.	240.	0.133	6.66	1.925
La-140	6385.15	1596.21	6.	1.	0.001	427.57	2.087
SB-124	6764.55	1690.98	0.	0.	0.000	1000.00	2.157s
BI-214	7058.84	1764.49	12.	19.	0.011	33.88	2.211s
Co-56	7086.31	1771.35	33.	-2.	-0.001	356.00	2.216s
y-88	7345.39	1836.06	6.	-2.	-0.001	304.14	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.3196E+00				5.31E+01	
			477.60	-3.320E+00	?(	1.084E+01 9.65E+01 1.05E+01	G
NA-22	C	-6.7544E-01				9.50E+02	
			1274.53	-6.754E-01	?(	1.695E+00 7.50E+01 9.99E+01	G
K-40	N	1.5817E+02				4.66E+11	
			1460.83	1.582E+02	(P	1.002E+01 6.66E+00 1.07E+01	G
Sc-46	F	2.9120E-01				8.38E+01	
			889.28	0.000E+00	?(	1.188E+00 1.00E+03 1.00E+02	G
			1120.55	5.824E-01	?(	2.041E+00 1.03E+02 1.00E+02	G
CR-51	F	1.1137E+00				2.77E+01	
			320.08	1.114E+00	?(	1.047E+01 2.72E+02 9.94E+00	G
MN-54	C	9.1635E-02				3.12E+02	
			834.85	9.163E-02	?(	9.230E-01 4.03E+02 1.00E+02	G
FE-59	F	-4.9967E-01				4.45E+01	
			1099.25	-4.997E-01	?(	2.353E+00 2.02E+02 5.65E+01	G
			1291.60	-9.034E-01	+ P	3.169E+00 1.74E+02 4.32E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Co-56	C 3.4654E-02					7.73E+01	
		846.77	3.465E-02	%(P	1.073E+00	1.24E+03	9.99E+01 G
		1238.28	-1.427E+00	+ P	2.953E+00	6.95E+01	6.61E+01 G
		1037.84	-6.269E+00	+ P	1.233E+01	5.23E+01	1.41E+01 G
		1771.35	-1.235E+00	+	1.567E+01	3.56E+02	1.55E+01 A
CO-57	C 2.1405E-01					2.72E+02	
		122.06	2.141E-01	?(	7.461E-01	1.03E+02	8.56E+01 G
		136.47	-2.144E+00	+	9.274E+00	1.29E+02	1.07E+01 G
CO-58	C 3.2366E-01					7.09E+01	
		810.78	3.237E-01	&(	7.635E-01	9.76E+01	9.95E+01 G
CO-60	F -1.2090E-01					1.93E+03	
		1332.50	-1.209E-01	?(P	1.183E+00	5.76E+02	1.00E+02 G
		1173.24	-5.137E-03	% P	1.237E+00	1.21E+04	9.99E+01 G
ZN-65	F -1.3260E-01					2.44E+02	
		1115.55	-1.326E-01	?(	4.385E+00	9.38E+02	5.06E+01 G
NB-94	I -3.4461E-01					7.41E+06	
		702.63	-3.446E-01	?(P	1.096E+00	1.43E+02	9.79E+01 G
		871.10	1.578E-02	%	1.179E+00	2.03E+03	9.99E+01 G
ZR-95	I 8.3346E-01					6.40E+01	
		756.73	8.335E-01	?(	9.697E-01	5.02E+01	5.45E+01 G
		724.20	0.000E+00	-	4.399E+00	1.00E+03	4.42E+01 G
NB-95	I -7.3721E-01					6.40E+01	
		765.79	-7.372E-01	?(	1.837E+00	7.48E+01	9.98E+01 G
RU-103	I -1.7629E-01					3.93E+01	
		497.05	-1.763E-01	?(P	8.112E-01	2.19E+02	9.09E+01 G
		610.30	-7.476E+00	+	4.323E+01	1.71E+02	5.75E+00 GA
RH-106	I 3.7043E-01					3.74E+02	
		621.92	3.704E-01	?(	7.909E+00	7.90E+02	9.93E+00 G
		1050.36	-4.037E+01	+	1.049E+02	7.75E+01	1.56E+00 G
		511.86	1.068E+01	?	3.756E+00	2.09E+01	2.00E+01 GA
AG-108M	C -5.4722E-02					1.53E+05	
		433.94	-5.472E-02	?(P	8.245E-01	6.36E+02	9.05E+01 G
		722.94	-6.133E-01	+	1.979E+00	9.58E+01	9.08E+01 G
		614.28	-3.091E-01	+	2.699E+00	2.57E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	-9.3467E-03					2.50E+02	
			884.68	-2.354E-01	?(	2.204E+00	2.66E+02	7.27E+01 G
			657.76	1.080E-01	?(	1.097E+00	2.84E+02	9.46E+01 G
			937.49	1.455E-01	?(	2.932E+00	8.00E+02	3.44E+01 G
			1384.30	-9.260E-02	%	3.743E+00	1.58E+03	2.43E+01 G
			763.94	-1.475E+00	+	5.644E+00	1.11E+02	2.23E+01 G
SN-113	F	3.6367E-01					1.15E+02	
			391.69	3.637E-01	?(P	1.549E+00	1.25E+02	6.40E+01 G
SB-124	F	-4.3125E-01					6.02E+01	
			602.73	-4.313E-01	?(	2.645E+00	1.82E+02	9.83E+01 G
			1690.98	0.000E+00	+	1.218E+00	1.00E+03	4.78E+01 G
			722.79	-5.498E+00	+	1.510E+01	8.20E+01	1.08E+01 G
SB-125	I	-2.4736E-01					1.01E+03	
			427.88	-2.474E-01	?(P	2.814E+00	4.25E+02	2.96E+01 G
			600.50	-2.363E+00	+	1.488E+01	1.86E+02	1.79E+01 G
			635.89	-3.912E+00	+	9.857E+00	7.53E+01	1.13E+01 G
			463.37	-1.223E+00	+ P	1.041E+01	2.60E+02	1.05E+01 G
I-131	I	-2.8310E-01					8.02E+00	
			364.48	-2.831E-01	?(P	8.669E-01	1.40E+02	8.17E+01 G
			284.30	-1.025E+00	+	1.007E+01	3.63E+02	6.14E+00 G
			636.97	-6.962E-01	+	1.827E+01	7.40E+02	7.17E+00 G
Gd-153	F	5.6641E-02					2.42E+02	
			97.50	-4.469E-01	(	2.712E+00	1.79E+02	3.00E+01 G
			103.20	7.496E-01	?(	3.051E+00	1.20E+02	2.18E+01 G
Ga-68	C	5.9306E+00					4.71E-02	
			1077.40	5.931E+00	?(	3.449E+01	2.39E+02	3.30E+00 G
Tc-99m	I	2.5958E-02					2.51E-01	
			140.51	2.596E-02	%(	9.050E-01	1.01E+03	8.93E+01 G
BA-133	F	-4.8477E-01					3.85E+03	
			356.00	-4.848E-01	?(	2.696E+00	1.65E+02	6.20E+01 G
			302.85	0.000E+00	+	8.346E+00	1.00E+03	1.83E+01 G
			383.84	3.099E+00	?	1.246E+01	1.18E+02	8.94E+00 GA
			80.99	2.484E-01	& P	2.012E+00	2.79E+02	3.41E+01 GA
CS-134	I	1.7810E-01					7.54E+02	
			604.71	-4.357E-01	(	2.600E+00	1.77E+02	9.76E+01 G
			795.87	-7.359E-01	+	2.086E+00	8.45E+01	8.55E+01 G
			569.32	5.975E-01	?(	4.445E+00	2.04E+02	1.54E+01 G
			801.95	6.331E+00	?(	2.137E+01	9.99E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-3.055E+00	+ P	1.129E+01	1.51E+02	8.35E+00 G
CS-137	I	-5.1296E-01					1.10E+04	
			661.66	-5.130E-01	?(	1.514E+00	8.75E+01	8.52E+01 G
CE-139	F	1.6530E-02					1.38E+02	
			165.85	1.653E-02	%(	9.730E-01	1.70E+03	7.99E+01 G
Ba-140	I	6.7733E-01					1.28E+01	
			537.26	6.773E-01	?(	2.892E+00	1.63E+02	2.44E+01 G
			162.66	-3.375E+00	&	1.208E+01	1.06E+02	6.22E+00 G
			304.85	0.000E+00	-	3.582E+01	1.00E+03	4.29E+00 G
La-140	I	3.5806E-01					1.28E+01	
			1596.21	1.054E-01	(	1.092E+00	4.28E+02	9.54E+01 G
			487.02	-4.057E-01	+	1.850E+00	1.77E+02	4.55E+01 G
			328.76	-3.815E-02	%	3.697E+00	3.57E+03	2.03E+01 G
			815.77	1.393E+00	(	5.106E+00	1.07E+02	2.33E+01 G
CE-141	I	-4.6124E-01					3.25E+01	
			145.44	-4.612E-01	&(	1.878E+00	1.21E+02	4.82E+01 G
PM-144	C	-6.8789E-02					3.63E+02	
			696.54	-6.879E-02	?(P	9.018E-01	7.03E+02	9.90E+01 G
			618.06	-2.819E-07	%	2.410E+00	2.49E+08	9.91E+01 G
EU-152	F	8.2229E-01					4.94E+03	
			344.29	-1.071E-01	&(P	4.567E+00	1.70E+03	2.65E+01 G
			1112.07	-4.967E+00	+	1.765E+01	1.05E+02	1.36E+01 G
			121.78	-6.817E-01	+	2.629E+00	1.15E+02	2.86E+01 G
			778.92	4.958E-01	&(P	7.466E+00	5.84E+02	1.29E+01 G
			964.11	2.798E+00	?(	1.059E+01	1.10E+02	1.46E+01 G
			244.69	1.800E-01	%	1.840E+01	2.99E+03	7.58E+00 G
			1408.00	1.194E+00	&	4.386E+00	1.52E+02	2.10E+01 GA
EU-154	I	1.8921E+00					3.14E+03	
			873.23	2.033E+00	?(	5.071E+00	1.00E+02	1.23E+01 G
			123.10	-1.095E-01	-	1.730E+00	4.58E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.608E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	9.597E+00	1.00E+03	2.02E+01 G
			1004.77	-2.780E+00	+	9.993E+00	1.06E+02	1.80E+01 G
			996.33	1.729E+00	?(	1.405E+01	2.29E+02	1.06E+01 G
EU-155	I	2.7033E-01					1.81E+03	
			105.31	3.507E-01	(P	3.461E+00	2.88E+02	2.12E+01 G
			86.54	2.148E-01	*(	4.091E+00	5.63E+02	3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HF-181	F	3.0986E-01					4.24E+01	
			482.00	3.099E-01	?(	1.214E+00	1.14E+02	8.05E+01 G
			133.02	0.000E+00	-	2.005E+00	1.00E+03	4.33E+01 G
			345.83	-4.984E-09	%	4.710E+00	3.44E+10	1.51E+01 G
			136.30	0.000E+00	-	1.495E+01	1.00E+03	5.85E+00 G
Ta-182	F	1.3685E+00					1.14E+02	
			1121.30	1.388E+00	?(	4.732E+00	9.99E+01	3.49E+01 G
			1221.41	8.316E-01	?(	3.055E+00	1.52E+02	2.70E+01 G
			1189.05	2.221E+00	?(	8.719E+00	1.69E+02	1.62E+01 G
Hg-203	F	1.1673E-01					4.66E+01	
			279.20	1.167E-01	&(	9.978E-01	2.46E+02	8.15E+01 G
TL-208	N	1.5650E+00					6.98E+02	
			583.02	1.565E+00	(P	8.180E-01	2.42E+01	8.45E+01 G
			277.28	3.729E+00	+	1.237E+01	9.80E+01	6.31E+00 G
			860.56	-6.376E-02	% P	8.722E+00	5.46E+03	1.24E+01 G
pm-146	C	1.0456E-01					2.02E+03	
			747.16	-2.114E-01	?(P	3.027E+00	7.06E+02	3.40E+01 G
			735.72	-2.284E+00	+	5.255E+00	9.55E+01	2.25E+01 G
			453.88	2.699E-01	?(	1.231E+00	1.77E+02	6.50E+01 G
y-88	F	1.5444E-01					1.07E+02	
			898.04	1.544E-01	&(P	1.041E+00	2.72E+02	9.37E+01 G
			1836.06	-1.699E-01	+	1.200E+00	3.04E+02	9.92E+01 G
Cd-113m		5.5318E+02					5.33E+03	
			263.70	5.532E+02	?(	1.220E+04	6.25E+02	6.00E-03 K
Cf-251	T	1.1111E+00					3.28E+05	
			176.60	1.111E+00	&(	3.274E+00	1.08E+02	1.70E+01 G
			227.00	-2.281E+00	&	1.189E+01	1.89E+02	6.30E+00 GA
Cf-249	T	-2.6866E-01					1.28E+05	
			387.95	-4.977E-01	?(	1.990E+00	1.18E+02	6.60E+01 G
			333.44	7.060E-01	?(	4.887E+00	2.59E+02	1.55E+01 G
Sn-126		1.3653E+00					3.65E+07	
			87.57	0.000E+00	-	3.352E+00	1.00E+03	3.75E+01 GA
			64.28	1.365E+00	&(	1.086E+01	2.33E+02	9.70E+00 G
			86.94	0.000E+00	-	1.395E+01	1.00E+03	9.04E+00 GA
PB-210	N	1.3179E+01					8.14E+03	
			46.54	1.318E+01	(P	2.887E+01	7.86E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	3.9279E+00					6.98E+02	
			238.63	3.928E+00	(P	1.184E+00	1.34E+01	4.33E+01 G
			300.03	3.906E+00	? P	4.570E+01	3.44E+02	3.28E+00 GA
PB-214	N	7.2430E+00					5.84E+05	
			351.93	7.243E+00	@(P	1.467E+00	1.15E+01	3.76E+01 G
			295.09	5.724E+00	- P	3.620E+00	2.82E+01	1.93E+01 G
			242.00	8.865E+00		7.228E+00	2.80E+01	7.43E+00 GA
BI-207	C	2.0159E-01					1.18E+04	
			569.70	1.926E-01	&(	9.585E-01	1.43E+02	9.77E+01 G
			1063.66	2.134E-01	?(P	1.539E+00	3.01E+02	7.45E+01 G
BI-212	N	6.9299E+00					6.98E+02	
			727.17	6.930E+00	&(	2.419E+01	1.03E+02	7.55E+00 G
			785.42	7.976E+00	?	8.341E+01	4.12E+02	1.28E+00 GA
U-235	N	3.4241E+00					2.57E+11	
			143.79	3.444E+00	(P	4.146E+00	4.65E+01	1.10E+01 G
			205.33	3.982E+00	?(P	1.200E+01	1.10E+02	5.01E+00 G
			163.38	2.831E+00	(P	8.498E+00	1.06E+02	5.08E+00 G
			185.72	9.941E-01	- P	1.051E+00	4.05E+01	5.40E+01 GA
BI-214	N	7.5586E+00					5.84E+05	
			609.31	7.559E+00	(P	1.576E+00	1.24E+01	4.61E+01 G
			1120.29	3.218E+00	- P	1.356E+01	1.24E+02	1.51E+01 G
			1764.49	1.026E+01	+ P	9.867E+00	3.39E+01	1.54E+01 G
BI-210M	T	-5.1010E-01					1.10E+09	
			265.83	-5.101E-01	?(	1.689E+00	9.81E+01	5.00E+01 G
			304.90	0.000E+00	+	5.489E+00	1.00E+03	2.80E+01 G
AC-228	N	4.0496E+00					2.10E+03	
			911.07	4.050E+00	(	3.399E+00	3.89E+01	2.90E+01 G
			968.97	-4.305E+00	-	1.174E+01	8.15E+01	1.75E+01 G
			338.32	-1.645E+00	-	9.516E+00	1.69E+02	1.20E+01 G
			93.35	-4.021E+00	-	2.213E+01	1.64E+02	5.56E+00 XA
TH-227	N	2.9467E-01					7.95E+03	
			50.14	2.947E-01	&(	1.361E+01	1.57E+03	8.00E+00 G
			256.24	-2.696E+00	+	1.054E+01	1.42E+02	7.00E+00 G
TH-229	N	-1.2206E+00					2.68E+06	
			193.51	-1.221E+00	*(	1.457E+01	4.28E+02	4.40E+00 G
			210.85	-1.027E+01	+	2.860E+01	1.03E+02	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	7.9009E+00					1.63E+12	
			63.29	9.946E+00	(P	2.038E+01	6.98E+01	3.81E+00 G
			92.59	6.506E+00	(P	1.243E+01	6.87E+01	5.58E+00 G
PA-233	C	6.4562E-01					7.82E+08	
			312.01	6.456E-01	?(P	4.211E+00	1.93E+02	3.60E+01 G
			300.18	0.000E+00	-	2.452E+01	1.00E+03	6.20E+00 G
PA-234	N	2.8483E+00					1.63E+12	
			131.29	7.327E-01	&(	4.676E+00	1.88E+02	1.80E+01 G
			946.02	2.909E+00	?(	6.367E+00	9.11E+01	1.34E+01 G
			569.47	3.171E+00	?(	9.017E+00	8.37E+01	8.20E+00 G
			883.24	6.455E+00	?(	9.697E+00	4.81E+01	9.60E+00 G
			880.53	1.029E+01	?	5.857E+00	2.78E+01	6.00E+00 GA
PA-234M	N	2.6629E+01					1.63E+12	
			1001.00	-1.860E+01	?(P	1.949E+02	2.89E+02	8.37E-01 G
			766.41	1.554E+02	?(P	5.456E+02	1.04E+02	2.94E-01 G
AM-241	T	-1.0467E-01					1.58E+05	
			59.54	-1.047E-01	?(	2.676E+00	8.77E+02	3.59E+01 G
Np-237	F	1.7086E+00					2.14E+06	
			86.49	1.709E+00	?(	9.377E+00	1.63E+02	1.31E+01 G
Ir-192	F	-3.3406E-01					7.40E+01	
			316.49	-3.341E-01	&(	1.155E+00	1.02E+02	8.70E+01 G
			468.06	-7.124E-01	+	2.599E+00	1.08E+02	5.18E+01 G
			308.44	-8.930E-01	+	5.377E+00	1.78E+02	3.18E+01 G
Cs-136	F	3.5981E-01					1.30E+01	
			818.50	2.303E-01	?(	1.157E+00	1.43E+02	1.00E+02 G
			1048.07	5.217E-01	?(	1.298E+00	7.42E+01	8.00E+01 G
			340.57	0.000E+00	-	2.547E+00	1.00E+03	4.69E+01 G
Np-239	T	6.1771E-01					2.36E+00	
			103.70	6.809E-01	?	2.918E+00	1.27E+02	2.40E+01 X
			106.13	6.177E-01	*(	2.897E+00	1.38E+02	2.27E+01 G
			99.50	4.374E-02	%	5.310E+00	3.52E+03	1.50E+01 X
Nd-147		-1.7639E+00					1.11E+01	
			531.00	-1.764E+00	?(	6.897E+00	1.53E+02	1.30E+01 G
			91.10	-8.231E-01	+	4.487E+00	1.62E+02	2.83E+01 G
TL-210	N	-6.0169E-02					5.84E+05	
			799.60	-2.282E-01	?(	1.984E+00	2.52E+02	9.90E+01 G
			296.00	1.503E-01	?(	1.881E+00	3.67E+02	7.90E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1313.00	-2.261E+00 +	7.473E+00	1.48E+02	2.10E+01	GA

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	108.	-2.	-0.001	877.50	-1.047E-01	
Sn-126	64.28	156.	8.	0.004	233.45	1.365E+00	
BA-133	80.99	94.	6.	0.003	278.73	2.484E-01	P
Np-237	86.49	343.	16.	0.009	163.38	1.709E+00	
EU-155	86.54	359.	5.	0.003	562.54	2.148E-01	
Nd-147	91.10	385.	-17.	-0.010	162.48	-8.231E-01	
Gd-153	97.50	160.	-10.	-0.006	178.82	-4.469E-01	
Gd-153	103.20	108.	13.	0.007	120.32	7.496E-01	
Np-239	103.70	120.	13.	0.007	126.70	6.809E-01	
EU-155	105.31	133.	6.	0.003	288.35	3.507E-01	P
Np-239	106.13	106.	11.	0.006	138.13	6.177E-01	
EU-152	121.78	140.	-15.	-0.008	114.50	-6.817E-01	
CO-57	122.06	99.	14.	0.008	103.44	2.141E-01	
EU-154	123.10	122.	-3.	-0.002	458.40	-1.095E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	131.29	172.	10.	0.006	188.15	7.327E-01	
CO-57	136.47	236.	-17.	-0.010	128.77	-2.144E+00	
CE-141	145.44	185.	-16.	-0.009	121.05	-4.612E-01	
TH-229	193.51	63.	-3.	-0.002	428.37	-1.221E+00	
TH-229	210.85	103.	-18.	-0.010	103.37	-1.027E+01	
TH-227	256.24	57.	-10.	-0.005	142.26	-2.696E+00	
Cd-113m	263.70	53.	2.	0.001	624.50	5.532E+02	
BI-210M	265.83	72.	-13.	-0.007	98.09	-5.101E-01	
Hg-203	279.20	61.	5.	0.003	245.97	1.167E-01	
I-131	284.30	33.	-3.	-0.002	362.86	-1.025E+00	
TL-210	296.00	202.	6.	0.003	367.48	1.503E-01	
Ir-192	308.44	253.	-13.	-0.007	178.50	-8.930E-01	
PA-233	312.01	195.	10.	0.006	192.61	6.456E-01	P
Ir-192	316.49	80.	-13.	-0.007	102.37	-3.341E-01	
CR-51	320.08	85.	5.	0.003	272.10	1.114E+00	
Cf-249	333.44	40.	5.	0.003	258.77	7.060E-01	
BA-133	356.00	197.	-12.	-0.007	164.53	-4.848E-01	
I-131	364.48	30.	-9.	-0.005	139.91	-2.831E-01	P
BA-133	383.84	75.	11.	0.006	118.38	3.099E+00	
Cf-249	387.95	104.	-13.	-0.007	118.21	-4.977E-01	
SN-113	391.69	56.	9.	0.005	124.68	3.637E-01	P
SB-125	427.88	34.	-3.	-0.001	424.85	-2.474E-01	P
AG-108M	433.94	26.	-2.	-0.001	635.84	-5.472E-02	P
pm-146	453.88	28.	6.	0.003	177.43	2.699E-01	
SB-125	463.37	53.	-4.	-0.002	259.70	-1.223E+00	P
Ir-192	468.06	82.	-12.	-0.007	107.87	-7.124E-01	
BE-7	477.59	56.	-12.	-0.006	96.52	-3.320E+00	
HF-181	482.00	40.	8.	0.005	114.30	3.099E-01	
RU-103	497.05	20.	-5.	-0.003	218.83	-1.763E-01	P
RH-106	511.86	20.	67.	0.037	20.95	1.068E+01	
Nd-147	531.00	28.	-7.	-0.004	152.75	-1.764E+00	
CS-134	563.24	28.	-7.	-0.004	151.27	-3.055E+00	P
CS-134	569.32	14.	3.	0.001	204.30	5.975E-01	
PA-234	569.47	16.	8.	0.004	83.73	3.171E+00	
BI-207	569.70	28.	5.	0.003	142.54	1.926E-01	
SB-125	600.50	235.	-12.	-0.007	186.41	-2.363E+00	
SB-124	602.73	223.	-12.	-0.007	181.52	-4.313E-01	
CS-134	604.71	211.	-12.	-0.007	176.54	-4.357E-01	
RU-103	610.30	199.	-12.	-0.007	171.04	-7.476E+00	
AG-108M	614.28	188.	-8.	-0.004	256.82	-3.091E-01	
RH-106	621.92	16.	1.	0.001	789.51	3.704E-01	
SB-125	635.89	34.	-12.	-0.007	75.35	-3.912E+00	
I-131	636.97	48.	-1.	-0.001	739.93	-6.962E-01	
AG-110M	657.76	27.	3.	0.001	283.95	1.080E-01	
CS-137	661.66	44.	-11.	-0.006	87.52	-5.130E-01	
PM-144	696.54	18.	-2.	-0.001	703.18	-6.879E-02	P
NB-94	702.63	26.	-8.	-0.005	143.43	-3.446E-01	P
SB-124	722.79	63.	-14.	-0.008	81.99	-5.498E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
AG-108M	722.94	77.	-14.	-0.008	95.82	-6.133E-01		
BI-212	727.17	79.	13.	0.007	103.34	6.930E+00		
pm-146	735.72	30.	-12.	-0.007	95.50	-2.284E+00		
pm-146	747.16	22.	-2.	-0.001	705.52	-2.114E-01		P
ZR-95	756.73	4.	11.	0.006	50.24	8.335E-01		
AG-110M	763.94	33.	-8.	-0.004	111.44	-1.475E+00		
NB-95	765.79	74.	-17.	-0.010	74.85	-7.372E-01		
PA-234M	766.41	55.	11.	0.006	103.53	1.554E+02		P
EU-152	778.92	18.	1.	0.001	583.88	4.958E-01		P
BI-212	785.42	22.	2.	0.001	412.43	7.976E+00		
CS-134	795.87	65.	-14.	-0.008	84.52	-7.359E-01		
TL-210	799.60	80.	-5.	-0.003	251.72	-2.282E-01		
CS-134	801.95	70.	12.	0.007	99.93	6.331E+00		
Cs-136	818.50	24.	5.	0.003	143.41	2.303E-01		
MN-54	834.85	14.	2.	0.001	403.11	9.163E-02		
EU-154	873.23	5.	5.	0.003	100.11	2.033E+00		
PA-234	880.53	0.	13.	0.007	27.79	1.029E+01		
PA-234	883.24	13.	13.	0.007	48.08	6.455E+00		
AG-110M	884.68	44.	-4.	-0.002	266.42	-2.354E-01		
y-88	898.04	14.	3.	0.002	272.01	1.544E-01		P
AG-110M	937.49	14.	1.	0.001	800.00	1.455E-01		
PA-234	946.02	9.	8.	0.004	91.09	2.909E+00		
EU-152	964.11	35.	8.	0.004	110.40	2.798E+00		
EU-154	996.33	30.	4.	0.002	229.46	1.729E+00		
PA-234M	1001.00	37.	-3.	-0.002	288.60	-1.860E+01		P
EU-154	1004.77	46.	-10.	-0.005	105.53	-2.780E+00		
Co-56	1037.84	40.	-16.	-0.009	52.32	-6.269E+00		P
Cs-136	1048.07	12.	8.	0.004	74.17	5.217E-01		
RH-106	1050.36	34.	-12.	-0.006	77.55	-4.037E+01		
BI-207	1063.66	15.	3.	0.002	301.44	2.134E-01		P
Ga-68	1077.40	10.	3.	0.002	238.82	5.931E+00		
FE-59	1099.25	20.	-5.	-0.003	201.66	-4.997E-01		
EU-152	1112.07	72.	-12.	-0.007	104.99	-4.967E+00		
ZN-65	1115.55	60.	-1.	-0.001	938.20	-1.326E-01		
Sc-46	1120.55	50.	10.	0.006	103.12	5.824E-01		
Co-56	1238.28	38.	-15.	-0.008	69.51	-1.427E+00		P
NA-22	1274.53	27.	-11.	-0.006	75.00	-6.754E-01		
FE-59	1291.60	16.	-6.	-0.003	173.84	-9.034E-01		P
TL-210	1313.00	21.	-7.	-0.004	147.85	-2.261E+00		
CO-60	1332.50	11.	-2.	-0.001	576.35	-1.209E-01		P
EU-152	1408.00	5.	4.	0.002	152.39	1.194E+00		
Co-56	1771.35	33.	-2.	-0.001	356.00	-1.235E+00		
y-88	1836.06	6.	-2.	-0.001	304.14	-1.699E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.3196E+00	-3.3196E+00	9.652E+01%	1.08E+01
NA-22	#A	-6.7544E-01	-6.7544E-01	7.500E+01%	1.70E+00
K-40		1.5817E+02	1.5817E+02	6.657E+00%	1.00E+01
Sc-46	#A	2.9120E-01	2.9120E-01	1.031E+02%	1.19E+00
CR-51	#A	1.1137E+00	1.1137E+00	2.721E+02%	1.05E+01
MN-54	#A	9.1634E-02	9.1635E-02	4.031E+02%	9.23E-01
FE-59	#A	-4.9966E-01	-4.9967E-01	2.017E+02%	2.35E+00
Co-56	#A	3.4654E-02	3.4654E-02	1.240E+03%	1.07E+00
CO-57	#A	2.1405E-01	2.1405E-01	1.034E+02%	7.46E-01
CO-58	#A	3.2366E-01	3.2366E-01	9.762E+01%	7.64E-01
CO-60	#A	-1.2090E-01	-1.2090E-01	5.763E+02%	1.18E+00
ZN-65	#A	-1.3260E-01	-1.3260E-01	9.382E+02%	4.39E+00
NB-94	#A	-3.4461E-01	-3.4461E-01	1.434E+02%	1.10E+00
ZR-95	#A	8.3345E-01	8.3346E-01	5.024E+01%	9.70E-01
NB-95	#A	-7.3720E-01	-7.3721E-01	7.485E+01%	1.84E+00
RU-103	#A	-1.7629E-01	-1.7629E-01	2.188E+02%	8.11E-01
RH-106	#A	3.7043E-01	3.7043E-01	7.895E+02%	7.91E+00
AG-108M	#A	-5.4722E-02	-5.4722E-02	6.358E+02%	8.24E-01
AG-110M	#A	-9.3466E-03	-9.3467E-03	2.664E+02%	2.20E+00
SN-113	#A	3.6367E-01	3.6367E-01	1.247E+02%	1.55E+00
SB-124	#A	-4.3125E-01	-4.3125E-01	1.815E+02%	2.65E+00
SB-125	#A	-2.4736E-01	-2.4736E-01	4.249E+02%	2.81E+00
I-131	#A	-2.8309E-01	-2.8310E-01	1.399E+02%	8.67E-01
Gd-153	#A	5.6641E-02	5.6641E-02	1.078E+02%	2.71E+00
Ga-68	#A	5.8833E+00	5.9306E+00	2.388E+02%	3.45E+01
Tc-99m	#A	2.5919E-02	2.5958E-02	1.012E+03%	9.05E-01
BA-133	#A	-4.8477E-01	-4.8477E-01	1.645E+02%	2.70E+00
CS-134	#A	1.7810E-01	1.7810E-01	9.597E+01%	2.60E+00
CS-137	#A	-5.1296E-01	-5.1296E-01	8.752E+01%	1.51E+00
CE-139	#A	1.6530E-02	1.6530E-02	1.699E+03%	9.73E-01
Ba-140	#A	6.7731E-01	6.7733E-01	1.629E+02%	2.89E+00
La-140	A	3.5804E-01	3.5806E-01	1.065E+02%	1.09E+00
CE-141	#A	-4.6124E-01	-4.6124E-01	1.211E+02%	1.88E+00
CE-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	7.84E+00
PM-144	#A	-6.8789E-02	-6.8789E-02	7.032E+02%	9.02E-01
EU-152	#A	8.2229E-01	8.2229E-01	1.104E+02%	4.57E+00
EU-154	#A	1.8921E+00	1.8921E+00	1.001E+02%	5.07E+00
EU-155	#A	2.7033E-01	2.7033E-01	2.884E+02%	3.46E+00
HF-181	#A	3.0985E-01	3.0986E-01	1.143E+02%	1.21E+00
Ta-182	#A	1.3685E+00	1.3685E+00	8.281E+01%	4.73E+00
Hg-203	#A	1.1673E-01	1.1673E-01	2.460E+02%	9.98E-01
TL-208		1.5650E+00	1.5650E+00	2.416E+01%	8.18E-01
pm-146	#A	1.0456E-01	1.0456E-01	1.774E+02%	3.03E+00

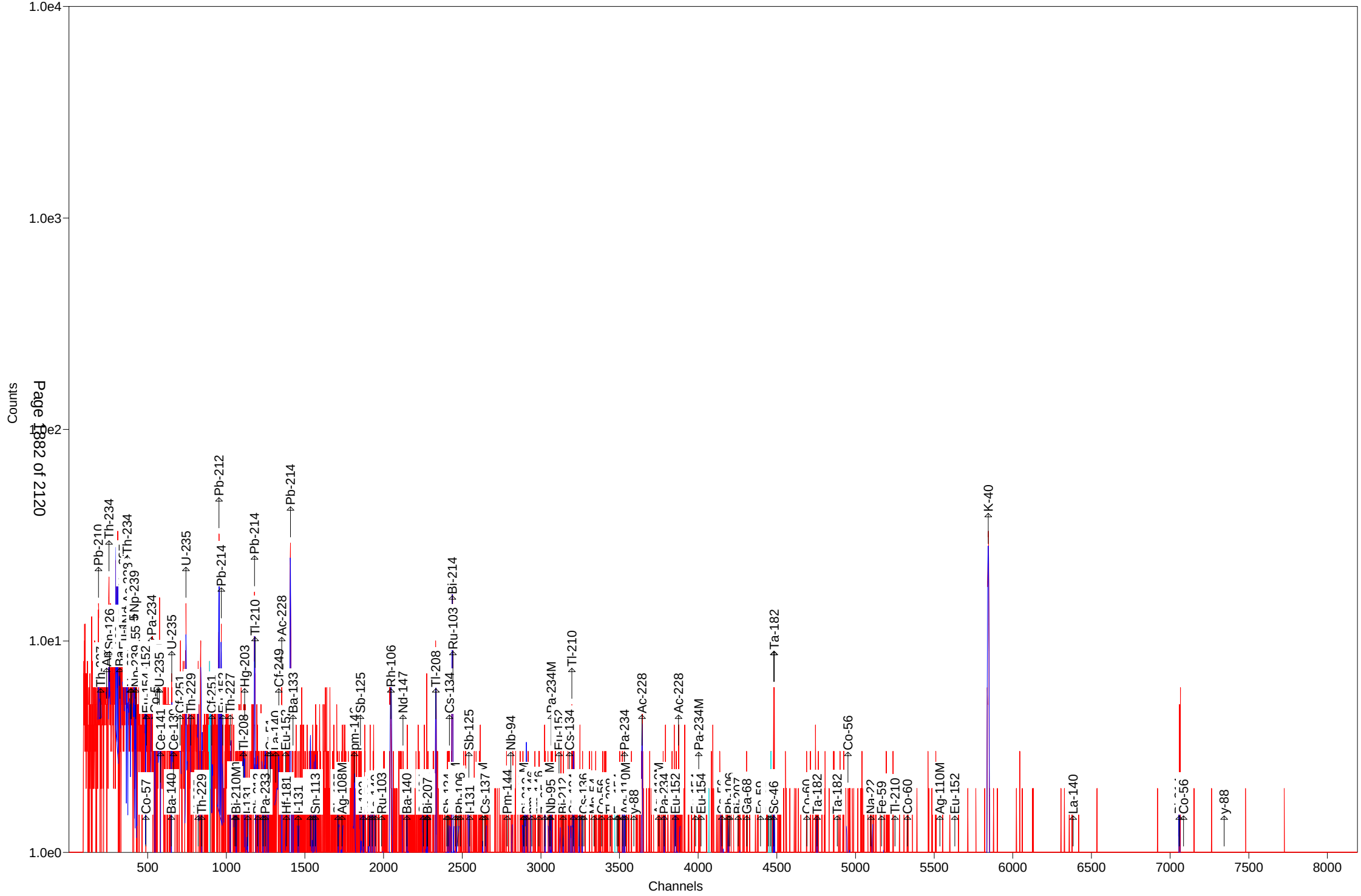
y-88 #A	1.5444E-01	1.5444E-01	2.720E+02%		1.04E+00
Cd-113m#A	5.5318E+02	5.5318E+02	6.245E+02%		1.22E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		3.31E+01
Cf-251 #A	1.1111E+00	1.1111E+00	1.080E+02%		3.27E+00
Cf-249 #A	-2.6866E-01	-2.6866E-01	1.182E+02%		1.99E+00
Sn-126 #A	1.3653E+00	1.3653E+00	2.335E+02%		1.09E+01
PB-210 A	1.3179E+01	1.3179E+01	7.858E+01%		2.89E+01
PB-212	3.9279E+00	3.9279E+00	1.340E+01%		1.18E+00
PB-214	7.2430E+00	7.2430E+00	1.151E+01%		1.47E+00
BI-207 #A	2.0159E-01	2.0159E-01	1.425E+02%		9.59E-01
BI-212 #A	6.9299E+00	6.9299E+00	1.033E+02%		2.42E+01
U-235 A	3.4241E+00	3.4241E+00	4.646E+01%		4.15E+00
BI-214	7.5586E+00	7.5586E+00	1.240E+01%		1.58E+00
BI-210M#A	-5.1010E-01	-5.1010E-01	9.809E+01%		1.69E+00
AC-228 #	4.0496E+00	4.0496E+00	3.886E+01%		3.40E+00
TH-227 #A	2.9467E-01	2.9467E-01	1.573E+03%		1.36E+01
TH-229 #A	-1.2206E+00	-1.2206E+00	4.284E+02%		1.46E+01
TH-234 A	7.9009E+00	7.9009E+00	4.897E+01%		2.04E+01
PA-231 #A	0.0000E+00	0.0000E+00	7.071E+02%		5.31E+01
PA-233 #A	6.4562E-01	6.4562E-01	1.926E+02%		4.21E+00
PA-234 #A	2.8483E+00	2.8483E+00	4.808E+01%		4.68E+00
PA-234M#A	2.6629E+01	2.6629E+01	1.035E+02%		1.95E+02
AM-241 #A	-1.0467E-01	-1.0467E-01	8.775E+02%		2.68E+00
Np-237 #A	1.7086E+00	1.7086E+00	1.634E+02%		9.38E+00
Ir-192 #A	-3.3406E-01	-3.3406E-01	1.024E+02%		1.15E+00
Cs-136 #A	3.5980E-01	3.5981E-01	7.417E+01%		1.16E+00
Np-239 #A	6.1761E-01	6.1771E-01	1.381E+02%		2.90E+00
Nd-147 #A	-1.7639E+00	-1.7639E+00	1.528E+02%		6.90E+00
TL-210 #A	-6.0169E-02	-6.0169E-02	2.227E+02%		1.98E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.5 keV) 1.901E+02 Bq/Sample
Total Decayed Activity (25.1 to 1999.5 keV) 1.9011574E+02 Bq/Sample

379959_Gamma_160-29881-B-41-B. 17_Gamma_20182905.spc.



