NOISE MONITORING PLAN AT SIMS METAL RECYCLING FACILITY

Metal Management Midwest, Inc.

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TABLE OF CONTENTS

1.0 INTRODUCTION

This noise monitoring plan (MP)[1] outlines the continuous monitoring of noise frequency and sound pressure levels that will be performed at the Metal Management Midwest, Inc., d/b/a Sims Metal (Sims) metal recycling Facility located at 2500 South Paulina Street in Chicago, Cook County, Illinois (the Facility).

This MP outlines the noise monitoring equipment to be used, the proposed site location, equipment operations, monitor calibrations, and data management. This noise MP will be implemented and overseen by the Sim's Environmental Compliance Manager.

1.1 Background

Continuous noise monitoring is proposed to be conducted at the Facility, to meet the requirements of the City of Chicago Department of Public Health (CDPH) Rules for Large Recycling Facilities (City Rules), Section 4.6. The City Rule calls for a demonstration that sound levels from the Facility do not exceed applicable standards set forth in Section 8 32-090 of the Chicago Noise Ordinance.

Noise monitoring is being performed to comply with the city's request, and to ensure the facility is not contributing to any noise nuisances and is in compliance with performance standards for noise specified in the Chicago Noise Ordinance.

1.2 Facility Description and History

The Facility is a metal recycling operation that among other things purchases end-of-life vehicles (ELV), appliances and other light gauge steel items (Light Iron; with ELV Feedstock Material), processes the Feedstock Material by means of a metal shredder (the Shredder) and/or other equipment, and ships recyclable ferrous and non-ferrous metal products. The Facility occupies approximately 28 acres of land in Chicago's South West Side, North of the Sanitary Ship Canal.

Various suppliers provide feedstock material to the Facility, including "local peddlers," typically in a pickup truck, ELV suppliers, typically using flatbed trucks, and commercial/industrial suppliers typically by means of Sims or contract hauler trucks. Suppliers entering the Facility must first proceed to a truck scale to be weighed. Suppliers are then directed to the appropriate unloading area where the loads are inspected. for prohibited or otherwise unauthorized materials. Prohibited materials discovered during inspections are rejected. Accepted material is then processed for recycling.

[1] This monitoring plan is requested per requirement of the City of Chicago Department of Public Health Rules for Large Recycling Facilities, Section 3.9.19.4.

The shredder produces a ferrous product and a nonferrous metal intermediate product (Nonferrous Shredder Aggregate). A front-end loader places the Nonferrous Shredder Aggregate into the Metal Recovery Plant (MRP) batch feeder, where it is processed to separate various nonferrous metal products. The non-metallic residue (ASR) is stored in a covered bin and then transported off-site for disposal. Ferrous and nonferrous metal products produced from feedstock materials are shipped to mills and smelters for remelting purposes.

The latitude and longitude coordinates for the Sims Facility are:

Latitude: 41° 50’47.43” North
Longitude: -87° 40’13.29” West

Figure 1.1 presents a Google Earth image presenting the location of the Sims Facility. An enlarged view of the Sims Facility is presented in Figure 1.2.

Figure 1.1 Google Earth Image Showing Location of the Sims Paulina Street Facility

Figure 1.2 Enlarged View of Sims Facility

2.0 NOISE MONITORING EQUIPMENT AND SITE LOCATION

Continuous noise monitoring is proposed to be conducted at one location, using a Class 1 acoustic monitoring instrument. The noise monitor will be located within the Facility, adjacent to the facility boundary, nearest to residential areas, and will continuously measure noise frequency and sound pressure levels.

2.1 Noise Monitoring Equipment

The proposed noise monitor will be the Larson Davis SoundAdvisor™ Sound Level Meter Model 831C (noise monitor). The Larson Davis 831C is a versatile noise monitor that combines the features of a precision Class 1 sound level meter, environmental noise analyzer, and real-time frequency analyzer. The Larson Davis 831C offers a complete set of metrics including octave filters (1/1 and 1/3), frequency weighting, time weighting, Ln percentiles, etc. The noise monitor will record sound pressure levels in one-band octaves and full frequency dB(a) using impulse weighting mode.[2]

The noise monitor will utilize a ½-inch free-field pre-polarized microphone, 50 mV/Pa, providing performance conforming to Class 1 sound level meter standards; as well as a microphone preamplifier. Wind blowing across the microphone has the potential to generate pressure fluctuations on the microphone diaphragm, which can produce errors in the measurement; thus, a windscreen will be installed over the microphone and preamplifier to avoid errors from winds.

