Exhibit A

MEMORANDUM

DATE: April 24, 2019

FROM: Mark Podrez – RTP Environmental Associates, Inc.

SUBJECT: S.H. Bell Chicago Facility – Analysis of Collected Air Monitoring Data

A. INTRODUCTION

S.H. Bell (SHB) has been conducting air monitoring since March 2017 at the SHB facility located at 10218 S Avenue O in Chicago Illinois. The monitoring includes Federal Equivalent Method (FEM) hourly PM_{10} monitoring, high-volume Federal Reference Method (FRM) PM_{10}-Manganese (PM_{10}-Mn) 24-hr monitoring, and hourly wind speed and direction monitoring. The facility is located approximately ½ mile west of Lake Michigan and is bordered to the west by the Calumet River. The local land uses include refining and heavy industry in the corridor along the Calumet River, and residential areas to the east and south of the facility.

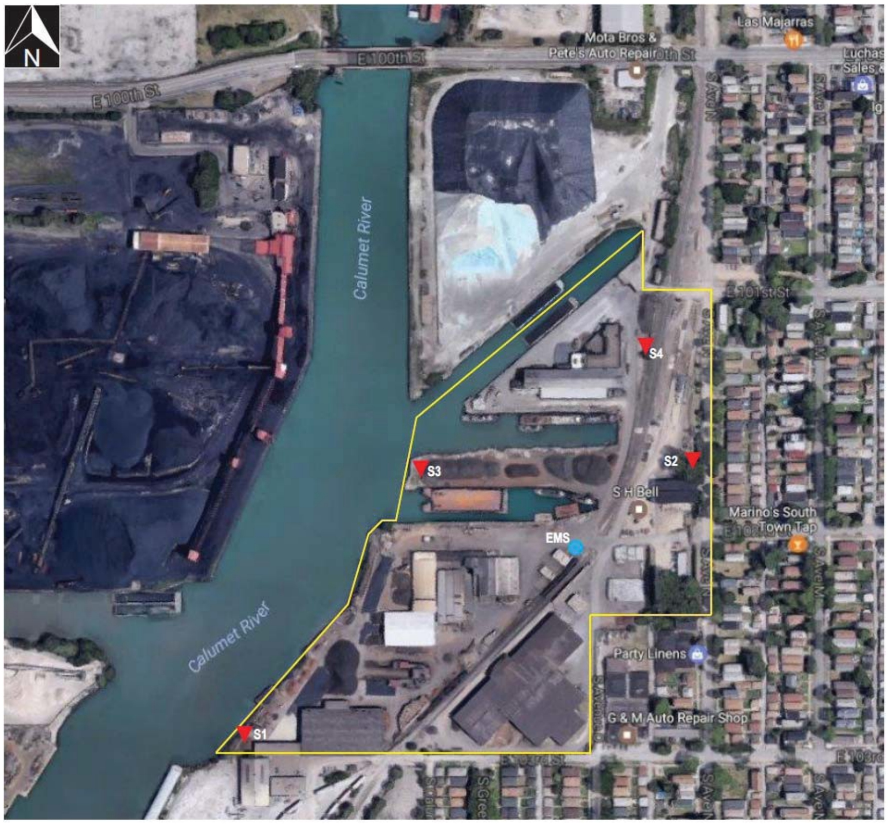
The FEM hourly PM_{10} monitoring is conducted at four sites surrounding the facility, as shown in Figure 1. The FRM daily PM_{10}-Mn is conducted at the Site S4. For additional details on the monitoring system design and operating procedures, refer to the project's Quality Assurance Project Plan (QAPP) (latest Revision 2, dated May 25, 2018).

This memorandum presents an analysis of approximately 2 years of PM_{10} and PM_{10}-Mn data that has been collected. The PM_{10} data is compared to the PM_{10} National Ambient Air Quality Standard (NAAQS), which has been developed by US EPA to protect public health (including the health of "sensitive" populations such as asthmatics, children, and the elderly) and public welfare (such as protection against damage to animals, crops, vegetation, and buildings). The PM_{10} NAAQS is defined as a 24-hr ambient air concentration of 150 µg/m3, which can be exceed no more than more than once per year on average over 3 years. In addition to the comparison of measured PM_{10} concentrations to the NAAQS, the hourly PM_{10} data have also been processed into "pollution roses", which can be helpful for evaluating PM_{10} concentrations.

EPA has not established a PM_{10}-Mn air quality standard. The Agency for Toxic Substances and Disease Registry (ATSDR) has identified an inhalation minimal risk level (MRL) as a screening level for long-term chronic exposure to manganese of 0.3 µg/m3. While other manganese health effect thresholds have been established by various government agencies and other organizations at higher concentrations, the PM_{10}-Mn monitoring data will be compared to the 0.3 µg/m3 value.

It should be noted that SHB installed two baghouses on loadout sheds in August 2017, and implemented other additional dust control measures in the fall of 2017 in accordance with a revised Fugitive Dust Control Plan. Therefore, the monitoring data has also been evaluated to determine if those control measures have resulted in measurable improvements in air quality.

Figure 1 Monitoring Site Locations at the S.H. Bell Chicago Facility



B. Comparison of Measured Air Concentrations to Thresholds

There has been only one PM_{10} daily concentration measurement greater than 150 µg/m3, which occurred on December 4, 2017 at site S1. EPA has documented that this event was caused by offsite sources during strong and persistent southerly winds.[1] Given that the PM_{10} NAAQS is based on no more than one exceedance per year on average over 3 years, the data from all sites demonstrates that the air quality in the area is in compliance with the PM_{10} NAAQS, and that there are no PM_{10} public health issues in the area. In fact, at S2 (the site closest to residential areas), the highest PM_{10} concentration measured during the last 2 years is less than ½ of the PM_{10} NAAQS.

Additionally, there have been no exceedances of the Reportable Action Level ("RAL") for the SHB facility that is contained in the City of Chicago-approved revised Fugitive Dust Plan. The RAL for the SHB facility, that triggers a reporting requirement to CDPH, has been conservatively set to as when the positive difference between the upwind monitor(s) and the downwind monitor(s) is greater than 125 µg/m3 on a calendar day that the facility is operating,

[1] https://www.epa.gov/sites/production/files/2018-06/documents/chicago_rail_and_port_llc_nov.pdf

Figures 2 and 3 present 12-month and 3-month moving averages of the measured PM_{10}-Mn concentrations. The maximum measured PM_{10}-Mn 12-month moving average is 0.19 µg/m3, which is well below the 0.3 µg/m3 threshold concentration. The maximum measured 3-month moving average is 0.38 µg/m3, which occurred for the period May through July, 2017. Since July 2017, the measured PM_{10}-Mn 3-month averages have been well below the 0.3 µg/m3 threshold concentration.

In summary, the comparison of the PM_{10} data against the PM_{10} NAAQS, and the PM_{10}-Mn data against the 0.3 µg/m3 threshold concentration, demonstrates that the measured air concentrations are less than the thresholds and in compliance with the NAAQS.

C. Analysis of Effectiveness of Control Measures

As noted in the introduction, SHB installed two baghouses on loadout sheds in August 2017, and implemented other additional dust control measures in the fall of 2017 in accordance with a revised Fugitive Dust Control Plan. Therefore, the monitoring data has also been evaluated to determine if those control measures have resulted in measurable improvements in air quality.

The first approach to evaluate the effectiveness of control measures is to compare the average PM_{10} and PM_{10}-Mn concentrations for the period March-September 2017 (before the baghouses and other control measures were fully implemented) to the period October 2017-March 2019 (after dust control measures were implemented). Table 1 presents the results of the comparison. The most notable improvements occurred for PM_{10} at site S1 and for PM_{10}-Mn measurements. At other sites, there were more modest improvements.

Table 1 –Average Concentrations (µg/m3)

Period	S1 PM_{10}	S2 PM_{10}	S3 PM_{10}	S4 PM_{10}	PM_{10}-Mn
Before Enhanced Controls	34	21	21	23	0.27
After Enhanced Controls	29	21	19	22	0.10

A second method for evaluating trends in measured air quality is the time series plot. Time series plots of PM_{10}-Mn are presented in Figures 2 and 3. Both of these plots indicate that PM_{10}-Mn concentrations have decreased since August 2017, when the baghouses were installed, and have remained at levels of 50% or less of the 0.3 µg/m3 threshold concentration since then. This data indicates that the control measures implemented by SHB have been effective in reducing the PM_{10}-Mn concentrations in the area.