Test America St. Louis Spectrum ID: 19_Gamma_20181615

Sample Description: 379959_Gamma_160-29881-A-42-C
Detector: Detector #19
Batch ID: 379959
Work Order Number: Gamma
Lot Number: 160-29881-A-42-C

Decay to Time: 8/23/2018 08:41 Live Time: 1800 sec
Acquisition Time: 8/23/2018 08:41:33 Real Time: 1802 sec
Analysis Time: 8/23/2018 09:11 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: Client_Long_Rev14.lib
Bkgd Correction File: 19_2018-08-11_1245.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-5.148E+00	105.8	5.445E+00	5.451E+00	1.837E+01
NA-22	4.705E-01	71.3	3.355E-01	3.364E-01	1.118E+00
K-40	1.838E+02	7.1	1.311E+01	1.606E+01	1.380E+01
Sc-46	-6.536E-01	102.0	6.664E-01	6.672E-01	2.263E+00
CR-51	-3.932E+00	185.1	7.278E+00	7.281E+00	2.451E+01
MN-54	-3.824E-01	166.6	6.370E-01	6.373E-01	1.523E+00
FE-59	1.303E+00	31.6	4.121E-01	4.172E-01	1.766E+00
Co-56	-1.824E-02	80.0	1.460E-02	1.463E-02	1.697E+00
CO-57	-5.727E-02	481.9	2.760E-01	2.760E-01	9.545E-01
CO-58	-7.970E-01	86.1	6.860E-01	6.872E-01	2.305E+00
CO-60	8.542E-01	44.3	3.784E-01	3.808E-01	1.203E+00
ZN-65	-2.146E+00	70.1	1.505E+00	1.509E+00	6.005E+00
NB-94	-1.515E-01	359.0	5.438E-01	5.438E-01	1.504E+00
ZR-95	6.114E-01	118.7	7.256E-01	7.263E-01	1.804E+00
NB-95	-2.381E-01	275.1	6.549E-01	6.550E-01	2.277E+00
RU-103	-3.810E-02	1215.9	4.632E-01	4.632E-01	1.102E+00
RH-106	2.035E+00	209.2	4.257E+00	4.258E+00	9.533E+00
AG-108M	-3.059E-01	136.0	4.160E-01	4.163E-01	1.375E+00
AG-110M	0.000E+00	1.#INF	1.226E-01	1.226E-01	2.758E+00
SN-113	4.996E-01	126.6	6.326E-01	6.331E-01	2.157E+00
SB-124	0.000E+00	1.#INF	4.822E-02	4.822E-02	2.703E+00
SB-125	2.044E+00	65.9	1.347E+00	1.351E+00	3.142E+00
I-131	8.221E-01	65.9	5.420E-01	5.436E-01	9.239E-01
Gd-153	8.152E-01	237.5	1.937E+00	1.937E+00	6.491E+00
Ga-68	-1.033E+01	250.8	2.590E+01	2.591E+01	6.080E+01
Tc-99m	0.000E+00	1.#INF	1.992E-01	1.992E-01	2.095E+00
BA-133	-8.237E-01	126.6	1.042E+00	1.043E+00	3.506E+00
CS-134	6.571E-01	32.9	2.159E-01	2.185E-01	2.727E+00
CS-137	-6.560E-01	89.5	5.873E-01	5.883E-01	1.984E+00
CE-139	3.227E-01	119.6	3.860E-01	3.863E-01	1.302E+00
Ba-140	-2.547E+00	72.7	1.852E+00	1.856E+00	5.434E+00
La-140	-3.730E-01	424.3	1.583E+00	1.583E+00	1.530E+00
CE-141	0.000E+00	1.#INF	3.375E-01	3.375E-01	3.815E+00

CE-144	-3.039E+00	154.0	4.681E+00	4.684E+00	1.567E+01
PM-144	-1.244E-01	444.0	5.525E-01	5.525E-01	1.345E+00
EU-152	3.686E-01	80.8	2.978E-01	2.984E-01	4.512E+00
EU-154	3.515E+00	86.7	3.049E+00	3.054E+00	1.258E+01
EU-155	1.327E+00	184.9	2.454E+00	2.455E+00	8.222E+00
HF-181	-6.372E-01	119.4	7.608E-01	7.615E-01	2.572E+00
Ta-182	1.912E+00	96.2	1.839E+00	1.842E+00	6.264E+00
Hg-203	-2.283E-01	178.4	4.073E-01	4.075E-01	1.399E+00
TL-208	1.972E+00	24.9	4.909E-01	5.010E-01	1.028E+00
pm-146	1.236E+00	76.4	9.441E-01	9.462E-01	2.193E+00
y-88	-9.781E-03	4944.9	4.836E-01	4.836E-01	1.242E+00
Cd-113m	4.000E+03	109.6	4.385E+03	4.391E+03	1.494E+04
Cd-109	0.000E+00	1.#INF	1.561E+01	1.561E+01	5.222E+01
Cf-251	1.255E+00	129.9	1.630E+00	1.632E+00	4.254E+00
Cf-249	4.200E-01	167.3	7.030E-01	7.033E-01	2.404E+00
Sn-126	-4.632E+00	111.7	5.174E+00	5.181E+00	1.730E+01
PB-210	1.956E+01	62.0	1.213E+01	1.219E+01	3.384E+01
PB-212	5.247E+00	13.6	7.150E-01	7.656E-01	1.717E+00
PB-214	8.191E+00	12.2	1.002E+00	1.085E+00	2.136E+00
BI-207	1.471E-01	278.6	4.097E-01	4.098E-01	1.098E+00
BI-212	4.351E+00	193.2	8.404E+00	8.407E+00	2.901E+01
U-235	0.000E+00	1.#INF	1.227E+00	1.227E+00	1.670E+01
BI-214	6.262E+00	17.7	1.108E+00	1.153E+00	2.056E+00
BI-210M	-7.845E-01	90.1	7.072E-01	7.083E-01	2.372E+00
AC-228	7.023E+00	17.2	1.208E+00	1.259E+00	1.636E+00
TH-227	1.531E+00	102.2	1.565E+00	1.567E+00	2.349E+01
TH-229	-5.525E+00	263.0	1.453E+01	1.453E+01	2.102E+01
TH-234	-2.155E+01	42.4	9.146E+00	9.226E+00	4.193E+01
PA-231	0.000E+00	1.#INF	6.510E+00	6.511E+00	7.917E+01
PA-233	0.000E+00	1.#INF	5.336E-01	5.336E-01	6.488E+00
PA-234	-5.729E-01	147.8	8.467E-01	8.472E-01	9.204E+00
PA-234M	-9.812E+01	65.7	6.444E+01	6.463E+01	3.685E+02
AM-241	1.066E+00	129.8	1.384E+00	1.385E+00	4.644E+00
Np-237	-2.841E+00	185.6	5.273E+00	5.275E+00	1.761E+01
Ir-192	5.909E-01	95.9	5.668E-01	5.678E-01	2.463E+00
Cs-136	5.772E-01	131.1	7.566E-01	7.574E-01	2.579E+00
Np-239	1.342E+00	170.4	2.286E+00	2.288E+00	7.657E+00
Nd-147	-3.310E-01	1045.6	3.461E+00	3.462E+00	8.763E+00
TL-210	0.000E+00	1.#INF	2.507E-01	2.507E-01	1.966E+00
Total	4.262E+03				

Analyst: kody Saulters

Sample description
379959_Gamma_160-29881-A-42-C

Spectrum Filename: C:\User\SPC\Det19\19_Gamma_20181615.An1

Acquisition information

Start time:	8/23/2018 8:41:33 AM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	Client_Long_Rev14.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/23/2018 8:41:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-08-11_1245.PBC 8/11/2018 12:45:44 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1651

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.45	26.	62.02	0.44	1.703E-02	46.54	4.250	PBC<MDA	PB210
59.54	18.	129.81	0.95	2.613E-02	59.54	35.900	PBC<MDA	AM241
74.90	68.	22.38	0.96	3.097E-02				
77.34	78.	19.82	0.96	3.149E-02				
86.88	13.	210.77	0.97	3.306E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	6.859E-01	EU155
					86.94	9.040	2.326E+00	Sn126
93.04	20.	177.83	0.98	3.372E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	6.032E+00	AC228
97.50	15.	237.54	0.98	3.401E-02	97.50	30.000	PBC<MDA	Gd153
105.31	17.	184.93	0.99	3.429E-02	105.31	21.200	PBC<MDA	EU155
106.13	19.	170.36	0.99	3.430E-02	106.13	22.700	PBC<MDA	Np239
121.78	11.	144.03	1.00	3.401E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	2.100E-01	CO57
123.10	10.	160.50	1.00	3.395E-02	123.10	40.790	PBC<MDA	EU154
165.85	14.	119.62	1.04	3.053E-02	165.85	79.900	PBC<MDA	CE139
176.60	11.	129.88	1.05	2.950E-02	176.60	17.000	PBC<MDA	Cf251
185.72	17.	100.31	1.06	2.864E-02	185.72	54.000	PBC<MDA	U235
238.49	108.	15.20	0.83	2.415E-02	238.63	43.300	5.760E+00	PB212
242.00	15.	147.50	1.11	2.388E-02	242.00	7.430	PBC<MDA	PB214
244.69	9.	242.11	1.11	2.369E-02	244.69	7.580	PBC<MDA	EU152
256.24	10.	102.22	1.12	2.288E-02	256.24	7.000	PBC<MDA	TH227
263.70	10.	109.64	1.13	2.238E-02	263.70	0.006	PBC<MDA	Cd113m
277.28	11.	97.58	1.14	2.153E-02	277.28	6.310	PBC<MDA	TL208
294.94	62.	19.90	0.85	2.050E-02	295.09	19.300	8.723E+00	PB214
316.49	14.	164.15	1.17	1.940E-02	316.49	87.040	PBC<MDA	Ir192
338.09	29.	29.33	1.68	1.839E-02	338.32	12.010	7.363E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
351.87	96.	14.24	0.98	1.783E-02	351.93	37.600	7.918E+00	PB214
364.48	9.	98.32	1.21	1.733E-02	364.48	81.700	PBC<MDA	I131
383.84	12.	110.01	1.23	1.664E-02	383.84	8.940	PBC<MDA	BA133
387.95	8.	167.35	1.23	1.650E-02	387.95	66.000	PBC<MDA	Cf249
391.69	9.	126.61	1.24	1.637E-02	391.69	64.000	PBC<MDA	SN113
427.88	11.	94.45	1.27	1.527E-02	427.88	29.600	PBC<MDA	SB125
463.37	11.	91.87	1.30	1.434E-02	463.37	10.470	PBC<MDA	SB125
468.06	11.	99.32	1.30	1.423E-02	468.06	51.750	PBC<MDA	Ir192
511.86	76.	16.84	2.59	1.328E-02	511.86	20.000	1.583E+01	RH106
563.24	7.	98.42	1.38	1.234E-02	563.24	8.350	PBC<MDA	CS134
569.32	15.	32.86	1.38	1.224E-02	569.32	15.380	4.475E+00	CS134
					569.47	8.200	8.396E+00	PA234
					569.70	97.740	7.046E-01	BI207
583.64	36.	24.89	1.15	1.202E-02	583.02	84.500	1.972E+00	TL208
609.18	55.	17.69	1.21	1.163E-02	609.31	46.090	5.751E+00	BI214
636.97	9.	87.87	1.44	1.125E-02	636.97	7.170	PBC<MDA	I131
727.17	6.	193.15	1.51	1.019E-02	727.17	7.550	PBC<MDA	BI212
735.72	8.	107.86	1.52	1.010E-02	735.72	22.500	PBC<MDA	pm146
747.16	5.	108.24	1.53	9.989E-03	747.16	34.000	PBC<MDA	pm146
756.73	6.	118.68	1.53	9.896E-03	756.73	54.460	PBC<MDA	ZR95
766.41	13.	89.74	1.54	9.803E-03	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
778.92	5.	164.92	1.55	9.687E-03	778.92	12.940	PBC<MDA	EU152
795.87	6.	140.45	1.56	9.534E-03	795.87	85.530	PBC<MDA	CS134
818.50	10.	131.09	1.58	9.339E-03	818.50	100.000	PBC<MDA	Cs136
873.23	6.	112.76	1.62	8.903E-03	873.23	12.270	PBC<MDA	EU154
883.18	3.	331.08	1.63	8.829E-03	883.24	9.600	PBC<MDA	PA234
911.38	31.	17.96	1.65	8.629E-03	911.07	29.000	6.882E+00	AC228
969.17	12.	83.91	1.69	8.244E-03	968.97	17.460	PBC<MDA	AC228
1004.77	10.	131.80	1.72	8.024E-03	1004.77	18.010	PBC<MDA	EU154
1037.84	7.	113.27	1.74	7.832E-03	1037.84	14.130	PBC<MDA	Co56
1050.36	5.	209.17	1.75	7.762E-03	1050.36	1.560	PBC<MDA	RH106
1063.66	4.	278.60	1.76	7.689E-03	1063.66	74.500	PBC<MDA	BI207
1099.25	6.	93.42	1.79	7.501E-03	1099.25	56.500	PBC<MDA	FE59
1120.29	13.	98.06	1.80	7.394E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1120.55	5.	233.03	1.80	7.393E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	3.717E-01	Sc46
					1121.30	34.900	1.066E+00	Ta182
1121.30	9.	96.20	1.80	7.389E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.912E+00	Ta182
1173.24	15.	44.30	1.84	7.138E-03	1173.24	99.900	1.143E+00	CO60
1274.53	6.	71.32	1.91	6.696E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.336E+00	EU154
1291.60	10.	31.62	1.92	6.626E-03	1291.60	43.200	1.941E+00	FE59
1332.50	7.	93.91	1.95	6.465E-03	1332.50	99.980	PBC<MDA	CO60
1408.00	6.	104.70	2.00	6.187E-03	1408.00	21.005	PBC<MDA	EU152
1461.00	212.	7.13	1.58	6.004E-03	1460.83	10.670	1.838E+02	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.98	11.	39.99	2.22	5.112E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.67	74.85	83.	68.	2.206E+03	22.38	0.960	-	D
308.42	77.29	80.	78.	2.479E+03	19.82	0.962	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Long_Rev14.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	184.93	46.45	79.	26.	0.014	62.02	0.438s
AM-241	237.25	59.54	264.	18.	0.010	129.81	0.946s
TH-234	252.25	63.29	271.	-41.	-0.023	42.44	0.950
Sn-126	256.21	64.28	308.	-23.	-0.013	111.70	0.951
BA-133	323.00	80.99	535.	-24.	-0.013	139.37	0.966s
Np-237	344.99	86.49	831.	-22.	-0.012	185.58	0.971s
EU-155	345.20	86.54	368.	-14.	-0.008	201.85	0.971s
Sn-126	346.79	86.94	341.	13.	0.007	210.77	0.971s
Cd-109	351.19	88.04	615.	0.	0.000	174.48	0.972A
Nd-147	363.42	91.10	610.	0.	0.000	1000.00	0.975
TH-234	369.37	92.59	637.	-27.	-0.015	64.51	0.976
AC-228	372.41	93.35	645.	20.	0.011	177.83	0.977
Gd-153	389.00	97.50	625.	15.	0.008	237.54	0.981s
Np-239	396.99	99.50	610.	0.	0.000	1000.00	0.982s
Gd-153	411.78	103.20	610.	0.	0.000	1000.00	0.986s
Np-239	413.78	103.70	610.	0.	0.000	1000.00	0.986s
EU-155	420.23	105.31	506.	17.	0.010	184.93	0.988
Np-239	423.49	106.13	504.	19.	0.010	170.36	0.988
EU-152	486.04	121.78	120.	11.	0.006	144.03	1.002
CO-57	487.18	122.06	103.	-3.	-0.002	481.89	1.003s
EU-154	491.33	123.10	112.	10.	0.005	160.50	1.004s
PA-234	524.09	131.29	434.	-20.	-0.011	147.78	1.011s
HF-181	531.00	133.02	455.	-20.	-0.011	150.87	1.013s
CE-144	533.06	133.54	475.	-20.	-0.011	154.05	1.013s
HF-181	544.09	136.30	495.	-8.	-0.004	400.10	1.015s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	544.79	136.47	503.	0.	0.000	1000.00	1.016s
Tc-99m	560.92	140.51	503.	0.	0.000	1000.00	1.019s
U-235	574.02	143.79	503.	0.	0.000	1000.00	1.022s
CE-141	580.63	145.44	503.	0.	0.000	1000.00	1.024s
Ba-140	649.47	162.66	158.	-2.	-0.001	765.45	1.039
U-235	652.34	163.38	161.	0.	0.000	1000.00	1.040
CE-139	662.23	165.85	137.	14.	0.008	119.62	1.042s
Cf-251	705.19	176.60	59.	11.	0.006	129.88	1.051s
U-235	741.65	185.72	77.	17.	0.009	100.31	1.060s
TH-229	772.79	193.51	88.	-12.	-0.007	262.99	1.066
U-235	820.06	205.33	63.	-5.	-0.003	599.68	1.077s
TH-229	842.11	210.85	70.	-7.	-0.004	466.90	1.082s
Cf-251	906.68	227.00	73.	-6.	-0.004	256.06	1.096s
PB-212	953.18	238.63	40.	99.	0.055	13.63	1.106D
PB-214	966.63	242.00	235.	15.	0.008	147.50	1.109s
EU-152	977.41	244.69	245.	9.	0.005	242.11	1.111s
TH-227	1023.58	256.24	26.	10.	0.005	102.22	1.122s
Cd-113m	1053.40	263.70	51.	10.	0.005	109.64	1.128s
BI-210M	1061.92	265.83	92.	-16.	-0.009	90.14	1.130s
TL-208	1107.70	277.28	50.	11.	0.006	97.58	1.140
Hg-203	1115.37	279.20	78.	-7.	-0.004	178.42	1.141
I-131	1135.76	284.30	60.	-10.	-0.006	154.92	1.146s
PB-214	1178.30	294.94	24.	62.	0.035	19.90	0.852s
TL-210	1182.54	296.00	342.	-14.	-0.008	182.51	1.156s
PB-212	1198.65	300.03	328.	-15.	-0.008	81.34	1.159
PA-231	1198.81	300.07	313.	-15.	-0.008	174.26	1.159s
PA-233	1199.25	300.18	299.	-6.	-0.003	436.25	1.159s
PA-231	1209.13	302.65	293.	0.	0.000	1000.00	1.162s
BA-133	1209.93	302.85	293.	0.	0.000	1000.00	1.162s
Ba-140	1217.92	304.85	293.	0.	0.000	1000.00	1.164s
BI-210M	1218.11	304.90	293.	0.	0.000	1000.00	1.164s
Ir-192	1232.27	308.44	293.	0.	0.000	1000.00	1.167s
PA-233	1246.56	312.01	293.	0.	0.000	1000.00	1.170
Ir-192	1264.46	316.49	240.	14.	0.008	164.15	1.173s
CR-51	1278.83	320.08	307.	-14.	-0.008	185.08	1.177
La-140	1313.52	328.76	221.	-16.	-0.009	80.95	1.184s
Cf-249	1332.23	333.44	205.	-7.	-0.004	275.95	1.188s
AC-228	1350.83	338.09	12.	29.	0.016	29.33	1.677s
EU-152	1375.60	344.29	61.	-11.	-0.006	80.79	1.197s
HF-181	1381.77	345.83	80.	0.	0.000	1000.00	1.199s
PB-214	1405.90	351.87	24.	96.	0.053	14.24	0.984
BA-133	1422.43	356.00	203.	-16.	-0.009	126.55	1.207
I-131	1456.35	364.48	20.	9.	0.005	98.32	1.215s
BA-133	1533.76	383.84	79.	12.	0.007	110.01	1.231s
Cf-249	1550.19	387.95	91.	8.	0.005	167.35	1.235s
SN-113	1565.14	391.69	66.	9.	0.005	126.61	1.238s
SB-125	1709.84	427.88	24.	11.	0.006	94.45	1.268s
AG-108M	1734.08	433.94	45.	-8.	-0.004	136.01	1.273s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	1813.83	453.88	28.	-2.	-0.001	499.96	1.290s
SB-125	1851.76	463.37	46.	11.	0.006	91.87	1.298s
Ir-192	1870.53	468.06	55.	11.	0.006	99.32	1.302s
BE-7	1908.66	477.60	98.	-14.	-0.008	105.77	1.310s
HF-181	1926.26	482.00	111.	-13.	-0.007	119.40	1.313s
La-140	1946.35	487.02	132.	-10.	-0.006	157.50	1.317
RH-106	2045.71	511.86	13.	76.	0.042	16.84	2.588s
Ba-140	2147.27	537.26	36.	-14.	-0.008	72.70	1.359s
CS-134	2251.16	563.24	9.	7.	0.004	98.42	1.380
CS-134	2275.49	569.32	5.	15.	0.008	32.86	1.385
TL-208	2332.75	583.64	12.	36.	0.020	24.89	1.150
SB-125	2400.20	600.50	137.	-6.	-0.003	278.89	1.410
SB-124	2409.12	602.73	131.	0.	0.000	1000.00	1.412s
CS-134	2417.03	604.71	131.	0.	0.000	1000.00	1.414s
BI-214	2434.92	609.18	14.	55.	0.031	17.69	1.205
RU-103	2439.39	610.30	131.	0.	0.000	1000.00	1.418s
AG-108M	2455.31	614.28	131.	0.	0.000	1000.00	1.421s
RH-106	2485.86	621.92	13.	-2.	-0.001	374.72	1.427s
SB-125	2541.74	635.89	27.	-10.	-0.006	100.18	1.439s
I-131	2546.08	636.97	25.	9.	0.005	87.87	1.440s
AG-110M	2629.23	657.76	22.	-1.	-0.001	670.82	1.456s
CS-137	2644.82	661.66	43.	-11.	-0.006	89.54	1.459s
PM-144	2784.35	696.54	23.	-2.	-0.001	444.01	1.487s
NB-94	2808.70	702.63	29.	-3.	-0.002	359.01	1.492s
SB-124	2889.33	722.79	51.	-14.	-0.008	77.86	1.507s
AG-108M	2889.93	722.94	65.	-4.	-0.002	259.90	1.507s
EU-154	2891.61	723.36	70.	0.	0.000	1000.00	1.508s
BI-212	2906.86	727.17	65.	6.	0.003	193.15	1.511s
pm-146	2941.07	735.72	14.	8.	0.004	107.86	1.518s
pm-146	2986.83	747.16	5.	5.	0.003	108.24	1.526s
ZR-95	3025.11	756.73	10.	6.	0.003	118.68	1.534s
AG-110M	3053.97	763.94	50.	-16.	-0.009	44.99	1.539s
NB-95	3061.35	765.79	64.	-4.	-0.002	275.10	1.541s
PA-234M	3063.85	766.41	58.	13.	0.007	89.74	1.541s
EU-152	3113.88	778.92	14.	5.	0.003	164.92	1.551
BI-212	3139.88	785.42	24.	-3.	-0.002	368.02	1.556s
CS-134	3181.68	795.87	37.	6.	0.004	140.45	1.564s
TL-210	3196.61	799.60	43.	0.	0.000	1000.00	1.567s
CS-134	3206.02	801.95	50.	-9.	-0.005	112.37	1.569s
CO-58	3241.32	810.78	60.	-13.	-0.007	86.08	1.575s
La-140	3261.30	815.77	73.	-13.	-0.007	94.12	1.579s
Cs-136	3272.22	818.50	76.	10.	0.005	131.09	1.581s
MN-54	3337.63	834.85	23.	-6.	-0.004	166.60	1.594s
Co-56	3385.32	846.77	29.	-8.	-0.004	113.05	1.603s
TL-208	3440.51	860.56	42.	-17.	-0.009	53.63	1.614s
NB-94	3482.65	871.10	25.	-4.	-0.002	207.80	1.621s
EU-154	3491.19	873.23	22.	6.	0.004	112.76	1.623s
PA-234	3520.39	880.53	35.	-10.	-0.005	91.08	1.628s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	3531.23	883.24	42.	3.	0.002	331.08	1.630s
AG-110M	3537.01	884.68	39.	0.	0.000	1000.00	1.632s
Sc-46	3555.40	889.28	50.	-10.	-0.006	101.96	1.635s
AC-228	3642.58	911.07	0.	31.	0.017	17.96	1.651
AG-110M	3748.30	937.49	40.	-17.	-0.009	42.73	1.671s
PA-234	3782.42	946.02	20.	-2.	-0.001	291.62	1.677
EU-152	3854.81	964.11	55.	-10.	-0.006	106.45	1.691s
AC-228	3874.26	968.97	43.	12.	0.007	83.91	1.694s
EU-154	3983.73	996.33	63.	-15.	-0.008	81.19	1.714s
PA-234M	4002.41	1001.00	81.	-12.	-0.007	65.67	1.718s
EU-154	4017.53	1004.77	76.	10.	0.005	131.80	1.721s
Co-56	4149.84	1037.84	10.	7.	0.004	113.27	1.745s
Cs-136	4190.78	1048.07	30.	-11.	-0.006	76.60	1.752s
RH-106	4199.94	1050.36	44.	5.	0.003	209.17	1.754s
BI-207	4253.17	1063.66	20.	4.	0.002	278.60	1.763s
Ga-68	4308.15	1077.40	20.	-4.	-0.002	250.83	1.773s
FE-59	4395.60	1099.25	5.	6.	0.003	93.42	1.789s
EU-152	4446.92	1112.07	80.	-14.	-0.008	70.26	1.798s
ZN-65	4460.81	1115.55	66.	-14.	-0.008	70.15	1.800s
BI-214	4479.78	1120.29	79.	13.	0.007	98.06	1.803s
Sc-46	4480.84	1120.55	64.	5.	0.003	233.03	1.804s
Ta-182	4483.84	1121.30	32.	9.	0.005	96.20	1.804s
CO-60	4691.70	1173.24	5.	15.	0.008	44.30	1.841s
Ta-182	4754.99	1189.05	21.	-3.	-0.002	319.69	1.852s
Ta-182	4884.51	1221.41	21.	-5.	-0.003	201.56	1.874s
Co-56	4952.04	1238.28	21.	-2.	-0.001	527.37	1.886
NA-22	5097.14	1274.53	5.	6.	0.003	71.32	1.910s
EU-154	5097.19	1274.54	11.	0.	0.000	1000.00	1.910s
FE-59	5165.45	1291.60	0.	10.	0.006	31.62	1.922s
TL-210	5251.13	1313.00	11.	-7.	-0.004	117.90	1.936s
CO-60	5329.19	1332.50	6.	7.	0.004	93.91	1.949s
AG-110M	5536.55	1384.30	11.	-1.	-0.001	598.44	1.984s
EU-152	5631.44	1408.00	6.	6.	0.003	104.70	1.999s
K-40	5843.61	1461.00	8.	212.	0.118	7.13	1.582
La-140	6385.01	1596.21	7.	-4.	-0.002	424.29	2.119s
SB-124	6764.54	1690.98	0.	0.	0.000	1000.00	2.176s
BI-214	7058.94	1764.49	3.	11.	0.006	39.99	2.219s
Co-56	7086.41	1771.35	14.	0.	0.000	1000.00	2.223s
y-88	7345.60	1836.06	0.	0.	0.000	1000.00	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-5.1482E+00				5.31E+01	
			477.60	-5.148E+00	?(	1.837E+01 1.06E+02 1.05E+01	G
NA-22	C	4.7047E-01				9.50E+02	
			1274.53	4.705E-01	?(	1.118E+00 7.13E+01 9.99E+01	G
K-40	N	1.8382E+02				4.66E+11	
			1460.83	1.838E+02	(P	1.380E+01 7.13E+00 1.07E+01	G
Sc-46	F	-6.5361E-01				8.38E+01	
			889.28	-6.536E-01	?(	2.263E+00 1.02E+02 1.00E+02	G
			1120.55	3.717E-01	+	3.004E+00 2.33E+02 1.00E+02	G
CR-51	F	-3.9324E+00				2.77E+01	
			320.08	-3.932E+00	?(	2.451E+01 1.85E+02 9.94E+00	G
MN-54	C	-3.8237E-01				3.12E+02	
			834.85	-3.824E-01	?(	1.523E+00 1.67E+02 1.00E+02	G
FE-59	F	1.3032E+00				4.45E+01	
			1099.25	8.156E-01	?(	1.766E+00 9.34E+01 5.65E+01	G
			1291.60	1.941E+00	?(	1.430E+00 3.16E+01 4.32E+01	G
Co-56	C	-1.8242E-02				7.73E+01	
			846.77	-4.892E-01	?(P	1.697E+00 1.13E+02 9.99E+01	G
			1238.28	-3.048E-01	+ P	2.985E+00 5.27E+02 6.61E+01	G
			1037.84	3.312E+00	?(P	8.905E+00 1.13E+02 1.41E+01	G
			1771.35	0.000E+00	+	1.419E+01 1.00E+03 1.55E+01	A
CO-57	C	-5.7267E-02				2.72E+02	
			122.06	-5.727E-02	?(	9.545E-01 4.82E+02 8.56E+01	G
			136.47	0.000E+00	+	1.684E+01 1.00E+03 1.07E+01	G
CO-58	C	-7.9697E-01				7.09E+01	
			810.78	-7.970E-01	?(	2.305E+00 8.61E+01 9.95E+01	G
CO-60	F	8.5417E-01				1.93E+03	
			1332.50	5.660E-01	?(P	1.203E+00 9.39E+01 1.00E+02	G
			1173.24	1.143E+00	?(	1.050E+00 4.43E+01 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	-2.1457E+00					2.44E+02	
			1115.55	-2.146E+00	?(P	6.005E+00	7.01E+01	5.06E+01 G
NB-94	I	-1.5146E-01					7.41E+06	
			702.63	-1.515E-01	?(P	1.504E+00	3.59E+02	9.79E+01 G
			871.10	-2.731E-01	+ P	1.633E+00	2.08E+02	9.99E+01 G
ZR-95	I	6.1136E-01					6.40E+01	
			756.73	6.114E-01	?(P	1.804E+00	1.19E+02	5.45E+01 G
			724.20	-7.061E-02	% P	5.141E+00	1.76E+03	4.42E+01 G
NB-95	I	-2.3805E-01					6.40E+01	
			765.79	-2.381E-01	?(	2.277E+00	2.75E+02	9.98E+01 G
RU-103	I	-3.8095E-02					3.93E+01	
			497.05	-3.810E-02	%(P	1.102E+00	1.22E+03	9.09E+01 G
			610.30	0.000E+00	+	4.662E+01	1.00E+03	5.75E+00 GA
RH-106	I	2.0350E+00					3.74E+02	
			621.92	-9.771E-01	?(	9.533E+00	3.75E+02	9.93E+00 G
			1050.36	2.121E+01	?(P	1.549E+02	2.09E+02	1.56E+00 G
			511.86	1.583E+01	?	4.127E+00	1.68E+01	2.00E+01 GA
AG-108M	C	-3.0588E-01					1.53E+05	
			433.94	-3.059E-01	(P	1.375E+00	1.36E+02	9.05E+01 G
			722.94	-2.670E-01	+	2.410E+00	2.60E+02	9.08E+01 G
			614.28	0.000E+00	+	2.998E+00	1.00E+03	8.98E+01 G
SN-113	F	4.9963E-01					1.15E+02	
			391.69	4.996E-01	?(P	2.157E+00	1.27E+02	6.40E+01 G
SB-125	I	2.0445E+00					1.01E+03	
			427.88	1.322E+00	?(P	3.142E+00	9.45E+01	2.96E+01 G
			600.50	-1.587E+00	+	1.515E+01	2.79E+02	1.79E+01 G
			635.89	-4.319E+00	& P	1.172E+01	1.00E+02	1.13E+01 G
			463.37	4.088E+00	&(	1.270E+01	9.19E+01	1.05E+01 G
I-131	I	8.2211E-01					8.02E+00	
			364.48	3.703E-01	?(	9.239E-01	9.83E+01	8.17E+01 G
			284.30	-4.286E+00	&	1.663E+01	1.55E+02	6.14E+00 G
			636.97	5.971E+00	?(	1.781E+01	8.79E+01	7.17E+00 G
Gd-153	F	8.1523E-01					2.42E+02	
			97.50	8.152E-01	?(	6.491E+00	2.38E+02	3.00E+01 G
			103.20	0.000E+00	-	8.767E+00	1.00E+03	2.18E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ga-68	C -1.0328E+01					4.71E-02	
		1077.40	-1.033E+01	?(	6.080E+01	2.51E+02	3.30E+00 G
BA-133	F -8.2372E-01					3.85E+03	
		356.00	-8.237E-01	?(	3.506E+00	1.27E+02	6.20E+01 G
		302.85	0.000E+00	+	1.245E+01	1.00E+03	1.83E+01 G
		383.84	4.425E+00	? P	1.648E+01	1.10E+02	8.94E+00 GA
		80.99	-1.202E+00	+	5.599E+00	1.39E+02	3.41E+01 GA
CS-134	I 6.5711E-01					7.54E+02	
		604.71	0.000E+00	?(	2.727E+00	1.00E+03	9.76E+01 G
		795.87	4.332E-01	?(P	2.106E+00	1.40E+02	8.55E+01 G
		569.32	4.475E+00	?(	3.823E+00	3.29E+01	1.54E+01 G
		801.95	-6.294E+00	+	2.412E+01	1.12E+02	8.69E+00 G
		563.24	3.600E+00	&(P	8.902E+00	9.84E+01	8.35E+00 G
CS-137	I -6.5600E-01					1.10E+04	
		661.66	-6.560E-01	?(	1.984E+00	8.95E+01	8.52E+01 G
CE-139	F 3.2265E-01					1.38E+02	
		165.85	3.227E-01	&(	1.302E+00	1.20E+02	7.99E+01 G
Ba-140	I -2.5471E+00					1.28E+01	
		537.26	-2.547E+00	?(P	5.434E+00	7.27E+01	2.44E+01 G
		162.66	-6.760E-01	&	1.777E+01	7.65E+02	6.22E+00 G
		304.85	0.000E+00	&	5.346E+01	1.00E+03	4.29E+00 G
La-140	I -3.7304E-01					1.28E+01	
		1596.21	-3.730E-01	?(P	1.530E+00	4.24E+02	9.54E+01 G
		487.02	-9.291E-01	+	4.969E+00	1.58E+02	4.55E+01 G
		328.76	-2.257E+00	+ P	1.047E+01	8.09E+01	2.03E+01 G
		815.77	-3.429E+00	+	1.087E+01	9.41E+01	2.33E+01 G
CE-144	I -3.0389E+00					2.85E+02	
		133.54	-3.039E+00	&(	1.567E+01	1.54E+02	1.11E+01 G
PM-144	C -1.2444E-01					3.63E+02	
		696.54	-1.244E-01	?(	1.345E+00	4.44E+02	9.90E+01 G
		618.06	-2.049E-02	% P	2.735E+00	2.35E+03	9.91E+01 G
EU-152	F 3.6860E-01					4.94E+03	
		344.29	-1.244E+00	&(P	4.512E+00	8.08E+01	2.65E+01 G
		1112.07	-7.880E+00	+ P	2.430E+01	7.03E+01	1.36E+01 G
		121.78	6.287E-01	&	3.072E+00	1.44E+02	2.86E+01 G
		778.92	2.216E+00	?(	8.929E+00	1.65E+02	1.29E+01 G
		964.11	-4.750E+00	+	1.718E+01	1.06E+02	1.46E+01 G
		244.69	2.854E+00	?(	2.340E+01	2.42E+02	7.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	2.517E+00	? P	6.084E+00	1.05E+02	2.10E+01 GA
EU-154	I	3.5154E+00					3.14E+03	
			873.23	3.221E+00	?(	1.258E+01	1.13E+02	1.23E+01 G
			123.10	3.811E-01	-	2.083E+00	1.61E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.283E+00	1.00E+03	3.52E+01 G
			723.36	0.000E+00	-	1.117E+01	1.00E+03	2.02E+01 G
			1004.77	3.716E+00	&(	1.669E+01	1.32E+02	1.80E+01 G
			996.33	-9.480E+00	+	2.577E+01	8.12E+01	1.06E+01 G
EU-155	I	1.3268E+00					1.81E+03	
			105.31	1.327E+00	?(P	8.222E+00	1.85E+02	2.12E+01 G
			86.54	-7.431E-01	+	5.046E+00	2.02E+02	3.07E+01 G
HF-181	F	-6.3720E-01					4.24E+01	
			482.00	-6.372E-01	?(	2.572E+00	1.19E+02	8.05E+01 G
			133.02	-7.771E-01	+	3.925E+00	1.51E+02	4.33E+01 G
			345.83	0.000E+00	+	9.054E+00	1.00E+03	1.51E+01 G
			136.30	-2.264E+00	+	3.050E+01	4.00E+02	5.85E+00 G
Ta-182	F	1.9121E+00					1.14E+02	
			1121.30	1.912E+00	?(	6.264E+00	9.62E+01	3.49E+01 G
			1221.41	-1.586E+00	-	7.205E+00	2.02E+02	2.70E+01 G
			1189.05	-1.618E+00	-	1.176E+01	3.20E+02	1.62E+01 G
Hg-203	F	-2.2828E-01					4.66E+01	
			279.20	-2.283E-01	?(	1.399E+00	1.78E+02	8.15E+01 G
TL-208	N	1.9723E+00					6.98E+02	
			583.02	1.972E+00	(P	1.028E+00	2.49E+01	8.45E+01 G
			277.28	4.425E+00	+ P	1.461E+01	9.76E+01	6.31E+00 G
			860.56	-8.420E+00	- P	1.638E+01	5.36E+01	1.24E+01 G
pm-146	C	1.2357E+00					2.02E+03	
			747.16	7.874E-01	?(P	2.193E+00	1.08E+02	3.40E+01 G
			735.72	1.913E+00	?(P	4.949E+00	1.08E+02	2.25E+01 G
			453.88	-1.203E-01	- P	1.606E+00	5.00E+02	6.50E+01 G
y-88	F	-9.7808E-03					1.07E+02	
			898.04	-9.781E-03	&(P	1.242E+00	4.94E+03	9.37E+01 G
			1836.06	0.000E+00	+	8.367E-01	1.00E+03	9.92E+01 G
Cd-113m		3.9995E+03					5.33E+03	
			263.70	4.000E+03	&(	1.494E+04	1.10E+02	6.00E-03 K
Cf-251	T	1.2553E+00					3.28E+05	
			176.60	1.255E+00	(	4.254E+00	1.30E+02	1.70E+01 G
			227.00	-2.231E+00	+	1.501E+01	2.56E+02	6.30E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Cf-249	T	4.2005E-01					1.28E+05	
			387.95	4.200E-01	?(	2.404E+00	1.67E+02	6.60E+01 G
			333.44	-1.427E+00	+	1.338E+01	2.76E+02	1.55E+01 G
Sn-126		-4.6323E+00					3.65E+07	
			87.57	-8.561E-02	}	5.258E+00	1.82E+03	3.75E+01 GA
			64.28	-4.632E+00	(	1.730E+01	1.12E+02	9.70E+00 G
			86.94	2.326E+00	+	1.651E+01	2.11E+02	9.04E+00 GA
PB-210	N	1.9556E+01					8.14E+03	
			46.54	1.956E+01	*(P	3.384E+01	6.20E+01	4.25E+00 G
PB-212	N	5.2465E+00					6.98E+02	
			238.63	5.247E+00	(P	1.717E+00	1.36E+01	4.33E+01 G
			300.03	-1.280E+01	- P	7.296E+01	8.13E+01	3.28E+00 GA
PB-214	N	8.1912E+00					5.84E+05	
			351.93	7.918E+00	(P	2.136E+00	1.42E+01	3.76E+01 G
			295.09	8.723E+00	*(P	3.578E+00	1.99E+01	1.93E+01 G
			242.00	4.672E+00	-	2.320E+01	1.47E+02	7.43E+00 GA
BI-207	C	1.4707E-01					1.18E+04	
			569.70	-7.743E-03	&(	1.098E+00	3.82E+03	9.77E+01 G
			1063.66	3.502E-01	&(P	2.304E+00	2.79E+02	7.45E+01 G
BI-212	N	4.3507E+00					6.98E+02	
			727.17	4.351E+00	?(P	2.901E+01	1.93E+02	7.55E+00 G
			785.42	-1.398E+01	+ P	1.154E+02	3.68E+02	1.28E+00 GA
BI-214	N	6.2624E+00					5.84E+05	
			609.31	5.751E+00	(P	2.056E+00	1.77E+01	4.61E+01 G
			1120.29	6.632E+00	?(P	2.192E+01	9.81E+01	1.51E+01 G
			1764.49	7.430E+00	?(P	8.038E+00	4.00E+01	1.54E+01 G
BI-210M	T	-7.8449E-01					1.10E+09	
			265.83	-7.845E-01	(	2.372E+00	9.01E+01	5.00E+01 G
			304.90	0.000E+00	&	8.191E+00	1.00E+03	2.80E+01 G
AC-228	N	7.0232E+00					2.10E+03	
			911.07	6.882E+00	?(	1.636E+00	1.80E+01	2.90E+01 G
			968.97	4.549E+00	-	1.284E+01	8.39E+01	1.75E+01 G
			338.32	7.363E+00	(P	4.694E+00	2.93E+01	1.20E+01 G
			93.35	6.032E+00	?	3.587E+01	1.78E+02	5.56E+00 XA
TH-227	N	1.5308E+00					7.95E+03	
			50.14	-1.130E-01	%(	2.349E+01	6.07E+03	8.00E+00 G
			256.24	3.409E+00	?(P	9.207E+00	1.02E+02	7.00E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-229   N  -5.5250E+00                                      2.68E+06
                         193.51-5.525E+00 ?(P 2.102E+01 2.63E+02 4.40E+00 G
                         210.85-4.857E+00 & P 2.936E+01 4.67E+02 2.99E+00 G