The noise monitor will be accessed either directly on the meter's touchscreen keypad, or remotely utilizing Larson Davis's G4 LD Utility PC software (G4 software). The G4 software provides the ability to interface, configure and set up the noise monitor remotely. The G4 software will also facilitate data downloads, file management internal to the unit, and data transmission to an off-site external data server. Noise data transmissions and exports will occur continuously, utilizing a Sierra Wireless RV50x modem with Verizon wireless 5G connections.

2.2 Placement of the Noise Monitor

The proposed noise monitoring site was selected based on proximity to residential areas, distance from other noise sources, site accessibility, suitability of terrain, and infrastructure.

The noise monitoring site is proposed to be located at the north end of the Facility and located at a height of 4-5 feet above ground. The location is within 500 feet of the nearest residential areas (located north of the Facility), and within 660 feet of the Benito Juarez Community Academy (located northeast of the Facility). This location would be the closest to residential areas and provides the best representation of the noise impact from equipment and site activities, from the Facility to the general public. The proposed location will be far enough from high noise sources, that the noise monitor will function as an ambient noise monitor, rather than a real-field noise source monitor.

[2] Per requirement of the City of Chicago Department of Public Health Rules for Large Recycling Facilities, Section 4.6.1.2

The proposed monitoring location also has established infrastructure from a meteorological tower and air quality equipment that is currently operating. A logger box, available line-power and cellular modem are available and can be used to support the noise monitor and its operations. The logger box provides protection for the noise monitoring equipment, the availability of line power and a cellular modem provides reliable power and cellular connection.

The noise monitoring site location identified is presented in Figure 2.1 below.

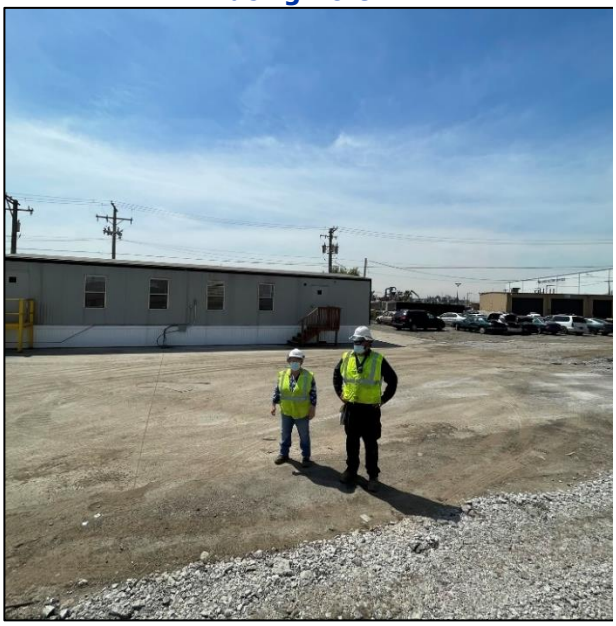
Figure 2.1 The Proposed Noise Monitoring Site Location

Figure 2.2 below presents photographs of the four cardinal directions surrounding the proposed noise monitoring site location.

Figure 2.1 Cardinal Surroundings of the Proposed Noise Monitoring Site Location

Facing North

Facing East



Facing South

Facing West

3.0 OPERATION OF NOISE MONITOR AND DATA MANAGEMENT

The noise monitor will continuously monitor noise frequency and sound pressure levels; 24 hours/day, 7 days/week. The noise monitor will be configured to log 1-minute noise data, and measure noise in 1/1 octave band, with frequencies between 8Hz to 16kHz, and 1/3 octave band, with frequencies between 6.3 Hz to 20kHz; including a determination of the total sound level in dB(a). This total sound level will be computed and measured by the noise monitor, based on sound levels generated by equipment and site activities[3], then stored in the noise monitor's internal memory.

Utilizing the G4 software, data stored on the monitor will be transmitted and stored off-site on an external data server. The G4 software data export will occur hourly, and the external data server backed-up daily. Data files will also be transmitted to a web-based data collection platform. The data platform will give field and management personnel access to historic noise data and provide notifications of elevated noise levels events.

Raw data collected from the noise monitor will be compiled in a Microsoft Excel spreadsheet and submitted to CDPH monthly, via email. This data submittal will occur within two weeks from the end of the reporting period month[4].

Visual and data audits of the noise monitoring system will occur every 7-days. Visual and data checks will be conducted and/or supervised by a qualified noise professional, with experience in noise monitoring and acoustics. Checks will ensure the noise monitor is sampling, data being transmitted, and noise data results are meeting the expected goals and objectives of the noise monitoring program. Any abnormal data values or apparent problems with sampling or data transmissions will be reported immediately to field and management personnel.