Figure 2 – 12-month Moving Average PM_{10}-Mn Concentration Plot

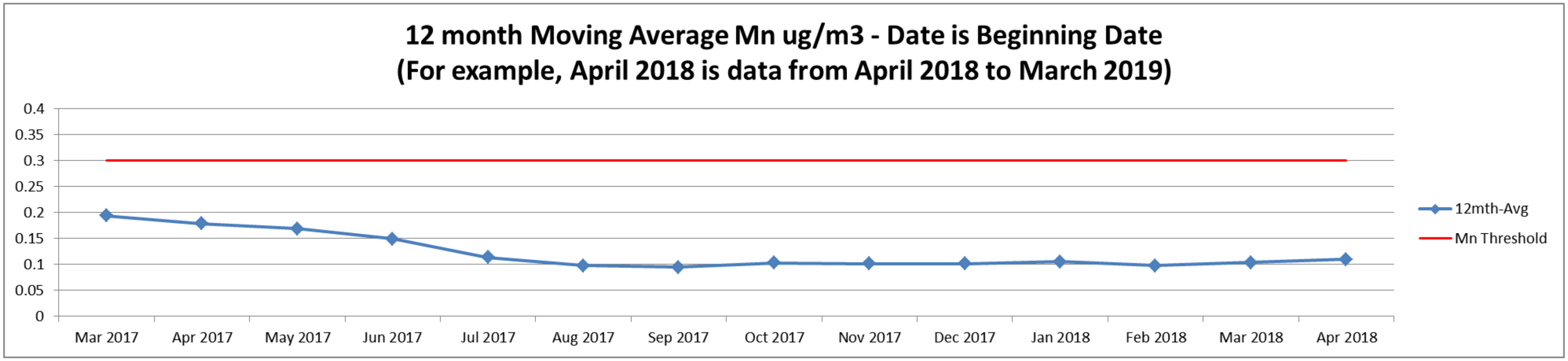


Figure 3 – 3-month Average PM_{10}-Mn Concentration Plot

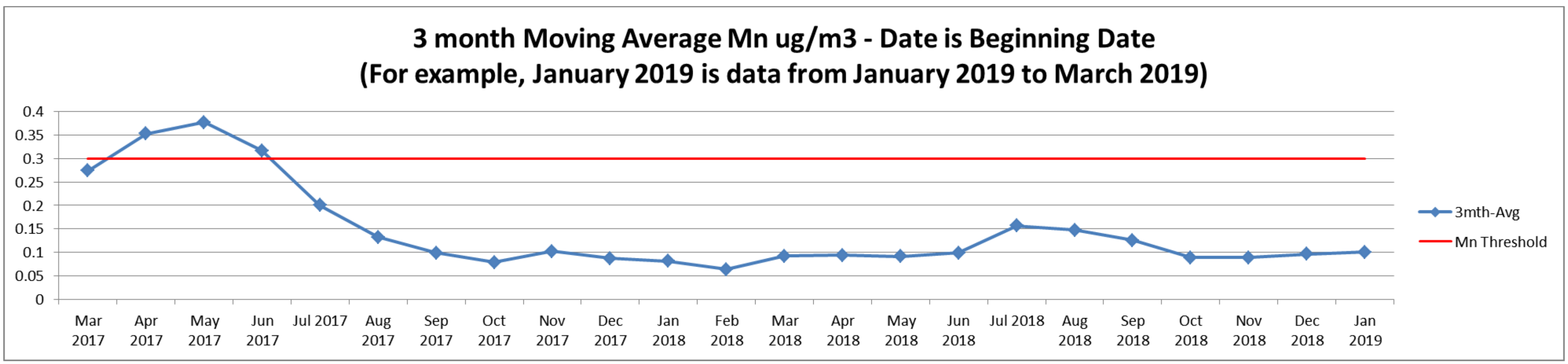


Figure 4 is a time series plot of the average PM_{10} concentration during each month for the S1 site. The figure also presents a linear trend line, which is useful for evaluating the improvement in air quality. Figure 4 indicates that there is a trend of decreasing monthly PM_{10} concentrations at the S1 site.

A third method that can be used to interpret air monitoring data is a "pollution rose". A pollution rose is a graphical display of the measured concentration levels versus the direction the wind is blowing from. The measured 1-hr PM_{10} concentrations are divided into ranges and displayed as a stacked bar with different colors corresponding to measured concentration ranges. Figure 5 presents two PM_{10} roses for site S1, one for the period March-September 2017 (before the baghouses and other control measures were fully implemented), and a second for the period October 2017-March 2019 (after dust control measures were implemented). When comparing these two roses, it is clear that hourly PM_{10} concentrations greater than 90 µg/m3 (the orange and red bars) associated with winds from the northeast (which would transport SHB emissions to the S1 monitor) are significantly less frequent after the implementation of controls than before. This data indicates that the control measures have been effective in reducing the PM_{10} emissions and air concentrations downwind of the facility.

The measured PM_{10} concentrations at the other three sites are much lower than the concentrations measured at S1, and therefore there are not as dramatic of differences between the "pre" and "post" control pollution roses. As an example, Figure 6 presents the same pairs of pollution roses for site S2.

D. Summary

The data analyses presented herein document that the PM_{10} and PM_{10}-Mn concentrations measured over the last 2 years by the SHB monitors are in compliance with the PM_{10} NAAQS, the RAL in the City of Chicago-approved revised Fugitive Dust Plan, and are less than the PM_{10}-Mn threshold concentrations. In addition, an analysis of the data indicates that the control measures implemented in 2017 in accordance with the revised Fugitive Dust Control plan have resulted in decreases in both PM_{10} and PM_{10}-Mn measured concentrations.

Figure 4 – S1 PM_{10} Concentrations by Month

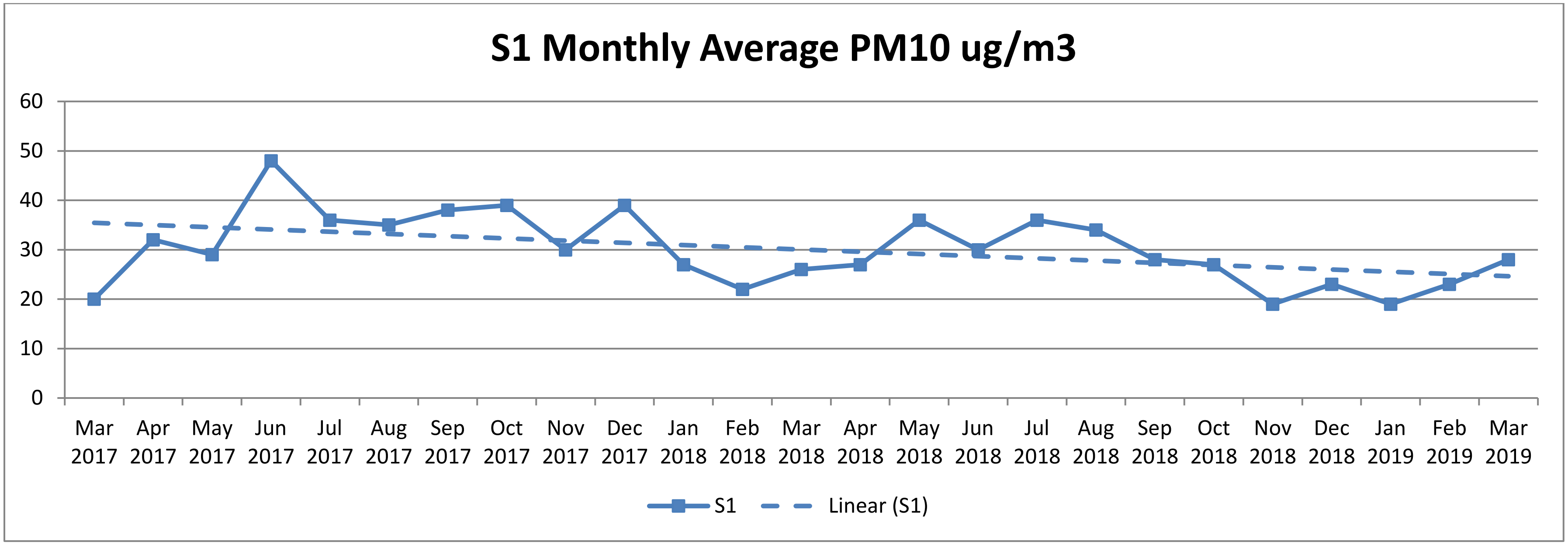
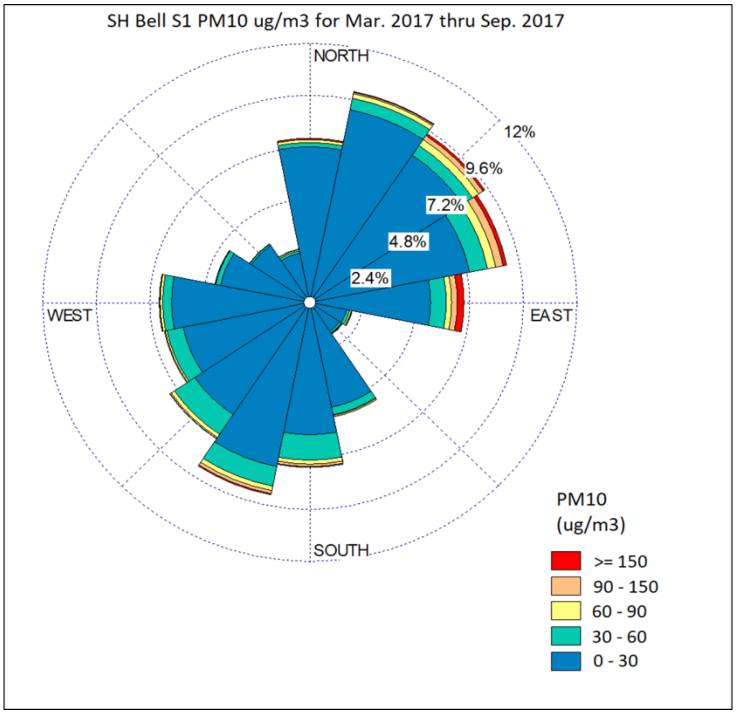