TH-234   N  -2.1549E+01                                      1.63E+12
                          63.29-2.155E+01 ?(P 4.193E+01 4.24E+01 3.81E+00 G
                          92.59-7.931E+00 + P 3.556E+01 6.45E+01 5.58E+00 G

PA-234   N  -5.7290E-01                                      1.63E+12
                         131.29-1.860E+00 ?(  9.204E+00 1.48E+02 1.80E+01 G
                         946.02-1.232E+00 + P 1.176E+01 2.92E+02 1.34E+01 G
                         569.47 1.845E-01 %   1.294E+01 1.89E+03 8.20E+00 G
                         883.24 1.841E+00 ?(  2.153E+01 3.31E+02 9.60E+00 G
                         880.53-1.026E+01 +   3.168E+01 9.11E+01 6.00E+00 GA

PA-234M  N  -9.8118E+01                                      1.63E+12
                        1001.00-9.812E+01 ?(P 3.685E+02 6.57E+01 8.37E-01 G
                         766.41 2.434E+02 + P 7.353E+02 8.97E+01 2.94E-01 G

AM-241   T   1.0659E+00                                      1.58E+05
                          59.54 1.066E+00 *(  4.644E+00 1.30E+02 3.59E+01 G

Np-237   F  -2.8414E+00                                      2.14E+06
                          86.49-2.841E+00 ?(  1.761E+01 1.86E+02 1.31E+01 G

Ir-192   F   5.9088E-01                                      7.40E+01
                         316.49 4.451E-01 ?(  2.463E+00 1.64E+02 8.70E+01 G
                         468.06 8.361E-01 ?(  2.813E+00 9.93E+01 5.18E+01 G
                         308.44 0.000E+00 -   7.290E+00 1.00E+03 3.18E+01 G

Cs-136   F   5.7720E-01                                      1.30E+01
                         818.50 5.772E-01 ?(  2.579E+00 1.31E+02 1.00E+02 G
                        1048.07-9.825E-01 +   2.522E+00 7.66E+01 8.00E+01 G
                         340.57 6.174E-08 %   4.421E+00 2.09E+09 4.69E+01 G

Np-239   T   1.3420E+00                                      2.36E+00
                         103.70 0.000E+00 -   7.961E+00 1.00E+03 2.40E+01 X
                         106.13 1.342E+00 &(  7.657E+00 1.70E+02 2.27E+01 G
                          99.50 0.000E+00 &   1.279E+01 1.00E+03 1.50E+01 X

Nd-147      -3.3105E-01                                      1.11E+01
                         531.00-3.310E-01 %(  8.763E+00 1.05E+03 1.30E+01 G
                          91.10 0.000E+00 &   6.899E+00 1.00E+03 2.83E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
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! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.54	264.	18.	0.010	129.81	1.066E+00	
TH-234	63.29	271.	-41.	-0.023	42.44	-2.155E+01	P
BA-133	80.99	535.	-24.	-0.013	139.37	-1.202E+00	
Np-237	86.49	831.	-22.	-0.012	185.58	-2.841E+00	
EU-155	86.54	368.	-14.	-0.008	201.85	-7.431E-01	
TH-234	92.59	637.	-27.	-0.015	64.51	-7.931E+00	P
Gd-153	97.50	625.	15.	0.008	237.54	8.152E-01	
EU-155	105.31	506.	17.	0.010	184.93	1.327E+00	P
Np-239	106.13	504.	19.	0.010	170.36	1.342E+00	
EU-152	121.78	120.	11.	0.006	144.03	6.287E-01	
CO-57	122.06	103.	-3.	-0.002	481.89	-5.727E-02	
EU-154	123.10	112.	10.	0.005	160.50	3.811E-01	
HF-181	133.02	455.	-20.	-0.011	150.87	-7.771E-01	
CE-144	133.54	475.	-20.	-0.011	154.05	-3.039E+00	
HF-181	136.30	495.	-8.	-0.004	400.10	-2.264E+00	
Ba-140	162.66	158.	-2.	-0.001	765.45	-6.760E-01	
CE-139	165.85	137.	14.	0.008	119.62	3.227E-01	
Cf-251	176.60	59.	11.	0.006	129.88	1.255E+00	
U-235	185.72	77.	17.	0.009	100.31	6.060E-01	
TH-229	193.51	88.	-12.	-0.007	262.99	-5.525E+00	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	205.33	63.	-5.	-0.003	599.68	-2.215E+00	P
TH-229	210.85	70.	-7.	-0.004	466.90	-4.857E+00	P
Cf-251	227.00	73.	-6.	-0.004	256.06	-2.231E+00	
EU-152	244.69	245.	9.	0.005	242.11	2.854E+00	
TH-227	256.24	26.	10.	0.005	102.22	3.409E+00	P
Cd-113m	263.70	51.	10.	0.005	109.64	4.000E+03	
BI-210M	265.83	92.	-16.	-0.009	90.14	-7.845E-01	
Hg-203	279.20	78.	-7.	-0.004	178.42	-2.283E-01	
I-131	284.30	60.	-10.	-0.006	154.92	-4.286E+00	
TL-210	296.00	342.	-14.	-0.008	182.51	-4.980E-01	
PA-231	300.07	313.	-15.	-0.008	174.26	-1.622E+01	
PA-233	300.18	299.	-6.	-0.003	436.25	-2.493E+00	
Ir-192	316.49	240.	14.	0.008	164.15	4.451E-01	
CR-51	320.08	307.	-14.	-0.008	185.08	-3.932E+00	
La-140	328.76	221.	-16.	-0.009	80.95	-2.257E+00	P
Cf-249	333.44	205.	-7.	-0.004	275.95	-1.427E+00	
EU-152	344.29	61.	-11.	-0.006	80.79	-1.244E+00	P
BA-133	356.00	203.	-16.	-0.009	126.55	-8.237E-01	
I-131	364.48	20.	9.	0.005	98.32	3.703E-01	
BA-133	383.84	79.	12.	0.007	110.01	4.425E+00	P
Cf-249	387.95	91.	8.	0.005	167.35	4.200E-01	
SN-113	391.69	66.	9.	0.005	126.61	4.996E-01	P
SB-125	427.88	24.	11.	0.006	94.45	1.322E+00	P
AG-108M	433.94	45.	-8.	-0.004	136.01	-3.059E-01	P
pm-146	453.88	28.	-2.	-0.001	499.96	-1.203E-01	P
SB-125	463.37	46.	11.	0.006	91.87	4.088E+00	
Ir-192	468.06	55.	11.	0.006	99.32	8.361E-01	
BE-7	477.60	98.	-14.	-0.008	105.77	-5.148E+00	
HF-181	482.00	111.	-13.	-0.007	119.40	-6.372E-01	
La-140	487.02	132.	-10.	-0.006	157.50	-9.291E-01	
RH-106	511.86	13.	76.	0.042	16.84	1.583E+01	
Ba-140	537.26	36.	-14.	-0.008	72.70	-2.547E+00	P
CS-134	563.24	9.	7.	0.004	98.42	3.600E+00	P
CS-134	569.32	5.	15.	0.008	32.86	4.475E+00	
SB-125	600.50	137.	-6.	-0.003	278.89	-1.587E+00	
RH-106	621.92	13.	-2.	-0.001	374.72	-9.771E-01	
SB-125	635.89	27.	-10.	-0.006	100.18	-4.319E+00	P
I-131	636.97	25.	9.	0.005	87.87	5.971E+00	
AG-110M	657.76	22.	-1.	-0.001	670.82	-5.346E-02	
CS-137	661.66	43.	-11.	-0.006	89.54	-6.560E-01	
PM-144	696.54	23.	-2.	-0.001	444.01	-1.244E-01	
NB-94	702.63	29.	-3.	-0.002	359.01	-1.515E-01	P
SB-124	722.79	51.	-14.	-0.008	77.86	-6.960E+00	
AG-108M	722.94	65.	-4.	-0.002	259.90	-2.670E-01	
BI-212	727.17	65.	6.	0.003	193.15	4.351E+00	P
pm-146	735.72	14.	8.	0.004	107.86	1.913E+00	P
pm-146	747.16	5.	5.	0.003	108.24	7.874E-01	P
ZR-95	756.73	10.	6.	0.003	118.68	6.114E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	763.94	50.	-16.	-0.009	44.99	-4.044E+00	P
NB-95	765.79	64.	-4.	-0.002	275.10	-2.381E-01	
PA-234M	766.41	58.	13.	0.007	89.74	2.434E+02	P
EU-152	778.92	14.	5.	0.003	164.92	2.216E+00	
BI-212	785.42	24.	-3.	-0.002	368.02	-1.398E+01	P
CS-134	795.87	37.	6.	0.004	140.45	4.332E-01	P
CS-134	801.95	50.	-9.	-0.005	112.37	-6.294E+00	
CO-58	810.78	60.	-13.	-0.007	86.08	-7.970E-01	
La-140	815.77	73.	-13.	-0.007	94.12	-3.429E+00	
Cs-136	818.50	76.	10.	0.005	131.09	5.772E-01	
MN-54	834.85	23.	-6.	-0.004	166.60	-3.824E-01	
Co-56	846.77	29.	-8.	-0.004	113.05	-4.892E-01	P
NB-94	871.10	25.	-4.	-0.002	207.80	-2.731E-01	P
EU-154	873.23	22.	6.	0.004	112.76	3.221E+00	
Sc-46	889.28	50.	-10.	-0.006	101.96	-6.536E-01	
AG-110M	937.49	40.	-17.	-0.009	42.73	-3.219E+00	P
EU-152	964.11	55.	-10.	-0.006	106.45	-4.750E+00	
EU-154	996.33	63.	-15.	-0.008	81.19	-9.480E+00	
PA-234M	1001.00	81.	-12.	-0.007	65.67	-9.812E+01	P
EU-154	1004.77	76.	10.	0.005	131.80	3.716E+00	
Co-56	1037.84	10.	7.	0.004	113.27	3.312E+00	P
Cs-136	1048.07	30.	-11.	-0.006	76.60	-9.825E-01	
RH-106	1050.36	44.	5.	0.003	209.17	2.121E+01	P
BI-207	1063.66	20.	4.	0.002	278.60	3.502E-01	P
Ga-68	1077.40	20.	-4.	-0.002	250.83	-1.033E+01	
FE-59	1099.25	5.	6.	0.003	93.42	8.156E-01	
EU-152	1112.07	80.	-14.	-0.008	70.26	-7.880E+00	P
ZN-65	1115.55	66.	-14.	-0.008	70.15	-2.146E+00	P
Sc-46	1120.55	64.	5.	0.003	233.03	3.717E-01	
CO-60	1173.24	5.	15.	0.008	44.30	1.143E+00	
Co-56	1238.28	21.	-2.	-0.001	527.37	-3.048E-01	P
NA-22	1274.53	5.	6.	0.003	71.32	4.705E-01	
FE-59	1291.60	0.	10.	0.006	31.62	1.941E+00	
TL-210	1313.00	11.	-7.	-0.004	117.90	-2.696E+00	
CO-60	1332.50	6.	7.	0.004	93.91	5.660E-01	P
AG-110M	1384.30	11.	-1.	-0.001	598.44	-4.862E-01	
EU-152	1408.00	6.	6.	0.003	104.70	2.517E+00	P
La-140	1596.21	7.	-4.	-0.002	424.29	-3.730E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-5.1482E+00	-5.1482E+00	1.058E+02%	1.84E+01
NA-22	#A	4.7047E-01	4.7047E-01	7.132E+01%	1.12E+00
K-40		1.8382E+02	1.8382E+02	7.132E+00%	1.38E+01
Sc-46	#A	-6.5361E-01	-6.5361E-01	1.020E+02%	2.26E+00
CR-51	#A	-3.9323E+00	-3.9324E+00	1.851E+02%	2.45E+01
MN-54	#A	-3.8237E-01	-3.8237E-01	1.666E+02%	1.52E+00
FE-59	#A	1.3031E+00	1.3032E+00	3.162E+01%	1.77E+00
Co-56	#A	-1.8242E-02	-1.8242E-02	8.002E+01%	1.70E+00
CO-57	#A	-5.7267E-02	-5.7267E-02	4.819E+02%	9.55E-01
CO-58	#A	-7.9697E-01	-7.9697E-01	8.608E+01%	2.30E+00
CO-60	#A	8.5417E-01	8.5417E-01	4.430E+01%	1.20E+00
ZN-65	#A	-2.1457E+00	-2.1457E+00	7.015E+01%	6.01E+00
NB-94	#A	-1.5146E-01	-1.5146E-01	3.590E+02%	1.50E+00
ZR-95	#A	6.1136E-01	6.1136E-01	1.187E+02%	1.80E+00
NB-95	#A	-2.3805E-01	-2.3805E-01	2.751E+02%	2.28E+00
RU-103	#A	-3.8095E-02	-3.8095E-02	1.216E+03%	1.10E+00
RH-106	#A	2.0350E+00	2.0350E+00	2.092E+02%	9.53E+00
AG-108M	#A	-3.0588E-01	-3.0588E-01	1.360E+02%	1.37E+00
AG-110M	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.76E+00
SN-113	#A	4.9963E-01	4.9963E-01	1.266E+02%	2.16E+00
SB-124	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.70E+00
SB-125	#A	2.0445E+00	2.0445E+00	6.588E+01%	3.14E+00
I-131	#A	8.2209E-01	8.2211E-01	6.593E+01%	9.24E-01
Gd-153	#A	8.1523E-01	8.1523E-01	2.375E+02%	6.49E+00
Ga-68	#A	-1.0270E+01	-1.0328E+01	2.508E+02%	6.08E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.09E+00
BA-133	#A	-8.2372E-01	-8.2372E-01	1.266E+02%	3.51E+00
CS-134	#A	6.5711E-01	6.5711E-01	3.286E+01%	2.73E+00
CS-137	#A	-6.5600E-01	-6.5600E-01	8.954E+01%	1.98E+00
CE-139	#A	3.2265E-01	3.2265E-01	1.196E+02%	1.30E+00
Ba-140	#A	-2.5471E+00	-2.5471E+00	7.270E+01%	5.43E+00
La-140	#A	-3.7304E-01	-3.7304E-01	4.243E+02%	1.53E+00
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.81E+00
CE-144	#A	-3.0389E+00	-3.0389E+00	1.540E+02%	1.57E+01
PM-144	#A	-1.2444E-01	-1.2444E-01	4.440E+02%	1.34E+00
EU-152	#A	3.6860E-01	3.6860E-01	8.079E+01%	4.51E+00
EU-154	#A	3.5154E+00	3.5154E+00	8.673E+01%	1.26E+01
EU-155	#A	1.3268E+00	1.3268E+00	1.849E+02%	8.22E+00
HF-181	#A	-6.3720E-01	-6.3720E-01	1.194E+02%	2.57E+00
Ta-182	#A	1.9121E+00	1.9121E+00	9.620E+01%	6.26E+00
Hg-203	#A	-2.2828E-01	-2.2828E-01	1.784E+02%	1.40E+00
TL-208		1.9723E+00	1.9723E+00	2.489E+01%	1.03E+00
pm-146	#A	1.2357E+00	1.2357E+00	7.640E+01%	2.19E+00

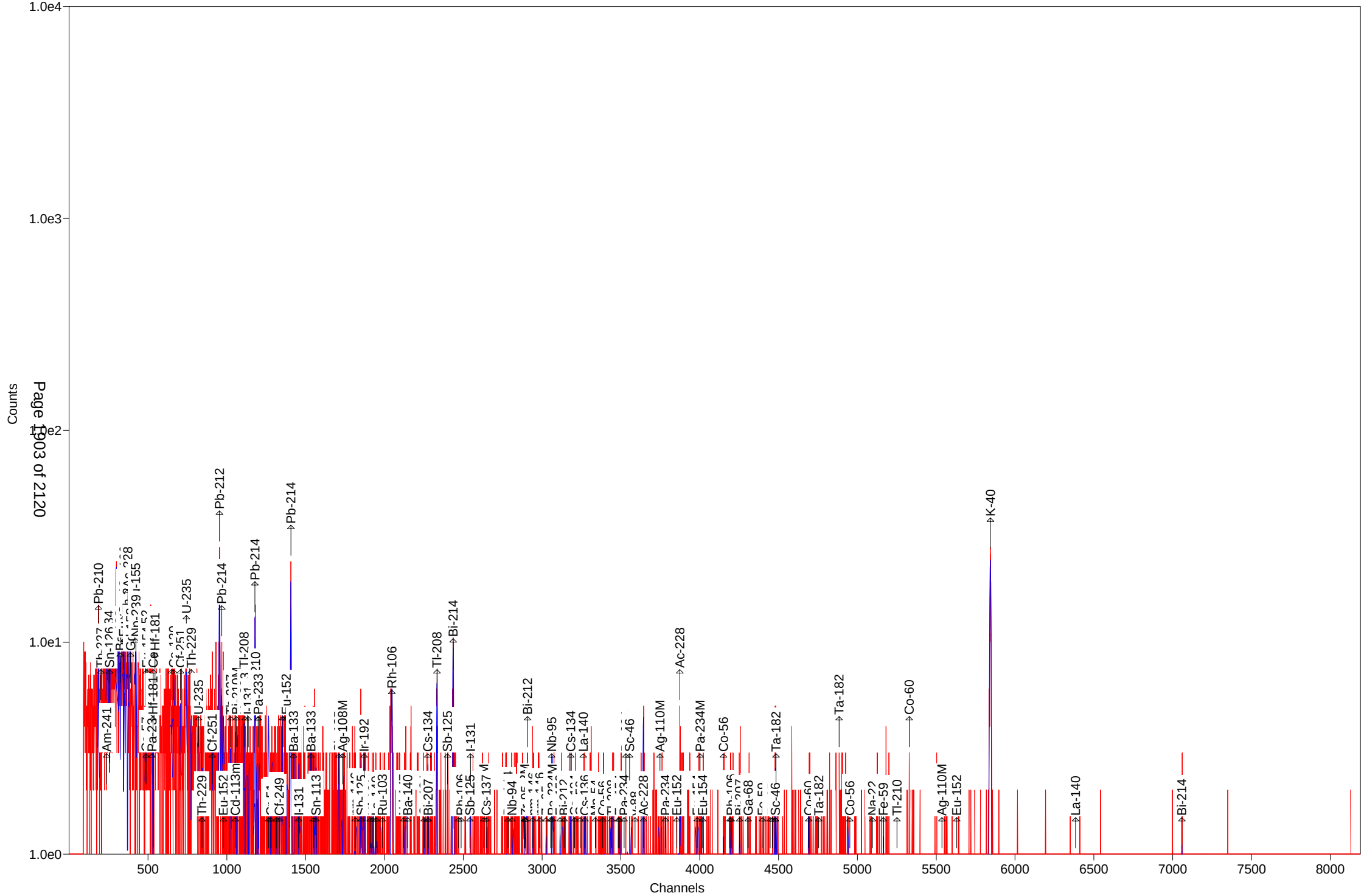
y-88 #A	-9.7808E-03	-9.7808E-03	4.945E+03%		1.24E+00
Cd-113m#A	3.9995E+03	3.9995E+03	1.096E+02%		1.49E+04
Cd-109 #A	0.0000E+00	0.0000E+00	1.000E+03%		5.22E+01
Cf-251 #A	1.2553E+00	1.2553E+00	1.299E+02%		4.25E+00
Cf-249 #A	4.2005E-01	4.2005E-01	1.673E+02%		2.40E+00
Sn-126 #A	-4.6323E+00	-4.6323E+00	1.117E+02%		1.73E+01
PB-210 #A	1.9556E+01	1.9556E+01	6.202E+01%		3.38E+01
PB-212	5.2465E+00	5.2465E+00	1.363E+01%		1.72E+00
PB-214	8.1912E+00	8.1912E+00	1.223E+01%		2.14E+00
BI-207 #A	1.4707E-01	1.4707E-01	2.786E+02%		1.10E+00
BI-212 #A	4.3507E+00	4.3507E+00	1.932E+02%		2.90E+01
U-235 #A	0.0000E+00	0.0000E+00	7.071E+02%		1.67E+01
BI-214	6.2624E+00	6.2624E+00	1.769E+01%		2.06E+00
BI-210M#A	-7.8449E-01	-7.8449E-01	9.014E+01%		2.37E+00
AC-228	7.0232E+00	7.0232E+00	1.720E+01%		1.64E+00
TH-227 #A	1.5308E+00	1.5308E+00	1.022E+02%		2.35E+01
TH-229 #A	-5.5250E+00	-5.5250E+00	2.630E+02%		2.10E+01
TH-234 #A	-2.1549E+01	-2.1549E+01	4.244E+01%		4.19E+01
PA-231 #A	0.0000E+00	0.0000E+00	1.000E+03%		7.92E+01
PA-233 #A	0.0000E+00	0.0000E+00	1.000E+03%		6.49E+00
PA-234 #A	-5.7290E-01	-5.7290E-01	1.478E+02%		9.20E+00
PA-234M#A	-9.8118E+01	-9.8118E+01	6.567E+01%		3.69E+02
AM-241 #A	1.0659E+00	1.0659E+00	1.298E+02%		4.64E+00
Np-237 #A	-2.8414E+00	-2.8414E+00	1.856E+02%		1.76E+01
Ir-192 #A	5.9088E-01	5.9088E-01	9.593E+01%		2.46E+00
Cs-136 #A	5.7718E-01	5.7720E-01	1.311E+02%		2.58E+00
Np-239 #A	1.3418E+00	1.3420E+00	1.704E+02%		7.66E+00
Nd-147 #A	-3.3104E-01	-3.3105E-01	1.046E+03%		8.76E+00
TL-210 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.97E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 2.321E+02 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 2.3207065E+02 Bq/Sample

379959_Gamma_160-29881-A-42-C. 19_Gamma_20181615.spc.



Daily Checks

Test America
St. Louis
Quality Control Check

Spectrum: 5_20180823001_QCAsLeft
Description: Quality control Check (QC Source 'A') Post Stabilization
Acquired: 8/23/2018 12:25:00 AM
Detector: Detector # 5
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.74	0.00	0.00	0.74	1.84	1.94	PASS
ActivityDiff	636.60	-5.00	-4.00	-0.93	4.00	5.00	PASS
QA-662							
FWHM	1.36	0.00	0.00	1.37	3.06	3.16	PASS
ActivityDiff	596.80	-5.00	-4.00	-0.46	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.82	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.86	4.10	4.20	PASS
ActivityDiff	1164.20	-5.00	-4.00	-0.27	4.00	5.00	PASS

Analyst: Bryan Ruiz Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 5_20180823002_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:46:49 AM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.44	1.55	1.60	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 7_20180822003_QCAsLeft
Description: Quality control Check (QC Source 'C') Post Stabilization
Acquired: 8/23/2018 12:23:23 AM
Detector: Detector # 7
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.42	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.32	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.92	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-1.01	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.96	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.28	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.21	4.00	5.00	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 7_20180823001_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:43:41 AM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 8_20180823002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 8/23/2018 1:05:11 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.51	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.93	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-2.57	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.39	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.95	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.96	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.31	4.00	5.00	PASS

Analyst: Bryan Ruiz Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 8_20180823002_QCAsLeft
Description: Quality control Check (QC Source 'D') Post Stabilization
Acquired: 8/23/2018 1:05:11 AM
Detector: Detector # 8
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.51	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.93	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-2.57	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.39	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.95	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.96	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.31	4.00	5.00	PASS

Analyst: Bryan Ruiz Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 8_20180823003_BG
Description: Background Contamination Check
Acquired: 8/23/2018 1:24:26 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.56	1.68	1.74	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 8_20180823003_BG
Description: Background Contamination Check
Acquired: 8/23/2018 1:24:26 AM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.56	1.68	1.74	PASS

Analyst: conrad.reuscher Reviewer: kody Saulters

Test America
St. Louis
Background Check

Spectrum: 9_20180823001_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:01:23 AM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.72	2.14	2.26	PASS

Analyst: conrad.reuscher Reviewer: Bryan Ruiz

Test America
St. Louis
Quality Control Check

Spectrum: 9_20180823002_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 8/23/2018 1:01:48 AM
Detector: Detector # 9
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.95	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	1.49	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.48	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	2.12	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.44	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	1.94	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	1.21	4.00	5.00	PASS

Analyst: conrad.reuscher Reviewer: Bryan Ruiz

Test America
St. Louis
Quality Control Check

Spectrum: 12_20180822004_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 8/23/2018 12:21:16 AM
Detector: Detector #12
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.70	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.54	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	0.85	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.31	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.45	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.17	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.53	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.02	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.50	4.00	5.00	PASS

Analyst: conrad.reuscher Reviewer: Bryan Ruiz

Test America
St. Louis
Background Check

Spectrum: 12_20180823002_BG
Description: Background Contamination Check
Acquired: 8/23/2018 1:25:13 AM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	1.99	2.07	2.10	PASS

Analyst: conrad.reuscher Reviewer: Bryan Ruiz

Test America
St. Louis
Quality Control Check

Spectrum: 14_20180823001_QCAsLeft
Description: Quality control Check (QC Source 'E') Post Stabilization
Acquired: 8/23/2018 12:23:01 AM
Detector: Detector #14
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.90	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	0.57	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.43	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.87	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5331.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.77	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.92	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-1.05	4.00	5.00	PASS

Analyst: Bryan Ruiz Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 14_20180823002_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:41:26 AM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.81	1.90	1.94	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 15_20180823001_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 8/23/2018 12:24:16 AM
Detector: Detector #15
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.58	59.79	60.04	PASS
FWHM	0.95	0.00	0.00	0.94	2.05	2.15	PASS
ActivityDiff	670.56	-5.00	-4.00	-0.06	4.00	5.00	PASS
QA-662							
FWHM	1.51	0.00	0.00	1.43	3.21	3.31	PASS
ActivityDiff	668.76	-5.00	-4.00	0.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.73	1333.01	1333.26	PASS
FWHM	1.99	0.00	0.00	2.01	4.19	4.29	PASS
ActivityDiff	1277.79	-5.00	-4.00	-0.51	4.00	5.00	PASS

Analyst: Bryan Ruiz Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 15_20180823002_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:44:11 AM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.71	1.74	1.77	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 17_20180823001_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:08:37 AM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.33	2.42	2.46	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 17_20180823002_QCAsLeft
Description: Quality control Check (QC Source 'H') Post Stabilization
Acquired: 8/23/2018 1:01:40 AM
Detector: Detector #17
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.64	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.38	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.37	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	-1.86	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.67	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.76	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-4.10	4.00	5.00	Low OOT

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Background Check

Spectrum: 19_20180822002_BG
Description: Background Contamination Check
Acquired: 8/23/2018 12:00:38 AM
Detector: Detector #19
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.30	2.15	2.20	2.27	2.39	2.44	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Test America
St. Louis
Quality Control Check

Spectrum: 19_20180823001_QCAsLeft
Description: Quality control Check (QC Source 'F') Post Stabilization
Acquired: 8/23/2018 1:02:36 AM
Detector: Detector #19
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.73	59.79	60.04	PASS
FWHM	0.89	0.00	0.00	0.89	1.99	2.09	PASS
ActivityDiff	663.00	-5.00	-4.00	0.14	4.00	5.00	PASS
QA-662							
FWHM	1.47	0.00	0.00	1.43	3.17	3.27	PASS
ActivityDiff	633.00	-5.00	-4.00	-0.38	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.64	1333.01	1333.26	PASS
FWHM	1.92	0.00	0.00	1.84	4.12	4.22	PASS
ActivityDiff	1222.00	-5.00	-4.00	-0.16	4.00	5.00	PASS

Analyst: conrad.reuscher Reviewer: conrad.reuscher

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge5

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard Rad12-0007

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14353	96.2
Am-241	2037	418	0.3590	1163	1230.2	105.7
Cd-109	2881	591	0.0361	16363	16101	98.4
Co-57	1511	310	0.8560	362	347.72	96.1
Ce-139	2139	439	0.7990	549	538.4	98.1
Hg-203	4651	954	0.8146	1171	1208.4	103.2
Sn-113	3015	618	0.6400	966	972.07	100.6
Cs-137	1938	397	0.8510	467	462.35	99.0
Y-88	7264	1489	0.9370	1589	1559.3	98.1
Co-60	3580	734	0.9997	734	722.51	98.4
Co-60	3581	734	0.9999	734	739.67	100.7
Y-88	7690	1577	0.9920	1589	1613.8	101.5

Reviewed By: Jody Watson

Date: 3/27/2012

Calibration Data from file: 5_Soil_TunaCan.Clb
Energy Calibration Date: 3/27/2012 Time: 5:20:02 PM
Efficiency Calibration Date: 3/27/2012 Time: 5:20:37 PM

Calibration Description:
5_Soil_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1351 +0.249831*Channel +2.72022e-008*Channel**2
FWHM (ch) = 2.8138 +0.001050*Channel -2.57606e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.61	-0.15%	0.74	0.75	-1.17%
237.86	59.54	59.56	-0.04%	0.74	0.77	-4.07%
351.46	88.03	87.95	0.10%	0.80	0.79	1.28%
487.52	122.06	121.94	0.10%	0.85	0.83	2.66%
663.26	165.85	165.85	0.00%	0.88	0.87	0.98%
1116.90	279.17	279.20	-0.01%	0.97	0.99	-2.35%
1567.36	391.69	391.78	-0.02%	1.12	1.10	1.78%
2647.45	661.66	661.74	-0.01%	1.38	1.35	1.91%
3592.51	898.02	898.01	0.00%	1.55	1.56	-1.11%
4692.96	1173.24	1173.18	0.00%	1.77	1.79	-1.18%
5329.72	1332.50	1332.44	0.00%	1.93	1.92	0.31%
7342.77	1836.01	1836.05	-0.00%	2.29	2.29	0.24%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8682 %
Ln(Eff) = 0.6466 -0.783045*Ln(Eng) -0.0041175*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4296 %
Ln(Eff) = -24.6225 +9.075211*Ln(Eng) -0.966442*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7205E-002	1.7882E-002	-3.93%
59.54	2.6619E-002	2.5335E-002	4.82%
88.03	3.4045E-002	3.4617E-002	-1.68%
122.06	3.4394E-002	3.5819E-002	-4.15%
165.85	========== Knee ==========		
165.85	3.0704E-002	3.1331E-002	-2.04%
279.17	2.1030E-002	2.0365E-002	3.17%
391.69	1.5475E-002	1.5370E-002	0.68%
661.66	9.8486E-003	9.9244E-003	-0.77%
898.02	7.5404E-003	7.6837E-003	-1.90%
1173.24	6.0360E-003	6.1381E-003	-1.69%
1332.50	5.5560E-003	5.5144E-003	0.75%
1836.01	4.2722E-003	4.2078E-003	1.51%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/27/2012 5:22:03 PM
TestAmerica                      Spectrum name: 5_TunaCan_20120810.An1

Sample description
     5_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan_20120810.An1

Acquisition information
       Start time:                 3/26/2012 3:05:42 PM
       Live time:               3600
       Real time:               3652
       Dead time:                  1.44 %
       Detector ID:                   5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0527