The monitor will be maintained in accordance with manufacturer recommendations, and Sims will maintain a digital logbook of all routine and non-routine repairs and calibrations. A digital copy of the calibration results will be included in the monthly data submittal to CDPH. A spare monitor will be maintained at the facility. In the event that the noise monitor malfunctions, and/or is unable to operate in a manner required for the noise monitoring program, Sims will be able to replace the malfunctioning unit immediately. Sims will notify the City of Chicago Department of Health should there be an interruption due to malfunctioning equipment.

Procedures outlined in this noise monitoring program will be reviewed annually, and any revisions made to the program, or alterations to the noise monitor's configuration must be reviewed and approved by the City of Chicago Department of Public Health.

[3] Per requirement of the City of Chicago Department of Public Health Rules for Large Recycling Facilities, Section 3.9.19.2.

[4] Per requirement of the City of Chicago Department of Public Health Rules for Large Recycling Facilities, Section 4.6.1.3.

3.1 Noise Monitor Calibration

Acoustic calibration of the noise monitor will be performed using the Larson Davis Model CAL200. The noise monitor will be calibrated at installation, quarterly, after equipment repair/replacement, or if any issues identified in the noise data indicates the need for calibration.

Acoustic calibration is the most used calibration method and is required by most national and international standards prior to making a measurement. The CAL200 calibrator will be used and provides an acoustic signal of a known amplitude and frequency to the microphone. From the voltage level measured by the meter, the unit can determine the sensitivity of the microphone.
The primary role of the noise monitor's calibration is to establish a numerical relationship between the sound level at the diaphragm of the microphone and the voltage measured by the meter so that the sound pressure level can be read directly from the display of the meter in dB. The result of a calibration is the determination of the sensitivity of the meter, including microphone and preamplifier, typically in dB re 1V/Pa or mV/Pa. A secondary role of calibration is to determine the sound level which would overload the instrument and the minimum sound level that can be accurately measured without being influenced by the operational noise from the meter.

All calibration results will be documented in the site's digital logbook and calibration files saved onto an external data server. Calibrations to the noise monitor will be performed or supervised by a qualified noise professional and follow the manufacturer's calibration procedures.

STANDARDS, FEATURES, AND SPECIFICATIONS

STANDARDS MET BY MODEL 831C		
The Model 831C meets the specifications of the following standards:		
Sound Level Meter Standards		
IEC61672-1 Ed. 2.0 (2013) Class 1		
IEC60651 Ed 1.2 (2001) and IEC60804 (2000-10) Type 1		
ANSI S1.4-2014 Class 1		
ANSI S1.43-1997 Type 1		
Octave Filter Standards (Option 831C-OB3)		
IEC61260 Ed. 2.0 (2014) Class 1		
ANSI S1.11-2014 Class 1		
Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use		
2014/35/EU Low Voltage Safety Directive		
IEC 61010-1 Ed. 3.0 (2010-06)		
2011/65/EU RoHS Directive		
Sound Level Meter Specifications		
Averaging (Integration Method)	Linear or Exponential	
Time Weightings	Slow, Fast,or Impulse	
Frequency Weightings	A, C, and Z	
Peak Detector Frequency Weighting	A, C, or Z	
Gain	0 dB or +20 dB	
Sample Rate	51,200 Hz	
Peak Rise Time	30 µs	
Metrics Measured	Leq, Lmax, Lmin, Lpeak, Ln (6 values), LDN, LDEN, LCeq-LAeq	
Physical Characteristics		
Length with Microphone and Preamplifier	11.35 in	29.0 cm
Length, Instrument Body Only	8.8 in	22.4 cm
Width	2.8 in	7.1 cm
Depth	1.6 in	4.1 cm
Weight with Batteries, No Preamplifer or Microphone	17.3 oz	490 g

GENERAL SPECIFICATIONS	
Reference Level	114.0 dB re. 20 µPa
Reference Level Range	Single large range for SLM measurements
Reference Frequency	1000 Hz
Reference Direction	0° is perpendicular to the microphone diaphragm
Operating Temperature	≤ ± 0.5 dB error between -22°F to +122 °F (-30 °C to 50 °C)
Storage Temperature	-40 °F to 176 °F (-40 °C to 80 °C)
Humidity	≤ ± 0.5 dB error from 10% to 99% relative humidity (non-condensing)
Equivalent Microphone Capacitance	12 pF
Effect of an Extension Cable	None up to 200 ft (61 m) with EXCxxx cable
Approvals	CE, ROHS, WEEE
Extended Weather Options	-40 °F to +158 °F (-40 °C to +70 °C) operation with CER-831-E
Resolution Specifications	
Levels	0.1 dB
Elapsed Time	0.1 s
Real Time Clock	1 s
Integration Time	
Time Averaged Levels and Sound Exposure Levels	
Minimum	0.1 s
Maximum with Daily Autostore Enabled	Unlimited
Maximum with Daily Autostore Disabled	> 23 days with error < 0.5 dB