Figure 5 –Site S1 PM_{10} Roses (1-hr Concentrations)

Before Additional Control Measures



After Additional Control Measures

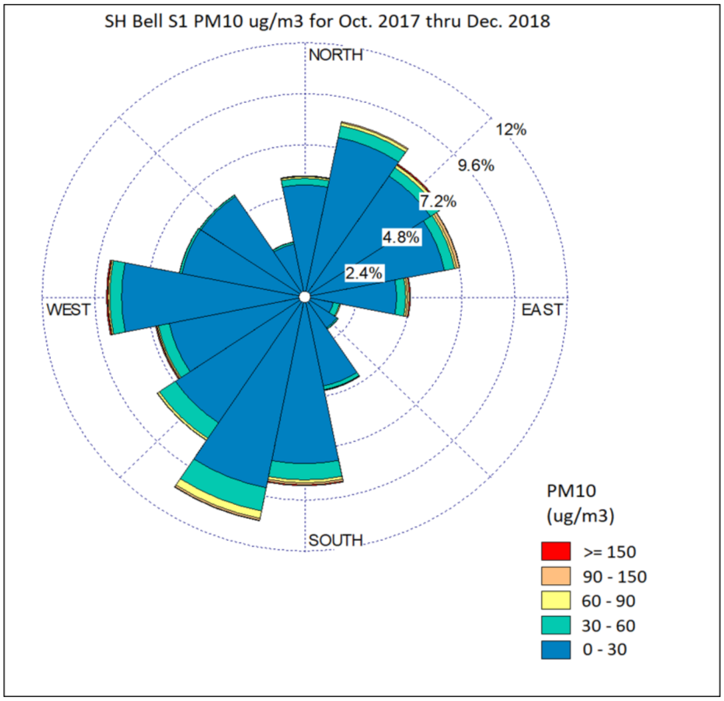
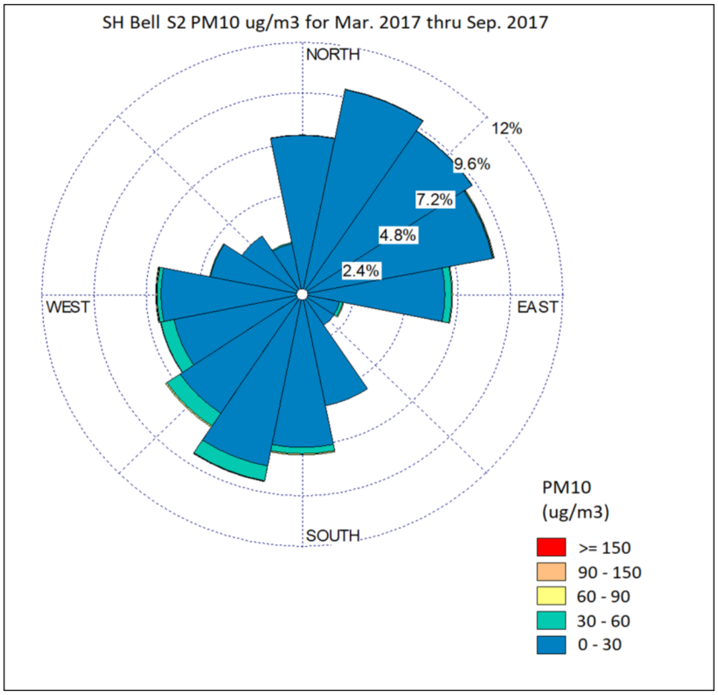


Figure 6 –Site S2 PM_{10} Roses (1-hr Concentrations)

Before Additional Control Measures



After Additional Control Measures

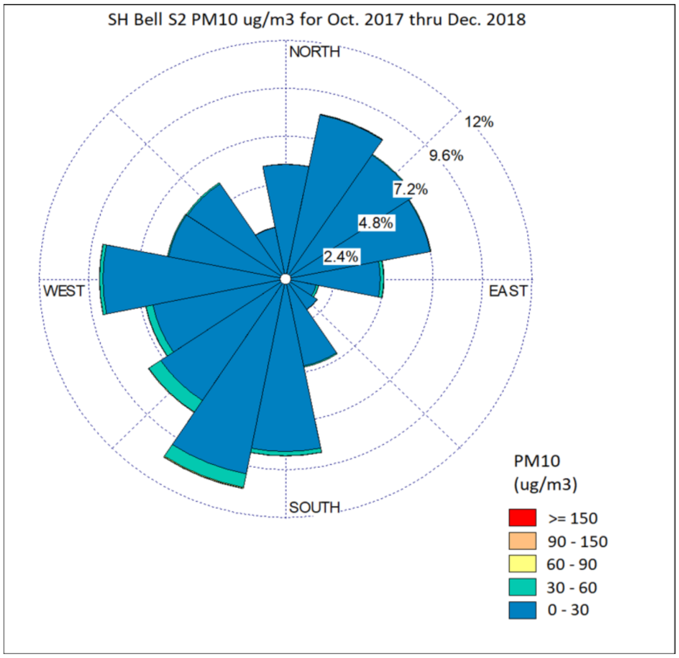


Exhibit B

Risk Assessment of Manganese in Ambient Air at the S.H. Bell Company Facility in Chicago, Illinois

Prepared for
S.H. Bell Company
10218 S. Avenue O
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April 16, 2019

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Executive Summary

Gradient has reviewed the S.H. Bell Chicago manganese (Mn) PM_{10}[1] air monitoring data available on the US Environmental Protection Agency (US EPA) in Illinois website (US EPA, 2019). The website includes data from March 2017 to January 2019. Gradient conducted a risk evaluation from these Mn data, the results of which are summarized below.

- Gradient conducted a conservative screening-level risk evaluation, consistent with US EPA risk assessment guidelines (US EPA, 1989), from 23 months of Mn PM_{10} data collected at the S.H. Bell Chicago facility. Mn concentrations ranged from 0.003 to 1.23 $\mu g/m^3$, with an arithmetic mean (or average) of 0.150 $\mu g/m^3$.
- We compared the Mn air concentrations (adjusted for an exposure frequency of 350 days per year, per US EPA guidelines) to the Agency for Toxic Substances and Disease Registry (ATSDR) chronic Mn Minimum Risk Level (MRL) of 0.3 $\mu g/m^3$ (ATSDR, 2012). The MRL is a health-protective air concentration that is well below the level of Mn in air estimated to cause no adverse effects following continuous exposure (34 $\mu g/m^3$) and well below the threshold Mn concentration that is not expected to increase normal levels of Mn in the brain (10 $\mu g/m^3$). This comparison results in a hazard index (HI). HIs at or below 1 mean that there is no risk of adverse effects.[2] The results of this comparison are presented in Figure ES.1 below.
- The HI calculated from the mean Mn PM_{10} concentration from 23 months of air monitoring data is 0.5, indicating there is no risk of adverse neurological effects, the most sensitive health endpoint for Mn, for the general population (including sensitive subpopulations) from continuous inhalation of Mn in ambient air in the vicinity of the S.H. Bell Chicago, Illinois facility.
- In addition, the risk calculation is based on a high estimate of Mn exposure that assumes a resident inhales outdoor air at their home for 24 hours per day, for 350 days per year. Consistent with the US EPA exposure factor guidelines, it is likely that time spent indoors and away from home would effectively reduce the Mn exposures by about 50%, reducing the HIs further.
- Given the conservative and health-protective basis of the Mn risk calculations in our evaluation, Gradient concludes, based on the available data, that there is no evidence that Mn in ambient air near the S.H. Bell Chicago facility will cause adverse health effects in the nearby community.

Sections 1-4 present the details of our risk evaluation.