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.61	38986.	0.74	0.74	1.793E-02	46.54	4.250	1.435E+04	Pb210
59.56	40041.	0.74	0.74	2.535E-02	59.54	35.700	1.230E+03	AM241
70.85	1493.	9.22	0.78	3.019E-02				
72.87	2354.	5.96	0.78	3.089E-02				
87.95	63754.	0.53	0.80	3.460E-02	88.03	3.610	1.610E+04	CD109
121.94	30888.	0.76	0.85	3.583E-02	122.06	85.600	3.477E+02	CO57
136.41	3768.	3.80	0.89	3.457E-02				
165.85	31597.	0.74	0.88	3.066E-02	165.85	79.900	5.384E+02	Ce139
279.20	20358.	0.87	0.97	2.036E-02	279.17	81.500	1.208E+03	Hg203
391.78	20611.	0.93	1.12	1.537E-02	391.69	64.000	9.721E+02	SN113
661.74	14000.	1.10	1.38	9.923E-03	661.66	85.210	4.623E+02	CS137
898.01	23228.	0.82	1.55	7.684E-03	898.02	93.700	1.559E+03	Y898
1173.18	15468.	0.93	1.77	6.138E-03	1173.24	99.900	7.225E+02	Co1173
1332.44	14238.	0.98	1.93	5.515E-03	1332.50	99.982	7.397E+02	Co1332
1836.04	13938.	0.87	2.30	4.208E-03	1836.01	99.200	1.614E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
291.16	72.88	8722.	2253.	7.295E+04	7.09	0.801	-
545.44	136.41	5274.	3768.	1.090E+05	3.80	0.888	-

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	12895.	38986.	10.829	0.74	0.743
AM-241	237.86	59.56	13293.	40041.	11.122	0.74	0.735
CD-109	351.46	87.95	12894.	63754.	17.710	0.53	0.805
CO-57	487.52	121.94	6935.	30888.	8.580	0.76	0.852
Ce-139	663.26	165.85	5616.	31597.	8.777	0.74	0.883
Hg-203	1116.90	279.20	2848.	20358.	5.655	0.87	0.966
SN-113	1567.36	391.78	3046.	20611.	5.725	0.93	1.119
CS-137	2647.45	661.74	1982.	14000.	3.889	1.10	1.380
Y-898	3592.51	898.01	1944.	23228.	6.452	0.82	1.547
Co-1173	4692.96	1173.18	847.	15468.	4.297	0.93	1.774
Co-1332	5329.75	1332.44	693.	14238.	3.955	0.98	1.927
Y-1836	7342.72	1836.04	102.	13938.	3.872	0.87	2.295

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4353E+04						8.15E+03	
			46.54	1.435E+04	(	1.958E+02	7.44E-01	4.25E+00	G
AM-241		1.2302E+03						1.58E+05	
			59.54	1.230E+03	(	1.659E+01	7.44E-01	3.57E+01	G
CD-109		1.6101E+04						4.63E+02	
			88.03	1.610E+04	(	1.343E+02	5.28E-01	3.61E+00	G
CO-57		3.4772E+02						2.72E+02	
			122.06	3.477E+02	(	4.399E+00	7.60E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3840E+02					1.38E+02	
		165.85	5.384E+02	(	5.997E+00	7.36E-01	7.99E+01 G
Hg-203	1.2084E+03					4.66E+01	
		279.17	1.208E+03	(	1.492E+01	8.69E-01	8.15E+01 G
SN-113	9.7207E+02					1.15E+02	
		391.69	9.721E+02	(	1.226E+01	9.31E-01	6.40E+01 G
CS-137	4.6235E+02					1.10E+04	
		661.66	4.623E+02	(	6.941E+00	1.10E+00	8.52E+01 G
Y-898	1.5593E+03					1.07E+02	
		898.02	1.559E+03	(	1.397E+01	8.19E-01	9.37E+01 G
Co-1173	7.2251E+02					1.93E+03	
		1173.24	7.225E+02	(	6.463E+00	9.30E-01	9.99E+01 G
Co-1332	7.3967E+02					1.93E+03	
		1332.50	7.397E+02	(	6.515E+00	9.82E-01	1.00E+02 G
Y-1836	1.6138E+03					1.07E+02	
		1836.01	1.614E+03	(	5.776E+00	8.71E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 5:22:03 PM
TestAmerica Spectrum name: 5_TunaCan_20120810.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4250E+04	1.4353E+04	7.439E-01%	1.96E+02
AM-241	1.2297E+03	1.2302E+03	7.442E-01%	1.66E+01
CD-109	1.4172E+04	1.6101E+04	5.277E-01%	1.34E+02
CO-57	2.7983E+02	3.4772E+02	7.604E-01%	4.40E+00
Ce-139	3.5061E+02	5.3840E+02	7.359E-01%	6.00E+00
Hg-203	3.4071E+02	1.2084E+03	8.687E-01%	1.49E+01
SN-113	5.8200E+02	9.7207E+02	9.315E-01%	1.23E+01
CS-137	4.5987E+02	4.6235E+02	1.097E+00%	6.94E+00
Y-898	8.9620E+02	1.5593E+03	8.189E-01%	1.40E+01
Co-1173	7.0069E+02	7.2251E+02	9.300E-01%	6.46E+00
Co-1332	7.1733E+02	7.3967E+02	9.821E-01%	6.52E+00
Y-1836	9.2756E+02	1.6138E+03	8.711E-01%	5.78E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.5 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 2000.5 keV) 3.9848164E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	==========	Knee	==========
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  2/28/2014 11:43:43 AM
TestAmerica                      Spectrum name: 7_TunaCan_20120388.An1

Sample description
     7_TunaCan_90099_030512


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
       Start time:                 3/5/2012 2:07:36 PM
       Live time:               3600
       Real time:               3721
       Dead time:                  3.25 %
       Detector ID:                    7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0324

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4726E+04					8.15E+03
			46.54	1.473E+04	(	1.744E+02 6.52E-01 4.25E+00 G	
AM-241		1.2416E+03					1.58E+05
			59.54	1.242E+03	(	1.457E+01 6.49E-01 3.57E+01 G	
CD-109		1.5976E+04					4.63E+02
			88.03	1.598E+04	(	1.088E+02 4.29E-01 3.61E+00 G	
CO-57		3.4677E+02					2.72E+02
			122.06	3.468E+02	(	4.144E+00 7.08E-01 8.56E+01 G	

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3948E+02					1.38E+02	
		165.85	5.395E+02	(	4.586E+00	5.65E-01	7.99E+01 G
Hg-203	1.1992E+03					4.66E+01	
		279.17	1.199E+03	(	9.415E+00	5.92E-01	8.15E+01 G
SN-113	9.7676E+02					1.15E+02	
		391.69	9.768E+02	(	8.153E+00	6.55E-01	6.40E+01 G
CS-137	4.6766E+02					1.10E+04	
		661.66	4.677E+02	(	5.584E+00	7.73E-01	8.52E+01 G
Y-898	1.5673E+03					1.07E+02	
		898.02	1.567E+03	(	1.056E+01	6.29E-01	9.37E+01 G
Co-1173	7.2623E+02					1.93E+03	
		1173.24	7.262E+02	(	6.394E+00	8.53E-01	9.99E+01 G
Co-1332	7.1964E+02					1.93E+03	
		1332.50	7.196E+02	(	6.072E+00	8.54E-01	1.00E+02 G
Y-1836	1.6357E+03					1.07E+02	
		1836.01	1.636E+03	(	5.819E+00	7.02E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA
Pb-210	1.4646E+04	1.4726E+04	6.521E-01%	1.74E+02
AM-241	1.2413E+03	1.2416E+03	6.489E-01%	1.46E+01
CD-109	1.4512E+04	1.5976E+04	4.292E-01%	1.09E+02
CO-57	2.9445E+02	3.4677E+02	7.076E-01%	4.14E+00
Ce-139	3.9059E+02	5.3948E+02	5.652E-01%	4.59E+00
Hg-203	4.6224E+02	1.1992E+03	5.917E-01%	9.42E+00
SN-113	6.6381E+02	9.7676E+02	6.552E-01%	8.15E+00
CS-137	4.6577E+02	4.6766E+02	7.730E-01%	5.58E+00
Y-898	1.0329E+03	1.5673E+03	6.291E-01%	1.06E+01
Co-1173	7.0966E+02	7.2623E+02	8.534E-01%	6.39E+00
Co-1332	7.0321E+02	7.1964E+02	8.542E-01%	6.07E+00
Y-1836	1.0780E+03	1.6357E+03	7.017E-01%	5.82E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (701.8 to 2000.2 keV) 3.620E+04 Bq
Total Decayed Activity (701.8 to 2000.2 keV) 4.0121711E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:               3600
       Real time:               3655
       Dead time:                  1.49 %
       Detector ID:                   8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Peak Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4960E+04					8.15E+03
			46.54	1.496E+04	(	2.033E+02 7.55E-01 4.25E+00	G
AM-241		1.2405E+03					1.58E+05
			59.54	1.240E+03	(	1.715E+01 7.72E-01 3.57E+01	G
CD-109		1.6066E+04					4.63E+02
			88.03	1.607E+04	(	1.353E+02 5.26E-01 3.61E+00	G
CO-57		3.4512E+02					2.72E+02
			122.06	3.451E+02	(	4.486E+00 7.68E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                 5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                  1.65 %
       Detector ID:                   9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq			COMMENTS
Pb-210	N	1.4240E+04						8.15E+03	
			46.54	1.424E+04	(	1.646E+02	6.67E-01	4.25E+00	G
AM-241		1.2445E+03						1.58E+05	
			59.54	1.245E+03	(	1.388E+01	6.60E-01	3.57E+01	G
CD-109		1.5902E+04						4.63E+02	
			88.03	1.590E+04	(	1.190E+02	4.84E-01	3.61E+00	G
CO-57		3.4748E+02						2.72E+02	
			122.06	3.475E+02	(	4.159E+00	7.31E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3587E+02					1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01 G
Hg-203	1.2167E+03					4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01 G
SN-113	9.7065E+02					1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01 G
CS-137	4.6658E+02					1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01 G
Y-898	1.5525E+03					1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01 G
Co-1173	7.2712E+02					1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01 G
Co-1332	7.1975E+02					1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02 G
Y-1836	1.6388E+03					1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: **Ge12**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: **#1402359 / Tuna Can_2018_00001**

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1261	99.0
Cd-109	79700	17596	18250	103.7
Co-57	1809	399	393.1	98.4
Ce-139	2723	601	585.9	97.5
Hg-203	5868	1296	1312	101.3
Sn-113	4658	1028	1059	103.0
Cs-137	2283	504	509.8	101.1
Y-88	7810	1724	1705	98.9
Co-60	3574	789	776.5	98.4
Co-60	3574	789	765.4	97.0
Y-88	7810	1724	1769	102.6

Reviewed By: Jody Watson

Date: 4/23/2018

Calibration Data from file: 12_Soil_TunaCan.Clb
Energy Calibration Date: 4/20/2018 Time: 11:53:01 AM
Efficiency Calibration Date: 4/20/2018 Time: 11:53:09 AM

Calibration Description:
12_TunaCan_108513

Energy Calibration Fit
Energy = 0.0591 +0.250183*Channel -3.73476e-008*Channel**2
FWHM (ch) = 3.2115 +0.001032*Channel -1.75096e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.95	46.54	46.58	-0.09%	0.84	0.85	-1.23%
237.82	59.54	59.56	-0.03%	0.86	0.86	-0.65%
351.66	88.03	88.03	-0.01%	0.89	0.89	-0.96%
487.75	122.06	122.08	-0.01%	0.92	0.93	-0.62%
662.97	165.85	165.91	-0.03%	0.97	0.97	0.22%
1115.42	279.17	279.07	0.04%	1.11	1.09	2.13%
1565.35	391.69	391.59	0.02%	1.20	1.20	0.60%
2645.53	661.66	661.66	-0.00%	1.49	1.45	2.30%
3591.22	898.02	898.04	-0.00%	1.66	1.67	-0.91%
4692.62	1173.24	1173.25	-0.00%	1.85	1.92	-3.60%
5330.40	1332.50	1332.57	-0.01%	2.09	2.05	1.92%
7346.34	1836.01	1835.97	0.00%	2.46	2.46	0.18%

Efficiency Calibration Fit
Polynomial Uncertainty = 1.0201 %
Coefficients:
-0.363508 -4.707999 0.462125 -0.051256 0.002384 -0.000043

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8052E-002	1.7999E-002	0.29%
59.54	2.7878E-002	2.8172E-002	-1.06%
88.03	3.7143E-002	3.5814E-002	3.58%
122.06	3.6658E-002	3.7240E-002	-1.59%
165.85	3.3189E-002	3.4052E-002	-2.60%
279.17	2.4853E-002	2.4494E-002	1.45%
391.69	1.9499E-002	1.8934E-002	2.90%
661.66	1.2936E-002	1.2789E-002	1.13%
898.02	1.0139E-002	1.0253E-002	-1.13%
1173.24	8.2922E-003	8.4265E-003	-1.62%
1332.50	7.4182E-003	7.6470E-003	-3.08%
1836.01	6.0193E-003	5.8663E-003	2.54%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 12_TunaCan_20180005

Sample Description: 12_TunaCan_108513
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 4/18/2018 13:54:19 Real Time: 3652 sec
Analysis Time: 4/20/2018 11:55 Dead Time: 1.41 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.600E+04	0.6	9.485E+01	1.031E+03	1.853E+02
AM-241	1.261E+03	0.7	9.223E+00	8.039E+01	1.659E+01
CD-109	1.825E+04	0.4	7.598E+01	1.135E+03	1.134E+02
CO-57	3.931E+02	0.8	3.042E+00	2.279E+01	5.110E+00
Ce-139	5.859E+02	0.7	4.357E+00	3.335E+01	6.791E+00
Hg-203	1.312E+03	1.1	1.414E+01	7.659E+01	2.206E+01
SN-113	1.059E+03	0.9	9.013E+00	6.310E+01	1.205E+01
CS-137	5.098E+02	0.9	4.734E+00	2.665E+01	6.233E+00
Y-898	1.705E+03	0.8	1.331E+01	8.765E+01	1.505E+01
Co-1173	7.765E+02	0.9	6.740E+00	3.922E+01	6.891E+00
Co-1332	7.654E+02	0.8	6.419E+00	3.866E+01	6.071E+00
Y-1836	1.769E+03	0.8	1.413E+01	1.018E+02	8.211E+00
Total	4.438E+04				

Analyst: Jody Watson

Sample description
12_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180005.An1

Acquisition information

Start time:	4/18/2018 1:54:19 PM
Live time:	3600
Real time:	3652
Dead time:	1.41 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0332

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
27.87	601.	9.86	0.70	3.939E-03				
33.44	3191.	3.58	0.84	8.062E-03				
36.78	534.	21.42	0.84	1.059E-02				
38.00	764.	15.14	0.84	1.151E-02				
46.62	43669.	0.59	0.85	1.805E-02	46.54	4.250	1.600E+04	Pb210
49.75	200.	71.91	0.85	2.153E-02				
59.56	45621.	0.73	0.86	2.818E-02	59.54	35.700	1.261E+03	AM241
70.78	903.	16.81	0.88	3.227E-02				
72.97	1715.	8.94	0.88	3.286E-02				
74.88	161.	95.77	0.88	3.334E-02				
77.23	29.	497.10	0.88	3.389E-02				
82.47	1429.	10.54	0.89	3.493E-02				
84.79	2014.	7.84	0.89	3.532E-02				
88.06	72330.	0.42	0.89	3.581E-02	88.03	3.610	1.825E+04	CD109
90.37	144.	87.05	0.90	3.612E-02				
122.08	34326.	0.77	0.92	3.724E-02	122.06	85.600	3.931E+02	CO57
136.51	4200.	4.35	0.96	3.651E-02				
165.91	33460.	0.74	0.97	3.405E-02	165.85	79.900	5.859E+02	Ce139
206.00	117.	63.94	0.45	3.024E-02				
238.46	443.	25.54	0.90	2.744E-02				
255.00	1168.	12.03	0.88	2.617E-02				
279.07	19187.	1.08	1.11	2.450E-02	279.17	81.500	1.312E+03	Hg203
286.67	107.	74.95	0.64	2.401E-02				
351.85	322.	30.50	1.33	2.056E-02				
391.59	24235.	0.85	1.20	1.894E-02	391.69	64.000	1.059E+03	SN113
500.18	113.	56.68	0.53	1.573E-02				
583.01	248.	32.33	0.89	1.403E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
601.08	176.	44.64	0.64	1.372E-02				
643.04	164.	48.09	0.69	1.306E-02				
661.66	19866.	0.93	1.49	1.279E-02	661.66	85.210	5.098E+02	CS137
695.58	154.	52.24	0.30	1.233E-02				
712.59	169.	39.74	0.69	1.212E-02				
814.18	641.	15.80	1.86	1.101E-02				
890.80	44.	76.23	0.45	1.031E-02				
898.03	29383.	0.78	1.66	1.025E-02	898.02	93.700	1.705E+03	Y898
924.59	170.	51.69	2.08	1.004E-02				
1059.91	148.	40.90	0.51	9.087E-03				
1173.24	22640.	0.87	1.85	8.426E-03	1173.24	99.900	7.765E+02	Co1173
1217.40	45.	61.22	0.33	8.195E-03				
1271.51	36.	60.60	1.04	7.928E-03				
1301.67	34.	60.56	0.43	7.787E-03				
1332.57	20270.	0.84	2.09	7.647E-03	1332.50	99.982	7.654E+02	Co1332
1491.52	180.	28.09	0.33	6.994E-03				
1835.92	18468.	0.80	2.47	5.867E-03	1836.01	99.200	1.769E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
111.16	27.87	1248.	601.	1.526E+05	9.86	0.703	-	s
133.41	33.32	4927.	3191.	3.959E+05	3.58	0.838	-	sD
146.77	36.66	6263.	534.	5.040E+04	21.42	0.841	-	sD
151.64	37.88	6317.	764.	6.642E+04	15.14	0.842	-	sD
198.79	49.71	10292.	213.	9.912E+03	67.59	0.855	-	sc
282.69	70.80	11078.	903.	2.799E+04	16.81	0.876	-	D
291.44	72.99	10900.	1715.	5.219E+04	8.94	0.878	-	D
299.07	74.90	11841.	161.	4.837E+03	95.77	0.880	-	c
308.48	77.26	10683.	29.	8.685E+02	497.10	0.883	-	c
329.43	82.44	10620.	1431.	4.097E+04	10.52	0.888	-	D
338.70	84.76	11438.	2016.	5.707E+04	7.83	0.890	-	sD
361.04	90.35	7839.	145.	4.014E+03	86.78	0.896	-	sc
545.45	136.51	7622.	4200.	1.150E+05	4.35	0.964	-	
823.26	206.00	2348.	117.	3.869E+03	63.94	0.454	-	s
953.03	238.46	3718.	443.	1.615E+04	25.54	0.897	-	s
1019.19	255.00	4459.	1168.	4.464E+04	12.03	0.878	-	
1145.82	286.67	2108.	107.	4.456E+03	74.95	0.636	-	s
1406.43	351.85	2440.	322.	1.569E+04	30.50	1.334	-	
1999.63	500.18	1252.	113.	7.164E+03	56.68	0.530	-	s
2330.90	583.01	1545.	248.	1.767E+04	32.33	0.894	-	s
2403.19	601.08	1564.	176.	1.283E+04	44.64	0.638	-	s
2571.03	643.04	1587.	164.	1.258E+04	48.09	0.694	-	s
2781.20	695.58	1652.	154.	1.250E+04	52.24	0.304	-	s
2849.27	712.59	1184.	169.	1.395E+04	39.74	0.695	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
3255.67	814.18	1648.	641.	5.823E+04	15.80	1.859	- s
3562.26	890.80	503.	44.	4.283E+03	76.23	0.452	- sc
3697.47	924.59	1556.	170.	1.690E+04	51.69	2.082	- s
4239.01	1059.91	879.	148.	1.629E+04	40.90	0.508	- s
4869.35	1217.40	238.	45.	5.491E+03	61.22	0.330	- s
5085.97	1271.51	165.	36.	4.541E+03	60.60	1.043	- s
5206.71	1301.67	156.	34.	4.366E+03	60.56	0.434	- s
5966.81	1491.52	462.	180.	2.581E+04	28.09	0.329	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	11653.	43669.	12.130	0.59	0.851D
AM-241	237.82	59.56	16449.	45621.	12.672	0.73	0.859
CD-109	351.65	88.03	9195.	72330.	20.092	0.42	0.894D
CO-57	487.75	122.08	9060.	34326.	9.535	0.77	0.923
Ce-139	662.97	165.91	6830.	33460.	9.295	0.74	0.975
Hg-203	1115.42	279.07	4712.	19187.	5.330	1.08	1.109
SN-113	1565.35	391.59	3432.	24235.	6.732	0.85	1.204
CS-137	2645.53	661.66	2656.	19866.	5.518	0.93	1.489
Y-898	3591.19	898.03	3033.	29383.	8.162	0.78	1.658
Co-1173	4692.59	1173.24	1810.	22640.	6.289	0.87	1.852
Co-1332	5330.41	1332.57	1150.	20270.	5.631	0.84	2.092
Y-1836	7346.14	1835.92	317.	18468.	5.130	0.80	2.475

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(P	1.853E+02 5.93E-01 4.25E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.2606E+03					1.58E+05	
		59.54	1.261E+03	(	1.659E+01	7.32E-01	3.57E+01 G
CD-109	1.8246E+04					4.63E+02	
		88.03	1.825E+04	(	1.134E+02	4.16E-01	3.61E+00 G
CO-57	3.9307E+02					2.72E+02	
		122.06	3.931E+02	(	5.110E+00	7.74E-01	8.56E+01 G
Ce-139	5.8589E+02					1.38E+02	
		165.85	5.859E+02	(	6.791E+00	7.44E-01	7.99E+01 G
Hg-203	1.3123E+03					4.66E+01	
		279.17	1.312E+03	(	2.206E+01	1.08E+00	8.15E+01 G
SN-113	1.0590E+03					1.15E+02	
		391.69	1.059E+03	(	1.205E+01	8.51E-01	6.40E+01 G
CS-137	5.0981E+02					1.10E+04	
		661.66	5.098E+02	(	6.233E+00	9.29E-01	8.52E+01 G
Y-898	1.7049E+03					1.07E+02	
		898.02	1.705E+03	(	1.505E+01	7.81E-01	9.37E+01 G
Co-1173	7.7646E+02					1.93E+03	
		1173.24	7.765E+02	(	6.891E+00	8.68E-01	9.99E+01 G
Co-1332	7.6541E+02					1.93E+03	
		1332.50	7.654E+02	(	6.071E+00	8.39E-01	1.00E+02 G
Y-1836	1.7690E+03					1.07E+02	
		1836.01	1.769E+03	(	8.211E+00	7.99E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5857E+04	1.6003E+04	5.927E-01%	1.85E+02
AM-241	1.2600E+03	1.2606E+03	7.317E-01%	1.66E+01
CD-109	1.5540E+04	1.8246E+04	4.164E-01%	1.13E+02
CO-57	2.9911E+02	3.9307E+02	7.739E-01%	5.11E+00
Ce-139	3.4161E+02	5.8589E+02	7.437E-01%	6.79E+00
Hg-203	2.6699E+02	1.3123E+03	1.078E+00%	2.21E+01
SN-113	5.5555E+02	1.0590E+03	8.510E-01%	1.20E+01
CS-137	5.0637E+02	5.0981E+02	9.286E-01%	6.23E+00
Y-898	8.4955E+02	1.7049E+03	7.808E-01%	1.50E+01
Co-1173	7.4709E+02	7.7646E+02	8.681E-01%	6.89E+00
Co-1332	7.3646E+02	7.6541E+02	8.386E-01%	6.07E+00
Y-1836	8.8152E+02	1.7690E+03	7.985E-01%	8.21E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 3.784E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.4384840E+04 Bq/Sample

Gamma Verification per Geometry

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

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     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
       Start time:                 4/23/2012 9:56:44 AM
       Live time:               3600
       Real time:               3665
       Dead time:                  1.77 %
       Detector ID:                   14

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 11:13:09 AM    Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan_20120385.An1
                                      Page 1
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```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0575

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    Bq
_____________________________________________________________________________
   46.67    47449.   0.64   0.73  2.181E-02    46.54   4.250  1.442E+04 Pb210
   59.63    48139.   0.67   0.74  3.071E-02    59.54  35.700  1.223E+03 AM241
   72.88     1815.   8.13   0.77  3.737E-02
   88.00    74331.   0.47   0.79  4.195E-02    88.03   3.610  1.614E+04 CD109
  121.95    35331.   0.76   0.82  4.379E-02   122.06  85.600  3.493E+02 CO57
  136.39     4314.   3.84   0.82  4.244E-02
  165.77    33960.   0.70   0.89  3.800E-02   165.85  79.900  5.385E+02 Ce139
  279.15    17136.   1.05   1.00  2.596E-02   279.17  81.500  1.206E+03 Hg203
  391.65    22586.   0.85   1.13  1.993E-02   391.69  64.000  9.714E+02 SN113
  661.68    18625.   0.92   1.36  1.313E-02   661.66  85.210  4.657E+02 CS137
  898.06    26064.   0.74   1.56  1.026E-02   898.02  93.700  1.570E+03 Y898
 1173.24    20614.   0.80   1.76  8.244E-03  1173.24  99.900  7.242E+02 Co1173
 1332.50    18485.   0.81   1.88  7.423E-03  1332.50  99.982  7.206E+02 Co1332
 1835.98    15919.   0.83   2.23  5.686E-03  1836.01  99.200  1.634E+03 Y1836


************ U N I D E N T I F I E D     P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  290.81    72.88      9094.      1708. 4.569E+04    9.16   0.857  -
  544.77   136.39      6618.      4314. 1.017E+05    3.84   0.819  -
```

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 3
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4422E+04					8.15E+03	
			46.54	1.442E+04	(	1.659E+02	6.42E-01 4.25E+00	G
AM-241		1.2225E+03					1.58E+05	
			59.54	1.223E+03	(	1.449E+01	6.65E-01 3.57E+01	G
CD-109		1.6145E+04					4.63E+02	
			88.03	1.614E+04	(	1.179E+02	4.73E-01 3.61E+00	G
CO-57		3.4928E+02					2.72E+02	
			122.06	3.493E+02	(	4.431E+00	7.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3852E+02					1.38E+02	
		165.85	5.385E+02	(	5.643E+00	6.97E-01 7.99E+01	G
Hg-203	1.2059E+03					4.66E+01	
		279.17	1.206E+03	(	2.002E+01	1.05E+00 8.15E+01	G
SN-113	9.7136E+02					1.15E+02	
		391.69	9.714E+02	(	1.115E+01	8.54E-01 6.40E+01	G
CS-137	4.6565E+02					1.10E+04	
		661.66	4.657E+02	(	5.571E+00	9.21E-01 8.52E+01	G
Y-898	1.5700E+03					1.07E+02	

```
                          898.02 1.570E+03  (  1.261E+01 7.43E-01 9.37E+01 G

Co-1173      7.2416E+02                                        1.93E+03
                         1173.24 7.242E+02  (  5.275E+00 7.99E-01 9.99E+01 G

Co-1332      7.2060E+02                                        1.93E+03
                         1332.50 7.206E+02  (  4.737E+00 8.09E-01 1.00E+02 G

Y-1836       1.6340E+03                                        1.07E+02
                         1836.01 1.634E+03  (  6.084E+00 8.27E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4284E+04    1.4422E+04    6.417E-01%                1.66E+02
 AM-241       1.2219E+03    1.2225E+03    6.654E-01%                1.45E+01
 CD-109       1.3631E+04    1.6145E+04    4.729E-01%                1.18E+02
```

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector:	Ge15
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

15_TunaCan_20120283

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1

Sample description
     15_TunaCan_90099_032212


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
       Start time:                 3/22/2012 11:06:02 AM
       Live time:               3600
       Real time:               3653
       Dead time:                  1.44 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  3/22/2012 1:04:51 PM    Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan_20120283.An1
                                      Page 1
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       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0249
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	-	D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4410E+04					8.15E+03	
			46.54	1.441E+04	(	1.957E+02	7.55E-01 4.25E+00	G
AM-241		1.2069E+03					1.58E+05	
			59.54	1.207E+03	(	1.577E+01	7.22E-01 3.57E+01	G
CD-109		1.6069E+04					4.63E+02	
			88.03	1.607E+04	(	1.399E+02	5.44E-01 3.61E+00	G
CO-57		3.5606E+02					2.72E+02	
			122.06	3.561E+02	(	4.647E+00	7.84E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3881E+02					1.38E+02	
		165.85	5.388E+02	(	6.551E+00	7.82E-01 7.99E+01	G
Hg-203	1.2024E+03					4.66E+01	
		279.17	1.202E+03	(	1.514E+01	8.77E-01 8.15E+01	G
SN-113	9.7462E+02					1.15E+02	
		391.69	9.746E+02	(	1.034E+01	8.20E-01 6.40E+01	G
CS-137	4.6543E+02					1.10E+04	
		661.66	4.654E+02	(	7.413E+00	1.16E+00 8.52E+01	G
Y-898	1.5737E+03					1.07E+02	

```
                                898.02 1.574E+03  (  1.260E+01 7.45E-01 9.37E+01 G

Co-1173      7.1644E+02                                        1.93E+03
                               1173.24 7.164E+02  (  7.050E+00 9.39E-01 9.99E+01 G

Co-1332      7.2655E+02                                        1.93E+03
                               1332.50 7.266E+02  (  7.301E+00 9.83E-01 1.00E+02 G

Y-1836       1.6332E+03                                        1.07E+02
                               1836.01 1.633E+03  (  8.923E+00 8.49E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                        Peak Codes:
   T - Thermal Neutron Activation        G - Gamma Ray
   F - Fast Neutron Activation           X - X-Ray
   I - Fission Product                   P - Positron Decay
   N - Naturally Occurring Isotope       S - Single-Escape
```



```
   P - Photon Reaction                   D - Double-Escape
   C - Charged Particle Reaction         K - Key Line
   M - No MDA Calculation                A - Not in Average
   R - Coincidence Corrected             C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
               Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4311E+04    1.4410E+04    7.549E-01%                1.96E+02
 AM-241       1.2065E+03    1.2069E+03    7.219E-01%                1.58E+01
 CD-109       1.4233E+04    1.6069E+04    5.439E-01%                1.40E+02
```

CO-57	2.8961E+02	3.5606E+02	7.837E-01%	4.65E+00
Ce-139	3.5832E+02	5.3881E+02	7.816E-01%	6.55E+00
Hg-203	3.6068E+02	1.2024E+03	8.771E-01%	1.51E+01
SN-113	5.9836E+02	9.7462E+02	8.201E-01%	1.03E+01
CS-137	4.6306E+02	4.6543E+02	1.155E+00%	7.41E+00
Y-898	9.2933E+02	1.5737E+03	7.445E-01%	1.26E+01
Co-1173	6.9585E+02	7.1644E+02	9.390E-01%	7.05E+00
Co-1332	7.0567E+02	7.2655E+02	9.834E-01%	7.30E+00
Y-1836	9.6449E+02	1.6332E+03	8.486E-01%	8.92E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 1999.6 keV) 3.512E+04 Bq
Total Decayed Activity (82.3 to 1999.6 keV) 3.9873703E+04 Bq

Gamma Verification per Geometry

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14476	97.0
Am-241	2037	418	0.3590	1163	1217.3	104.6
Cd-109	2881	591	0.0361	16363	16121	98.5
Co-57	1511	310	0.8560	362	351.58	97.1
Ce-139	2139	439	0.7990	549	540.43	98.5
Hg-203	4651	954	0.8146	1171	1200.7	102.6
Sn-113	3015	618	0.6400	966	969.38	100.4
Cs-137	1938	397	0.8510	467	466.08	99.8
Y-88	7264	1489	0.9370	1589	1562.4	98.3
Co-60	3580	734	0.9997	734	724.88	98.7
Co-60	3581	734	0.9999	734	733.12	99.8
Y-88	7690	1577	0.9920	1589	1616.3	101.7

Reviewed By: Megan McAfee

Date: 4/13/2012

Calibration Data from file: 17_Soil_TunaCan.Clb
Energy Calibration Date: 4/12/2012 Time: 9:28:30 AM
Efficiency Calibration Date: 4/12/2012 Time: 9:28:42 AM

Calibration Description:
17_TunaCan_90099_032612

Energy Calibration Fit
Energy = 0.1178 +0.250077*Channel -2.37566e-008*Channel**2
FWHM (ch) = 2.9772 +0.000994*Channel -3.22638e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.96	46.54	46.62	-0.17%	0.77	0.79	-3.16%
237.92	59.54	59.61	-0.12%	0.78	0.80	-3.33%
351.79	88.03	88.09	-0.07%	0.82	0.83	-1.16%
487.44	122.06	122.01	0.04%	0.89	0.86	3.09%
662.32	165.85	165.74	0.07%	0.93	0.91	2.22%
1115.65	279.17	279.09	0.03%	1.03	1.01	2.15%
1565.90	391.69	391.66	0.01%	1.10	1.11	-0.78%
2646.02	661.66	661.66	-0.00%	1.37	1.35	1.74%
3591.93	898.02	898.07	-0.01%	1.52	1.53	-0.67%
4693.19	1173.24	1173.25	-0.00%	1.72	1.73	-0.81%
5330.69	1332.50	1332.53	-0.00%	1.82	1.84	-0.74%
7346.32	1836.01	1835.98	0.00%	2.14	2.13	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9072 %
Ln(Eff) = -0.5264 -0.402416*Ln(Eng) -0.0260446*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.0020 %
Ln(Eff) = -23.4389 +8.582715*Ln(Eng) -0.907543*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0383E-002	2.1004E-002	-3.05%
59.54	3.0743E-002	2.9571E-002	3.81%
88.03	3.9976E-002	4.0594E-002	-1.55%
122.06	4.1510E-002	4.2756E-002	-3.00%
165.85	========== Knee ==========		
165.85	3.7629E-002	3.8252E-002	-1.65%
279.17	2.7514E-002	2.6814E-002	2.54%
391.69	2.1207E-002	2.1122E-002	0.40%
661.66	1.4433E-002	1.4427E-002	0.04%
898.02	1.1287E-002	1.1478E-002	-1.69%
1173.24	9.2333E-003	9.3589E-003	-1.36%
1332.50	8.4692E-003	8.4809E-003	-0.14%
1836.01	6.7041E-003	6.5931E-003	1.66%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  1
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1

Sample description
     17_TunaCan_90099_032612


Spectrum Filename: C:\User\SPC\Det17\17_TunaCan_20120263.An1

Acquisition information
       Start time:                 3/26/2012 6:29:58 AM
       Live time:               3600
       Real time:               3672
       Dead time:                  1.95 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (1087) Env32  G53W4.25  7/6/2012 10:31:21 AM    Page  2
TestAmerica, Inc.               Spectrum name: 17_TunaCan_20120263.An1
                                      Page 1
```

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2012 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.   12 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0522

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    Bq
_____________________________________________________________________________
   46.62    46187.   0.69   0.77  2.106E-02    46.54   4.250  1.448E+04 Pb210
   59.61    46245.   0.74   0.78  2.961E-02    59.54  35.700  1.217E+03 AM241
   72.97     2852.   5.64   0.82  3.610E-02
   88.09    74900.   0.46   0.82  4.061E-02    88.03   3.610  1.612E+04 CD109
  122.01    37313.   0.73   0.89  4.276E-02   122.06  85.600  3.516E+02 CO57
  136.40     4536.   4.09   0.81  4.164E-02
  165.74    38793.   0.66   0.93  3.765E-02   165.85  79.900  5.404E+02 Ce139
  255.04     1259.   9.59   1.07  2.855E-02
  279.09    26776.   0.82   1.03  2.682E-02   279.17  81.500  1.201E+03 Hg203
  391.66    28306.   0.76   1.11  2.112E-02   391.69  64.000  9.694E+02 SN113
  661.66    20517.   0.91   1.37  1.443E-02   661.66  85.210  4.661E+02 CS137
  898.07    34851.   0.63   1.52  1.148E-02   898.02  93.700  1.562E+03 Y898
 1173.25    23664.   0.80   1.72  9.359E-03  1173.24  99.900  7.249E+02 Co1173
 1332.52    21706.   0.78   1.83  8.481E-03  1332.50  99.982  7.331E+02 Co1332
 1835.97    21924.   0.70   2.15  6.593E-03  1836.01  99.200  1.616E+03 Y1836