GENERAL SPECIFICATIONS (CONTINUED)	
Ln Statistics	
Number of Selectable Parameters	6 in xx.xx% format
Spectral Statistics	Requires Octave Analysis option (831C-OB3)
Markers	
Number of Markers	10
Prenamed Markers	Truck, Automobile, Motorcycle, Aircraft, Exclude
Back Erase	
Back Erase Time	5 or 10 s
Measurement Control Modes	
Available Modes	Manual Stop, Timed Stop, Stop when Stable, Continuous, Single Block Timer, Daily Block Timer
Timed Stop	Time in hh:mm:ss
Stop When Stable	Delta level in xx.x dB and time in hh:mm:ss
Continuous with Daily Auto-Store	1, 2, 4, 6, 12, 24, 48, 96 or 144 files per day, automated file numbering "yymmddnn.LD0"
Restart after Power Failure	Automatic if powered by 12 VDC and continuous run mode
Single Block Timer	Start date and time to end date and time
Daily Block Timer	Up to 3 blocks between each start and end date
Clock Stability	
< 1 sec in 24 hours, at 75 °F (+24 °C)	
< 10 sec in 30 days, at -40 °F to +158 °F (-40 °C to +70 °C)	
< 1 s when using NTP	
Microphone Input	
Connector	Latching 5-pin connector
Input Impedance	100 kΩ and 300 pF
Full Scale Input (0 dB gain)	14 Vpeak
ICP Current (requires ADP074)	4 mA
AC/DC Output	
Jack	2.5 mm (32 in) female
AC Output Voltage Range	± 14 Vpeak (preamplifier output)
	± 2.1 Vpeak with 0, 20 or 40 dB gain (for LINE inputs)
AC Output Recommended Load	10 kΩ or greater
DC Output Voltage Scale	10 mV per dB, 0 V for 0 dB, 1 V = 100 dB
DC Output Frequency & Time Weighting	Follows SLM Settings: A, C, or Z and S, F, or I
Power Supply	
Batteries	4-AA (LR6) NiMH, 1.5 V Lithium or Alkaline cells (supplied with 2500 mAh NiMH)
External Power (5 V from USB)	USB Mini-B connector to * USB interface from computer * PSA029 AC to DC power adaptor
External Power	I/O connector: 10 to 25 VDC (Use cable CBL140)
Operating Time (with power save options)	> 18 hours (1.5 V Lithium batteries)
	> 8 hours (Alkaline or NiMH batteries)
Power Consumption with PRM831	1.1 W (backlight off, running)
	≤ 2 W (with DVX012)
	5 W (maximum)
Memory Retention	
Data Memory	Non-volatile flash memory, backup performed every minute
Real-time Clock	≥ 1 year with batteries removed

GENERAL SPECIFICATIONS (CONTINUED)				
Broadband Noise Levels				
Self-generated Electrical Noise	0 dB Gain		20 dB Gain	
Weighting	Typical (dB)	Max (dB)	Typical (dB)	Max (dB)
A	10	12	6	9
C	13	16	12	15
Z	22	25	22	25
Self-generated Total Noise	0 dB Gain		20 dB Gain	
Weighting	Typical (dB)	Max (dB)	Typical (dB)	Max (dB)
A	16	19	16	17
C	17	20	16	19
Z	23	26	23	26

Note: Combination of the electronic noise and the thermal noise of the 377B02 microphone at 68 °F (20 °C) measured in a sealed and vibration isolated cavity with an averaging time of 60 seconds. Electronic noise of the instrument with an ADP080 (12 pF) in place of the microphone highest anticipated self-generated noise.

