NOISE MONITORING SUMMARY REPORT

(September 2018 – December 2018)

BASF Hudson River Sediment Remediation, Rensselaer, NY

Introduction

This Noise Monitoring report has been prepared to provide a summary of noise monitoring activities implemented to monitor potential noise impacts resulting from the remedial construction activities at the former BASF Corporation site, located at 35 Riverside Avenue in Rensselaer, New York.

The Site remediation construction activities took place from September 2018 through December 2018 and included site preparation, installation of sheet piles in the Hudson River, and site restoration. The monitoring followed the procedures and applicable limits established in the Noise Monitoring Plan (Ref: Hudson River Operable Unit 2, Sediment Remediation, Noise Monitoring Plan, BASF Rensselaer, Rensselaer, New York, July 2018). Implementation of the noise monitoring plan included logging of noise data via noise monitors and mitigation to alleviate high noise levels, if encountered.

Noise Basics

Noise can be defined as unwanted sound. Sound is generated by pressure waves in air. Sound pressure level (SPL) is used to measure the intensity of sound, which is described in terms of decibels. The decibel (dB) is a logarithmic unit that expresses the ratio of the SPL being measured to a standard reference level. Sound pressure waves may be of various frequencies. The human ear responds only to a limited range of frequencies. When measuring noise levels, frequencies to which the human ear does not respond must be filtered out. The procedure referred to as “A-scale” weighting best approximates the frequency response of the human ear. Sound levels measured on the A scale are designated by the term dBA.

A number of noise descriptors are used to characterize various aspects of noise that take into account the variability of noise levels over time. Common descriptors, criteria, and guidelines used to characterize noise are discussed below.

Noise measurements are most often taken using the "A-weighted" frequency response function. The A-weighted frequency or dBA scale simulates the response of the human ear to sound levels and has been given prominence as a means for estimating annoyance caused by noise; for estimating the magnitude of noise-induced hearing damage; for use in hearing conservation criteria; for speech interference measurements; and in procedures for estimating community reaction to (general broadband) noise (Clayton, 1978; Cheremisinoff, 1977). All sound levels referred to in this document are A-weighted, slow response, sound pressure levels.

Since the dBA noise metric describes a noise level at just one moment, and very few noises are constant, other ways of describing noise over extended periods are needed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the equivalent sound level (or L_{eq}) can be computed. The L_{eq} descriptor is the constant sound level that, in a given situation and time period (e.g., one-hour L_{eq}, or 24-hour L_{eq}), conveys the same sound energy as the actual time-varying sound. The L_{eq} is a single sound level value for a desired duration which includes all of the time-varying sound energy during the measurement period. The U.S. Environmental Protection Agency (EPA) has selected the L_{eq} as the best environmental noise descriptor primarily because it correlates reasonably well with the effects of noise on people, even for wide variations of environmental sound levels and different time exposure patterns.

The L_{max} is the maximum measured sound level at any instant in time. L_{max} is considered the noise metric to determine whether ambient noise levels are detrimental to life, health and enjoyment to a sensitive property.

Noise from Typical Construction Equipment and Operations

L_{eq} as it relates to construction activity depends on several factors including machine power, the manner of operation and the amount of time the equipment is operated over a given time period. The following provides information on typical levels generated by various construction equipment and provides guidance on determining the noise from construction activities.

The most dominant source of noise for the majority of construction equipment is the engine exhaust. However, for some construction work, such as impact pile driving or pavement breaking, the noise produced by the work process is the dominant source. Similar construction activities can create different noise impacts, depending on the location of the construction site, the terrain, and other intervening features and the type of receptor populations in the vicinity of the construction site.

Noise Thresholds

Noise impact criteria, used to establish the warning and mitigation action limits are discussed in the Noise Monitoring Plan. The two "action" noise threshold levels were used to evaluate the potential for noise level exceedance near the sensitive receptors, and are shown in Table 1 below.

Table 1 Noise Impact Thresholds at Sensitive Receptors in L_{eq} (dBA)

Warning Action Level	Mitigation Level
85	90

The recorded noise levels were reviewed to identify any exceedances over the warning action level/mitigation level on a weekly basis. The On-site Manager was contacted to evaluate the cause of the elevated noise level.