************ U N I D E N T I F I E D     P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  291.30    72.97     10374.      2884. 7.989E+04    5.33   0.816  -       D
  544.98   136.40      8136.      4536. 1.089E+05    4.09   0.813  -
 1019.46   255.04      3805.      1259. 4.410E+04    9.59   1.072  -
```


s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.

C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.96	46.62	15035.	46187.	12.830	0.69	0.766
AM-241	237.92	59.61	17361.	46245.	12.846	0.74	0.777
CD-109	351.79	88.09	12661.	74900.	20.806	0.46	0.821
CO-57	487.44	122.01	9755.	37313.	10.365	0.73	0.891
Ce-139	662.32	165.74	6828.	38793.	10.776	0.66	0.926
Hg-203	1115.65	279.09	4528.	26776.	7.438	0.82	1.034
SN-113	1565.90	391.66	3496.	28306.	7.863	0.76	1.105
CS-137	2646.02	661.66	2816.	20517.	5.699	0.91	1.369
Y-898	3591.91	898.07	2257.	34851.	9.681	0.63	1.523
Co-1173	4693.17	1173.25	1531.	23664.	6.573	0.80	1.720
Co-1332	5330.69	1332.52	1002.	21706.	6.029	0.78	1.825
Y-1836	7346.26	1835.97	205.	21924.	6.090	0.70	2.146

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4476E+04				8.15E+03	
			46.54	1.448E+04	(	1.799E+02 6.89E-01 4.25E+00	G
AM-241		1.2173E+03				1.58E+05	
			59.54	1.217E+03	(	1.623E+01 7.35E-01 3.57E+01	G
CD-109		1.6121E+04				4.63E+02	
			88.03	1.612E+04	(	1.134E+02 4.57E-01 3.61E+00	G
CO-57		3.5158E+02				2.72E+02	
			122.06	3.516E+02	(	4.362E+00 7.33E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.4043E+02				1.38E+02	
		165.85	5.404E+02	(	5.402E+00 6.57E-01 7.99E+01	G
Hg-203	1.2007E+03				4.66E+01	
		279.17	1.201E+03	(	1.418E+01 8.17E-01 8.15E+01	G
SN-113	9.6938E+02				1.15E+02	
		391.69	9.694E+02	(	9.529E+00 7.56E-01 6.40E+01	G
CS-137	4.6608E+02				1.10E+04	
		661.66	4.661E+02	(	5.679E+00 9.07E-01 8.52E+01	G

```
Y-898        1.5624E+03                                        1.07E+02
                          898.02 1.562E+03  (  1.005E+01 6.29E-01 9.37E+01 G

Co-1173      7.2488E+02                                        1.93E+03
                         1173.24 7.249E+02  (  5.668E+00 7.98E-01 9.99E+01 G

Co-1332      7.3312E+02                                        1.93E+03
                         1332.50 7.331E+02  (  5.074E+00 7.81E-01 1.00E+02 G

Y-1836       1.6163E+03                                        1.07E+02
                         1836.01 1.616E+03  (  5.123E+00 7.01E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq

 ____________________________________________________________________________
 Pb-210       1.4372E+04    1.4476E+04    6.891E-01%                1.80E+02
```

AM-241	1.2168E+03	1.2173E+03	7.355E-01%	1.62E+01
CD-109	1.4197E+04	1.6121E+04	4.569E-01%	1.13E+02
CO-57	2.8320E+02	3.5158E+02	7.325E-01%	4.36E+00
Ce-139	3.5257E+02	5.4043E+02	6.571E-01%	5.40E+00
Hg-203	3.4034E+02	1.2007E+03	8.175E-01%	1.42E+01
SN-113	5.8164E+02	9.6938E+02	7.559E-01%	9.53E+00
CS-137	4.6359E+02	4.6608E+02	9.066E-01%	5.68E+00
Y-898	9.0011E+02	1.5624E+03	6.288E-01%	1.00E+01
Co-1173	7.0308E+02	7.2488E+02	7.979E-01%	5.67E+00
Co-1332	7.1107E+02	7.3312E+02	7.808E-01%	5.07E+00
Y-1836	9.3113E+02	1.6163E+03	7.012E-01%	5.12E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (77.1 to 1999.2 keV) 3.505E+04 Bq
Total Decayed Activity (77.1 to 1999.2 keV) 3.9979633E+04 Bq

Gamma Verification per Geometry

Detector: **Ge19**
Geometry: **Tuna Can**
Reference date: **1/1/2018**
Calibration Standard: **108513**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **342.2**
lab ID# of cal standard: #1402359 / Tuna Can_2018_00001

Isotope	Certified Activity - Bq	Geometry Activity - Bq	Count Results	%recovery
Pb-210	72410	15986	16000	100.1
Am-241	5770	1274	1262	99.1
Cd-109	79700	17596	18110	102.9
Co-57	1809	399	392.1	98.2
Ce-139	2723	601	592.2	98.5
Hg-203	5868	1296	1308	101.0
Sn-113	4658	1028	1045	101.6
Cs-137	2283	504	518.1	102.8
Y-88	7810	1724	1691	98.1
Co-60	3574	789	778.3	98.6
Co-60	3574	789	770.3	97.6
Y-88	7810	1724	1762	102.2

Reviewed By: Jody Watson

Date: 4/17/2018

Calibration Data from file: 19_Soil_TunaCan.Clb
Energy Calibration Date: 4/16/2018 Time: 12:11:10 PM
Efficiency Calibration Date: 4/16/2018 Time: 12:11:21 PM

Calibration Description:
19_TunaCan_108513

Energy Calibration Fit
Energy = 0.1766 +0.250204*Channel -3.73478e-008*Channel**2
FWHM (ch) = 3.5649 +0.000922*Channel -2.36904e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.55	46.54	46.60	-0.13%	0.89	0.93	-4.67%
237.43	59.54	59.58	-0.07%	0.92	0.95	-2.49%
351.31	88.03	88.07	-0.05%	0.99	0.97	1.45%
487.25	122.06	122.08	-0.02%	1.02	1.00	1.42%
662.37	165.85	165.89	-0.02%	1.07	1.04	2.92%
1114.62	279.17	279.01	0.06%	1.17	1.14	2.29%
1564.53	391.69	391.54	0.04%	1.23	1.24	-0.87%
2644.90	661.66	661.68	-0.00%	1.46	1.46	0.15%
3590.43	898.02	898.04	-0.00%	1.63	1.64	-0.77%
4691.85	1173.24	1173.27	-0.00%	1.84	1.84	-0.05%
5329.60	1332.50	1332.60	-0.01%	1.94	1.95	-0.29%
7345.15	1836.01	1835.95	0.00%	2.27	2.26	0.25%

Efficiency Calibration Fit
Polynomial Uncertainty = 0.8405 %
Coefficients:
-0.371612 -4.869309 0.466742 -0.049787 0.002234 -0.000039

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.7090E-002	1.7048E-002	0.25%
59.54	2.5898E-002	2.6134E-002	-0.91%
88.03	3.4294E-002	3.3195E-002	3.21%
122.06	3.3380E-002	3.3999E-002	-1.85%
165.85	3.0076E-002	3.0529E-002	-1.51%
279.17	2.1644E-002	2.1412E-002	1.07%
391.69	1.6644E-002	1.6371E-002	1.64%
661.66	1.1237E-002	1.0933E-002	2.71%
898.02	8.5558E-003	8.7213E-003	-1.93%
1173.24	7.0410E-003	7.1383E-003	-1.38%
1332.50	6.3120E-003	6.4652E-003	-2.43%
1836.01	5.0415E-003	4.9331E-003	2.15%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.50	4.25	8.11E+003	15986.00	679.41	4.20%	1/1/2018 11:00:00 AM
Am-241	59.50	35.70	1.58E+005	1273.90	454.78	3.60%	1/1/2018 11:00:00 AM
Cd-109	88.00	3.61	4.61E+002	17596.00	635.22	4.10%	1/1/2018 11:00:00 AM
Co-57	122.10	85.60	2.72E+002	399.38	341.87	3.40%	1/1/2018 11:00:00 AM
Ce-139	165.90	79.90	1.38E+002	601.20	480.36	3.60%	1/1/2018 11:00:00 AM
Hg-203	279.20	81.50	4.66E+001	1295.50	1055.83	3.50%	1/1/2018 11:00:00 AM
Sn-113	391.70	64.00	1.15E+002	1028.40	658.18	3.90%	1/1/2018 11:00:00 AM
Cs-137	661.70	85.21	1.10E+004	504.03	429.48	4.10%	1/1/2018 11:00:00 AM
Y-88	898.00	93.70	1.07E+002	1724.30	1615.67	3.70%	1/1/2018 11:00:00 AM
Co-60	1173.20	99.90	1.93E+003	789.05	788.26	3.90%	1/1/2018 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	789.05	788.89	3.90%	1/1/2018 11:00:00 AM
Y-88	1836.10	99.20	1.07E+002	1724.30	1710.51	3.70%	1/1/2018 11:00:00 AM

Test America St. Louis Spectrum ID: 19_TunaCan_20180020

Sample Description: 19_TunaCan_108513
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: 108513

Decay to Time: 1/1/2018 11:00 Live Time: 3600 sec
Acquisition Time: 3/14/2018 15:23:10 Real Time: 3652 sec
Analysis Time: 4/16/2018 13:51 Dead Time: 1.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2017-05-03_0244.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.600E+04	0.6	9.827E+01	1.032E+03	1.956E+02
AM-241	1.262E+03	0.8	9.764E+00	8.057E+01	1.778E+01
CD-109	1.811E+04	0.4	7.707E+01	1.127E+03	1.177E+02
CO-57	3.921E+02	0.9	3.334E+00	2.277E+01	5.681E+00
Ce-139	5.922E+02	0.7	4.306E+00	3.370E+01	6.700E+00
Hg-203	1.308E+03	0.8	1.088E+01	7.580E+01	1.542E+01
SN-113	1.045E+03	0.8	8.323E+00	6.221E+01	1.083E+01
CS-137	5.181E+02	1.1	5.945E+00	2.731E+01	8.219E+00
Y-898	1.691E+03	0.7	1.196E+01	8.678E+01	1.289E+01
Co-1173	7.783E+02	0.9	6.815E+00	3.933E+01	6.923E+00
Co-1332	7.703E+02	1.0	7.560E+00	3.911E+01	7.892E+00
Y-1836	1.762E+03	0.8	1.428E+01	1.014E+02	1.026E+01
Total	4.424E+04				

Analyst: Jody Watson

TestAmerica Inc Spectrum name: 19_TunaCan_20180020.An1

Sample description
19_TunaCan_108513

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180020.An1

Acquisition information

Start time:	3/14/2018 3:23:10 PM
Live time:	3600
Real time:	3652
Dead time:	1.43 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration
Filename: 19_Soil_TunaCan.Clb
19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2018 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2017-05-03_0244.PBC 5/3/2017 2:44:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0474

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	41485.	0.61	0.93	1.711E-02	46.54	4.250	1.600E+04	Pb210
49.66	185.	79.61	0.94	2.004E-02				
59.58	42387.	0.77	0.92	2.615E-02	59.54	35.700	1.262E+03	AM241
70.77	1497.	10.76	0.96	2.996E-02				
72.98	2850.	5.71	0.96	3.053E-02				
77.04	130.	105.86	0.96	3.144E-02				
82.61	1804.	9.10	0.97	3.245E-02				
84.89	1999.	8.21	0.97	3.279E-02				
88.09	70129.	0.43	0.97	3.320E-02	88.03	3.610	1.811E+04	CD109
109.95	270.	55.08	0.90	3.432E-02				
122.08	34171.	0.85	1.02	3.400E-02	122.06	85.600	3.921E+02	CO57
136.52	4531.	4.35	1.04	3.311E-02				
156.45	191.	70.26	0.48	3.141E-02				
165.89	36156.	0.73	1.07	3.053E-02	165.85	79.900	5.922E+02	Ce139
255.00	1262.	10.74	1.03	2.296E-02				
279.01	28100.	0.83	1.17	2.142E-02	279.17	81.500	1.308E+03	Hg203
374.53	40.	110.13	0.47	1.696E-02				
391.54	25531.	0.80	1.23	1.638E-02	391.69	64.000	1.045E+03	SN113
438.33	68.	61.86	0.55	1.498E-02				
450.42	51.	90.94	0.45	1.466E-02				
579.11	37.	118.27	1.39	1.208E-02				
583.45	143.	40.12	1.40	1.201E-02				
590.49	120.	62.06	0.55	1.191E-02				
602.94	89.	61.09	0.46	1.172E-02				
608.99	230.	39.38	0.89	1.163E-02				
634.72	58.	97.26	0.36	1.128E-02				
661.68	17295.	1.15	1.46	1.093E-02	661.66	85.210	5.181E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
680.83	293.	36.47	0.98	1.070E-02				
701.88	76.	74.94	0.28	1.046E-02				
813.88	662.	13.53	1.81	9.378E-03				
898.02	31118.	0.71	1.63	8.721E-03	898.02	93.700	1.691E+03	Y898
919.02	96.	39.05	0.43	8.573E-03				
973.55	110.	43.13	1.47	8.215E-03				
1173.23	19468.	0.88	1.84	7.138E-03	1173.24	99.900	7.783E+02	Co1173
1311.47	54.	70.42	0.52	6.547E-03				
1332.58	17466.	0.98	1.95	6.465E-03	1332.50	99.982	7.703E+02	Co1332
1426.68	175.	38.25	0.53	6.121E-03				
1515.29	59.	39.89	1.20	5.826E-03				
1553.02	72.	48.79	0.62	5.708E-03				
1619.47	59.	52.31	0.50	5.509E-03				
1835.90	19413.	0.81	2.27	4.933E-03	1836.01	99.200	1.762E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
197.98	49.61	10751.	205.	1.023E+04	71.88	0.937 -	c
282.14	70.75	12228.	1497.	4.997E+04	10.76	0.956 -	D
290.98	72.96	11800.	2850.	9.335E+04	5.71	0.958 -	D
307.22	77.02	9412.	130.	4.137E+03	105.86	0.962 -	c
329.65	82.59	12567.	1809.	5.576E+04	9.07	0.967 -	sD
338.75	84.87	12449.	2015.	6.145E+04	8.14	0.969 -	sD
438.78	109.95	7282.	270.	7.868E+03	55.08	0.905 -	s
544.98	136.52	8574.	4531.	1.368E+05	4.35	1.039 -	s
624.64	156.45	5607.	191.	6.070E+03	70.26	0.482 -	s
1018.60	255.00	4278.	1262.	5.496E+04	10.74	1.030 -	
1496.54	374.53	900.	40.	2.387E+03	110.13	0.471 -	c
1751.63	438.33	774.	68.	4.506E+03	61.86	0.545 -	s
1800.00	450.42	900.	51.	3.478E+03	90.94	0.447 -	sc
2314.63	579.33	954.	37.	3.086E+03	118.27	1.393 -	sc
2331.99	583.67	1569.	143.	1.188E+04	40.12	1.396 -	sD
2360.15	590.49	1480.	120.	1.008E+04	62.06	0.550 -	s
2409.97	602.94	1012.	89.	7.593E+03	61.09	0.464 -	s
2434.16	608.99	1840.	230.	1.977E+04	39.38	0.887 -	s
2537.07	634.72	1084.	58.	5.099E+03	97.26	0.355 -	sc
2721.49	680.83	2304.	293.	2.739E+04	36.47	0.976 -	s
2805.71	701.88	1056.	76.	7.264E+03	74.94	0.285 -	s
3253.74	813.88	1425.	662.	7.059E+04	13.53	1.808 -	s
3674.40	919.02	530.	96.	1.126E+04	39.05	0.432 -	s
3892.57	973.55	682.	110.	1.345E+04	43.13	1.468 -	s
5245.01	1311.47	348.	54.	8.248E+03	70.42	0.522 -	s
5706.21	1426.68	646.	175.	2.859E+04	38.25	0.525 -	s
6061.00	1515.29	198.	59.	1.013E+04	39.89	1.199 -	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
6212.08	1553.02	345.	72.	1.256E+04	48.79	0.621	- s
6478.17	1619.47	284.	59.	1.074E+04	52.31	0.497	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.31	46.54	11710.	41485.	11.524	0.61	0.935D
AM-241	237.43	59.58	16272.	42387.	11.774	0.77	0.923
CD-109	351.15	88.03	9451.	70129.	19.480	0.43	0.972D
CO-57	487.25	122.08	11165.	34171.	9.492	0.85	1.017
Ce-139	662.37	165.89	7603.	36156.	10.043	0.73	1.073
Hg-203	1114.62	279.01	4975.	28100.	7.806	0.83	1.168
SN-113	1564.53	391.54	3156.	25531.	7.092	0.80	1.227
CS-137	2644.90	661.68	3399.	17295.	4.804	1.15	1.461
Y-898	3590.36	898.02	2532.	31118.	8.644	0.71	1.632
Co-1173	4691.69	1173.23	1338.	19468.	5.408	0.88	1.845
Co-1332	5329.52	1332.58	1430.	17466.	4.852	0.98	1.948
Y-1836	7344.98	1835.90	561.	19413.	5.392	0.81	2.273

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6003E+04				8.15E+03	
			46.54	1.600E+04	(	1.956E+02 6.14E-01 4.25E+00 G	
AM-241		1.2624E+03				1.58E+05	
			59.54	1.262E+03	(	1.778E+01 7.73E-01 3.57E+01 G	
CD-109		1.8113E+04				4.63E+02	
			88.03	1.811E+04	(	1.177E+02 4.25E-01 3.61E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	3.9206E+02						2.72E+02
		122.06	3.921E+02	(	5.681E+00	8.50E-01	8.56E+01 G
Ce-139	5.9221E+02						1.38E+02
		165.85	5.922E+02	(	6.700E+00	7.27E-01	7.99E+01 G
Hg-203	1.3079E+03						4.66E+01
		279.17	1.308E+03	(	1.542E+01	8.32E-01	8.15E+01 G
SN-113	1.0455E+03						1.15E+02
		391.69	1.045E+03	(	1.083E+01	7.96E-01	6.40E+01 G
CS-137	5.1806E+02						1.10E+04
		661.66	5.181E+02	(	8.219E+00	1.15E+00	8.52E+01 G
Y-898	1.6914E+03						1.07E+02
		898.02	1.691E+03	(	1.289E+01	7.07E-01	9.37E+01 G
Co-1173	7.7829E+02						1.93E+03
		1173.24	7.783E+02	(	6.923E+00	8.76E-01	9.99E+01 G
Co-1332	7.7032E+02						1.93E+03
		1332.50	7.703E+02	(	7.892E+00	9.81E-01	1.00E+02 G
Y-1836	1.7620E+03						1.07E+02
		1836.01	1.762E+03	(	1.026E+01	8.10E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.5905E+04	1.6003E+04	6.141E-01%	1.96E+02
AM-241	1.2620E+03	1.2624E+03	7.734E-01%	1.78E+01
CD-109	1.6256E+04	1.8113E+04	4.255E-01%	1.18E+02
CO-57	3.2615E+02	3.9206E+02	8.503E-01%	5.68E+00
Ce-139	4.1173E+02	5.9221E+02	7.271E-01%	6.70E+00
Hg-203	4.4729E+02	1.3079E+03	8.318E-01%	1.54E+01
SN-113	6.7689E+02	1.0455E+03	7.961E-01%	1.08E+01
CS-137	5.1570E+02	5.1806E+02	1.148E+00%	8.22E+00
Y-898	1.0578E+03	1.6914E+03	7.071E-01%	1.29E+01
Co-1173	7.5832E+02	7.7829E+02	8.756E-01%	6.92E+00
Co-1332	7.5056E+02	7.7032E+02	9.814E-01%	7.89E+00
Y-1836	1.1019E+03	1.7620E+03	8.103E-01%	1.03E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 3.947E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 4.4235852E+04 Bq/Sample

Initial Calibration Verifications

2nd Source Verification

Detector:	Ge5
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1160.9	99.7
Cs-137	1926	396	0.851	465	442.36	95.1
Co-60	3611	742	0.99974	742	700.21	94.3
Co-60	3612	742	0.999856	742	701.86	94.6

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  1
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1

Sample description
     5_TunaCan2nd_Rad10_032712


Spectrum Filename: C:\User\SPC\Det5\5_TunaCan2nd_20120813.An1

Acquisition information
       Start time:                 3/27/2012 10:12:05 AM
       Live time:               7200
       Real time:               7250
       Dead time:                  0.69 %
       Detector ID:                    5

Detector system
     Ge 5 SN/157


Calibration
       Filename:                   5_Soil_TunaCan.Clb
     5_Soil_TunaCan_90099_032612


       Energy Calibration
            Created:               3/27/2012 5:20:02 PM
            Zero offset:           0.135 keV
            Gain:                  0.250 keV/channel
            Quadratic:             2.720E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/27/2012 5:20:37 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.466115E-01 + (-7.830454E-01*Log(E) ) +
                                   ( -4.117504E-03*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.43 %
            Log(Eff):             -2.462251E+01 + ( 9.075211E+00*Log(E) ) +
                                   ( -9.664422E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.61keV )
       Stop channel:            8000 (  2000.53keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 7:35:49 AM    Page  2
TestAmerica                     Spectrum name: 5_TunaCan2nd_20120813.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	5_2012-02-26_0305.PBC 2/26/2012 3:05:30 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 33.1557

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.81	1005.	12.08	0.62	1.151E-02				
46.61	72616.	0.49	0.73	1.792E-02	46.54	4.250	1.421E+04	Pb210
49.73	1326.	15.18	0.68	1.987E-02				
59.57	75329.	0.49	0.74	2.535E-02	59.54	35.700	1.161E+03	AM241
87.94	40851.	0.68	0.80	3.460E-02	88.03	3.610	1.542E+04	CD109
96.44	148.	47.31	0.80	3.568E-02				
99.01	160.	48.52	0.81	3.589E-02				
105.59	109.	69.79	0.52	3.619E-02				
121.94	9225.	1.66	0.84	3.583E-02	122.06	85.600	3.348E+02	CO57
129.89	126.	62.97	0.30	3.522E-02				
136.43	1263.	7.42	0.90	3.457E-02				
165.86	1574.	6.14	0.84	3.133E-02	165.85	79.900	5.319E+02	Ce139
238.72	327.	27.04	0.86	2.319E-02				
247.25	57.	84.47	0.31	2.252E-02				
259.02	93.	60.17	0.97	2.167E-02				
260.46	98.	58.62	0.97	2.157E-02				
322.65	45.	91.14	0.46	1.806E-02				
351.63	256.	27.79	1.06	1.681E-02				
391.95	494.	16.33	1.15	1.536E-02	391.69	64.000	9.501E+02	SN113
407.02	43.	90.43	0.56	1.489E-02				
412.80	202.	35.90	0.77	1.471E-02				
420.83	123.	52.91	0.72	1.448E-02				
510.72	188.	44.32	0.50	1.232E-02				
542.81	148.	28.69	0.36	1.171E-02				
583.30	161.	33.50	0.69	1.103E-02				
661.70	25605.	0.71	1.39	9.924E-03	661.66	85.210	4.424E+02	CS137
762.61	129.	36.06	0.79	8.812E-03				
796.90	151.	38.71	0.30	8.493E-03				
886.67	129.	46.77	0.30	7.766E-03				
897.77	428.	19.21	1.38	7.686E-03	898.02	93.700	1.665E+03	Y898
932.49	230.	35.52	0.82	7.445E-03				

1008.65	104.	56.29	0.28	6.970E-03				
1173.15	23044.	0.73	1.79	6.138E-03	1173.24	99.900	7.002E+02	Co1173
1332.39	20769.	0.71	1.87	5.515E-03	1332.50	99.982	7.019E+02	Co1332
1836.05	245.	7.47	1.56	4.208E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.78	36.81	4847.	1005.	8.731E+04	12.08	0.625	-
198.52	49.73	12365.	1326.	6.673E+04	15.18	0.681	- s
385.40	96.42	1874.	90.	2.532E+03	71.31	0.588	- sc
395.68	98.99	2103.	121.	3.381E+03	58.44	0.394	- s

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 7:35:49 AM Page 3
TestAmerica Spectrum name: 5_TunaCan2nd_20120813.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
422.09	105.59	2271.	109.	3.012E+03	69.79	0.518	- sc
519.32	129.89	2194.	126.	3.592E+03	62.97	0.298	- s
545.51	136.43	2377.	1263.	3.654E+04	7.42	0.900	- s
954.90	238.72	2247.	327.	1.410E+04	27.04	0.863	- sM
989.00	247.25	1031.	57.	2.516E+03	84.47	0.312	- sc
1036.13	259.01	1532.	93.	4.309E+03	60.17	0.968	- D
1041.90	260.46	1588.	98.	4.525E+03	58.62	0.970	- D
1290.76	322.65	744.	45.	2.473E+03	91.14	0.455	- c
1406.70	351.63	1442.	256.	1.523E+04	27.79	1.058	- s
1628.36	407.02	667.	43.	2.866E+03	90.43	0.562	- sc
1651.47	412.80	1438.	202.	1.370E+04	35.90	0.775	- s
1683.60	420.83	1291.	123.	8.472E+03	52.91	0.720	- s
2043.25	510.72	1553.	188.	1.523E+04	44.32	0.503	- s
2171.67	542.81	587.	148.	1.267E+04	28.69	0.362	- s
2333.63	583.30	785.	161.	1.460E+04	33.50	0.694	- s
3050.97	762.61	614.	129.	1.468E+04	36.06	0.794	- s
3188.11	796.90	856.	151.	1.782E+04	38.71	0.295	- s
3547.15	886.67	963.	129.	1.665E+04	46.77	0.296	- s
3730.41	932.49	1438.	230.	3.096E+04	35.52	0.818	- s
4035.01	1008.65	864.	104.	1.490E+04	56.29	0.275	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.61	16470.	72552.	10.077	0.49	0.733
AM-241	237.88	59.57	15419.	75329.	10.462	0.49	0.735
CD-109	351.46	87.94	8772.	40851.	5.674	0.68	0.804
CO-57	487.54	121.94	3880.	9225.	1.281	1.66	0.838
Ce-139	663.30	165.86	2329.	1574.	0.219	6.14	0.840
SN-113	1568.04	391.95	1640.	494.	0.069	16.33	1.153
CS-137	2647.28	661.70	1362.	25582.	3.553	0.71	1.394
Y-898	3591.55	897.77	1410.	428.	0.060	19.21	1.376

Co-1173	4692.83	1173.15	788.	23044.	3.201	0.73	1.786
Co-1332	5329.55	1332.39	98.	20769.	2.885	0.71	1.870
Y-1836	7342.76	1836.05	15.	245.	0.034	7.47	1.556s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.4212E+04					8.15E+03	
			46.54	1.421E+04	(P	1.177E+02	4.91E-01	4.25E+00 G
AM-241		1.1609E+03					1.58E+05	
			59.54	1.161E+03	(	8.959E+00	4.87E-01	3.57E+01 G
CD-109		1.5419E+04					4.63E+02	
			88.03	1.542E+04	(	1.658E+02	6.81E-01	3.61E+00 G
CO-57		3.3478E+02					2.72E+02	
			122.06	3.348E+02	(	1.063E+01	1.66E+00	8.56E+01 G
Ce-139		5.3191E+02					1.38E+02	
			165.85	5.319E+02	(	7.689E+01	6.14E+00	7.99E+01 G
Hg-203		-6.5193E-03					4.66E+01	
			279.17	-6.519E-03	%(	1.788E+00	8.22E+03	8.15E+01 G
SN-113		9.5011E+02					1.15E+02	
			391.69	9.501E+02	(	3.682E+02	1.63E+01	6.40E+01 G
CS-137		4.4236E+02					1.10E+04	
			661.66	4.424E+02	(P	3.020E+00	7.12E-01	8.52E+01 G
Y-898		1.6655E+03					1.07E+02	
			898.02	1.665E+03	(	6.908E+02	1.92E+01	9.37E+01 G
Co-1173		7.0021E+02					1.93E+03	
			1173.24	7.002E+02	(	4.056E+00	7.32E-01	9.99E+01 G
Co-1332		7.0186E+02					1.93E+03	
			1332.50	7.019E+02	(	1.651E+00	7.07E-01	1.00E+02 G
Y-1836		1.6424E+03					1.07E+02	
			1836.01	1.642E+03	(	1.392E+02	7.47E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210	1.3259E+04	1.4212E+04	4.918E-01%	1.18E+02
AM-241	1.1568E+03	1.1609E+03	4.867E-01%	8.96E+00
CD-109	4.5403E+03	1.5419E+04	6.810E-01%	1.66E+02
CO-57	4.1787E+01	3.3478E+02	1.660E+00%	1.06E+01
Ce-139	8.7347E+00	5.3191E+02	6.138E+00%	7.69E+01
Hg-203 #A	-6.5193E-03	>12 Halflives	8.2197E+03%	1.7882E+00
SN-113	6.9747E+00	9.5011E+02	1.633E+01%	3.68E+02
CS-137	4.2015E+02	4.4236E+02	7.122E-01%	3.02E+00
Y-898	8.2662E+00	1.6655E+03	1.921E+01%	6.91E+02
Co-1173	5.2196E+02	7.0021E+02	7.316E-01%	4.06E+00
Co-1332	5.2320E+02	7.0186E+02	7.069E-01%	1.65E+00
Y-1836	8.1520E+00	1.6424E+03	7.471E+00%	1.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (  279.0 to  2000.5 keV)     2.050E+04  Bq/Sample
Total Decayed Activity (  279.0 to  2000.5 keV) 3.7761527E+04  Bq/Sample
```

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/28/2012 8:52:25 AM
TestAmerica                      Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
     7_TunaCan2ndSource_81427-334_032712


Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
       Start time:                 3/27/2012 3:25:25 PM
       Live time:               3600
       Real time:               3684
       Dead time:                  2.28 %
       Detector ID:                   7

Detector system
     Ge 7 SN/154


Calibration
       Filename:                   7_Soil_TunaCan.Clb
     7_TunaCan_90099_032712


       Energy Calibration
            Created:               3/16/2012 11:44:50 AM
            Zero offset:           0.153 keV
            Gain:                  0.250 keV/channel
            Quadratic:             6.716E-09 keV/channel^2

       Efficiency Calibration
            Created:               3/16/2012 11:45:14 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.87 %
            Log(Eff):              6.716580E-01 + (-6.166540E-01*Log(E) ) +
                                   ( -2.065917E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.48 %
            Log(Eff):             -2.689695E+01 + ( 1.019544E+01*Log(E) ) +
                                   ( -1.081671E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.65keV )
       Stop channel:            8000 (  2000.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	876.	[illegible]	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
_____________________________________________________________________________

Pb-210   N   1.3857E+04                                        8.15E+03
                            46.54 1.386E+04  (P 1.480E+02 6.34E-01 4.25E+00 G

AM-241       1.1504E+03                                        1.58E+05
                            59.54 1.150E+03  (  1.036E+01 5.81E-01 3.57E+01 G

CD-109       1.5217E+04                                        4.63E+02
                            88.03 1.522E+04  (  1.799E+02 7.73E-01 3.61E+00 G

CO-57        3.1712E+02                                        2.72E+02
                           122.06 3.171E+02  (  1.205E+01 2.04E+00 8.56E+01 G

Ce-139       5.1801E+02                                        1.38E+02
                           165.85 5.180E+02  (  7.941E+01 6.45E+00 7.99E+01 G

Hg-203      -4.5441E-01                                        4.66E+01
                           279.17-4.544E-01 ?(  2.347E+00 1.56E+02 8.15E+01 G

SN-113       9.3315E+02                                        1.15E+02
                           391.69 9.332E+02  (  4.178E+02 1.96E+01 6.40E+01 G

CS-137       4.4047E+02                                        1.10E+04
                           661.66 4.405E+02  (  3.706E+00 8.56E-01 8.52E+01 G

Y-898        1.6944E+03                                        1.07E+02
                           898.02 1.694E+03  (  8.216E+02 2.35E+01 9.37E+01 G

Co-1173      6.8172E+02                                        1.93E+03
                          1173.24 6.817E+02  (  4.436E+00 8.58E-01 9.99E+01 G

Co-1332      6.9210E+02                                        1.93E+03
                          1332.50 6.921E+02  (  2.586E+00 8.49E-01 1.00E+02 G

Y-1836       1.7801E+03                                        1.07E+02
                          1836.01 1.780E+03  (  2.065E+02 9.19E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  1
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
     8_TunaCan_81427-334_2ndsource_032912


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
       Start time:                 3/29/2012 1:58:04 AM
       Live time:               3600
       Real time:               3622
       Dead time:                  0.61 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  3/29/2012 7:45:38 AM    Page  2
TestAmerica                     Spectrum name: 8_TunaCan2nd_20120697.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

8_TunaCan2nd_20120697

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 3
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 4
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 3

```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.4221E+04                                     8.15E+03
                            46.54 1.422E+04  (  1.806E+02 7.43E-01 4.25E+00 G

AM-241       1.1754E+03                                     1.58E+05
                            59.54 1.175E+03  (  1.311E+01 7.10E-01 3.57E+01 G

CD-109       1.5223E+04                                     4.63E+02
                            88.03 1.522E+04  (  2.071E+02 8.83E-01 3.61E+00 G

CO-57        3.3494E+02                                     2.72E+02
                           122.06 3.349E+02  (  1.600E+01 2.55E+00 8.56E+01 G

Ce-139       6.0766E+02                                     1.38E+02
                           165.85 6.077E+02 *(  1.153E+02 8.62E+00 7.99E+01 G

Hg-203       6.1671E-01                                     4.66E+01
                           279.17 6.167E-01  (  2.689E+00 1.31E+02 8.15E+01 G

SN-113       1.0157E+03                                     1.15E+02
                           391.69 1.016E+03  (  4.390E+02 1.79E+01 6.40E+01 G

CS-137       4.4661E+02                                     1.10E+04
                           661.66 4.466E+02  (P 3.489E+00 8.85E-01 8.52E+01 G

Y-898        2.5543E+03                                     1.07E+02
                           898.02 2.554E+03  (  9.046E+02 1.79E+01 9.37E+01 G

Co-1173      6.9722E+02                                     1.93E+03
                          1173.24 6.972E+02  (  4.649E+00 9.19E-01 9.99E+01 G

Co-1332      6.9192E+02                                     1.93E+03
                          1332.50 6.919E+02  (  2.515E+00 9.18E-01 1.00E+02 G

Y-1836       1.7236E+03                                     1.07E+02
                          1836.01 1.724E+03  (  1.542E+02 9.00E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 6
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector:	Ge9
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

9_TunaCan_20120371

```
     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  1
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1

Sample description
     9_TunaCan_90099_061412


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
       Start time:                 6/14/2012 10:54:15 AM
       Live time:               3600
       Real time:               3629
       Dead time:                  0.81 %
       Detector ID:                    9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                   9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:               6/14/2012 10:19:40 AM
            Zero offset:           0.088 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:               6/14/2012 10:19:51 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.30 %
            Log(Eff):             -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                   ( -3.950640E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.42 %
            Log(Eff):             -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                   ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.66keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  6/14/2012 1:20:45 PM    Page  2
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120371.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

9_TunaCan_20120371

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 3

TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

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```
 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             Bq/Sample     keV     Bq/Sample     Bq/Sample      COMMENTS
 ____________________________________________________________________________

Pb-210   N   1.3971E+04                                     8.15E+03
                            46.54 1.397E+04  (  1.478E+02 6.46E-01 4.25E+00 G

AM-241       1.1694E+03                                     1.58E+05
                            59.54 1.169E+03  (  1.086E+01 6.16E-01 3.57E+01 G

CD-109       1.5657E+04                                     4.63E+02
                            88.03 1.566E+04  (  2.117E+02 8.71E-01 3.61E+00 G

CO-57        3.3118E+02                                     2.72E+02
                           122.06 3.312E+02  (  1.731E+01 2.86E+00 8.56E+01 G

Ce-139       5.4173E+02                                     1.38E+02
                           165.85 5.417E+02  (  1.357E+02 1.07E+01 7.99E+01 G

Hg-203      -5.2429E-01                                     4.66E+01
                           279.17-5.243E-01 ?(  2.327E+00 1.34E+02 8.15E+01 G

SN-113       9.5260E+02                                     1.15E+02
                           391.69 9.526E+02 ?(  7.503E+02 2.44E+01 6.40E+01 G

CS-137       4.4452E+02                                     1.10E+04
                           661.66 4.445E+02  (  3.202E+00 7.63E-01 8.52E+01 G

Y-898        2.4057E+03                                     1.07E+02
                           898.02 2.406E+03 @(  1.118E+03 2.36E+01 9.37E+01 G

Co-1173      6.8772E+02                                     1.93E+03
                          1173.24 6.877E+02  (  4.547E+00 8.09E-01 9.99E+01 G

Co-1332      6.9256E+02                                     1.93E+03
                          1332.50 6.926E+02  (  2.044E+00 7.49E-01 1.00E+02 G

Y-1836       1.7452E+03                                     1.07E+02
                          1836.01 1.745E+03  (  2.388E+02 1.02E+01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



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   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

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      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                        Peak Codes:
  T - Thermal Neutron Activation        G - Gamma Ray
  F - Fast Neutron Activation           X - X-Ray
  I - Fission Product                   P - Positron Decay
  N - Naturally Occurring Isotope       S - Single-Escape
  P - Photon Reaction                   D - Double-Escape
  C - Charged Particle Reaction         K - Key Line
  M - No MDA Calculation                A - Not in Average
  R - Coincidence Corrected             C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
Hg-203     280.29      2362.       -52.    -0.014   133.84   0.000E+00
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                Bq/Sample