[1] PM_{10} = Particulate Matter $\leq$10 μm in diameter.
[2] This is based on US EPA's target HI of 1, meaning that no adverse effects are expected in the population if the HI is equal to 1 or lower (US EPA, 1989). An HI greater than 1 does **not** mean that adverse effects are likely to occur, but that more investigation may be necessary.

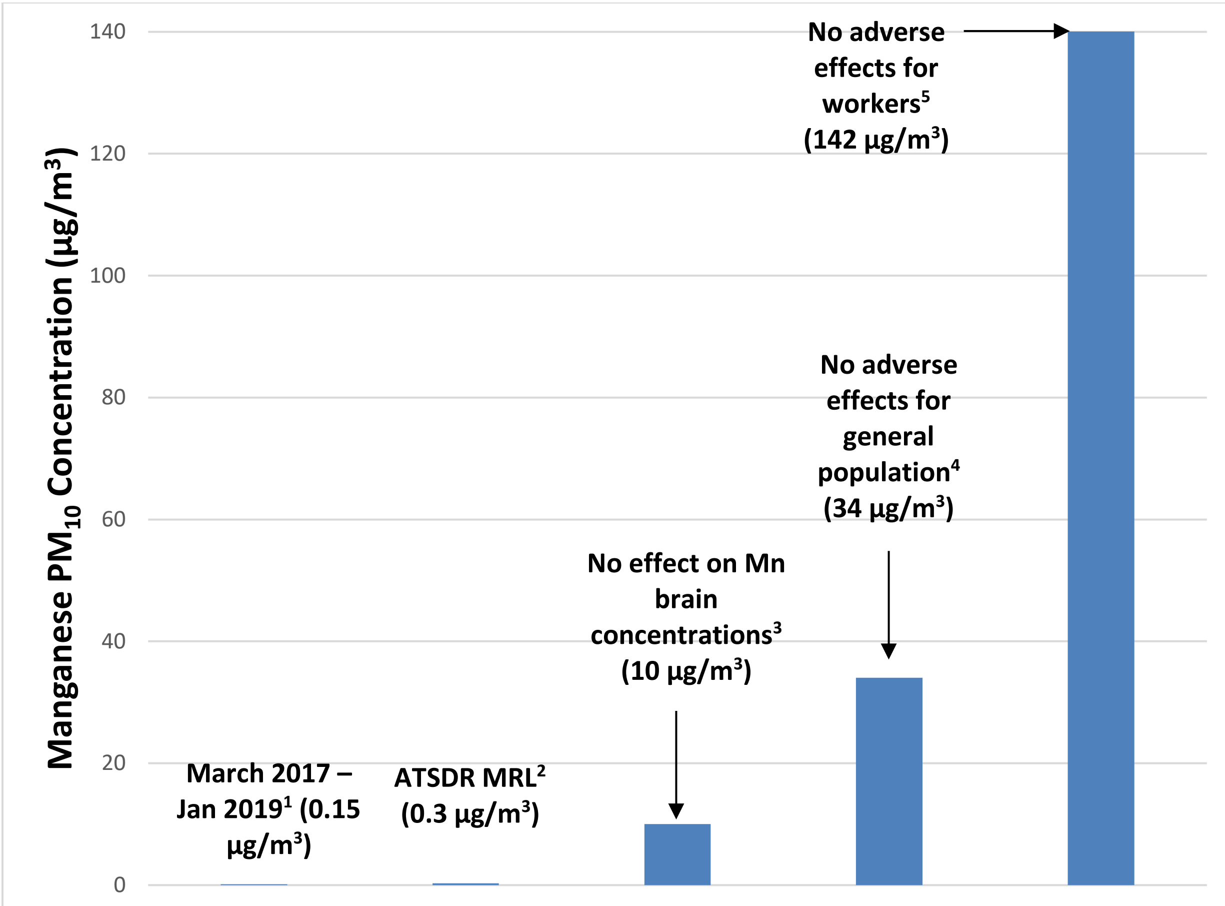


Figure ES.1 S.H. Bell Chicago Mn PM_{10} Concentrations Compared to Mn Air Concentrations with No Health Effects. ATSDR = Agency for Toxic Substances and Disease Registry; Mn = Manganese; MRL = Minimal Risk Level; PM_{10} = Particulate Matter ≤10 µm in Diameter. (1) Mn PM_{10} concentrations represent the arithmetic mean concentration over the exposure period listed. (2) ATSDR MRL = 0.3 µg/m^3 (ATSDR, 2012). (3) Exposure concentration at or below which Mn levels in the brain are not expected to increase above normal levels for fetuses, infants, children, and adults (Schroeter *et al*., 2011, 2012; Yoon *et al*., 2011). (4) No adverse effect for the general population (*i.e*., continuous exposure) estimated from the no adverse effect worker exposure concentration (142 µg/m^3 x 5/7 days per week x 8/24 hours per day = 34 µg/m^3). (5) No adverse effect worker exposure concentration estimated from the Roels *et al*. (1992) study (*i.e*., $BMDL_{10}$, or 95% lower confidence limit on the benchmark dose for a 10% extra risk compared to controls).

1 Manganese Air Monitoring Data and Exposure Evaluation

Gradient has reviewed the S.H. Bell Chicago manganese (Mn) PM_{10}[3] air monitoring data available on the US Environmental Protection Agency (US EPA) in Illinois website (US EPA, 2019)). The website includes data from March 2017 through January 2019. This section describes the Mn data and exposure evaluation applied in the risk assessment.

1.1 Mn Air Monitoring Data

Mn PM_{10} air monitoring data from US EPA's S.H. Bell Chicago Air Monitoring Data website (US EPA, 2019) consist of approximately 10 samples per month (approximately 1 sample collected every 3 days), for a total of 230 samples collected from the beginning of March 2017 through the end of January 2019. Mn samples were collected from the S4 monitoring station, which is one of four monitoring stations located on the S.H. Bell property. The S4 monitoring station is located in the northern portion of the S.H. Bell property, as depicted on the US EPA website (US EPA, 2019).

Mn concentrations ranged from 0.003 to 1.23 $\mu g/m^3$, with an arithmetic mean of 0.150 $\mu g/m^3$. The arithmetic mean concentration, described on the US EPA in Illinois website (US EPA, 2019), is used to derive the exposure point concentration described below.

1.2 Mn Exposure Concentration

The Mn inhalation exposure concentration (EC) is calculated as follows, per US EPA risk assessment guidelines (US EPA, 1989):

$$EC\ (\mu g/m^3) = CA \times EF \times ED \div AT$$

where:

CA	=	Average Mn PM_{10} Concentration in Air ($\mu g/m^3$) (US EPA, 2019)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
AT	=	Averaging Time (days)

US EPA typically considers a high-end residential exposure frequency of 350 days per year, an exposure duration of 30 years, and an averaging time of 30 years (or 10,950 days) for non-cancer risk evaluations (US EPA, 1989).

With these exposure assumptions, we calculate a Mn EC from the 23 months of Mn air monitoring data as follows.

[3] PM_{10} = Particulate Matter ≤10 μm in diameter.

$$EC = 0.150\ \mu g/m^3 \times 30\ years \times 350\ days/year \div 10{,}950\ days$$

$$EC = 0.144\ \mu g/m^3$$

1.2.1 Consideration of Time Spent Indoors and Away from Home

It is important to point out that the Mn ECs estimated above are for a resident who inhales Mn in outdoor air for 24 hours per day, for 350 days per year. The selection of 24 hours per day as the daily exposure duration implicitly assumes either that residents are outdoors for 24 hours per day, for 350 days per year, or that the concentration of indoor Mn particulates is the same as outdoor Mn particulates. Neither assumption is reasonable for the US population. The US EPA Exposure Factors Handbook (US EPA, 2011) reports that the 95^{th} percentile time spent outdoors at a residence was 7.3 hours/day (30%) for adults (>18 years old) (16.7 hours/day indoors, or 70%). US EPA (2011) also indicates that the amount of time spent indoors for infants and children under the age of 2 is nearly the entire day (mean: 22 hours; 95^{th} percentile: 24 hours). The US EPA Exposure Factors Handbook (US EPA, 2011) also indicates that the mean time spent away from home for adults who are 18-64 years old is approximately 7 hours/day (30% of time away from home).