Noise Monitoring

Three (3) Piccolo Integrating Sound Level Meters (SLMs) were used to collect both L_{eq} and L_{max} levels for 10-minute intervals. These SLMs meet the ANSI Standards for Type II accuracy and quality, and they were setup in Auto-Store mode to continuously record the noise generated during construction activities. Data was downloaded and analyzed on a weekly basis.

The noise monitoring program took place at three (3) locations between September 14 and December 21, 2018 to measure noise levels generated from the site remedial activities including:

- General site work;
- Sheet piling using a vibratory hammer; and
- Site grading using loader and compactor.

The monitored levels provided warning and time for further consideration of potential mitigation measures, if necessary. The noise monitoring locations during remedial activities are shown in Figure 1 and outlined in Table 2 below.

Figure 1 Noise Monitoring Locations September 14 – December 21, 2018

Table 2 Noise Monitoring Locations

Receptor	Location Description
N1	Northeast corner
N2	Center of Eastern property line
N3	Southeast corner

The closest sensitive receptors are the business employee parking lot directly north of the site, and residences along Riverside Avenue located approximately 350 feet to the north of the site.

All other sensitive receptors are located across the railroad tracks over 1500 feet to the east of the site.

Noise Monitoring Result Summary

Construction source noise is associated with a variety of mobile and stationary sources, each having unique noise characteristics and operating for different time periods. The only noise descriptor that can be used reliably with these noise sources is the L_{eq}. L_{max} noise levels are only recorded for informational purpose.

Measurements were recorded from September 14 to December 21, 2018 and are summarized in Table 3 below. As shown in the table, monitors were not running continuously. Any gaps in data were due to work not performed on the site, the draining of meter batteries due to colder temperatures, etc.

Table 3 Weekly Noise Levels

Receptor	Week	L_{eq}	L_{max}	Notes
N1	9/14/18 only	49.4 – 61.8 dBA	54.1 – 84.3 dBA	Noise monitors started on 9/14/18
N2	9/14/18 only	52.5 – 70.3 dBA	55.7 – 96.7 dBA	Noise monitors started on 9/14/18
N3	9/14/18 only	52.6 – 71.0 dBA	54.5 – 93.1 dBA	Noise monitors started on 9/14/18
N1	9/17/18 – 9/21/18	49.6 – 71.6 dBA	53.0 – 95.3 dBA	-
N2	9/17/18 – 9/21/18	52.1 – 72.5 dBA	54.5 – 95.1 dBA	-
N3	9/17/18 – 9/21/18	51.7 – 75.3 dBA	54.5 – 101.4 dBA	-
N1	9/24/18 – 9/28/18	45.1 – 72.1 dBA	49.3 – 94.0 dBA	-
N2	9/24/18 – 9/28/18	48.5 – 70.3 dBA	53.8 – 93.0 dBA	Unit not monitoring on 9/27/18 and part of 9/28/18
N3	9/24/18 – 9/28/18	46.9 – 73.8 dBA	49.6 – 99.9 dBA	Unit not monitoring on 9/27/18 and part of 9/28/18
N1	10/1/18 – 10/5/18	46.5 – 75.5 dBA	49.3 – 99.4 dBA	-
N2	10/1/18 – 10/5/18	50.6 – 82.5 dBA	52.6 – 101.0 dBA	-
N3	10/1/18 – 10/5/18	49.6 – 76.4 dBA	52.1 - 97.5 dBA	Unit not monitoring on 10/1/18 through 10/3/18 and part of 10/4/18
N1	10/8/18 – 10/12/18	48.0 – 73.8 dBA	52.5 – 90.4 dBA	Unit not monitoring on 10/11/18 and 10/12/18
N2	10/8/18 – 10/12/18	63.1 – 88.5 dBA	68.5 – 104.4 dBA	-
N3	10/8/18 – 10/12/18	49.0 – 74.2 dBA	53.1 – 94.9 dBA	Unit not monitoring on 10/11/18 through 10/12/19
N1	10/15/18 – 10/19/18	48.1 – 74.1 dBA	51.5 – 97.0 dBA	Unit not monitoring on 10/15/18 through 10/17/19
N2	10/15/18 – 10/19/18	46.9 – 87.1 dBA	53.2 – 104.5 dBA	-
N3	10/15/18 – 10/19/18	47.0 – 75.2 dBA	52.0 – 96.9 dBA	Unit not monitoring on 10/15/18 through 10/17/18 and part of 10/18/18
N1	10/22/18 – 10/26/18	46.4 – 80.0 dBA	49.4 – 99.2 dBA	Unit not monitoring on 10/25/18 and 10/26/18
N2	10/22/18 – 10/26/18	-	-	Unit not monitoring
N3	10/22/18 – 10/26/18	48.9 – 70.5 dBA	50.7 – 93.6 dBA	Unit not monitoring on 10/24/18 through 10/26/18
N1	10/29/18 – 11/2/18	48.1 – 79.7 dBA	51.7 – 99.2 dBA	Unit not monitoring on 10/29/18
N2	10/29/18 – 11/2/18	50.9 – 71.3 dBA	52.6 – 100.5 dBA	Unit not monitoring on 10/29/18
N3	10/29/18 – 11/2/18	50.7 – 86.6 dBA	53.4 – 101.5 dBA	Unit not monitoring on 10/29/18
N1	11/5/18 – 11/9/18	-	-	Unit not monitoring