_____________________________________________________________________________
Pb-210       1.2947E+04    1.3971E+04    6.459E-01%                 1.48E+02
AM-241       1.1648E+03    1.1694E+03    6.156E-01%                 1.09E+01
CD-109       4.0954E+03    1.5657E+04    8.713E-01%                 2.12E+02
CO-57        3.3792E+01    3.3118E+02    2.862E+00%                 1.73E+01
Ce-139       5.9752E+00    5.4173E+02    1.074E+01%                 1.36E+02
Hg-203 #A   -5.2429E-01 >12 Halflives   1.3384E+02%   2.3272E+00
SN-113 #     4.3447E+00    9.5260E+02    2.438E+01%                 7.50E+02
CS-137       4.2011E+02    4.4452E+02    7.635E-01%                 3.20E+00
Y-898  #     7.1422E+00    2.4057E+03    2.361E+01%                 1.12E+03
Co-1173      4.9827E+02    6.8772E+02    8.087E-01%                 4.55E+00
Co-1332      5.0178E+02    6.9256E+02    7.487E-01%                 2.04E+00
Y-1836       5.1813E+00    1.7452E+03    1.023E+01%                 2.39E+02
```



```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ---------------------------
Total Activity (  379.7 to  1999.7 keV)     1.968E+04  Bq/Sample
Total Decayed Activity (  379.7 to  1999.7 keV) 3.8598309E+04  Bq/Sample
```

2nd Source Verification

Detector: **Ge12**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1288	103.1
Cs-137	1926	425	0.851	499	509.9	102.1
Co-60	3612	797	0.999856	797	833.8	104.6

Reviewed By: Jody Watson

Date: 4/24/2018

Test America St. Louis Spectrum ID: 12_TunaCan_20180012

Sample Description: 12_TunaCan_ICV
Detector: Detector #12
Batch ID: 12
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/24/2018 09:26:18 Real Time: 5018 sec
Analysis Time: 4/24/2018 10:50 Dead Time: 0.36 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Soil_TunaCan.Clb
Efficiency Cal Desc: 12_TunaCan_108513
Efficiency Cal Date: 4/20/2018 11:53
Energy Cal Date: 4/20/2018 11:13
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 12_2017-05-07_0806.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.634E+04	0.6	9.464E+01	1.053E+03	1.764E+02
AM-241	1.288E+03	0.4	5.772E+00	8.177E+01	8.914E+00
CD-109	2.726E+04	25.0	6.823E+03	7.030E+03	1.764E+04
CO-57	1.000E+100	153.6	5.398E-01	5.402E-01	1.425E+00
Ce-139	1.000E+100	106.9	5.267E-01	5.274E-01	1.390E+00
Hg-203	1.000E+100	297.5	6.855E-01	6.856E-01	1.730E+00
SN-113	1.000E+100	692.4	1.143E+00	1.143E+00	2.762E+00
CS-137	5.099E+02	0.8	3.904E+00	2.652E+01	3.285E+00
Y-898	1.000E+100	140.9	1.086E+00	1.086E+00	2.342E+00
Co-1173	8.106E+02	1.3	1.069E+01	4.173E+01	9.187E+00
Co-1332	8.338E+02	1.3	1.078E+01	4.290E+01	6.803E+00
Y-1836	1.000E+100	127.2	4.662E-01	4.667E-01	9.202E-01
Total	6.000E+100				

Analyst: Jody Watson

Sample description
12_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det12\12_TunaCan_20180012.An1

Acquisition information

Start time:	4/24/2018 9:26:18 AM
Live time:	5000
Real time:	5018
Dead time:	0.36 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_Soil_TunaCan.Clb

12_TunaCan_108513

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/20/2018 11:53:09 AM
Type:	Polynomial
Uncertainty:	1.020 %
Coefficients:	-0.363508 -4.707999 0.462125
	-0.051256 0.002384 -0.000043

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	100 (25.08keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2017-05-07_0806.PBC 5/7/2017 8:06:54 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 25.3541

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
28.13	58.	46.71	0.75	4.137E-03				
32.13	394.	18.65	0.81	7.163E-03				
36.69	330.	25.31	0.84	1.059E-02				
46.66	43625.	0.58	0.85	1.811E-02	46.54	4.250	1.634E+04	Pb210
49.83	321.	44.33	0.85	2.160E-02				
59.65	63562.	0.45	0.86	2.820E-02	59.54	35.700	1.288E+03	AM241
70.53	127.	49.58	1.39	3.219E-02				
74.86	220.	28.10	0.88	3.333E-02				
77.21	369.	16.72	0.88	3.387E-02				
87.68	350.	23.71	0.81	3.578E-02	88.03	3.610	3.034E+04	CD109
93.18	213.	27.98	1.16	3.644E-02				
165.85	67.	106.94	0.97	3.405E-02	165.85	79.900	HL>Cutoff	Ce139
238.54	388.	19.10	0.88	2.744E-02				
279.17	23.	297.48	1.09	2.449E-02	279.17	81.500	HL>Cutoff	Hg203
307.48	44.	92.73	0.49	2.278E-02				
312.92	63.	62.15	0.30	2.248E-02				
320.20	50.	55.24	0.61	2.209E-02				
355.42	79.	51.62	0.51	2.040E-02				
384.05	22.	98.42	0.50	1.922E-02				
428.92	42.	63.02	0.59	1.766E-02				
454.01	126.	41.89	2.09	1.692E-02				
493.21	76.	56.00	0.64	1.589E-02				
583.05	231.	19.93	1.19	1.403E-02				
609.57	255.	15.76	1.66	1.358E-02				
661.72	21282.	0.77	1.42	1.279E-02	661.66	85.210	5.099E+02	CS137
898.02	37.	140.94	1.67	1.025E-02	898.02	93.700	HL>Cutoff	Y898
1173.31	7459.	1.32	1.92	8.426E-03	1173.24	99.900	8.106E+02	Co1173

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.58	6951.	1.30	1.98	7.647E-03	1332.50	99.982	8.318E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
112.21	28.13	314.	58.	1.406E+04	46.71	0.750	-	s
128.21	32.13	1577.	394.	5.496E+04	18.65	0.810	-	
146.44	36.67	3332.	330.	3.120E+04	25.31	0.841	-	sD
199.29	49.79	9113.	333.	1.539E+04	40.96	0.855	-	sD
281.70	70.53	1447.	127.	3.956E+03	49.58	1.387	-	s
299.02	74.84	1784.	220.	6.587E+03	28.10	0.880	-	D
308.40	77.19	1706.	369.	1.088E+04	16.72	0.883	-	sD
372.24	93.18	1248.	213.	5.837E+03	27.98	1.163	-	sM
953.35	238.54	1339.	388.	1.414E+04	19.10	0.882	-	s
1229.01	307.48	572.	44.	1.931E+03	92.73	0.491	-	sc
1250.75	312.92	513.	63.	2.788E+03	62.15	0.295	-	s
1279.88	320.20	329.	50.	2.263E+03	55.24	0.611	-	s
1420.71	355.42	528.	79.	3.873E+03	51.62	0.511	-	s
1535.20	384.00	232.	22.	1.118E+03	98.42	0.497	-	sc
1714.62	428.92	312.	42.	2.406E+03	63.02	0.590	-	s
1814.96	454.01	760.	126.	7.448E+03	41.89	2.094	-	s
1971.76	493.21	502.	76.	4.813E+03	56.00	0.640	-	s
2331.07	583.05	403.	231.	1.644E+04	19.93	1.194	-	
2437.14	609.57	326.	255.	1.877E+04	15.76	1.660	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.79	46.54	10103.	43625.	8.725	0.58	0.851D
AM-241	237.76	59.54	8808.	63562.	12.712	0.45	0.865D
CD-109	350.62	87.77	1861.	315.	0.063	25.03	0.760s
CO-57	487.68	122.06	2320.	-56.	-0.011	153.64	0.928
Ce-139	662.74	165.85	1600.	67.	0.013	106.94	0.973s
Hg-203	1115.81	279.17	1331.	23.	0.005	297.48	1.086s
SN-113	1565.74	391.69	1248.	-10.	-0.002	692.39	1.196s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2645.75	661.72	832.	21282.	4.256	0.77	1.422
Y-898	3591.15	898.02	555.	37.	0.007	140.94	1.672s
Co-1173	4692.85	1173.31	308.	7459.	1.492	1.32	1.921
Co-1332	5330.42	1332.58	135.	6968.	1.394	1.29	1.978
Y-1836	7346.49	1836.01	27.	-11.	-0.002	127.17	2.459s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6338E+04				8.15E+03	
			46.54	1.634E+04	(P	1.764E+02 5.79E-01 4.25E+00	G
AM-241		1.2876E+03				1.58E+05	
			59.54	1.288E+03	(	8.914E+00 4.48E-01 3.57E+01	G
CD-109		2.7262E+04				4.63E+02	
			88.03	2.726E+04	*(	1.764E+04 2.50E+01 3.61E+00	G
CO-57		-3.5134E-01				2.72E+02	
			122.06	-3.513E-01	(	1.425E+00 1.54E+02 8.56E+01	G
Ce-139		4.9250E-01				1.38E+02	
			165.85	4.925E-01	?(	1.390E+00 1.07E+02 7.99E+01	G
Hg-203		2.3043E-01				4.66E+01	
			279.17	2.304E-01	&(	1.730E+00 2.97E+02 8.15E+01	G
SN-113		-1.6505E-01				1.15E+02	
			391.69	-1.650E-01	&(	2.762E+00 6.92E+02 6.40E+01	G
CS-137		5.0987E+02				1.10E+04	
			661.66	5.099E+02	(	3.285E+00 7.66E-01 8.52E+01	G
Y-898		7.7025E-01				1.07E+02	
			898.02	7.703E-01	&(	2.342E+00 1.41E+02 9.37E+01	G
Co-1173		8.1058E+02				1.93E+03	
			1173.24	8.106E+02	(	9.187E+00 1.32E+00 9.99E+01	G
Co-1332		8.3376E+02				1.93E+03	
			1332.50	8.338E+02	(	6.803E+00 1.29E+00 1.00E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-1836	-3.6659E-01					1.07E+02	
		1836.01	-3.666E-01	?(	9.202E-01	1.27E+02	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
CO-57	122.06	2320.	-56.	-0.011	153.64	0.000E+00
Ce-139	165.85	1600.	67.	0.013	106.94	0.000E+00
Hg-203	279.17	1331.	23.	0.005	297.48	0.000E+00
SN-113	391.69	1248.	-10.	-0.002	692.39	0.000E+00
Y-898	898.02	555.	37.	0.007	140.94	0.000E+00
Y-1836	1836.01	27.	-11.	-0.002	127.17	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.1406E+04	1.6338E+04	5.793E-01%	1.76E+02
AM-241	1.2640E+03	1.2876E+03	4.483E-01%	8.91E+00
CD-109 #	4.8702E+01	2.7262E+04	2.503E+01%	1.76E+04
CO-57 #A	-3.5134E-01	>12 Halflives	1.536E+02%	1.43E+00
Ce-139 #A	4.9250E-01	>12 Halflives	1.069E+02%	1.39E+00
Hg-203 #A	2.3043E-01	>12 Halflives	2.975E+02%	1.73E+00
SN-113 #A	-1.6505E-01	>12 Halflives	6.924E+02%	2.76E+00
CS-137	3.9058E+02	5.0987E+02	7.657E-01%	3.29E+00
Y-898 #A	7.7025E-01	>12 Halflives	1.409E+02%	2.34E+00
Co-1173	1.7721E+02	8.1058E+02	1.318E+00%	9.19E+00
Co-1332	1.8227E+02	8.3376E+02	1.293E+00%	6.80E+00
Y-1836 #A	-3.6659E-01	>12 Halflives	1.272E+02%	9.20E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (25.1 to 1999.1 keV) 1.347E+04 Bq/Sample
Total Decayed Activity (25.1 to 1999.1 keV) 4.7041629E+04 Bq/Sample

2nd Source Verification

Detector:	Ge14
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  1
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
     14_TunaCan2nd_rad10_042412


Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
       Start time:                 4/24/2012 8:12:45 AM
       Live time:               3600
       Real time:               3635
       Dead time:                  0.95 %
       Detector ID:                   14

Detector system
     Ge14 SN/11080670


Calibration
       Filename:                   14_Soil_TunaCan.Clb
     14_TunaCan_90099_042312


       Energy Calibration
            Created:               4/23/2012 11:29:29 AM
            Zero offset:           0.158 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -1.959E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/23/2012 11:29:47 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.02 %
            Log(Eff):              2.101260E-01 + (-5.951973E-01*Log(E) ) +
                                   ( -1.605331E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.28 %
            Log(Eff):             -2.391492E+01 + ( 8.828985E+00*Log(E) ) +
                                   ( -9.371496E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.67keV )
       Stop channel:            8000 (  1999.52keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:20:28 AM     Page  2
TestAmerica, Inc.               Spectrum name: 14_TunaCan2nd_20120390.An1
                                      Page 1
```

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	-	s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	-	s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-	
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	-	s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	-	s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	-	s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	-	sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	-	s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	-	s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210   N   1.3845E+04                                        8.15E+03
                            46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241       1.1408E+03                                        1.58E+05
                            59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109       1.5678E+04                                        4.63E+02
                            88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57        3.2838E+02                                        2.72E+02
                           122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139       5.8018E+02                                        1.38E+02
                           165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203      -5.1862E-01                                        4.66E+01
                           279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113       1.0438E+03                                        1.15E+02
                           391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137       4.4755E+02                                        1.10E+04
                           661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898        2.2899E+03                                        1.07E+02
                           898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173      6.9001E+02                                        1.93E+03
                          1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332      6.9961E+02                                        1.93E+03
                          1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836       1.8162E+03                                        1.07E+02
                          1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%		1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%		1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%		2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%		1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%		1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00	
SN-113	6.4765E+00	1.0438E+03	1.791E+01%		4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%		3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%		9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%		4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%		2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%		1.60E+02

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 6
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

2nd Source Verification

Detector:	Ge 15
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

15_TunaCan2nd_20120288

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  1
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
     15_TunaCan2nd_rad10_032312


Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
       Start time:                 3/23/2012 6:10:28 AM
       Live time:               7200
       Real time:               7248
       Dead time:                  0.66 %
       Detector ID:                   15

Detector system
     Ge15 SN/1102216


Calibration
       Filename:                   15_Soil_TunaCan.Clb
     15_TunaCan_90099_032212


       Energy Calibration
            Created:               3/22/2012 1:02:46 PM
            Zero offset:           0.004 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.104E-08 keV/channel^2

       Efficiency Calibration
            Created:               3/22/2012 1:03:01 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -6.894897E-01 + (-3.290613E-01*Log(E) ) +
                                   ( -3.875629E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.13 %
            Log(Eff):             -2.362677E+01 + ( 8.666669E+00*Log(E) ) +
                                   ( -9.214638E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.53keV )
       Stop channel:            8000 (  1999.56keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  2
TestAmerica, Inc.               Spectrum name: 15_TunaCan2nd_20120288.An1
                                      Page 1
```

15_TunaCan2nd_20120288

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2012-02-26_0425.PBC 2/26/2012 4:25:10 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 26.5953

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

Page 2

145.78	36.48	5577.	1231.	9.786E+04	11.17	1.202	-	s
198.43	49.65	13746.	1514.	7.010E+04	14.37	1.248	-	sM
370.24	92.63	3274.	219.	5.791E+03	44.56	0.421	-	s

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TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
544.93	136.33	3516.	1390.	3.731E+04	8.77	1.130	-	s
952.92	238.39	2518.	480.	1.849E+04	20.10	1.422	-	sM
1042.01	260.67	968.	81.	3.328E+03	57.86	0.332	-	sM
1407.66	352.13	1248.	110.	5.749E+03	54.66	0.679	-	s
1472.16	368.26	1252.	125.	6.736E+03	49.84	0.459	-	s
1601.36	400.57	843.	73.	4.224E+03	61.58	0.543	-	s
3017.75	754.74	768.	100.	9.719E+03	52.53	0.393	-	s
3618.39	904.89	752.	86.	9.741E+03	54.53	0.363	-	s
4001.87	1000.75	476.	82.	1.015E+04	43.22	0.582	-	s
4385.05	1096.51	621.	181.	2.415E+04	26.16	0.796	-	s
4905.82	1226.66	215.	98.	1.445E+04	36.87	0.740	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.62	46.44	19930.	76355.	10.605	0.51	0.907
AM-241	237.58	59.44	16824.	80694.	11.208	0.48	0.935
CD-109	351.67	87.99	9695.	43578.	6.052	0.68	0.972
CO-57	487.63	122.00	4069.	10133.	1.407	1.58	1.014
Ce-139	662.95	165.85	3411.	1699.	0.236	7.29	1.054
Hg-203	1116.56	279.32	3139.	56.	0.008	141.32	1.144
SN-113	1565.32	391.56	1615.	581.	0.081	13.59	1.282
CS-137	2645.11	661.57	2071.	29285.	4.067	0.71	1.459
Y-898	3591.24	898.10	1317.	516.	0.072	14.74	1.959
Co-1173	4691.69	1173.15	1159.	26111.	3.627	0.71	1.803
Co-1332	5329.20	1332.45	323.	23674.	3.288	0.68	1.945
Y-1836	7345.58	1836.14	48.	260.	0.036	8.96	1.181s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210    N   1.3663E+04                                        8.15E+03
                              46.54 1.366E+04  (P 1.182E+02 5.11E-01 4.25E+00 G

AM-241        1.1510E+03                                        1.58E+05
                              59.54 1.151E+03  (  8.660E+00 4.81E-01 3.57E+01 G

CD-109        1.5268E+04                                        4.63E+02
                              88.03 1.527E+04  (  1.617E+02 6.78E-01 3.61E+00 G

CO-57         3.3887E+02                                        2.72E+02
                             122.06 3.389E+02  (  1.003E+01 1.58E+00 8.56E+01 G

Ce-139        5.1921E+02                                        1.38E+02
                             165.85 5.192E+02  (  8.400E+01 7.29E+00 7.99E+01 G

Hg-203        4.1717E-01                                        4.66E+01
                             279.17 4.172E-01  (  1.954E+00 1.41E+02 8.15E+01 G

SN-113        9.4771E+02                                        1.15E+02
                             391.69 9.477E+02  (  3.099E+02 1.36E+01 6.40E+01 G

CS-137        4.3518E+02                                        1.10E+04
                             661.66 4.352E+02  (  3.191E+00 7.12E-01 8.52E+01 G

Y-898         1.6812E+03                                        1.07E+02
                             898.02 1.681E+03  (  5.598E+02 1.47E+01 9.37E+01 G

Co-1173       6.8716E+02                                        1.93E+03
                            1173.24 6.872E+02  (  4.246E+00 7.12E-01 9.99E+01 G

Co-1332       6.9646E+02                                        1.93E+03
                            1332.50 6.965E+02  (  2.544E+00 6.82E-01 1.00E+02 G

Y-1836        1.5036E+03                                        1.07E+02
                            1836.01 1.504E+03  (  2.033E+02 8.96E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
                                       Page 4
```

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
Pb-210		1.2751E+04	1.3663E+04	5.115E-01%	1.18E+02
AM-241		1.1469E+03	1.1510E+03	4.812E-01%	8.66E+00
CD-109		4.5239E+03	1.5268E+04	6.776E-01%	1.62E+02
CO-57		4.2749E+01	3.3887E+02	1.583E+00%	1.00E+01
Ce-139		8.7071E+00	5.1921E+02	7.291E+00%	8.40E+01
Hg-203	A	4.1717E-01	>12 Halflives	1.4132E+02%	1.9540E+00
SN-113		7.1340E+00	9.4771E+02	1.359E+01%	3.10E+02
CS-137		4.1344E+02	4.3518E+02	7.117E-01%	3.19E+00
Y-898		8.5738E+00	1.6812E+03	1.474E+01%	5.60E+02
Co-1173		5.1301E+02	6.8716E+02	7.125E-01%	4.25E+00
Co-1332		5.1995E+02	6.9646E+02	6.817E-01%	2.54E+00
Y-1836		7.6681E+00	1.5036E+03	8.962E+00%	2.03E+02

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TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 1999.6 keV) 1.994E+04 Bq/Sample
Total Decayed Activity (37.5 to 1999.6 keV) 3.6891324E+04 Bq/Sample

2nd Source Verification

Detector:	Ge17
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.2	97.9
Cs-137	1926	396	0.851	465	440.98	94.8
Co-60	3611	742	0.99974	742	682.05	91.9
Co-60	3612	742	0.999856	742	689.63	92.9

Reviewed By: Megan McAfee

Date: 4/13/2012

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     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  1
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1

Sample description
     17_Tuna2nd_81427_032612


Spectrum Filename: C:\User\SPC\Det17\17_Tuna2nd_20120265.An1

Acquisition information
       Start time:                 3/26/2012 9:29:21 AM
       Live time:               3600
       Real time:               3637
       Dead time:                  1.02 %
       Detector ID:                   17

Detector system
     Ge17 SN/11080671


Calibration
       Filename:                   17_Soil_TunaCan.Clb
     17_TunaCan_90099_032612


       Energy Calibration
            Created:               4/12/2012 9:28:30 AM
            Zero offset:           0.118 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.376E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/12/2012 9:28:42 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.91 %
            Log(Eff):             -5.264190E-01 + (-4.024164E-01*Log(E) ) +
                                   ( -2.604461E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.00 %
            Log(Eff):             -2.343889E+01 + ( 8.582715E+00*Log(E) ) +
                                   ( -9.075430E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.63keV )
       Stop channel:            8000 (  1999.21keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method

     ORTEC g v - i (3263) Env32  G53W4.25  7/6/2012 9:25:36 AM     Page  2
TestAmerica, Inc.               Spectrum name: 17_Tuna2nd_20120265.An1
                                      Page 1
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Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-02-26_0520.PBC 2/26/2012 5:20:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0590

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.64	681.	13.12	0.69	1.356E-02				
40.87	116.	86.09	0.16	1.677E-02				
46.62	41004.	0.69	0.76	2.106E-02	46.54	4.250	1.365E+04	Pb210
49.59	775.	17.97	0.63	2.318E-02				
59.61	43179.	0.65	0.77	2.961E-02	59.54	35.700	1.140E+03	AM241
77.20	214.	40.60	1.02	3.765E-02				
88.08	23344.	0.86	0.81	4.060E-02	88.03	3.610	1.500E+04	CD109
121.99	5536.	2.31	0.89	4.276E-02	122.06	85.600	3.357E+02	CO57
136.39	771.	11.84	0.71	4.164E-02				
162.22	87.	50.79	0.72	3.820E-02				
165.73	964.	7.35	1.09	3.765E-02	165.85	79.900	5.310E+02	Ce139
216.43	116.	39.82	0.95	3.196E-02				
217.94	83.	57.15	0.95	3.181E-02				
238.21	247.	27.84	0.94	2.992E-02				
265.99	94.	61.67	0.61	2.773E-02				
301.12	44.	67.34	0.41	2.544E-02				
340.53	91.	61.26	0.55	2.333E-02				
351.73	148.	32.96	0.62	2.280E-02				
391.54	336.	18.56	0.91	2.113E-02	391.69	64.000	9.356E+02	SN113
464.58	72.	65.99	1.18	1.868E-02				
466.04	44.	93.25	1.18	1.864E-02				
582.96	167.	29.62	0.45	1.584E-02				
661.66	18538.	0.82	1.37	1.443E-02	661.66	85.210	4.410E+02	CS137
738.88	57.	57.41	0.44	1.329E-02				
833.91	110.	41.26	0.51	1.214E-02				
856.69	111.	46.51	0.75	1.189E-02				
898.10	352.	17.10	1.23	1.148E-02	898.02	93.700	1.818E+03	Y898
1026.09	89.	47.19	0.52	1.037E-02				
1173.27	17119.	0.83	1.74	9.359E-03	1173.24	99.900	6.820E+02	Co1173
1332.53	15698.	0.82	1.79	8.481E-03	1332.50	99.982	6.896E+02	Co1332
1835.81	220.	7.55	1.96	6.593E-03	1836.01	99.200	1.873E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.04	36.64	2578.	681.	5.025E+04	13.12	0.695	-
162.95	40.87	4224.	116.	6.916E+03	86.09	0.161	- c
197.82	49.59	6204.	775.	3.343E+04	17.97	0.635	- sM
308.25	77.20	2934.	214.	5.685E+03	40.60	1.020	- s

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:25:36 AM Page 3
TestAmerica, Inc. Spectrum name: 17_Tuna2nd_20120265.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.96	136.39	1975.	771.	1.852E+04	11.84	0.713	-
648.26	162.22	793.	87.	2.269E+03	50.79	0.719	- s
865.04	216.40	1003.	116.	3.620E+03	39.82	0.953	- D
871.09	217.91	1078.	83.	2.603E+03	57.15	0.955	- D
952.16	238.21	1349.	247.	8.265E+03	27.84	0.937	- s
1063.26	265.99	1020.	94.	3.372E+03	61.67	0.615	- s
1203.77	301.12	417.	44.	1.730E+03	67.34	0.412	- sc
1361.41	340.53	898.	91.	3.887E+03	61.26	0.553	- s
1406.20	351.73	744.	148.	6.491E+03	32.96	0.618	- s
1857.60	464.69	1086.	72.	3.842E+03	65.99	1.178	- sc
1863.46	466.15	839.	44.	2.387E+03	93.25	1.179	- sc
2331.15	582.96	570.	167.	1.054E+04	29.62	0.448	- s
2954.96	738.88	338.	57.	4.289E+03	57.41	0.442	- s
3335.20	833.91	507.	110.	9.049E+03	41.26	0.506	- s
3426.35	856.69	611.	111.	9.318E+03	46.51	0.755	- s
4104.24	1026.09	453.	89.	8.549E+03	47.19	0.517	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.95	46.62	10512.	40927.	11.369	0.69	0.761
AM-241	237.89	59.61	9192.	43179.	11.994	0.65	0.771
CD-109	351.75	88.08	4394.	23344.	6.484	0.86	0.812
CO-57	487.38	121.99	2606.	5536.	1.538	2.31	0.891
Ce-139	662.30	165.73	1283.	964.	0.268	7.35	1.085
Hg-203	1119.82	280.13	1632.	-52.	-0.015	109.81	1.012s
SN-113	1565.42	391.54	971.	336.	0.093	18.56	0.910s
CS-137	2646.04	661.66	840.	18538.	5.149	0.82	1.373
Y-898	3592.05	898.10	753.	352.	0.098	17.10	1.228
Co-1173	4693.24	1173.27	496.	17119.	4.755	0.83	1.743
Co-1332	5330.69	1332.53	136.	15698.	4.361	0.82	1.789
Y-1836	7345.64	1835.81	10.	220.	0.061	7.55	1.956s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.3650E+04				8.15E+03	
			46.54	1.365E+04	(P	1.603E+02 6.87E-01 4.25E+00	G
AM-241		1.1402E+03				1.58E+05	
			59.54	1.140E+03	(	1.187E+01 6.55E-01 3.57E+01	G
CD-109		1.5004E+04				4.63E+02	
			88.03	1.500E+04	(	2.003E+02 8.59E-01 3.61E+00	G
CO-57		3.3573E+02				2.72E+02	
			122.06	3.357E+02	(	1.459E+01 2.31E+00 8.56E+01	G
Ce-139		5.3096E+02				1.38E+02	
			165.85	5.310E+02	(	9.338E+01 7.35E+00 7.99E+01	G
Hg-203		-6.6653E-01				4.66E+01	
			279.17	-6.665E-01	?(	2.427E+00 1.10E+02 8.15E+01	G
SN-113		9.3563E+02				1.15E+02	
			391.69	9.356E+02	@(	4.114E+02 1.86E+01 6.40E+01	G
CS-137		4.4098E+02				1.10E+04	
			661.66	4.410E+02	(	3.277E+00 8.23E-01 8.52E+01	G
Y-898		1.8177E+03				1.07E+02	
			898.02	1.818E+03	(	6.751E+02 1.71E+01 9.37E+01	G
Co-1173		6.8205E+02				1.93E+03	
			1173.24	6.820E+02	(	4.243E+00 8.31E-01 9.99E+01	G
Co-1332		6.8963E+02				1.93E+03	
			1332.50	6.896E+02	(	2.503E+00 8.22E-01 1.00E+02	G
Y-1836		1.8728E+03				1.07E+02	
			1836.01	1.873E+03	(	1.462E+02 7.55E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.13	1632.	-52.	-0.015	109.81	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma		MDA Bq/Sample
Pb-210	1.2735E+04	1.3650E+04	6.879E-01%		1.60E+02
AM-241	1.1361E+03	1.1402E+03	6.548E-01%		1.19E+01
CD-109	4.4248E+03	1.5004E+04	8.588E-01%		2.00E+02
CO-57	4.2016E+01	3.3573E+02	2.313E+00%		1.46E+01
Ce-139	8.7645E+00	5.3096E+02	7.352E+00%		9.34E+01
Hg-203 #A	-6.6653E-01	>12 Halflives	1.0981E+02%	2.4271E+00	
SN-113 #	6.9111E+00	9.3563E+02	1.856E+01%		4.11E+02
CS-137	4.1887E+02	4.4098E+02	8.234E-01%		3.28E+00
Y-898	9.0827E+00	1.8177E+03	1.710E+01%		6.75E+02
Co-1173	5.0861E+02	6.8205E+02	8.315E-01%		4.24E+00
Co-1332	5.1427E+02	6.8963E+02	8.225E-01%		2.50E+00
Y-1836 #	9.3579E+00	1.8728E+03	7.550E+00%		1.46E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

17_Tuna2nd_20120265

---------- S U M M A R Y ----------

Total Activity (582.9 to 1999.2 keV) 1.981E+04 Bq/Sample

Total Decayed Activity (582.9 to 1999.2 keV) 3.7099195E+04 Bq/Sample

2nd Source Verification

Detector: **Ge19**
Geometry: **Tunacan**
Reference date: **10/1/2006**
Calibration Standard: **74139-334**
Standard volume g / vial: **1550**
Standard volume transferred in g / geometry: **341.9**
lab ID# of cal standard: **1282974**

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	449	0.359	1250	1313	105.1
Cs-137	1926	425	0.851	499	520	104.2
Co-60	3612	797	0.999856	797	852.3	107.0

Reviewed By: Jody Watson

Date: 4/20/2018

Sample description
19_TunaCan_ICV

Spectrum Filename: C:\User\SPC\Det19\19_TunaCan_20180077.An1

Acquisition information

Start time:	4/20/2018 11:09:29 AM
Live time:	5000
Real time:	5017
Dead time:	0.33 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_Soil_TunaCan.Clb

19_TunaCan_108513

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/16/2018 12:11:21 PM
Type:	Polynomial
Uncertainty:	0.841 %
Coefficients:	-0.371612 -4.869309 0.466742
	-0.049787 0.002234 -0.000039

Library Files

Main analysis library:	DET_EnergyStandardMix & Pb.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3
Half lives decay limit:	12.000

Test America St. Louis Spectrum ID: 19_TunaCan_20180077

Sample Description: 19_TunaCan_ICV
Detector: Detector #19
Batch ID: 19
Work Order Number: TunaCan
Lot Number: ICV

Decay to Time: 10/1/2006 11:00 Live Time: 5000 sec
Acquisition Time: 4/20/2018 11:09:29 Real Time: 5017 sec
Analysis Time: 4/20/2018 14:51 Dead Time: 0.33 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 19_Soil_TunaCan.Clb
Efficiency Cal Desc: 19_TunaCan_108513
Efficiency Cal Date: 4/16/2018 12:11
Energy Cal Date: 4/16/2018 11:22
Library: DET_EnergyStandardMix & Pb.lib
Bkgd Correction File: 19_2018-04-08_1846.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
Pb-210	1.650E+04	0.6	9.640E+01	1.063E+03	1.744E+02
AM-241	1.313E+03	0.5	6.894E+00	8.344E+01	9.974E+00
CD-109	3.738E+04	20.7	7.737E+03	8.077E+03	1.896E+04
CO-57	1.000E+100	211.0	6.331E-01	6.334E-01	1.592E+00
Ce-139	1.000E+100	99.6	6.348E-01	6.358E-01	1.593E+00
Hg-203	1.000E+100	373.3	7.558E-01	7.559E-01	2.516E+00
SN-113	1.000E+100	155.7	8.400E-01	8.406E-01	3.066E+00
CS-137	5.203E+02	0.8	4.133E+00	2.709E+01	3.044E+00
Y-898	1.000E+100	101.0	1.285E+00	1.287E+00	2.765E+00
Co-1173	8.308E+02	1.4	1.173E+01	4.298E+01	9.972E+00
Co-1332	8.523E+02	1.3	1.136E+01	4.394E+01	5.252E+00
Y-1836	1.000E+100	870.9	3.744E+00	3.744E+00	1.054E+00
Total	6.000E+100				

Analyst: Jody Watson

Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	19_2018-04-08_1846.PBC 4/8/2018 6:46:00 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0720

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
44.25	824.	17.08	0.93	1.551E-02				
46.68	41733.	0.58	0.93	1.715E-02	46.54	4.250	1.650E+04	Pb210
49.79	341.	39.16	0.94	2.016E-02				
59.62	60109.	0.53	0.90	2.617E-02	59.54	35.700	1.313E+03	AM241
74.97	186.	31.71	0.96	3.099E-02				
77.20	287.	21.92	0.96	3.147E-02				
87.56	402.	20.70	1.81	3.319E-02	88.03	3.610	3.738E+04	CD109
165.85	78.	99.62	1.04	3.053E-02	165.85	79.900	HL>Cutoff	Ce139
182.09	60.	62.86	0.35	2.898E-02				
238.45	394.	15.79	1.44	2.415E-02				
274.68	114.	32.95	1.42	2.168E-02				
302.83	39.	62.96	0.34	2.009E-02				
352.06	200.	22.00	1.15	1.782E-02				
438.49	43.	83.30	0.29	1.498E-02				
533.21	81.	44.24	0.90	1.287E-02				
661.74	18571.	0.79	1.47	1.093E-02	661.66	85.210	5.203E+02	CS137
862.76	25.	64.29	0.63	8.983E-03				
878.66	89.	46.18	0.42	8.863E-03				
1173.34	6485.	1.41	1.82	7.138E-03	1173.24	99.900	8.308E+02	Co1173
1332.62	6030.	1.33	1.85	6.465E-03	1332.50	99.982	8.523E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
176.55	44.21	10886.	853.	5.501E+04	17.63	0.932	-	sD
198.69	49.75	8765.	357.	1.770E+04	37.47	0.937	-	sD
298.95	74.97	1637.	186.	5.997E+03	31.71	0.960	-	sD
307.87	77.19	1825.	287.	9.107E+03	21.92	0.962	-	sD
727.12	182.09	591.	60.	2.082E+03	62.86	0.346	-	s
952.44	238.45	1002.	394.	1.631E+04	15.79	1.438	-	s
1097.28	274.68	483.	114.	5.242E+03	32.95	1.420	-	s
1209.83	302.83	282.	39.	1.942E+03	62.96	0.340	-	sc
1406.67	352.06	549.	200.	1.122E+04	22.00	1.153	-	
1752.27	438.49	465.	43.	2.871E+03	83.30	0.289	-	c
2131.09	533.21	325.	81.	6.269E+03	44.24	0.897	-	s
3449.28	862.76	100.	25.	2.783E+03	64.29	0.628	-	s
3512.90	878.66	320.	89.	1.004E+04	46.18	0.424	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.31	46.54	8855.	41733.	8.347	0.58	0.935D
AM-241	237.59	59.62	9494.	60109.	12.022	0.53	0.904
CD-109	349.28	87.56	1868.	402.	0.080	20.70	1.808s
CO-57	487.17	122.06	2413.	-44.	-0.009	210.99	1.003s
Ce-139	662.22	165.85	1690.	78.	0.016	99.62	1.042
Hg-203	1115.25	279.17	2166.	-18.	-0.004	373.28	1.141s
SN-113	1565.13	391.69	1148.	-28.	-0.006	155.72	1.238s
CS-137	2645.14	661.74	517.	18571.	3.714	0.79	1.469
Y-898	3590.37	898.02	560.	-52.	-0.010	101.01	1.642s
Co-1173	4692.11	1173.34	260.	6485.	1.297	1.41	1.816
Co-1332	5329.67	1332.62	55.	6030.	1.206	1.33	1.853
Y-1836	7345.40	1836.01	25.	-11.	-0.002	870.90	2.261s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.6496E+04					8.15E+03
			46.54	1.650E+04	(P	1.744E+02 5.84E-01 4.25E+00 G	
AM-241		1.3126E+03					1.58E+05
			59.54	1.313E+03	(	9.974E+00 5.25E-01 3.57E+01 G	
CD-109		3.7383E+04					4.63E+02
			88.03	3.738E+04	*(	1.896E+04 2.07E+01 3.61E+00 G	
CO-57		-3.0008E-01					2.72E+02
			122.06	-3.001E-01	?(	1.592E+00 2.11E+02 8.56E+01 G	
Ce-139		6.3720E-01					1.38E+02
			165.85	6.372E-01	&(	1.593E+00 9.96E+01 7.99E+01 G	
Hg-203		-2.0247E-01					4.66E+01
			279.17	-2.025E-01	?(	2.516E+00 3.73E+02 8.15E+01 G	
SN-113		-5.3940E-01					1.15E+02
			391.69	-5.394E-01	&(P	3.066E+00 1.56E+02 6.40E+01 G	
CS-137		5.2035E+02					1.10E+04
			661.66	5.203E+02	(	3.044E+00 7.94E-01 8.52E+01 G	
Y-898		-1.2727E+00					1.07E+02
			898.02	-1.273E+00	?(	2.765E+00 1.01E+02 9.37E+01 G	
Co-1173		8.3078E+02					1.93E+03
			1173.24	8.308E+02	(P	9.972E+00 1.41E+00 9.99E+01 G	
Co-1332		8.5225E+02					1.93E+03
			1332.50	8.523E+02	(	5.252E+00 1.33E+00 1.00E+02 G	
Y-1836		-4.2991E-01					1.07E+02
			1836.01	-4.299E-01	?(P	1.054E+00 8.71E+02 9.92E+01 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
CO-57	122.06	2413.	-44.	-0.009	210.99	0.000E+00	
Ce-139	165.85	1690.	78.	0.016	99.62	0.000E+00	
Hg-203	279.17	2166.	-18.	-0.004	373.28	0.000E+00	
SN-113	391.69	1148.	-28.	-0.006	155.72	0.000E+00	P
Y-898	898.02	560.	-52.	-0.010	101.01	0.000E+00	
Y-1836	1836.01	25.	-11.	-0.002	870.90	0.000E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.1520E+04	1.6496E+04	5.844E-01%	1.74E+02
AM-241	1.2885E+03	1.3126E+03	5.252E-01%	9.97E+00
CD-109 #	6.7177E+01	3.7383E+04	2.070E+01%	1.90E+04
CO-57 #A	-3.0008E-01	>12 Halflives	2.110E+02%	1.59E+00
Ce-139 #A	6.3720E-01	>12 Halflives	9.962E+01%	1.59E+00
Hg-203 #A	-2.0247E-01	>12 Halflives	3.733E+02%	2.52E+00
SN-113 #A	-5.3940E-01	>12 Halflives	1.557E+02%	3.07E+00
CS-137	3.9871E+02	5.2035E+02	7.943E-01%	3.04E+00
Y-898 #A	-1.2727E+00	>12 Halflives	1.010E+02%	2.77E+00