Furthermore, a number of studies conducted in urban areas across the US and Canada have demonstrated that only a fraction of ambient particulates are capable of penetrating into homes (Ozkaynak *et al*., 1996; Long *et al*., 2001; Allen *et al*., 2003; Williams *et al*., 2003; Wallace and Williams, 2005; Sarnat *et al*., 2006; Clark *et al*., 2010). Particle infiltration is well recognized to be highly variable, depending on particle properties (*e.g.*, size distribution, composition), season, home ventilation conditions, and home building characteristics (*e.g.*, age, construction type). The range of average particle infiltration factors (fraction of ambient particles remaining airborne indoors) from these studies is 0.48-0.74, with an overall average across studies of 0.60. For example, Sarnat *et al*. (2006) estimated an average particle infiltration factor of 0.48 for $PM_{2.5}$ (Particulate Matter $\leq$2.5 μm in diameter), based on 17 homes in Los Angeles, California. Long *et al*. (2001) estimated a $PM_{2.5}$ infiltration factor of 0.74 from 9 residential homes in Boston, Massachusetts. More recently, Clark *et al*. (2010) estimated an infiltration factor of 0.52 from 46 residential homes in Toronto, Canada. Because the relative contribution of ambient Mn levels would be reduced in indoor air, as compared to outdoor air, it is scientifically appropriate to incorporate information on the apportionment of time between outdoor and indoor activities when estimating effective high-end exposure concentrations.

Consideration of these more realistic exposure assumptions about time spent indoors and away from home would effectively reduce the EC by about 50%. For example, if one assumes that the outdoor Mn air concentration is 0.3 $\mu g/m^3$, applying the adjustments discussed above would be as follows:

$$[(30\%\ time\ outdoors \times 0.3\ \mu g/m^3) + (70\%\ time\ indoors \times 60\%\ infiltration\ from\ outdoor\ air \times 0.3\ \mu g/m^3)] \times 70\%\ of\ time\ spent\ at\ residence = 0.151\ \mu g/m^3$$

2 Dose-Response Evaluation

2.1 Manganese Essentiality and Health Effects

Mn is a naturally occurring element and the fifth most abundant metal in the earth's crust. Mn is an essential nutrient that is necessary for the function of several enzyme systems and cell energy production in humans. A sufficient intake of Mn is needed for the formation of healthy cartilage and bone (ATSDR, 2012) and for neuronal health (Horning *et al*., 2015; Chen *et al*., 2015). Therefore, a deficiency of Mn can cause adverse health effects, including adverse neurological effects. In addition, because excess Mn accumulates in the brain, exposure to elevated levels of Mn *via* ingestion or inhalation can also cause adverse neurological effects (ASTDR, 2012; Horning *et al*., 2015). Therefore, maintaining appropriate levels of Mn in the body is critical for human health.

The most common health effects associated with chronic inhalation of elevated levels of Mn in occupational environments are neuromotor deficits (*e.g.*, tremor, hand-eye coordination) (ATSDR, 2012). Chronic exposure to high levels of Mn (*i.e.*, greater than 2 mg/m^3) can cause a disabling syndrome called "manganism," which includes a dull affect, altered gait, fine tremor, headaches, and sometimes psychiatric disturbances (ATSDR, 2012). Studies suggest that chronic exposure to low levels of Mn in ambient air are unlikely to be associated with neurological effects. Typical levels of Mn in ambient air range from 0.02 $\mu g/m^3$ (mean in the US) to 0.3 $\mu g/m^3$, near industrial facilities (ASTDR, 2012).

2.2 Manganese Chronic Inhalation Toxicity Criteria and Application to Risk Assessment

US EPA and other regulatory agencies (*e.g*., ATSDR) derive chronic inhalation toxicity criteria that are estimates of continuous inhalation exposure concentrations for individuals (including sensitive subpopulations) that represent negligible, if any, risk for adverse health effects during a lifetime. These toxicity criteria are derived from scientific studies in animals or humans, using either no observed adverse effect levels (NOAELs) (*i.e.*, exposure levels at which no statistically significant increases in adverse effects are observed between exposed and unexposed populations), or benchmark dose (BMD) concentrations (*e.g*., $BMDL_{10}$ value, which is a 95% lower confidence limit on the BMD for a 10% extra risk compared to controls) as the point of departure (POD). The POD is typically divided by uncertainty factors (UFs) to account for various uncertainties in the underlying animal or human toxicity study (*e.g*., sensitive subpopulations). Thus, inhalation toxicity criteria are developed to be well below concentrations that have been observed to cause adverse health effects. Regulatory agencies have different names for such criteria, although the values are derived using similar methodologies and are applied similarly in making decisions to manage risks from chemicals. For example, the US EPA inhalation criteria are termed as "reference concentrations" (or "RfCs"), and the ATSDR inhalation criteria are termed "minimal risk levels" (or "MRLs").

Exceedance of a chronic toxicity value does not indicate that any one individual is at elevated risk. That is, chronic toxicity values that include UFs and assumptions of continuous exposures, such as ATSDR MRLs and US EPA RfCs, are not intended to be an exact line above which toxic effects will occur and below which no effects will occur. US EPA has explained that toxicity criteria published in their Integrated

Risk Information System (IRIS) database cannot be used to predict whether or not an adverse health effect will occur:

> In general, **IRIS values cannot be validly used to accurately predict the incidence of human disease** or the type of effects that chemical exposures have on humans. This is due to the numerous uncertainties involved in risk assessment, including those associated with extrapolations from animal data to humans and from high experimental doses to lower environmental exposures. The organs affected and the type of adverse effect resulting from chemical exposure may differ between study animals and humans. In addition, many factors besides exposure to a chemical influence the occurrence and extent of human disease. (US EPA, 2005 [emphasis added])

ATSDR includes a similar discussion in describing MRLs:

> These substance-specific estimates [MRLs], which are intended to serve as screening levels, are used by ATSDR health assessors to identify contaminants and potential health effects that may be of concern at hazardous waste sites. It is important to note that **MRLs are not intended to define clean-up or action levels**… MRLs are derived for hazardous substances using the no-observed-adverse-effect level/uncertainty factor approach. They are **below levels that might cause adverse health effects in the people most sensitive to such chemical-induced effects. Exposure to a level above the MRL does not mean that adverse health effects will occur.** (ATSDR, 2012 [emphasis added])

2.2.1 Manganese Inhalation Toxicity Value

As discussed on the US EPA in Illinois website (US EPA, 2019), the arithmetic mean Mn concentration is compared to the ATSDR Mn MRL of 0.3 $\mu g/m^3$ (ATSDR, 2012). The ATSDR MRL is based on the most current science and, thus, is the most appropriate toxicity value to apply in a Mn inhalation risk assessment. The ATSDR Mn MRL is based on observations of subclinical neurological effects in workers exposed to Mn for an average of 5.3 years (Roels *et al*., 1992). ATSDR applied US EPA's BMD software to derive a $BMDL_{10}$ POD of 142 $\mu g/m^3$ for abnormal eye-hand coordination in workers exposed to respirable Mn. ATSDR adjusted the 142 $\mu g/m^3$ POD to account for continuous exposure in the general population (*vs*. a worker population) (142 $\mu g/m^3$ × 5/7 days/week × 8/24 hours/day = 34 $\mu g/m^3$), and applied a UF of 10 for limitations/uncertainties and another UF of 10 for human variability, for a total UF of 100, resulting in an MRL of 0.3 $\mu g/m^3$.[4] Thus, the Mn MRL is 100-fold lower than the estimated continuous exposure concentration in the general population that would be expected to result in essentially no adverse effects.

Further, peer-reviewed studies suggest that Mn brain concentrations would not exceed normal levels in adults, children, neonates, or fetuses at Mn exposure concentrations as high as 10 $\mu g/m^3$ (Schroeter *et al*., 2011, 2012; Yoon *et al*., 2011), providing further support for the conservative nature of the Mn MRL of 0.3 $\mu g/m^3$.

It is also important to consider that the Mn MRL is based on Mn concentrations with a mean particle aerodynamic diameter of ≤5 microns (μm) (PM_{05}) from the Roels *et al*. (1992) study. As discussed above, the Mn data for the S.H. Bell Chicago site are PM_{10} concentrations (*i.e*., particle size ≤10 μm), which include the PM_{05} fraction and particles larger than 5 μm but less than or equal to 10 μm. Therefore, Mn PM_{10} concentrations likely overestimate Mn PM_{05} concentrations, and, therefore, comparison of Mn PM_{10} concentrations to the MRL likely overestimates the Mn risk.

[4] It is noteworthy that the MRL is rounded down to one significant figure from 0.340 to 0.3 $\mu g/m^3$. Rounding the MRL to one significant figure provides support for rounding hazard indices to one significant figure.

3 Risk Calculations

Regulatory agencies typically present non-cancer risks as chronic hazard index (HI) estimates. HI estimates are calculated by dividing the exposure concentration by the chronic toxicity value. US EPA states that HI estimates should be rounded to and presented as one significant figure (US EPA, 1989). US EPA's target HI is 1, meaning that no adverse effects are expected in the population if the HI is equal to 1 or lower.

The Mn HI calculation is as follows:

$$HI = EC\ (\mu g/m^3) \div \text{Mn Inhalation Toxicity Value (MRL)}\ (\mu g/m^3)$$

where:

HI	=	Hazard Index
EC	=	Exposure Concentration
MRL	=	Minimum Risk Level

The Mn HI for the S.H. Bell Chicago air monitoring data (March 2017 through January 2019) is 0.5 (HI = 0.144 $\mu g/m^3$ ÷ 0.3 $\mu g/m^3$ = 0.5). The following table summarizes the Mn air concentration, exposure concentration, and HI.