MODEL 831C WITH PRM831 AND 377B02 MICROPHONE			
		0 dB Gain	20 dB Gain
Dynamic Range	A	17 dB - 140 dB	16 - 120 dB
	C	17 dB - 140 dB	17 - 120 dB
	Z	24 dB - 140 dB	23 - 120 dB
Measurement Range [1]	A	24 dB - 140 dB	20 - 120 dB
	C	26 dB - 140 dB	25 - 120 dB
	Z	36 dB - 140 dB	33 - 120 dB
Peak Range	A	65 dB - 143 dB	44 - 123 dB
	C	66 dB - 143 dB	45 - 123 dB
	Z	68 dB - 143 dB	59 - 123 dB
Max Level	SPL	140 dB	120 dB
	PEAK	143 dB	123 dB

[1] As defined in IEC 61672-1. Microphone and electrical self-noise included

OPTIONS AT-A-GLANCE

SPECTRAL ANALYSIS	
Octave Analysis (with Option 831C-OB3)	
1/1 Octave Filters	8 Hz to 16 kHz
1/3 Octave Filters	6.3 Hz to 20 kHz
Octave Analysis Parameters	
Filters	None, 1/1 octave, 1/3 octave, or 1/1 and 1/3 octaves
Frequency Weighting	A, C, or Z (independent of broadband weighting)
Maximum Spectrum	Maximum in each band or Spectrum at broadband Lmax
Spectral Statistics	6 percentiles per filter
Octave Band Logging Capability	Time History (see 831C-LOG) Measurement History (see 831C-ELA) Event History (see 831C-ELA)
Normalized Spectrum	
View Modes	SPL, Leq, Lmax, or Lmin; absolute or relative
Predefined Curves	A, C, -A, -C
User-Defined Curves	Four named for 1/1 octave and four for 1/3 octaves bands
FFT Analysis (with option 831C-FFT)	
FFT Lines	400, 800, 1600, 3200, & 6400
Bandwidth (Hz)	100, 200, 500, 1k, 2k, 5k, 10k, & 20k
Window	Hanning, Flat-top, and Rectangular
Overlap	Fixed 33%

SPECTRAL ANALYSIS (CONTINUED)	
Units	dB re 20 uPa, m/s², cm/s², mm/s², g, ft/s², in/s², custom
Y-axis	Linear or log
Cursor	Max tracking with harmonic cursors
Supported Sensors	Microphone or ICP® accelerometer (with ADP074)
Integration	Frequency domain to velocity and displacement
Acoustic Weighting	A, C, or Z (none)
PROFILING WITH TIME HISTORY LOGGING, MEASUREMENT HISTORY, AND EVENT HISTORY	
Time History Logging (with option 831C-LOG)	
Record Period	Selections from 2.5 ms to 24 hr
Logging Parameters	Any combination of available broadband and spectral AnyData plus non sound metrics
Measurement History Logging (with option 831C-ELA)	
Interval	1 min to 99 hr
Logging Parameters	Same as Overall Measurements Ln Statistics + Spectral Ln (if OB1 or OB3 enabled)
Sound Record Tagging	At start of each interval (required to enable SR)
Logging Period	20 ms to 5 s (independent of TH or MH)
Logging Parameters	Leq, Lmax, Lpeak, Date and Time, Duration, Exposure in dB and Pa2s, and available spectral Leq and maximum. Event Time History is also available with broadband and spectral levels.
Sound Record Tagging	Required to enable SR at 8 ksps or 16 ksps
SEL	Yes (LAE)
Sound Recording (831C-SR)	
Data Format	Mono wave file (.wav) or compressed (.ogg)
Listening Options	On Model 831C using USB headset with Utility program, DNA, or using standard wave file player
Sample Rate	8, 16, 24, ,48, or 51.2 ksps
Storage Requirement	1 MB/min at 8 ksps to 6 MB/min at 48 ksps for .wav file
Sound Recording Modes	Manual, coupled to marker, at measurement interval start, upon event
Pretrigger	Variable depending upon sample rate; up to 60 s
Duration	Max 9999 s
Sound Streaming	Streaming to host
ROOM AND BUILDING ACOUSTICS	
Reverberation Time (with option 831C-RA)	
Methods	Impulse Excitation and Interrupted Noise
Filters	1/1 (63 Hz to 8 kHz) and 1/3 (50 Hz to 10 kHz)
Sample Time	2.5, 5, 10 or 20 ms
Measurements	T20, T30 and ISO 3382-2 quality indicators
WEATHER (METEOROLOGICAL PARAMETERS)	
Combined Meteorological Unit (with sensor SEN031)	
Measured Parameters	Wind speed and direction, temperature, relative humidity, rain, and hail
Sensor Model	SEN031 (requires CBL167 & DVX018)
Sensor Noise Level	30 dB A-weighted at 2 ft (61 cm)
Ultrasonic Anemometer—Wind Sensor (with sensor SEN032)	
Measured Parameters	Wind speed and direction
Sensor Model	SEN032 (requires CBL167 & DVX018)
Sensor Noise Level	30 dB A-weighted at 2 ft (61 cm)
COMMUNICATION OPTIONS	
Direct USB to Sierra Wireless (831C-SW)	
Sierra Wireless RV50(X)	4G cellular gateway
Power	3.2 W with power save configuration