Co-1173	1.8188E+02	8.3078E+02	1.412E+00%	9.97E+00
Co-1332	1.8658E+02	8.5225E+02	1.333E+00%	5.25E+00
Y-1836 #A	-4.2991E-01	>12 Halflives	8.709E+02%	1.05E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 1.364E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.4 keV) 5.7394852E+04 Bq/Sample

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 5_20180810016_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:43:53 PM
Detector: Detector # 5
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.45	1.30	1.35	1.45	1.55	1.60	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det5\5_20180810016_BGLong.An1

Acquisition information

Start time:	8/10/2018 4:43:53 PM
Live time:	72000
Real time:	72874
Dead time:	1.20 %
Detector ID:	5

Detector system
Ge 5 SN/157

Calibration

Filename:	5_QC.Clb

Ge5_QC

Energy Calibration

Created:	2/28/2012 7:35:48 PM
Zero offset:	0.158 keV
Gain:	0.250 keV/channel
Quadratic:	3.911E-08 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:03:22 AM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.62keV)
Stop channel:	8000 (2000.81keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1329

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.61	575.	9.62	0.75	5.685E-02	46.54	4.250	3.309E+00	PB210
59.58	222.	19.64	0.78	7.425E-02	59.54	35.900	1.158E-01	AM241
63.26	576.	10.09	0.53	7.920E-02	63.29	3.810	2.650E+00	TH234
74.93	181.	19.09	0.81	9.484E-02				
77.01	160.	21.57	0.81	9.764E-02				
84.22	206.	24.45	0.93	1.073E-01				
92.50	870.	6.42	1.07	1.129E-01	92.59	5.584	1.915E+00	TH234
					93.35	5.561	1.922E+00	AC228
185.75	413.	12.55	0.93	9.607E-02	185.72	54.000	1.105E-01	U235
					185.99	3.280	1.821E+00	Ra226
238.81	159.	25.81	0.79	8.319E-02	238.63	43.300	6.140E-02	PB212
295.35	92.	27.59	0.69	6.947E-02	295.09	19.300	9.574E-02	PB214
351.95	166.	25.58	0.96	5.573E-02	351.93	37.600	1.101E-01	PB214
511.30	1712.	4.93	2.46	3.834E-02	511.86	20.000	3.104E+00	RH106
609.75	126.	21.99	1.54	3.199E-02	609.31	46.090	1.190E-01	BI214
					610.30	5.750	9.557E-01	RU103
661.91	178.	14.52	1.33	2.860E-02	661.66	85.210	1.014E-01	CS137
1461.24	164.	16.29	2.39	1.300E-02	1460.83	10.670	1.642E+00	K40
1764.84	100.	12.65	2.33	1.105E-02	1764.49	15.400	8.160E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.33	74.92	506.	181.	1.907E+03	19.10	0.813	- D

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
307.69	77.00	513.	160.	1.635E+03	21.57	0.815	- D
336.54	84.22	662.	206.	1.915E+03	24.45	0.927	- sM
2045.80	511.30	600.	1712.	4.465E+04	4.93	2.462	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.61	677.	575.	0.008	9.62	0.752s
AM-241	237.89	59.58	531.	222.	0.003	19.64	0.781
TH-234	252.63	63.26	731.	576.	0.008	10.09	0.532s
TH-234	369.68	92.50	642.	870.	0.012	6.42	1.071s
Ra-226	742.98	185.75	592.	413.	0.006	12.55	0.932s
PB-212	955.33	238.81	460.	159.	0.002	25.81	0.793
PB-214	1181.65	295.35	224.	92.	0.001	27.59	0.692s
PB-214	1408.17	351.95	428.	166.	0.002	25.58	0.961
BI-214	2439.68	609.75	194.	126.	0.002	21.99	1.540
CS-137	2648.36	661.91	140.	178.	0.002	14.52	1.333
K-40	5844.38	1461.24	66.	164.	0.002	16.29	2.392s
BI-214	7057.47	1764.84	10.	100.	0.001	12.65	2.328s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	1.6424E+00				4.66E+11	
			1460.83	1.642E+00	@(	4.063E-01 1.63E+01 1.07E+01	G
CS-137	I	1.0143E-01				1.10E+04	
			661.66	1.014E-01	(	3.296E-02 1.45E+01 8.52E+01	G
PB-210	N	3.3090E+00				8.14E+03	
			46.54	3.309E+00	(	7.139E-01 9.62E+00 4.25E+00	G

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```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-212   N   6.1404E-02                                      6.98E+02
                          238.63 6.140E-02  (  3.955E-02 2.58E+01 4.33E+01 G
                          300.03 0.000E+00 %   3.585E-01 7.06E+01 3.28E+00 GA

PB-214   N   1.0525E-01                                      5.84E+05
                          351.93 1.101E-01  (  6.568E-02 2.56E+01 3.76E+01 G
                          295.09 9.574E-02 ?(  7.491E-02 2.76E+01 1.93E+01 G
                          242.00 0.000E+00 &   2.232E-01 0.00E+00 7.43E+00 GA

BI-214   N   1.1899E-01                                      5.84E+05
                          609.31 1.190E-01  (  6.363E-02 2.20E+01 4.61E+01 G
                         1120.29 0.000E+00 %   2.266E-01 1.06E+02 1.51E+01 G
                         1764.49 8.160E-01 +   1.424E-01 1.26E+01 1.54E+01 G

TH-234   N   2.6501E+00                                      1.63E+12
                           63.29 2.650E+00  (  5.921E-01 1.01E+01 3.81E+00 G
                           92.59 1.915E+00 -   2.662E-01 6.42E+00 5.58E+00 G

Ra-226       1.8208E+00                                      5.84E+05
                          185.99 1.821E+00 @(  5.121E-01 1.25E+01 3.28E+00 G

AM-241   T   1.1584E-01                                      1.58E+05
                           59.54 1.158E-01  (  5.739E-02 1.96E+01 3.59E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.0562E-01		
NA-22	<	2.5037E-02		
K-40	#	1.6424E+00	1.6293E+01%	4.063E-01
Sc-46	<	3.7661E-02		
CR-51	<	1.2554E-01		
MN-54	<	2.5199E-02		
FE-59	<	5.0341E-02		
Co-56	<	2.5678E-02		
CO-57	<	1.3752E-02		
CO-58	<	2.3836E-02		
CO-60	<	2.9632E-02		
ZN-65	<	3.2363E-02		
NB-94	<	2.5051E-02		
ZR-95	<	3.8574E-02		
NB-95	<	3.7066E-02		
RU-103	<	1.8496E-02		
RH-106	<	1.5240E-01		
AG-108M	<	1.6248E-02		
AG-110M	<	1.7233E-02		
SN-113	<	2.5892E-02		
SB-124	<	3.4006E-02		
SB-125	<	4.9219E-02		
I-131	<	1.5910E-02		
BA-133	<	3.7157E-02		
CS-134	<	2.9495E-02		
CS-137		1.0143E-01	1.4520E+01%	3.296E-02
CE-139	<	8.4954E-03		
Ba-140	<	7.7138E-02		
La-140	<	2.4913E-02		
CE-141	<	1.7180E-02		
CE-144	<	7.7452E-02		
PM-144	<	2.7416E-02		

EU-152	<	5.0510E-02		
EU-154	<	2.2330E-01		
EU-155	<	3.6902E-02		
HF-181	<	3.2945E-02		
Ta-182	<	1.2045E-01		
Hg-203	<	2.4374E-02		
TL-208	<	2.2155E-02		
pm-146	<	6.7934E-02		
y-88	<	2.8781E-02		
PB-210	#	3.3090E+00	9.6232E+00%	7.139E-01
PB-212		6.1404E-02	2.5813E+01%	3.955E-02
PB-214		1.0525E-01	1.8810E+01%	6.568E-02
BI-207	<	3.2832E-02		
BI-212	<	4.9720E-01		
BI-214		1.1899E-01	2.1992E+01%	6.363E-02
BI-210M	<	2.3222E-02		
RA-224	<	4.3341E-01		
AC-228	<	1.0012E-01		
TH-227	<	1.1121E-01		
TH-229	<	2.3179E-01		
TH-234		2.6501E+00	1.0091E+01%	5.921E-01
PA-231	<	7.2118E-01		
PA-233	<	3.4210E-02		
PA-234	<	4.5006E-02		
PA-234M	<	3.1169E+00		
Ra-226	#	1.8208E+00	1.2546E+01%	5.121E-01
U-235	<	7.9645E-02		
AM-241		1.1584E-01	1.9636E+01%	5.739E-02
Np-237	<	1.0013E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.8 keV) 9.925E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20180810004_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:44:48 PM
Detector: Detector # 7
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.32	1.40	1.45	PASS

Analyst: Joey Sausto Reviewer: Joey Sausto

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Test America
St. Louis
Background Check

Spectrum: 8_20180810015_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:45:55 PM
Detector: Detector # 8
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.59	1.68	1.74	PASS

Analyst: Joey Sausto Reviewer: Joey Sausto

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Test America
St. Louis
Background Check

Spectrum: 9_20180810015_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:43:36 PM
Detector: Detector # 9
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.81	2.14	2.26	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20180810015_BGLong.An1

Acquisition information
Start time: 8/10/2018 4:43:36 PM
Live time: 72000
Real time: 72113
Dead time: 0.16 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 12:03:10 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.0962

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
238.69	154.	27.02	0.88	1.228E-01	238.63	43.300	4.021E-02	PB212
295.15	190.	28.37	0.99	1.047E-01	295.09	19.300	1.310E-01	PB214
351.87	349.	15.04	1.23	8.642E-02	351.93	37.600	1.493E-01	PB214
510.84	2333.	5.05	2.32	6.210E-02	511.86	20.000	2.613E+00	RH106
583.35	149.	23.80	1.04	5.512E-02	583.02	84.500	4.443E-02	TL208
609.32	367.	11.03	1.05	5.258E-02	609.31	46.090	2.103E-01	BI214
					610.30	5.750	1.689E+00	RU103
620.89	113.	22.75	2.48	5.136E-02	621.92	9.930	3.068E-01	RH106
803.37	162.	28.24	1.50	3.765E-02	801.95	8.690	6.860E-01	CS134
1120.95	173.	19.42	2.28	2.761E-02	1120.29	15.100	5.763E-01	BI214
					1120.55	99.987	8.704E-02	Sc46
					1121.30	34.900	2.495E-01	Ta182
1460.77	285.	8.50	1.70	2.339E-02	1460.83	10.670	1.584E+00	K40
1764.41	138.	22.00	1.64	2.159E-02	1764.49	15.400	5.763E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2042.70	510.84	992.	2333.	3.757E+04	5.05	2.318	-	s
3212.96	803.37	297.	162.	4.303E+03	28.24	1.499	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-212	954.22	238.69	526.	154.	0.002	27.02	0.883s
PB-214	1180.02	295.15	656.	190.	0.003	28.37	0.991
PB-214	1406.87	351.87	557.	349.	0.005	15.04	1.225
TL-208	2332.77	583.35	266.	149.	0.002	23.80	1.043s
BI-214	2436.64	609.32	318.	367.	0.005	11.03	1.047s
RH-106	2482.92	620.89	163.	113.	0.002	22.75	2.485s
BI-214	4483.73	1120.95	155.	173.	0.002	19.42	2.279
K-40	5843.79	1460.77	58.	285.	0.004	8.50	1.696
BI-214	7059.34	1764.41	98.	138.	0.002	22.00	1.643s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.5840E+00					4.66E+11	
			1460.83	1.584E+00	(	2.131E-01	8.50E+00 1.07E+01	G
RH-106	I	3.0681E-01					3.74E+02	
			621.92	3.068E-01	&(	1.696E-01	2.28E+01 9.93E+00	G
			1050.36	0.000E+00	%	1.245E+00	6.20E+01 1.56E+00	G
			511.86	0.000E+00	%	1.722E-01	1.00E+03 2.00E+01	GA
TL-208	N	4.4430E-02					6.98E+02	
			583.02	4.443E-02	@(	2.347E-02	2.38E+01 8.45E+01	G
			277.28	0.000E+00	%	1.381E-01	4.96E+01 6.31E+00	G
			860.56	0.000E+00	%	1.470E-01	4.04E+01 1.24E+01	G
PB-212	N	4.0210E-02					6.98E+02	
			238.63	4.021E-02	?(	2.861E-02	2.70E+01 4.33E+01	G
			300.03	0.000E+00	&	3.687E-01	0.00E+00 3.28E+00	GA
PB-214	N	1.4311E-01					5.84E+05	
			351.93	1.493E-01	(	4.816E-02	1.50E+01 3.76E+01	G
			295.09	1.310E-01	(	8.388E-02	2.84E+01 1.93E+01	G
			242.00	0.000E+00		1.834E-01	0.00E+00 7.43E+00	GA

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-214   N   2.1033E-01                                        5.84E+05
                           609.31 2.103E-01  (  4.918E-02 1.10E+01 4.61E+01 G
                          1120.29 5.763E-01 +   2.023E-01 1.94E+01 1.51E+01 G
                          1764.49 5.763E-01 +   2.040E-01 2.20E+01 1.54E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction
```

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.1988E-01		
NA-22	<	2.7797E-02		
K-40		1.5840E+00	8.5042E+00%	2.131E-01
Sc-46	<	3.6721E-02		
CR-51	<	1.0962E-01		
MN-54	<	2.0038E-02		
FE-59	<	3.6811E-02		
Co-56	<	1.9127E-02		
CO-57	<	1.2375E-02		
CO-58	<	2.1307E-02		
CO-60	<	2.1527E-02		
ZN-65	<	6.8022E-02		
NB-94	<	2.2411E-02		
ZR-95	<	2.8323E-02		
NB-95	<	1.8135E-02		
RU-103	<	1.3990E-02		
RH-106		3.0681E-01	2.2752E+01%	1.696E-01
AG-108M	<	1.4026E-02		
AG-110M	<	3.7604E-02		
SN-113	<	1.8482E-02		
SB-124	<	1.6651E-02		
SB-125	<	3.9923E-02		
I-131	<	1.4420E-02		
BA-133	<	2.6774E-02		
CS-134	<	2.2384E-02		
CS-137	<	9.5369E-03		
CE-139	<	8.8122E-03		
Ba-140	<	5.2152E-02		
La-140	<	2.0380E-02		
CE-141	<	2.0200E-02		
CE-144	<	1.1772E-01		
PM-144	<	2.1703E-02		
EU-152	<	2.4758E-02		
EU-154	<	1.6075E-01		
EU-155	<	3.1670E-02		
HF-181	<	1.9997E-02		
Ta-182	<	7.5655E-02		
Hg-203	<	1.0739E-02		
TL-208	#	4.4430E-02	2.3798E+01%	2.347E-02
pm-146	<	5.0370E-02		
y-88	<	2.0941E-02		
PB-210	<	3.5341E-01		
PB-212	#	4.0210E-02	2.7024E+01%	2.861E-02

PB-214		1.4311E-01	1.5043E+01%	4.816E-02
BI-207	<	2.3294E-02		
BI-212	<	2.9312E-01		
BI-214		2.1033E-01	1.1031E+01%	4.918E-02
BI-210M	<	1.7230E-02		
RA-224	<	3.1756E-01		
AC-228	<	1.0105E-01		
TH-227	<	1.0474E-01		
TH-229	<	1.7611E-01		
TH-234	<	5.3583E-01		
PA-231	<	4.7274E-01		
PA-233	<	2.4904E-02		
PA-234	<	4.5621E-02		
PA-234M	<	3.6251E+00		
Ra-226	<	3.1936E-01		
U-235	<	6.2685E-02		
AM-241	<	4.9079E-02		
Np-237	<	8.4081E-02		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.3 keV)     2.329E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 12_20180810017_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:44:39 PM
Detector: Detector #12
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.00	1.89	1.93	1.99	2.07	2.10	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20180810017_BGLong.An1

Acquisition information

Start time:	8/10/2018 4:44:39 PM
Live time:	72000
Real time:	72034
Dead time:	0.05 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration

Filename:	12_QC.Clb

12_SourceCheck_H_2018

Energy Calibration

Created:	4/20/2018 11:13:27 AM
Zero offset:	0.059 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/24/2018 2:08:25 PM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	Null.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.59keV)
Stop channel:	8000 (1999.13keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

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Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.55	1258.	4.81	0.82	5.833E-02				
63.28	896.	7.94	0.78	7.854E-02				
74.78	279.	15.94	0.88	9.241E-02				
77.05	208.	21.82	0.88	9.516E-02				
92.56	1257.	5.53	0.96	1.066E-01				
185.63	684.	10.46	0.96	8.765E-02				
198.16	225.	24.03	0.81	8.619E-02				
238.56	495.	8.30	1.05	8.151E-02				
242.04	159.	22.41	1.05	8.111E-02				
294.76	276.	20.71	0.86	7.499E-02				
351.79	402.	16.02	1.19	6.838E-02				
583.09	207.	22.50	1.18	4.157E-02				
609.02	356.	12.26	1.25	3.856E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.84	46.55	847.	1258.	2.157E+04	4.81	0.816	-	
252.72	63.28	1188.	896.	1.140E+04	7.94	0.778	-	
298.69	74.77	846.	279.	3.014E+03	15.94	0.880	-	D
307.77	77.05	928.	208.	2.188E+03	21.82	0.882	-	sD
369.74	92.56	1020.	1257.	1.179E+04	5.53	0.965	-	s
741.83	185.63	1023.	684.	7.800E+03	10.46	0.960	-	
791.91	198.16	733.	225.	2.607E+03	24.03	0.806	-	
953.46	238.53	597.	495.	6.072E+03	8.30	1.045	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
967.35	242.00	552.	159.	1.955E+03	22.41	1.049	-	sD
1178.15	294.81	690.	276.	3.681E+03	20.71	0.859	-	s
1406.18	351.79	725.	402.	5.879E+03	16.02	1.194	-	
2331.22	583.09	379.	207.	4.975E+03	22.50	1.184	-	
2434.96	609.02	370.	356.	9.218E+03	12.26	1.250	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Null.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

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```
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
        Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                  MDA
              DPS
_____________________________________________________________________________
DUMMY    No in-range peaks
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.1 keV)     0.000E+00  DPS
```

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Test America
St. Louis
Background Check

Spectrum: 14_20180810015_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:43:22 PM
Detector: Detector #14
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.80	1.66	1.71	1.77	1.90	1.94	PASS

Analyst: Joey Sausto Reviewer:

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20180810015_BGLong.An1

Acquisition information
Start time: 8/10/2018 4:43:22 PM
Live time: 72000
Real time: 72097
Dead time: 0.13 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.51keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1233

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.68	708.	7.68	0.94	6.142E-02	46.54	4.250	3.780E+00	PB210
63.36	476.	11.25	0.86	8.547E-02	63.29	3.810	2.031E+00	TH234
74.89	218.	19.97	0.78	1.021E-01				
77.35	137.	29.55	0.78	1.056E-01				
92.64	1024.	7.04	1.18	1.215E-01	92.59	5.584	2.097E+00	TH234
					93.35	5.561	2.105E+00	AC228
185.50	476.	10.39	1.19	1.072E-01	185.72	54.000	1.143E-01	U235
238.30	318.	15.46	0.79	9.397E-02	238.63	43.300	1.085E-01	PB212
241.62	136.	24.04	0.95	9.305E-02	242.00	7.430	2.738E-01	PB214
351.44	266.	16.64	1.06	6.559E-02	351.93	37.600	1.501E-01	PB214
510.74	1828.	4.90	2.94	4.542E-02	511.86	20.000	2.800E+00	RH106
582.77	185.	21.82	2.01	3.931E-02	583.02	84.500	7.729E-02	TL208
609.32	257.	14.79	1.64	3.708E-02	609.31	46.090	2.086E-01	BI214
					610.30	5.750	1.676E+00	RU103
1120.05	56.	27.23	1.00	1.998E-02	1120.29	15.100	2.593E-01	BI214
					1120.55	99.987	3.918E-02	Sc46
1460.92	149.	17.21	1.75	1.557E-02	1460.83	10.670	1.248E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.94	74.86	837.	218.	2.134E+03	19.97	0.777	- sD
308.79	77.33	745.	137.	1.292E+03	29.55	0.780	- sD
2042.07	510.74	641.	1828.	4.024E+04	4.90	2.941	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.16	46.68	750.	708.	0.010	7.68	0.937s
TH-234	252.84	63.36	842.	476.	0.007	11.25	0.858
TH-234	369.93	92.64	1091.	1024.	0.014	7.04	1.175s
U-235	741.27	185.50	622.	476.	0.007	10.39	1.190s
PB-212	953.75	238.63	492.	325.	0.005	11.12	0.945D
PB-214	967.21	242.00	469.	136.	0.002	24.04	0.948D
PB-214	1404.92	351.44	442.	266.	0.004	16.64	1.064s
TL-208	2330.19	582.77	279.	185.	0.003	21.82	2.012s
BI-214	2436.39	609.32	273.	257.	0.004	14.79	1.638s
BI-214	4479.76	1120.05	54.	56.	0.001	27.23	0.995s
K-40	5843.94	1460.92	70.	149.	0.002	17.21	1.751

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.2481E+00					4.66E+11	
			1460.83	1.248E+00	(	3.477E-01	1.72E+01	1.07E+01 G
TL-208	N	7.7292E-02					6.98E+02	
			583.02	7.729E-02	*(	3.369E-02	2.18E+01	8.45E+01 G
			277.28	0.000E+00	%	1.671E-01	4.49E+01	6.31E+00 G
			860.56	0.000E+00	&	1.714E-01	1.00E+03	1.24E+01 G
PB-210	N	3.7799E+00					8.14E+03	
			46.54	3.780E+00	*(	6.958E-01	7.68E+00	4.25E+00 G
PB-212	N	1.1119E-01					6.98E+02	
			238.63	1.112E-01	(	3.625E-02	1.11E+01	4.33E+01 G
			300.03	0.000E+00	%	3.242E-01	0.00E+00	3.28E+00 GA

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Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.5009E-01					5.84E+05	
			351.93	1.501E-01	*(	5.681E-02	1.66E+01	3.76E+01 G
			295.09	0.000E+00	%	5.991E-02	4.52E+01	1.93E+01 G
			242.00	2.738E-01	+	2.081E-01	2.40E+01	7.43E+00 GA
BI-214	N	2.2111E-01					5.84E+05	
			609.31	2.086E-01	(	6.481E-02	1.48E+01	4.61E+01 G
			1120.29	2.593E-01	?(	1.696E-01	2.72E+01	1.51E+01 G
			1764.49	0.000E+00	%	1.845E-01	1.00E+03	1.54E+01 G
TH-234	N	2.0702E+00					1.63E+12	
			63.29	2.031E+00	(	5.888E-01	1.12E+01	3.81E+00 G
			92.59	2.097E+00	*(	3.207E-01	7.04E+00	5.58E+00 G
U-235	N	1.1428E-01					2.57E+11	
			185.72	1.143E-01	*	2.854E-02	1.04E+01	5.40E+01 GA
			143.79	0.000E+00	%	9.228E-02	5.90E+01	1.10E+01 G
			205.33	0.000E+00	&	2.058E-01	1.00E+03	5.01E+00 G
			163.38	0.000E+00	%	1.930E-01	8.52E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 1.0204E-01		
NA-22	< 3.8989E-02		
K-40	1.2481E+00	1.7206E+01%	3.477E-01
Sc-46	< 2.1091E-02		
CR-51	< 1.1902E-01		
MN-54	< 2.2298E-02		
FE-59	< 5.2616E-02		
Co-56	< 2.2610E-02		
CO-57	< 1.6572E-02		
CO-58	< 1.7058E-02		
CO-60	< 2.9378E-02		
ZN-65	< 7.4867E-02		
NB-94	< 2.3506E-02		
ZR-95	< 3.5189E-02		
NB-95	< 1.5200E-02		
RU-103	< 1.5657E-02		
RH-106	< 1.9801E-01		
AG-108M	< 1.3504E-02		
AG-110M	< 2.9621E-02		
SN-113	< 2.0533E-02		
SB-124	< 3.7601E-02		
SB-125	< 4.5667E-02		
I-131	< 1.5094E-02		
BA-133	< 1.9607E-02		
CS-134	< 2.1864E-02		
CS-137	< 2.3542E-02		
CE-139	< 1.6326E-02		
Ba-140	< 5.9398E-02		
La-140	< 2.5560E-02		
CE-141	< 2.5070E-02		
CE-144	< 6.6611E-02		
PM-144	< 2.3892E-02		
EU-152	< 5.5255E-02		
EU-154	< 1.7601E-01		
EU-155	< 3.7139E-02		

HF-181	<	2.3013E-02		
Ta-182	<	1.0243E-01		
Hg-203	<	1.7343E-02		
TL-208	#	7.7292E-02	2.1824E+01%	3.369E-02
pm-146	<	5.6706E-02		
y-88	<	2.4123E-02		
PB-210	#	3.7799E+00	7.6818E+00%	6.958E-01
PB-212		1.1119E-01	1.1122E+01%	3.625E-02
PB-214	#	1.5009E-01	1.6645E+01%	5.681E-02
BI-207	<	3.1062E-02		
BI-212	<	2.4634E-01		
BI-214		2.2111E-01	1.4790E+01%	6.481E-02
BI-210M	<	1.9865E-02		
RA-224	<	4.2600E-01		
AC-228	<	1.0784E-01		
TH-227	<	1.0137E-01		
TH-229	<	2.3211E-01		
TH-234		2.0702E+00	6.6353E+00%	5.888E-01
PA-231	<	2.7180E-01		
PA-233	<	3.0394E-02		
PA-234	<	7.0490E-02		
PA-234M	<	2.9257E+00		
Ra-226	<	5.8989E-01		
U-235	#	1.1428E-01	1.0385E+01%	2.854E-02
AM-241	<	3.5395E-02		
Np-237	<	6.5336E-02		

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     7.772E+00  DPS
```

Test America
St. Louis
Background Check

Spectrum: 15_20180810016_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:44:15 PM
Detector: Detector #15
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.68	1.59	1.62	1.69	1.74	1.77	PASS

Analyst: Joey Sausto Reviewer: Rachel Mueller

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20180810016_BGLong.An1

Acquisition information

Start time:	8/10/2018 4:44:15 PM
Live time:	72000
Real time:	72038
Dead time:	0.05 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_QC.Clb

15_QC_83725-334_SOURCE F_2011

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	8/2/2011 8:55:45 AM	
Knee Energy:	0.00 keV	
Above the Knee:	Interpolative	Uncertainty = 0.00 %
Below the Knee:	Interpolative	Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1210

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.45	691.	8.49	0.93	6.043E-02	46.54	4.250	3.729E+00	PB210
63.22	653.	9.20	0.81	8.191E-02	63.29	3.810	2.904E+00	TH234
74.94	241.	17.65	0.97	9.695E-02				
77.05	170.	27.42	0.97	9.965E-02				
87.25	191.	24.49	0.95	1.127E-01	86.49	13.100	1.814E-01	Np237
					86.54	30.700	7.737E-02	EU155
92.53	936.	7.99	1.11	1.142E-01	92.59	5.584	2.040E+00	TH234
					93.35	5.561	2.047E+00	AC228
185.77	462.	13.95	0.94	9.779E-02	185.72	54.000	1.216E-01	U235
					185.99	3.280	2.003E+00	Ra226
238.45	250.	20.94	1.20	8.506E-02	238.63	43.300	9.420E-02	PB212
295.31	238.	21.66	1.82	7.136E-02	295.09	19.300	2.395E-01	PB214
351.73	277.	18.36	1.13	5.767E-02	351.93	37.600	1.776E-01	PB214
583.27	101.	25.15	1.05	3.411E-02	583.02	84.500	4.859E-02	TL208
609.61	246.	14.40	1.35	3.218E-02	609.31	46.090	2.302E-01	BI214
					610.30	5.750	1.850E+00	RU103
1001.32	86.	25.91	1.98	1.891E-02	1001.00	0.837	7.546E+00	PA234M
1120.37	99.	23.55	2.28	1.693E-02	1120.29	15.100	5.378E-01	BI214
					1120.55	99.987	8.124E-02	Sc46
					1121.30	34.900	2.329E-01	Ta182
1460.98	155.	17.22	1.44	1.314E-02	1460.83	10.670	1.536E+00	K40
1764.34	93.	14.99	0.66	1.107E-02	1764.49	15.400	7.579E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.37	74.96	784.	241.	2.485E+03	17.65	0.973	- sD
307.81	77.08	1006.	170.	1.710E+03	27.42	0.974	- sD
348.56	87.25	706.	191.	1.697E+03	24.49	0.952	- M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.46	46.45	826.	691.	0.010	8.49	0.932
TH-234	252.50	63.22	934.	653.	0.009	9.20	0.814
TH-234	369.68	92.53	1216.	936.	0.013	7.99	1.110s
Ra-226	742.40	185.77	887.	462.	0.006	13.95	0.938
PB-212	953.00	238.45	677.	250.	0.003	20.94	1.196
PB-214	1180.32	295.31	536.	238.	0.003	21.66	1.824s
PB-214	1406.10	351.78	571.	273.	0.004	20.78	1.122
TL-208	2331.77	583.27	171.	101.	0.001	25.15	1.051s
BI-214	2437.14	609.61	252.	246.	0.003	14.40	1.351
PA-234M	4004.06	1001.32	88.	86.	0.001	25.91	1.979
BI-214	4480.42	1120.37	92.	99.	0.001	23.55	2.280s
K-40	5843.60	1460.98	76.	155.	0.002	17.22	1.443s
BI-214	7058.17	1764.34	16.	93.	0.001	14.99	0.658s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS
K-40	N	1.5356E+00				4.66E+11	
			1460.83	1.536E+00	?(	4.293E-01 1.72E+01 1.07E+01	G

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```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208   N   4.8591E-02                                      6.98E+02
                          583.02 4.859E-02  (  3.069E-02 2.51E+01 8.45E+01 G
                          277.28 0.000E+00 &   1.918E-01 8.02E+02 6.31E+00 G
                          860.56 0.000E+00 %   2.199E-01 6.99E+01 1.24E+01 G

PB-210   N   3.7293E+00                                      8.14E+03
                           46.54 3.729E+00  (  7.374E-01 8.49E+00 4.25E+00 G

PB-212   N   9.4201E-02                                      6.98E+02
                          238.63 9.420E-02  (  4.678E-02 2.09E+01 4.33E+01 G
                          300.03 0.000E+00 %   3.608E-01 4.66E+01 3.28E+00 GA

PB-214   N   1.9696E-01                                      5.84E+05
                          351.93 1.751E-01  (  7.312E-02 2.08E+01 3.76E+01 G
                          295.09 2.395E-01 *(  1.115E-01 2.17E+01 1.93E+01 G
                          242.00 0.000E+00     2.524E-01 0.00E+00 7.43E+00 GA

BI-214   N   2.3022E-01                                      5.84E+05
                          609.31 2.302E-01  (  7.177E-02 1.44E+01 4.61E+01 G
                         1120.29 5.378E-01 +   2.575E-01 2.36E+01 1.51E+01 G
                         1764.49 7.579E-01 +   1.740E-01 1.50E+01 1.54E+01 G

TH-234   N   2.9037E+00                                      1.63E+12
                           63.29 2.904E+00  (  6.451E-01 9.20E+00 3.81E+00 G
                           92.59 2.040E+00 -   3.599E-01 7.99E+00 5.58E+00 G

PA-234M  N   7.5455E+00                                      1.63E+12
                         1001.00 7.546E+00 ?(  4.073E+00 2.59E+01 8.37E-01 G
                          766.41 0.000E+00 %   7.708E+00 4.56E+01 2.94E-01 G

Ra-226       2.0030E+00                                      5.84E+05
                          185.99 2.003E+00  (  6.129E-01 1.39E+01 3.28E+00 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
```

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.1321E-01		
NA-22	<	1.5718E-02		
K-40	#	1.5356E+00	1.7219E+01%	4.293E-01
Sc-46	<	2.6566E-02		
CR-51	<	1.2618E-01		
MN-54	<	2.4502E-02		
FE-59	<	5.4555E-02		
Co-56	<	2.6969E-02		
CO-57	<	1.9410E-02		
CO-58	<	2.1457E-02		
CO-60	<	2.7986E-02		
ZN-65	<	7.9191E-02		
NB-94	<	2.6465E-02		
ZR-95	<	4.1421E-02		
NB-95	<	3.3636E-02		
RU-103	<	1.9307E-02		
RH-106	<	2.0701E-01		
AG-108M	<	1.8877E-02		
AG-110M	<	2.1368E-02		
SN-113	<	2.7368E-02		
SB-124	<	2.8291E-02		
SB-125	<	5.6135E-02		
I-131	<	1.7071E-02		

BA-133	<	1.9117E-02		
CS-134	<	1.4703E-02		
CS-137	<	2.5554E-02		
CE-139	<	2.0817E-02		
Ba-140	<	7.0436E-02		
La-140	<	2.9281E-02		
CE-141	<	2.1369E-02		
CE-144	<	6.8700E-02		
PM-144	<	2.6385E-02		
EU-152	<	6.3583E-02		
EU-154	<	1.9456E-01		
EU-155	<	4.9561E-02		
HF-181	<	2.9440E-02		
Ta-182	<	1.1154E-01		
Hg-203	<	1.4013E-02		
TL-208		4.8591E-02	2.5145E+01%	3.069E-02
pm-146	<	5.8833E-02		
y-88	<	3.1116E-02		
PB-210		3.7293E+00	8.4933E+00%	7.374E-01
PB-212		9.4201E-02	2.0940E+01%	4.678E-02
PB-214		1.9696E-01	1.5010E+01%	7.312E-02
BI-207	<	3.3742E-02		
BI-212	<	2.8539E-01		
BI-214		2.3022E-01	1.4395E+01%	7.177E-02
BI-210M	<	2.3203E-02		
RA-224	<	4.8674E-01		
AC-228	<	1.1656E-01		
TH-227	<	8.2002E-02		
TH-229	<	2.4731E-01		
TH-234		2.9037E+00	9.1992E+00%	6.451E-01
PA-231	<	5.6057E-01		
PA-233	<	3.5006E-02		
PA-234	<	8.2942E-02		
PA-234M#		7.5455E+00	2.5914E+01%	4.073E+00
Ra-226		2.0030E+00	1.3945E+01%	6.129E-01
U-235	<	9.7027E-02		
AM-241	<	8.0900E-02		
Np-237	<	1.2050E-01		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (37.6 to 1999.5 keV) 1.829E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 17_20180810019_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:45:27 PM
Detector: Detector #17
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.32	2.18	2.23	2.32	2.42	2.46	PASS

Analyst: Joey Sausto Reviewer: Rachel Mueller

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Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det17\17_20180810019_BGLong.An1

Acquisition information
Start time: 8/10/2018 4:45:27 PM
Live time: 72000
Real time: 72579
Dead time: 0.80 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: 3