Table 3.1 Mn PM_{10} Air Concentration, Exposure Concentration, and Hazard Index

Exposure Period	Mean Mn PM_{10} Air Concentration ($\mu g/m^3$)	Mn PM_{10} Exposure Concentration[1] ($\mu g/m^3$)	Hazard Index[2,3]
March 2017 – January 2019	0.150	0.144	0.5

Notes:
Mn = Manganese; PM_{10} = Particulate Matter ≤10 µm in Diameter; US EPA = US Environmental Protection Agency.
(1) Mn air concentration is adjusted for an exposure frequency of 350 days per year, per US EPA guidelines (US EPA, 1989).
(2) Note that had we calculated the HI using the 95% upper confidence limit (UCL) on the mean, as opposed to the mean that is used on the US EPA in Illinois website, for the S.H. Bell Chicago Mn air monitoring data, the hazard index would remain less than 1.
(3) US EPA guidelines (1989) indicate that hazard indices should be reported to one significant figure. As stated in the guidelines (1989) in Exhibit 8-3, "All hazard indices and hazard quotients should be expressed as one significant figure."

Note that if we adjust for more realistic exposure assumptions regarding time spent indoors and away from home, the HIs would be even lower.

4 Risk Evaluation Conclusion

The results of our conservative risk evaluation, conducted in a manner consistent with US EPA risk assessment guidelines, indicate that there is no risk of adverse neurological effects for the general population (including sensitive subpopulations) from continuous inhalation of Mn in ambient air (collected from March 2017 through January 2019) in the vicinity of the S.H. Bell Chicago facility (HI = 0.5). This conclusion is based on comparison of the Mn EC to the ATSDR chronic Mn MRL of 0.3 $\mu g/m^3$ that is well below the level of Mn in air estimated to cause no adverse effects following continuous exposure (34 $\mu g/m^3$), and well below the threshold Mn concentration that is not expected to increase normal levels of Mn in the brain (10 $\mu g/m^3$). In addition, the risk calculation is based on a high estimate of Mn exposure that assumes a resident inhales outdoor air at their home for 24 hours per day, for 350 days per year. As discussed above, it is likely that time spent indoors and away from home would effectively reduce the Mn exposures and risk estimates by about 50% in accordance with the US EPA exposure factor guidelines.

Given the conservative and health-protective basis of the Mn risk calculations in our evaluation, Gradient concludes, based on the available data, that there is no evidence that Mn in ambient air near the S.H. Bell Chicago facility will cause adverse health effects in the nearby community.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. "Toxicological Profile for Manganese (Final)." 556p., September.

Allen, R; Larson, T; Sheppard, L; Wallace, L; Sally Liu, LJ. 2003. "Use of real-time light scattering data to estimate the contribution of infiltrated and indoor generated particles to indoor air." *Environ. Sci. Technol.* 37:3484-3492.

Chen, P; Chakraborty, S; Mukhopadhyay, S; Lee, E; Paoliello, MM; Bowman, AB; Aschner, M. 2015. "Manganese homeostasis in the nervous system." *J. Neurochem.* 134(4):601-610. doi: 10.1111/jnc.13170.

Clark, NA; Allen, RW; Hystad, P; Wallace, L; Dell, SD; Foty, R; Dabek-Zlotorzynska, E; Evans, G; Wheeler, AJ. 2010. "Exploring variation and predictors of residential fine particulate matter infiltration." *Int. J. Environ. Res. Public Health* 7(8):3211-3224.

Horning, KJ; Caito, SW; Tipps, KG; Bowman, AB; Aschner, M. 2015. "Manganese is essential for neuronal health." *Annu. Rev. Nutr.* 35:71-108. doi: 10.1146/annurev-nutr-071714-034419.

Long, CM; Suh, HH; Catalano, PJ; Koutrakis, P. 2001. "Using time- and size-resolved particulate data to quantify indoor penetration and deposition behavior." *Environ. Sci. Technol.* 35(10):2089-2099. doi: 10.1021/es001477d.

Ozkaynak, H; Xue, X; Spengler, J; Wallace, L; Pellizzari, E; Jenkins, P. 1996. "Personal exposure to airborne particles and metals: Results from the particle team study in Riverside, California." *J. Expo. Anal. Environ. Epidemiol.* 6(1):57-78.

Roels, HA; Ghyselen, P; Buchet, JP; Ceulemans, E; Lauwerys, RR. 1992. "Assessment of the permissible exposure level to manganese in workers exposed to manganese dioxide dust." *Br. J. Ind. Med.* 49:25-34.

Sarnat, SE; Coull, BA; Ruiz, PA; Koutrakis, P; Suh, HH. 2006. "The influences of ambient particles composition and size on particle infiltration in Los Angeles, CA, residences." *J. Air Waste Manag. Assoc.* 56:186-196.

Schroeter, JD; Dorman, DC; Yoon, M; Nong, A; Taylor, MD; Andersen, ME; Clewell, HJ. 2012. "Application of a multi-route physiologically-based pharmacokinetic model for manganese to evaluate dose-dependent neurological effects in monkeys." *Toxicol. Sci.* 129(2):432-446.

Schroeter, JD; Nong, A; Yoon, M; Taylor, MD; Dorman, DC; Andersen, ME; Clewell, HJ III. 2011. "Analysis of manganese tracer kinetics and target tissue dosimetry in monkeys and humans with multi-route physiologically based pharmacokinetic models." *Toxicol. Sci.* 120(2):481-498. doi: 10.1093/toxsci/kfq389.

US EPA. 1989. "Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (Part A) (Interim final)." Office of Emergency and Remedial Response, NTIS PB90-155581, EPA-540/1-89-002, 287p., December.

US EPA. 2005. "Integrated Risk Information System (IRIS): Additional Information." July 26. Accessed at https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=2776.

US EPA. 2011. "Exposure Factors Handbook: 2011 Edition." Office of Research and Development, National Center for Environmental Assessment (NCEA), EPA/600/R-090/052F, 1,436p., September.

US EPA. 2019. "Filter-based Monitor (S4) Data from the FRM Monitor [March 2017 –January 2019]." Accessed on March 18, 2019 at https://www.epa.gov/il/sh-bell-chicago-air-monitoring-data#data.

Wallace, L; Williams, R. 2005. "Use of personal-indoor-outdoor sulfur concentrations to estimate the infiltration factor and outdoor exposure factor for individual homes and persons." *Environ. Sci. Technol.* 39:1707-1714.

Williams, R; Suggs, J; Rea, A; Leovic, K; Vette, A; Croghan, C; Sheldon, L; Rodes, C; Thornburg, J; Ejire, A; Herbst, M; Sanders, W. 2003. "The Research Triangle Park particulate matter panel study: PM mass concentration relationships." *Atmos. Environ.* 37:5349-5363.

Yoon, M; Schroeter, JD; Nong, A; Taylor, MD; Dorman, DC; Andersen, ME; Clewell, HJ III. 2011. "Physiologically based pharmacokinetic modeling of fetal and neonatal manganese exposure in humans: Describing manganese homeostasis during development." *Toxicol. Sci.* 122(2):297-316. doi: 10.1093/toxsci/kfr141.

Exhibit C

IIMA INTERNATIONAL IRON METALLICS ASSOCIATION

a unified voice for the metallics industry

Use of High Purity Pig Iron for Foundries Producing Ductile Iron Castings

High Purity Pig Iron (HPPI) is differentiated from other types of pig iron by its low manganese, phosphorus and sulphur contents. HPPI is manufactured from the smelting of ilmenite sand in electric furnaces to produce titanium dioxide slag and pig iron. Production facilities are located in South Africa, Canada, Norway and elsewhere. HPPI constitutes the principal ferrous feedstock material for production of ductile iron castings (also known as nodular or spheroidal graphite iron) used in high quality automotive, engineering and energy casting components.