N2	11/5/18 – 11/9/18	-	-	Unit not monitoring
N3	11/5/18 – 11/9/18	-	-	Unit not monitoring
N1	11/12/18 – 11/16/18	-	-	Unit not monitoring
N2	11/12/18 – 11/16/18	-	-	Unit not monitoring
N3	11/12/18 – 11/16/18	-	-	Unit not monitoring
N1	11/19/18 – 11/23/18	-	-	Unit not monitoring
N2	11/19/18 – 11/23/18	-	-	Unit not monitoring
N3	11/19/18 – 11/23/18	-	-	Unit not monitoring
N1	11/26/18 – 11/30/18	42.7 – 75.0 dBA	57.3 – 98.6 dBA	Unit not monitoring on 11/26/18 through 11/28/19
N2	11/26/18 – 11/30/18	42.1 – 73.7 dBA	52.8 – 96.3 dBA	Unit not monitoring on 11/26/18 through 11/28/19
N3	11/26/18 – 11/30/18	41.2 – 72.9 dBA	53.2 – 96.2 dBA	Unit not monitoring on 10/26/18 through 10/28/18 and part of 10/29/18
N1	12/3/18 – 12/7/18	42.1 – 82.5 dBA	46.4 – 94.6 dBA	Unit not monitoring on 12/6/18 and 12/7/18
N2	12/3/18 – 12/7/18	42.2 – 84.6 dBA	47.0 – 98.6 dBA	Unit not monitoring on 12/7/18
N3	12/3/18 – 12/7/18	43.8 – 76.3 dBA	52.6 – 97.7 dBA	Unit not monitoring on 12/7/18
N1	12/10/18 – 12/14/18	51.5 – 65.9 dBA	70.2 – 85.5 dBA	Unit not monitoring on 12/10/18, 12/11/18, 12/13/18 and 12/14/19
N2	12/10/18 – 12/14/18	51.3 – 66.9 dBA	71.1 – 86.0 dBA	Unit not monitoring on 12/10/18, 12/11/18, 12/13/18 and 12/14/19
N3	12/10/18 – 12/14/18	-	-	Unit not monitoring
N1	12/17/18 – 12/21/18	41.5 – 74.3 dBA	52.9 – 97.5 dBA	-
N2	12/17/18 – 12/21/18	-	-	Unit not monitoring
N3	12/17/18 – 12/21/18	43.8 – 75.1 dBA	53.6 – 98.0 dBA	-

Conclusion and Mitigation

During the monitoring period, noise levels showed an increase during operational days over levels when the site was not operating. However, there were a few occasions when noise levels increased when the site was not operating. Those levels were removed from Table 3. Noise levels did not exceed the mitigation level of 90 dBA at any receptor.

At N1, L_{eq} noise levels at 85 dBA or above were not recorded. Therefore, it is not expected that levels exceeding the warning threshold reached the sensitive receptors north of the site.

At N2 and N3, noise levels exceeded the warning level a total of (6) six ten minute periods at N2 and (2) two ten minute periods at N3. No exceedance lasted longer than 20 minutes concurrently, and it is not expected that levels exceeding the warning threshold reached the sensitive receptors. Therefore, mitigation procedures were not deemed necessary.