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1273

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.64	1180.	5.09	0.78	5.953E-02	46.54	4.250	6.490E+00	PB210
63.33	1050.	5.82	0.78	8.041E-02	63.29	3.810	4.763E+00	TH234
75.03	270.	17.06	0.80	9.511E-02				
77.03	179.	26.79	0.80	9.761E-02				
84.57	328.	19.68	1.20	1.070E-01				
92.65	1636.	5.05	1.08	1.119E-01	92.59	5.584	3.637E+00	TH234
					93.35	5.561	3.649E+00	AC228
143.71	238.	22.42	0.62	1.094E-01	143.79	10.960	2.758E-01	U235
185.60	806.	7.39	0.83	9.859E-02	185.72	54.000	2.102E-01	U235
					185.99	3.280	3.463E+00	Ra226
198.26	312.	17.58	1.05	9.571E-02				
238.53	387.	13.50	0.99	8.657E-02	238.63	43.300	1.436E-01	PB212
295.04	235.	20.00	0.89	7.373E-02	295.09	19.300	2.291E-01	PB214
351.79	391.	12.89	1.09	6.084E-02	351.93	37.600	2.375E-01	PB214
510.87	2310.	4.35	2.37	4.376E-02	511.86	20.000	3.673E+00	RH106
583.14	172.	19.12	1.17	3.886E-02	583.02	84.500	7.273E-02	TL208
609.43	367.	11.94	1.09	3.709E-02	609.31	46.090	2.984E-01	BI214
					610.30	5.750	2.396E+00	RU103
1001.10	118.	24.27	0.87	2.198E-02	1001.00	0.837	8.947E+00	PA234M
1121.16	138.	25.41	1.65	1.989E-02	1120.29	15.100	6.405E-01	BI214
					1120.55	99.987	9.674E-02	Sc46
					1121.30	34.900	2.773E-01	Ta182
1460.47	287.	11.46	1.44	1.609E-02	1460.83	10.670	2.325E+00	K40
1764.39	139.	17.87	1.98	1.381E-02	1764.49	15.400	9.079E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.55	75.07	924.	270.	2.835E+03	17.06	0.802	- D
307.55	77.07	1065.	179.	1.838E+03	26.79	0.804	- D
337.69	84.57	1211.	328.	3.064E+03	19.68	1.200	- sM
792.23	198.26	770.	312.	3.260E+03	17.58	1.052	- s
2042.39	510.53	849.	2310.	5.278E+04	4.35	2.370	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.03	46.64	854.	1180.	0.016	5.09	0.780
TH-234	252.74	63.33	946.	1050.	0.015	5.82	0.782
TH-234	370.00	92.65	1416.	1636.	0.023	5.05	1.076s
U-235	574.12	143.71	870.	238.	0.003	22.42	0.616s
U-235	742.10	185.72	864.	790.	0.011	6.26	0.825D
PB-212	953.25	238.53	705.	387.	0.005	13.50	0.986
PB-214	1179.24	295.04	590.	235.	0.003	20.00	0.893
PB-214	1406.16	351.79	537.	391.	0.005	12.89	1.090
TL-208	2331.44	583.14	248.	172.	0.002	19.12	1.170
BI-214	2436.60	609.43	374.	367.	0.005	11.94	1.093
PA-234M	4003.44	1001.10	158.	118.	0.002	24.27	0.870s
BI-214	4483.85	1121.16	188.	138.	0.002	25.41	1.651s
K-40	5841.78	1460.47	117.	287.	0.004	11.46	1.443s
BI-214	7058.43	1764.39	70.	139.	0.002	17.87	1.984

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	2.3253E+00					4.66E+11	
			1460.83	2.325E+00	(	4.293E-01	1.15E+01	1.07E+01 G
TL-208	N	7.2729E-02					6.98E+02	
			583.02	7.273E-02	(	3.218E-02	1.91E+01	8.45E+01 G
			277.28	0.000E+00	&	2.015E-01	1.00E+03	6.31E+00 G
			860.56	0.000E+00	%	1.952E-01	6.90E+01	1.24E+01 G
PB-210	N	6.4895E+00					8.14E+03	
			46.54	6.490E+00	(	7.642E-01	5.09E+00	4.25E+00 G
PB-212	N	1.4356E-01					6.98E+02	
			238.63	1.436E-01	(	4.685E-02	1.35E+01	4.33E+01 G
			300.03	0.000E+00	%	4.120E-01	1.11E+02	3.28E+00 GA
PB-214	N	2.3467E-01					5.84E+05	
			351.93	2.375E-01	(	6.725E-02	1.29E+01	3.76E+01 G
			295.09	2.291E-01	(	1.132E-01	2.00E+01	1.93E+01 G
			242.00	0.000E+00	?	2.559E-01	0.00E+00	7.43E+00 GA
BI-214	N	2.9837E-01					5.84E+05	
			609.31	2.984E-01	(	7.537E-02	1.19E+01	4.61E+01 G
			1120.29	6.405E-01	&	3.084E-01	2.54E+01	1.51E+01 G
			1764.49	9.079E-01	+	2.724E-01	1.79E+01	1.54E+01 G
TH-234	N	4.7628E+00					1.63E+12	
			63.29	4.763E+00	(	6.624E-01	5.82E+00	3.81E+00 G
			92.59	3.637E+00	-	3.958E-01	5.05E+00	5.58E+00 G
PA-234M	N	8.9471E+00					1.63E+12	
			1001.00	8.947E+00	(	4.620E+00	2.43E+01	8.37E-01 G
			766.41	0.000E+00	%	7.982E+00	8.90E+01	2.94E-01 G
U-235	N	2.7585E-01					2.57E+11	
			185.72	2.061E-01	}	3.646E-02	6.26E+00	5.40E+01 GA
			143.79	2.758E-01	*(	1.625E-01	2.24E+01	1.10E+01 G
			205.33	0.000E+00	%	2.539E-01	1.15E+02	5.01E+00 G
			163.38	0.000E+00	%	2.414E-01	5.77E+01	5.08E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.9036E-01		
NA-22	<	2.7142E-02		
K-40		2.3253E+00	1.1461E+01%	4.293E-01
Sc-46	<	3.5899E-02		
CR-51	<	1.4006E-01		
MN-54	<	2.3904E-02		
FE-59	<	5.3227E-02		
Co-56	<	2.5761E-02		
CO-57	<	1.0459E-02		
CO-58	<	2.4475E-02		
CO-60	<	3.0878E-02		
ZN-65	<	8.9402E-02		

NB-94	<	2.5022E-02		
ZR-95	<	4.2507E-02		
NB-95	<	3.8120E-02		
RU-103	<	1.6934E-02		
RH-106	<	1.3760E-01		
AG-108M	<	1.7414E-02		
AG-110M	<	4.6804E-02		
SN-113	<	2.3971E-02		
SB-124	<	3.7445E-02		
SB-125	<	5.0963E-02		
I-131	<	1.7722E-02		
BA-133	<	3.4520E-02		
CS-134	<	4.1717E-02		
CS-137	<	4.6000E-02		
CE-139	<	2.5922E-02		
Ba-140	<	6.9760E-02		
La-140	<	3.1209E-02		
CE-141	<	1.8591E-02		
CE-144	<	1.3528E-01		
PM-144	<	2.5363E-02		
EU-152	<	5.1411E-02		
EU-154	<	1.1435E-01		
EU-155	<	4.5988E-02		
HF-181	<	3.8688E-02		
Ta-182	<	1.1305E-01		
Hg-203	<	1.5523E-02		
TL-208		7.2729E-02	1.9118E+01%	3.218E-02
pm-146	<	6.7921E-02		
y-88	<	3.0102E-02		
PB-210		6.4895E+00	5.0864E+00%	7.642E-01
PB-212		1.4356E-01	1.3505E+01%	4.685E-02
PB-214		2.3467E-01	1.1896E+01%	6.725E-02
BI-207	<	3.9156E-02		
BI-212	<	3.1171E-01		
BI-214		2.9837E-01	1.1942E+01%	7.537E-02
BI-210M	<	2.6235E-02		
RA-224	<	2.3696E-01		
AC-228	<	1.2706E-01		
TH-227	<	9.8790E-02		
TH-229	<	2.7998E-01		
TH-234		4.7628E+00	5.8168E+00%	6.624E-01
PA-231	<	3.4995E-01		
PA-233	<	3.8931E-02		
PA-234	<	5.1098E-02		
PA-234M		8.9471E+00	2.4272E+01%	4.620E+00
U-235		2.7585E-01	2.2423E+01%	1.625E-01
AM-241	<	8.8892E-02		
Np-237	<	1.5562E-01		

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.5 keV)     2.355E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 19_20180810017_BGLong
Description: Background Long PBC Count
Acquired: 8/10/2018 4:44:27 PM
Detector: Detector #19
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.30	2.15	2.20	2.28	2.39	2.44	PASS

Analyst: Joey Sausto Reviewer:

(Page 1 of 7)

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det19\19_20180810017_BGLong.An1

Acquisition information

Start time:	8/10/2018 4:44:27 PM
Live time:	72000
Real time:	72068
Dead time:	0.09 %
Detector ID:	19

Detector system
Ge19 SN/11146715

Calibration

Filename:	19_QC.Clb

19_QC_Source F_83725-334

Energy Calibration

Created:	4/16/2018 11:22:57 AM
Zero offset:	0.177 keV
Gain:	0.250 keV/channel
Quadratic:	-3.735E-08 keV/channel^2

Efficiency Calibration

Created:	4/17/2018 2:50:57 PM
Knee Energy:	0.00 keV
Above the Knee:	Interpolative Uncertainty = 0.00 %
Below the Knee:	Interpolative Uncertainty = 0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G800W064
Start channel:	150 (37.71keV)
Stop channel:	8000 (1999.42keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00 +/- 0.000E+00%
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	3

(Page 2 of 7)

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01 %
Energy Calibration
Normalized diff: 0.1631

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.72	1477.	4.89	0.92	5.752E-02	46.54	4.250	8.424E+00	PB210
63.49	737.	11.12	0.88	7.743E-02	63.29	3.810	3.479E+00	TH234
75.06	314.	18.15	0.96	9.117E-02				
77.42	201.	26.67	0.96	9.398E-02				
92.79	1073.	6.75	1.10	1.129E-01	92.59	5.584	2.371E+00	TH234
					93.35	5.561	2.360E+00	AC228
185.76	574.	12.71	0.86	1.371E-01	185.72	54.000	1.077E-01	U235
					185.99	3.280	1.773E+00	Ra226
238.56	346.	14.57	0.97	1.252E-01	238.63	43.300	8.877E-02	PB212
295.50	195.	27.19	1.52	1.125E-01	295.09	19.300	1.248E-01	PB214
351.81	312.	16.27	0.99	9.966E-02	351.93	37.600	1.158E-01	PB214
511.09	2116.	5.06	2.44	6.382E-02	511.86	20.000	2.312E+00	RH106
583.58	184.	22.79	1.02	4.737E-02	583.02	84.500	6.367E-02	TL208
609.39	300.	18.22	1.34	4.155E-02	609.31	46.090	2.179E-01	BI214
					610.30	5.750	1.756E+00	RU103
1001.38	140.	21.43	2.13	2.118E-02	1001.00	0.837	1.097E+01	PA234M
1460.63	321.	8.81	1.59	1.343E-02	1460.83	10.670	3.111E+00	K40
1764.48	139.	14.74	1.38	9.848E-03	1764.49	15.400	1.271E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
299.29	75.07	1468.	314.	3.446E+03	18.15	0.960	- sD
308.74	77.43	1341.	201.	2.143E+03	26.67	0.962	- D

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Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
2042.61	510.68	936.	2116.	3.316E+04	5.06	2.440	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.01	46.72	1125.	1477.	0.021	4.89	0.922
TH-234	252.88	63.45	1605.	799.	0.011	10.63	0.888
TH-234	370.19	92.79	1251.	1073.	0.015	6.75	1.105
Ra-226	741.82	185.76	1188.	574.	0.008	12.71	0.862
PB-212	952.91	238.56	696.	346.	0.005	14.57	0.970
PB-214	1180.55	295.50	654.	195.	0.003	27.19	1.524s
PB-214	1405.69	351.81	545.	312.	0.004	16.27	0.991
TL-208	2332.51	583.58	350.	184.	0.003	22.79	1.019s
BI-214	2435.75	609.39	490.	300.	0.004	18.22	1.340
PA-234M	4003.93	1001.38	152.	140.	0.002	21.43	2.135s
K-40	5842.13	1460.63	70.	321.	0.004	8.81	1.589
BI-214	7058.90	1764.48	54.	139.	0.002	14.74	1.384s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	3.1112E+00					4.66E+11	
			1460.83	3.111E+00	(	4.041E-01	8.81E+00	1.07E+01 G
TL-208	N	6.3674E-02					6.98E+02	
			583.02	6.367E-02	(	3.111E-02	2.28E+01	8.45E+01 G
			277.28	0.000E+00	%	1.399E-01	2.88E+02	6.31E+00 G
			860.56	0.000E+00	%	2.171E-01	3.30E+02	1.24E+01 G
PB-210	N	8.4241E+00					8.14E+03	
			46.54	8.424E+00	(	9.066E-01	4.89E+00	4.25E+00 G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PB-212   N   8.8774E-02                                      6.98E+02
                          238.63 8.877E-02  (  3.218E-02 1.46E+01 4.33E+01 G
                          300.03 0.000E+00 %   2.594E-01 6.44E+01 3.28E+00 GA

PB-214   N   1.1884E-01                                      5.84E+05
                          351.93 1.158E-01  (  4.132E-02 1.63E+01 3.76E+01 G
                          295.09 1.248E-01  (  7.799E-02 2.72E+01 1.93E+01 G
                          242.00 0.000E+00     1.838E-01 0.00E+00 7.43E+00 GA

BI-214   N   2.1786E-01                                      5.84E+05
                          609.31 2.179E-01  (  7.679E-02 1.82E+01 4.61E+01 G
                         1120.29 0.000E+00 %   2.339E-01 5.60E+01 1.51E+01 G
                         1764.49 1.271E+00 +   3.389E-01 1.47E+01 1.54E+01 G

TH-234   N   3.7732E+00                                      1.63E+12
                           63.29 3.773E+00  (  8.944E-01 1.06E+01 3.81E+00 G
                           92.59 2.371E+00 -   3.701E-01 6.75E+00 5.58E+00 G

PA-234M  N   1.0970E+01                                      1.63E+12
                         1001.00 1.097E+01  (  4.714E+00 2.14E+01 8.37E-01 G
                          766.41 0.000E+00 %   8.416E+00 7.56E+01 2.94E-01 G

Ra-226       1.7732E+00                                      5.84E+05
                          185.99 1.773E+00  (  5.045E-01 1.27E+01 3.28E+00 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
```

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.1493E-01		
NA-22	<	1.6765E-02		
K-40		3.1112E+00	8.8076E+00%	4.041E-01
Sc-46	<	4.6860E-02		
CR-51	<	8.8846E-02		
MN-54	<	2.7768E-02		
FE-59	<	6.1700E-02		
Co-56	<	2.5662E-02		
CO-57	<	9.0917E-03		
CO-58	<	1.3725E-02		
CO-60	<	3.5651E-02		
ZN-65	<	5.8266E-02		
NB-94	<	2.6938E-02		
ZR-95	<	4.3709E-02		
NB-95	<	4.6825E-02		
RU-103	<	1.3421E-02		
RH-106	<	2.1143E-01		
AG-108M	<	1.2254E-02		
AG-110M	<	4.3265E-02		
SN-113	<	1.4310E-02		
SB-124	<	3.4481E-02		
SB-125	<	3.8202E-02		
I-131	<	1.0881E-02		
BA-133	<	2.4779E-02		
CS-134	<	3.5071E-02		
CS-137	<	2.9468E-02		
CE-139	<	1.6861E-02		
Ba-140	<	4.9696E-02		
La-140	<	3.0225E-02		
CE-141	<	2.7112E-02		
CE-144	<	1.2167E-01		

PM-144	<	2.8551E-02		
EU-152	<	3.1880E-02		
EU-154	<	2.0788E-01		
EU-155	<	5.2390E-02		
HF-181	<	1.4588E-02		
Ta-182	<	1.1656E-01		
Hg-203	<	1.5769E-02		
TL-208		6.3674E-02	2.2794E+01%	3.111E-02
pm-146	<	6.7677E-02		
y-88	<	2.6985E-02		
PB-210		8.4241E+00	4.8935E+00%	9.066E-01
PB-212		8.8774E-02	1.4571E+01%	3.218E-02
PB-214		1.1884E-01	1.5842E+01%	4.132E-02
BI-207	<	2.8515E-02		
BI-212	<	3.5861E-01		
BI-214		2.1786E-01	1.8222E+01%	7.679E-02
BI-210M	<	1.7823E-02		
RA-224	<	3.4925E-01		
AC-228	<	9.0934E-02		
TH-227	<	1.2374E-01		
TH-229	<	2.0094E-01		
TH-234		3.7732E+00	1.0634E+01%	8.944E-01
PA-231	<	4.7539E-01		
PA-233	<	2.3521E-02		
PA-234	<	7.7424E-02		
PA-234M		1.0970E+01	2.1429E+01%	4.714E+00
Ra-226		1.7732E+00	1.2714E+01%	5.045E-01
U-235	<	1.2812E-01		
AM-241	<	8.9872E-02		
Np-237	<	1.6019E-01		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.4 keV) 2.854E+01 DPS

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Run Logs

Gamma Spectroscopy Run Log

Detector: GV5

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 15:05		IC 160-12297/1		12297			JLW
03/27/12 10:12		ICV 160-12297/2		12297			JLW
12/07/16 01:00		CCB 160-282801/1		282801			
12/07/16 01:42		CCV 160-282801/2		282801			
12/07/16 02:04		CCV 160-282801/3		282801			
12/07/16 07:35	30	ZZZZZ		282801			
12/07/16 08:34	30	ZZZZZ		282801			
12/07/16 09:33		ACVTOP 160-282801/6		282801			KLS
12/07/16 09:33		ACVTOP 160-282835/1		282835			PS
08/10/18 16:43		ICB 160-381834/1		381834			RTM
08/23/18 00:02		CCV 160-384697/1		384697			
08/23/18 00:25		CCV 160-384697/2		384697			KLS
08/23/18 00:46		CCB 160-384697/3		384697			KLS
08/23/18 01:28	30	ZZZZZ		384697			
08/23/18 02:12	30	ZZZZZ		384697			
08/23/18 02:55	30	ZZZZZ		384697			
08/23/18 03:39	30	ZZZZZ		384697			
08/23/18 06:32	30	160-29881-14	CRC-B4-1820	384697	379951	901.1	KLS
08/23/18 07:14	30	160-29881-31	CRC-B14-2426	384697	379951	901.1	KLS
08/23/18 07:50	30	MB 160-379959/1-A		384697	379959	901.1	KLS
08/23/18 08:48	30	ZZZZZ		384697			
08/23/18 08:48	30	ZZZZZ		384697			
08/23/18 11:46	30	160-29881-1	CRC-B9-0406	384697	379951	901.1	KLS
08/23/18 15:11	30	ZZZZZ		384697			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 14:07		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
12/06/16 16:15		ACVTOP 160-282836/1		282836			PS
08/10/18 16:44		ICB 160-381736/1		381736			JFS
08/23/18 00:01		CCV 160-384698/1		384698			
08/23/18 00:23		CCV 160-384698/2		384698			KLS
08/23/18 00:43		CCB 160-384698/3		384698			KLS
08/23/18 01:25	120	ZZZZZ		384698			
08/23/18 03:41	30	ZZZZZ		384698			
08/23/18 06:31	30	160-29881-13	CRC-B4-1012	384698	379951	901.1	KLS
08/23/18 07:12	30	160-29881-30	CRC-B14-1618	384698	379951	901.1	KLS
08/23/18 07:52	30	160-29881-38	CRC-B5-2224	384698	379959	901.1	KLS
08/23/18 08:45	30	ZZZZZ		384698			
08/23/18 08:45	30	ZZZZZ		384698			
08/23/18 10:37	120	ZZZZZ		384698			
08/23/18 14:23	120	ZZZZZ		384698			
08/23/18 17:02	120	ZZZZZ		384698			
08/23/18 19:16	120	ZZZZZ		384698			
08/23/18 22:50	60	ZZZZZ		384698			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW

Gamma Spectroscopy Run Log

Detector: GV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
12/06/16 10:28		ACVTOP 160-282755/1		282755			PS
08/10/18 16:45		ICB 160-381737/1		381737			JFS
08/23/18 00:03		CCV 160-384699/1		384699			
08/23/18 00:42		CCV 160-384699/2		384699			
08/23/18 01:05		CCV 160-384699/3		384699			KLS
08/23/18 01:24		CCB 160-384699/4		384699			KLS
08/23/18 02:14	30	ZZZZZ		384699			
08/23/18 02:56	30	ZZZZZ		384699			
08/23/18 03:42	30	ZZZZZ		384699			
08/23/18 06:29	30	160-29881-12	CRC-B11-0204	384699	379951	901.1	KLS
08/23/18 07:10	30	160-29881-29	CRC-B14-1012	384699	379951	901.1	KLS
08/23/18 07:53	30	ZZZZZ		384699			
08/23/18 08:45	30	ZZZZZ		384699			
08/23/18 08:45	30	ZZZZZ		384699			
08/23/18 15:12	30	ZZZZZ		384699			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
12/05/16 11:08		ACVTOP 160-282744/1		282744			PS
08/10/18 16:43		ICB 160-381731/1		381731			RTM
08/23/18 00:01		CCB 160-384700/1		384700			KLS
08/23/18 00:41		CCV 160-384700/2		384700			
08/23/18 01:01		CCV 160-384700/3		384700			KLS
08/23/18 01:26	30	ZZZZZ		384700			
08/23/18 02:08	30	ZZZZZ		384700			
08/23/18 02:54	30	ZZZZZ		384700			
08/23/18 03:34	30	ZZZZZ		384700			
08/23/18 06:25	30	MB 160-379951/1-A		384700	379951	901.1	KLS
08/23/18 07:08	30	160-29881-1 DU	CRC-B9-0406 DU	384700	379951	901.1	KLS
08/23/18 07:43	30	160-29881-32	CRC-B17-0406	384700	379951	901.1	KLS
08/23/18 08:43	30	ZZZZZ		384700			
08/23/18 09:26	30	ZZZZZ		384700			
08/23/18 09:26	30	ZZZZZ		384700			
08/23/18 15:10	30	ZZZZZ		384700			
08/23/18 15:53	30	ZZZZZ		384700			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/18/18 13:54		IC 160-364854/1		364854			JLW
04/24/18 09:26		ICV 160-364854/2		364854			JLW
08/10/18 16:44		ICB 160-381730/1		381730			RTM
08/23/18 00:00		CCV 160-384701/1		384701			
08/23/18 00:21		CCV 160-384701/2		384701			KLS
08/23/18 00:39		CCB 160-384701/3		384701			
08/23/18 01:25		CCB 160-384701/4		384701			KLS
08/23/18 02:09	30	ZZZZZ		384701			
08/23/18 02:55	30	ZZZZZ		384701			
08/23/18 03:34	30	ZZZZZ		384701			
08/23/18 06:26	30	LCS 160-379951/2-A		384701	379951	901.1	KLS

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/23/18 07:09	30	160-29881-15	CRC-B12-0002	384701	379951	901.1	KLS
08/23/18 07:44	30	160-29881-33	CRC-B17-0810	384701	379951	901.1	KLS
08/23/18 08:47	30	160-29881-39	CRC-B5-2830	384701	379959	901.1	KLS
08/23/18 09:26	30	ZZZZZ		384701			
08/23/18 15:11	30	ZZZZZ		384701			
08/23/18 15:54	30	ZZZZZ		384701			
08/23/18 17:34	30	160-29881-37 DU	CRC-B5-1618 DU	384701	379959	901.1	KLS

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
12/06/16 19:00		ACVTOP 160-282843/1		282843			PS
08/10/18 16:43		ICB 160-381727/1		381727			RTM
08/23/18 00:01		CCV 160-384703/1		384703			
08/23/18 00:23		CCV 160-384703/2		384703			KLS
08/23/18 00:41		CCB 160-384703/3		384703			KLS
08/23/18 01:21	120	ZZZZZ		384703			
08/23/18 03:43	120	ZZZZZ		384703			
08/23/18 06:26	30	ZZZZZ		384703			
08/23/18 07:09	30	160-29881-16	CRC-B12-0406	384703	379951	901.1	KLS
08/23/18 07:43	30	160-29881-34	CRC-B17-1820	384703	379951	901.1	KLS
08/23/18 08:39	120	ZZZZZ		384703			
08/23/18 11:32	120	ZZZZZ		384703			
08/23/18 14:21	120	ZZZZZ		384703			
08/23/18 17:01	120	ZZZZZ		384703			
08/23/18 19:13	120	ZZZZZ		384703			
08/23/18 22:48	60	ZZZZZ		384703			

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
12/02/16 13:12		ACVTOP 160-282704/1		282704			PS
08/10/18 16:44		ICB 160-381728/1		381728			RTM
08/23/18 00:02		CCV 160-384704/1		384704			
08/23/18 00:24		CCV 160-384704/2		384704			KLS
08/23/18 00:44		CCB 160-384704/3		384704			KLS
08/23/18 01:22	60	ZZZZZ		384704			
08/23/18 03:32	120	ZZZZZ		384704			
08/23/18 06:28	30	160-29881-4	CRC-B7-0204	384704	379951	901.1	KLS
08/23/18 07:10	30	160-29881-17	CRC-B12-1214	384704	379951	901.1	KLS
08/23/18 07:45	30	160-29881-35	CRC-B17-2628	384704	379951	901.1	KLS
08/23/18 08:41	30	160-29881-40	CRC-B11-1214	384704	379959	901.1	KLS
08/23/18 10:37	120	ZZZZZ		384704			
08/23/18 14:22	120	ZZZZZ		384704			
08/23/18 17:02	120	ZZZZZ		384704			
08/23/18 19:14	120	ZZZZZ		384704			
08/23/18 22:49		ZZZZZ		384704			

Gamma Spectroscopy Run Log

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/26/12 06:29		IC 160-12390/1		12390			JLW
03/26/12 09:29		ICV 160-12390/2		12390			JLW
11/30/16 17:05		ACVTOP 160-282698/1		282698			PS
08/10/18 16:45		ICB 160-381729/1		381729			RTM
08/23/18 00:08		CCB 160-384702/1		384702			KLS
08/23/18 00:40		CCV 160-384702/2		384702			
08/23/18 01:01		CCV 160-384702/3		384702			KLS
08/23/18 01:23	120	ZZZZZ		384702			
08/23/18 03:44	120	ZZZZZ		384702			
08/23/18 06:28	30	160-29881-8	CRC-B14-0204	384702	379951	901.1	KLS
08/23/18 07:11	30	160-29881-27	CRC-B4-2628	384702	379951	901.1	KLS
08/23/18 07:47	30	160-29881-36	CRC-B5-1214	384702	379951	901.1	KLS
08/23/18 08:44	30	160-29881-41	CRC-B11-2022	384702	379959	901.1	KLS
08/23/18 10:24	60	ZZZZZ		384702			
08/23/18 11:34	120	ZZZZZ		384702			
08/23/18 14:24	120	ZZZZZ		384702			
08/23/18 17:03	120	ZZZZZ		384702			
08/23/18 19:15	120	ZZZZZ		384702			
08/23/18 22:48	60	ZZZZZ		384702			

Detector: GV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/14/18 10:55		ZZZZZ		364044			
03/14/18 15:23		IC 160-364044/1		364044			JLW
04/20/18 09:45		ICV 160-364044/3		364044			JLW
08/10/18 16:44		ICB 160-381732/1		381732			RTM
08/23/18 00:00		CCB 160-384705/1		384705			KLS
08/23/18 00:42		CCV 160-384705/2		384705			
08/23/18 01:02		CCV 160-384705/3		384705			KLS
08/23/18 01:29	30	ZZZZZ		384705			
08/23/18 02:16	30	ZZZZZ		384705			
08/23/18 02:54	30	ZZZZZ		384705			
08/23/18 03:37	30	ZZZZZ		384705			
08/23/18 06:28	30	160-29881-9	CRC-B17-0204	384705	379951	901.1	KLS
08/23/18 07:09	30	160-29881-28	CRC-B14-0608	384705	379951	901.1	KLS
08/23/18 07:48	30	LCS 160-379959/2-A		384705	379959	901.1	KLS
08/23/18 08:41	30	160-29881-42	CRC-B11-2628	384705	379959	901.1	KLS
08/23/18 18:46	30	160-29881-37	CRC-B5-1618	384705	379959	901.1	KLS

Radiological
Pre-Preparation Data

Shipping and Receiving Documents

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Phone: 314.298.8566 Fax: 314.298.8757

Chain of Custody Record

215031

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Kris Schnoes	Site Contact: Dave Franc	Date:	COC No:
Company Name: Tetra Tech	Tel/Fax:	Lab Contact:	Carrier:	1 of 4 COCs
Address: 1 S. Wacker Dr, Ste 3700	Analysis Turnaround Time			Sampler:
City/State/Zip: Chicago, IL 60606	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: Carnotite Reduction Co	☐ 1 week			
Site: Chicago, IL	☐ 2 days			Job / SDG No.:
PO #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Ra-226, -228	Ur-Alpha Spec	Th-230	Sample Specific Notes:
CRC-B9-0406 l	7/12/18	750	G	Soil	1			X	X	X	
CRC-B6-0204 l	7/11/18	1630	G	"	1				X	X	
CRC-B1-0406 l	7/10/18	1030	G	"	1				X	X	
CRC-B7-0204 l	7/11/18	1145	G	"	1			X	X	X	
CRC-B22-0506 l	7/12/18	1200	G	"	1				X	X	
CRC-B7-0406 l	7/11/18	1525	G	"	1				X	X	
CRC-B4-0608 l	7/26/18	1100	G	"	1				X	X	
CRC-B14-0204 l	7/27/18	1210	G	"	1			X	X	X	
CRC-B17-0204 l	7/27/18	1615	G	"	1			X	X	X	
CRC-B5-0204 l	7/30/18	1135	G	"	1				X	X	
CRC-B5-0608 l	7/30/18	1140	G	"	1				X	X	
CRC-B11-0204 l	7/30/18	1410	G	"	1			X	X	X	

160-29881 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Tetra Tech	7/30/18 1700	Michael Fleem	TA	7-31-18 0910
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

~~2417 Bond Street, University Park, IL 60484~~
~~Phone: 708.534.5200 Fax: 708.534.5211~~
Earth City, MO

Chain of Custody Record

Report To (optional):
Contact: Kris Schnogs
Company: Tetra Tech
Address: 15 Wacker Dr
Address: Ste 3700, Chicago, IL
Phone: 773-759-8058
Fax:
E-Mail: kris.schnogs@tetratech.com

Bill To (optional):
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#:

Lab Job #:
Chain of Custody Number:
Page 2 of 4
Temperature °C of Cooler:

Client: Tetra Tech
Client Project #:
Project Name: Carnotite Reduction Co.
Project Location/State: Chicago, IL
Lab Project #:
Sampler: D. Franc
Lab PM:

Preservative Key: 1. HCL, Cool to 4° 2. H2SO4, Cool to 4° 3. HNO3, Cool to 4° 4. NaOH, Cool to 4° 5. NaOH/Zn, Cool to 4° 6. NaHSO4 7. Cool to 4° 8. None 9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix	Ra-226, -228	Isotropic Ur	Th-230							Comments
		CRC-B4-~~0806~~ 1012 ✓	7/26/18	1110	2	S	X	X	X							
		CRC-B4-1820 ✓	↓	1120	↓	↓	X	X	X							
		CRC-B12-0002 ✓	↓	1210	↓	↓	X	X	X							
		CRC-B12-0406 ✓	↓	1220	↓	↓	X	X	X							
		CRC-B12-1214 ✓	↓	1230	↓	↓	X	X	X							
		CRC-BK1-0203 ✓	↓	1310	1	↓			X							
		CRC-BK2-0102 ✓	↓	1330	↓	↓			X							
		CRC-BK2-0304 ✓	↓	1335	↓	↓			X							
		CRC-BK4-0102 ✓	↓	1400	↓	↓			X							
		CRC-BK6-0002 ✓	↓	1435	↓	↓			X							

Turnaround Time Required (Business Days): ___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days X 10 Days ___ 15 Days ___ Other
Requested Due Date:

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab ☐ Archive for ___ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
[signature]	Tetra Tech	7/31/18	1700	[signature]	TA	7-31-18	0910
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier:
Shipped:
Hand Delivered:

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
MS – Miscellaneous
OL – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
WI – Wipe
DW – Drinking Water
O – Other

Client Comments:

Lab Comments:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

(optional)
Report To
Contact: Kris Schnoes
Company: Tetra Tech
Address: 1 S. Wacker Dr
Address: Ste 3700, Chicago, IL
Phone: 773-759-8058
Fax:
E-Mail: kris.schnoes@tetratech.com

(optional)
Bill To
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#

Chain of Custody F co

Lab Job #:
Chain of Custody Number
Page 3 of 4
Temperature °C of Cooler:

Client: Tetra Tech
Client Project #:
Project Name: Carnotite Reduction Co
Project Location/State: Chicago, IL
Lab Project #:
Sampler: D. Franc
Lab PM:

Preservative:
Parameter: Ra-226, -228 | Isotropic U | Th-230

Preservative Key
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix	Ra-226, -228	Isotropic U	Th-230	Comments
		CRC-BK6-0406 ✓	7/26/18	1440	1	S			X	
		CRC-BK7-0405 ✓	↓	1510	↓				X	
		CRC-BK9-0506 ✓		1545					X	
		CRC-BK8-0102 ✓		1600					X	
		CRC-B4-2628 ✓	7/27/18	0920	2		X	X	X	
		CRC-B14-0608 ✓		1215			X	X	X	
		CRC-B14-1012 ✓		1220			X	X	X	
		CRC-B14-1618 ✓		1225			X	X	X	
		CRC-B14-2426 ✓		1230			X	X	X	
		CRC-B17-0406 ✓	↓	1620			X	X	X	

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days ___ 10 Days ___ 15 Days _____ Other
Requested Due Date:

Sample Disposal
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
[signature]	Tetra Tech	7/31/18	1700	[signature]	TA	7/31/18	0910
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier
Shipped
Hand Delivered

Matrix Key
WW – Wastewater
W – Water
S – Soil
SL – Sludge
MS – Miscellaneous
OL – Oil
A – Air
SE – Sediment
SO – Soil
L – Leachate
Wi – Wipe
DW – Drinking Water
O – Other

Client Comments

Lab Comments:

TAL-4124A-500 (1209)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

3417 Bond Street, University Park, IL 60484
Phone: 708.534.5200 Fax: 708.534.5211

Chain of Custody Record

Report To (optional)
Contact: Kris Schnoes
Company: Tetra Tech
Address: 15 Wacker
Address: Ste 3200 Chicago, IL
Phone: 773-759-8058
Fax:
E-Mail: kris.schnoes@tetratech.com

Bill To (optional)
Contact:
Company:
Address:
Address:
Phone:
Fax:
PO#/Reference#

Lab Job #:
Chain of Custody Number:
Page 4 of 4
Temperature °C of Cooler

Client: Tetra Tech
Client Project #
Project Name: Carnotite Reduction Co.
Project Location/State: Chicago, IL
Lab Project #
Sampler: D. Frame
Lab PM

Preservative
Parameter

Preservative Key:
1. HCL, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. NaHSO4
7. Cool to 4°
8. None
9. Other

Lab ID	MS/MSD	Sample ID	Sampling Date	Sampling Time	# of Containers	Matrix	Ra-226, -228	Isotropic U	Th-230							Comments
		CRC-B17-0810	7/27/18	1625	2	S	X	X	X							
		CRC-B17-1820	↓	1630	↓	↓	X	X	X							
		CRC-B17-2628	7/30/18	0845	↓	↓	X	X	X							
		CRC-B5-1214	↓	1145	↓	↓	X	X	X							
		CRC-B5-1618	↓	1150	↓	↓	X	X	X							
		CRC-B5-2224	↓	1155	↓	↓	X	X	X							
		CRC-B5-2830	↓	1200	↓	↓	X	X	X							
		CRC-B11-1214	↓	1420	↓	↓	X	X	X							
		CRC-B11-2022	↓	1435	↓	↓	X	X	X							
		CRC-B11-2628	↓	1450	↓	↓	X	X	X							

Turnaround Time Required (Business Days)
___ 1 Day ___ 2 Days ___ 5 Days ___ 7 Days ___ 10 Days ___ 15 Days _____ Other
Requested Due Date

Sample Disposal
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
[signature]	Tetra Tech	7/30/18	1700	[signature]	TA	7-31-18	0910
Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Lab Courier
Shipped
Hand Delivered

Matrix Key
WW - Wastewater
W - Water
S - Soil
SL - Sludge
MS - Miscellaneous
OL - Oil
A - Air
SE - Sediment
SO - Soil
L - Leachate
WI - Wipe
DW - Drinking Water
O - Other

Client Comments

Lab Comments:

TAL-# (24-500 (1209)

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 160-29881-1

Login Number: 29881
List Number: 1
Creator: McKinney, Gerrod E

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	18.2
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	