High Purity Pig iron Characteristics - % by weight					
Pig iron Type	**C**	**Si**	**Mn**	**S**	**P**
Basic	3.5 - 4.5	≤1.25	≤1.0	≤0.05	0.08-0.15
Foundry	3.5 - 4.1	2.5 - 3.5	0.5 - 1.2	≤0.04	≤0.12
HPPI	**3.7 - 4.7**	**0.05 -1.5**	**≤0.05**	**≤0.025**	**≤0.035**
Various tighter specifications are available from specific producers					
Ingots typically weigh 7.5 to 12 kg					
Dimensions vary from producer to producer, e.g. 17.5 x 13.5 x 16 cm, 20 x 15 x 5 cm					

Aside from its low Mn, P and S contents, HPPI is also low in other undesirable impurity elements. Being manufactured from ilmenite mined on a large scale, HPPI has a consistent and predictable chemical and physical analysis.

a unified voice for the metallics industry

The Benefits of Using HPPI in Ductile Iron Castings

Low content of residual impurities

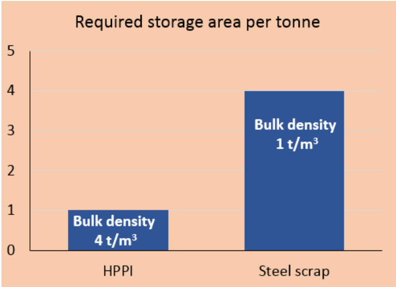
- dilutes undesirable elements in the melt
- offers potential for use of higher proportion lower grade, lower cost scrap

Consistent and predictable analysis

- allows better control and lower variability of melting
- tighter control of final casting composition = better mechanical properties of castings
- removes requirement for costly heat treatment of castings

Higher bulk density than steel scrap

- much lower storage space
- less handling during charge make-up
- fewer charge buckets required
- lower charging time



Lower surface area: volume ratio than scrap

- lower oxide (rust) formation = lower slag volumes

Carbon content is chemically combined

- goes into solution much more quickly with less energy required than when adding a recarburiser to scrap

Low Mn content and dilution effectiveness

- the required mechanical properties of most castings made with HPPI are achieved in the as-cast condition, thus eliminating costly heat treatment, a particularly attractive option for the production of castings with high impact resistance.

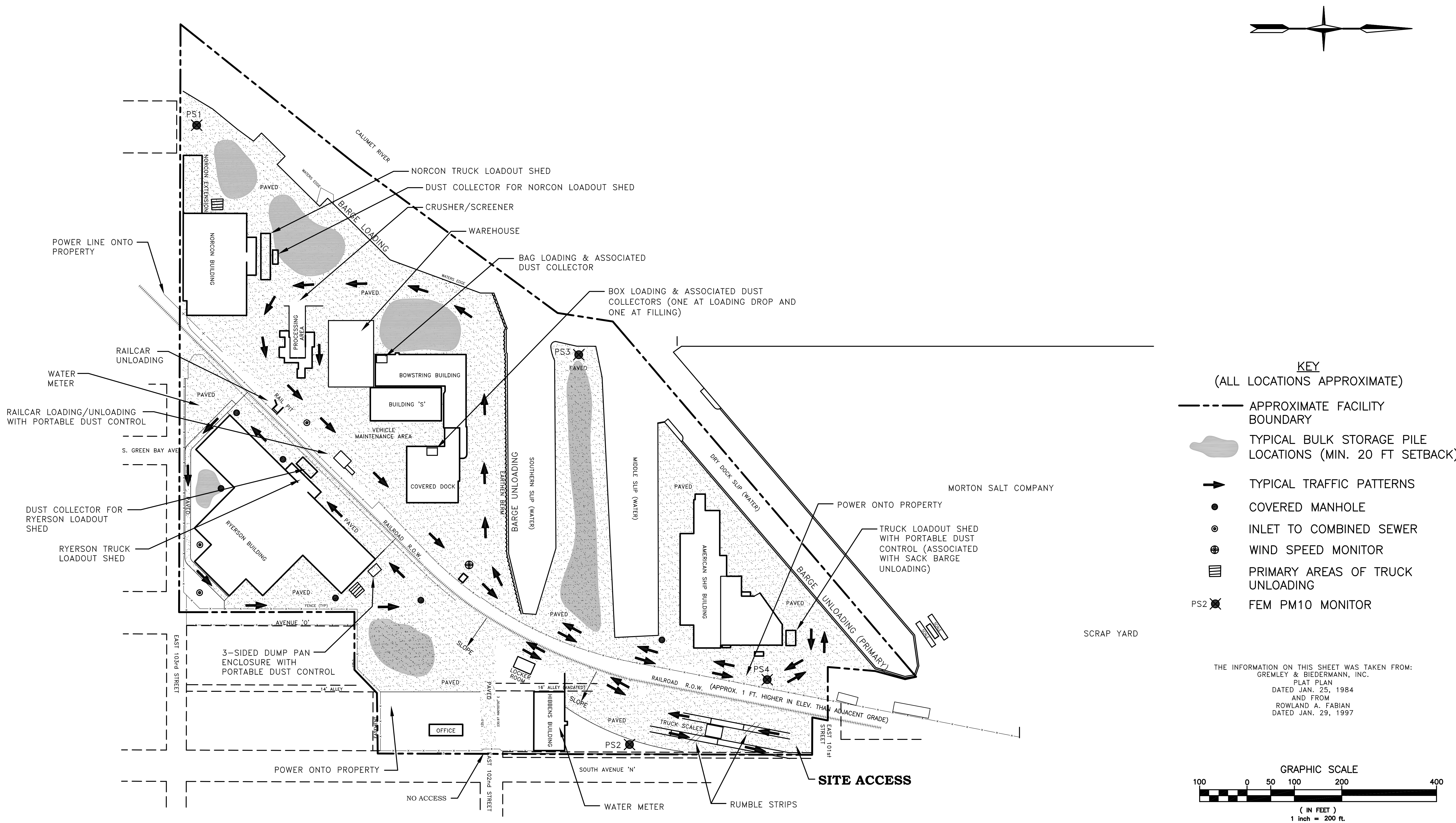
Higher electrical efficiency

- faster melting and reduced power consumption in induction furnaces

Increasing the percentage of pig iron in the charge normally leads to higher nodule counts in ductile iron castings

For all these reasons HPPI leads to significant net savings in casting costs.

Exhibit D



wood.

FACILITY DIAGRAM
Chicago Terminal
S.H. Bell Company
Chicago, IL

FIGURE 1

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
GAP	3410140990	KP	10/23/14	01/29/18

2/19/2019 1:47 PM P:\Env\3410 - SH Bell Co Chicago\CADD\3410140990 Fig 1 01-29-18.dwg FIG-1

Exhibit E

Enforcement and Compliance History Online

Detailed Facility Report

Facility Summary

SH BELL CO

10218 S AVE O, CHICAGO, IL 60617

FRS (Facility Registry Service) ID: 110064143804
EPA Region: 05
Latitude: 41.7095
Longitude: -87.54175
Locational Data Source: EIS
Industry:
Indian Country: N

Enforcement and Compliance Summary

Statute	CAA
Insp (5 Years)	--
Date of Last Inspection	09/04/2012
Current Compliance Status	No Violation Identified
Qtrs with NC (of 12)	3
Qtrs with Significant Violation	3
Informal Enforcement Actions (5 years)	2
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	1
Penalties from EPA Cases (5 years)	$100,000

Statute	RCRA
Insp (5 Years)	--
Date of Last Inspection	01/10/1995
Current Compliance Status	**No Violation Identified**
Qtrs with NC (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--
Penalties from EPA Cases (5 years)	--

Regulatory Information

Clean Air Act (CAA): Operating Minor (IL000031600BWX)
Clean Water Act (CWA): No Information
Resource Conservation and Recovery Act (RCRA): Inactive ( ) Other (ILD069973253)
Safe Drinking Water Act (SDWA): No Information

Other Regulatory Reports

Air Emissions Inventory (EIS): 3200811
Greenhouse Gas Emissions (eGGRT): No Information
Toxic Releases (TRI): No Information
Compliance and Emissions Data Reporting Interface (CEDRI): No Information

Known Data Problems

Facility/System Characteristics

Facility/System Characteristics

System	Statute	Identifier	Universe	Status	Areas	Permit Expiration Date	Indian Country	Latitude	Longitude
FRS		110064143804					N	41.7095	-87.54175
AIR	CAA	IL000031600BWX	Minor Emissions	Operating	CAASIP, CAATVP		N		
EIS	CAA	3200811		OPERATING			N	41.7095	-87.54175
RCR	RCRA	ILD069973253	Other	Inactive ( )			N	41.708588	-87.539725

Facility Address

System	Statute	Identifier	Facility Name	Facility Address
FRS		110064143804	SH BELL CO	10218 S AVE O, CHICAGO, IL 60617
AIR	CAA	IL000031600BWX	SH BELL CO	10218 S AVE O, CHICAGO, IL 60617-5907
EIS	CAA	3200811	SH BELL CO	10218 S AVE O, CHICAGO, IL 60617
RCR	RCRA	ILD069973253	BELL S H	10218 S AVE O, CHICAGO, IL 60617

Facility SIC (Standard Industrial Classification) Codes

System	Identifier	SIC Code	SIC Description
AIR	IL000031600BWX	4225	General Warehousing And Storage

Facility NAICS (North American Industry Classification System) Codes

System	Identifier	NAICS Code	NAICS Description
EIS	3200811	493110	General Warehousing and Storage
AIR	IL000031600BWX	493110	General Warehousing and Storage
RCR	ILD069973253	339999	All Other Miscellaneous Manufacturing

Facility Tribe Information

Reservation Name	Tribe Name	EPA Tribal ID	Distance to Tribe (miles)
No data records returned			

Enforcement and Compliance

Compliance Monitoring History (5 years)

Statute	Source ID	System	Compliance Monitoring Type	Lead Agency	Date	Finding (if applicable)
CAA	*IL000031600BWX*	*AIR*	*Formal*	*EPA*	*02/27/2018*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*02/01/2018*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*08/16/2017*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*03/21/2017*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*03/01/2017*	
CAA	*IL000031600BWX*	*AIR*	*PCE Off-Site*	*EPA*	*12/16/2016*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*12/08/2015*	
CAA	*IL000031600BWX*	*AIR*	*PCE Off-Site*	*State*	*11/24/2015*	
CAA	*IL000031600BWX*	*AIR*	*PCE Off-Site*	*EPA*	*03/18/2015*	
CAA	*IL000031600BWX*	*AIR*	*Formal*	*EPA*	*03/04/2015*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*05/20/2014*	
CAA	*IL000031600BWX*	*AIR*	*Partial Evaluation*	*EPA*	*05/20/2014*	
CAA	*IL000031600BWX*	*AIR*	*Partial Evaluation*	*EPA*	*05/19/2014*	
CAA	*IL000031600BWX*	*AIR*	*PCE Off-Site*	*EPA*	*05/19/2014*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*05/19/2014*	
CAA	*IL000031600BWX*	*AIR*	*Partial Evaluation*	*EPA*	*04/25/2014*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*State*	*04/25/2014*	
CAA	*IL000031600BWX*	*AIR*	*PCE On-Site*	*EPA*	*04/25/2014*	

Entries in italics are not counted in EPA compliance monitoring strategies or annual results.

Compliance Summary Data

Statute	Source ID	Current SNC (Significant Noncompliance)/HPV (High Priority Violation)	Current As Of	Qtrs with NC (Noncompliance) (of 12)	Data Last Refreshed
CAA	IL000031600BWX	No	04/13/2019	3	04/12/2019
RCRA	ILD069973253	No	04/13/2019	0	04/12/2019

Three-Year Compliance History by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11
	CAA (Source ID: IL000031600BWX)	04/01-06/30/16	07/01-09/30/16	10/01-12/31/16	01/01-03/31/17	04/01-06/30/17	07/01-09/30/17	10/01-12/31/17	01/01-03/31/18	04/01-06/30/18	07/01-09/30/18	10/01-12/31/18

Statute	Program/Pollutant/Violation Type				QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11
	Facility-Level Status				**High Priority Violation**	**High Priority Violation**	**High Priority Violation**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**
	HPV History				Addressed-EPA	Addressed-EPA	Addressed-EPA								
	Violation Type	**Agency**	**Programs**	**Pollutants**											
CAA	HPV	EPA	CAAFESOP, CAASIP	PARTICULATE MATTER < 10 UM	05/19/2014	→	12/05/2016								

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
RCRA (Source ID: ILD069973253)		04/01-06/30/16	07/01-09/30/16	10/01-12/31/16	01/01-03/31/17	04/01-06/30/17	07/01-09/30/17	10/01-12/31/17	01/01-03/31/18	04/01-06/30/18	07/01-09/30/18	10/01-12/31/18	01/01-03/31/19
	Facility-Level Status	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**	**No Violation Identified**

Informal Enforcement Actions (5 Years)

Statute	System	Source ID	Type of Action	Lead Agency	Date
CAA	AIR	IL000031600BWX	Notice of Violation	EPA	08/07/2017
CAA	AIR	IL000031600BWX	Notice of Violation	EPA	07/15/2014

Formal Enforcement Actions (5 Years)

Statute	System	Law/Section	Source ID	Action Type	Case No.	Lead Agency	Case Name	Issued/Filed Date	Settlements/Actions	Settlement/Action Date	Federal Penalty	State/Local Penalty	SEP Cost	Comp Action Cost
CAA	AIR	110	AIR/IL000031600BWX	Judicial	05-2015-5065	EPA	S H BELL	08/09/2016	1	12/05/2016	$100,000	$0	$0	$884,659

Environmental Conditions

Water Quality

Permit ID	Combined Sewer System?	Number of CSO (Combined Sewer Overflow) Outfalls	12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database))	WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database))	State Waterbody Name (ICIS (Integrated Compliance Information System))	Impaired Waters	Impaired Class	Causes of Impairment(s) by Group(s)	Watershed with ESA (Endangered Species Act)-listed Aquatic Species?
No data records returned									

Waterbody Designated Uses

Reach Code	Waterbody Name	Exceptional Use	Recreational Use	Aquatic Life Use	Shellfish Use	Beach Closure Within Last Year	Beach Closure Within Last Two Years
No data records returned							

Air Quality

Nonattainment Area?	Pollutant(s)	Applicable Nonattainment Standard(s)
Yes	Ozone	8-Hour Ozone (2008), 8-Hour Ozone (2015)
No	Lead	
Yes	Particulate Matter	PM-10 (1987), PM-2.5 (1997)
No	Carbon Monoxide	
No	Nitrogen Dioxide	
No	Sulfur Dioxide	

Pollutants

Toxics Release Inventory History of Reported Chemicals Released in Pounds per Year at Site

Air Pollutant Report

TRI Facility ID	Year	Total Air Emissions	Surface Water Discharges	Off-Site Transfers to POTWs (Publicly Owned Treatment Works)	Underground Injections	Releases to Land	Total On-site Releases	Total Off-site Releases
No data records returned								

Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

Chemical Name
No data records returned

Demographic Profile

Demographic Profile of Surrounding Area (1 Mile)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 US Census and American Community Survey data, and are accurate to the extent that the facility latitude and longitude listed below are correct. The latitude and longitude are obtained from the EPA Locational Reference Table (LRT) when available.

General Statistics	
Total Persons	19,988
Population Density	6,997/sq.mi.
Percent Minority	88%
Households in Area	5,837
Housing Units in Area	6,556
Households on Public Assistance	125
Persons Below Poverty Level	12,446

Geography	
Radius of Selected Area	1 mi.
Center Latitude	41.7095
Center Longitude	-87.54175
Land Area	92%
Water Area	8%

Income Breakdown - Households (%)	
Less than $15,000	1,033 (17.33%)
$15,000 - $25,000	937 (15.72%)
$25,000 - $50,000	1,868 (31.33%)
$50,000 - $75,000	1,054 (17.68%)
Greater than $75,000	1,070 (17.95%)

Age Breakdown - Persons (%)	
Children 5 years and younger	1,728 (9%)
Minors 17 years and younger	6,367 (32%)
Adults 18 years and older	13,621 (68%)
Seniors 65 years and older	1,868 (9%)

Race Breakdown - Persons (%)	
White	9,680 (48%)
African-American	1,266 (6%)
Hispanic-Origin	16,323 (82%)
Asian/Pacific Islander	51 (0%)
American Indian	242 (1%)
Other/Multiracial	8,748 (44%)

Education Level(Persons 25 & older) - Persons (%)	
Less than 9th Grade	2,882 (24.27%)
9th through 12th Grade	1,606 (13.52%)
High School Diploma	3,954 (33.29%)
Some College/2-year	2,305 (19.41%)
B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More	1,129 (9.51%)

Exhibit F

Fugitive Dust Plan

S.H. Bell Company

10218 South Avenue O
Chicago, Illinois 60617

Revised, April 2019

Table of Contents

I. Introduction

This Fugitive Dust Plan has been prepared for the S.H. Bell Company (S.H. Bell Co.) Chicago Terminal, located at 10218 South Avenue O, in Chicago, Illinois, in accordance with the City of Chicago Department of Public Health (CDPH) – Rules for Control of Emissions from Handling and Storing Bulk Materials, revised January 25, 2019 (Regulation).

This document meets the Fugitive Dust Plan requirement of Section 3.0(3) of the Regulation. This document updates the CDPH-approved November 2017 Fugitive Dust Plan, the January 2018 Fugitive Dust Plan (that incorporated the new dust control equipment listed in CDPH's approval), and the February 2019 Fugitive Dust Plan (that incorporated the new Section 6.0 of the Regulation). The purpose of this update of the Fugitive Dust Plan is to include elements of the new Section 5.0 of the Regulation not otherwise covered by the Enclosure Plan submitted concurrently with this update. This Fugitive Dust Plan is intended solely for use by CDPH and S.H. Bell Co. and cannot be used for any other purpose as it contains information requested by CDPH that is for informational purposes only.

Certification by Owner

S.H. Bell Co. is the owner/operator of the facility and responsible for execution of this Fugitive Dust Plan. S.H. Bell Co. hereby certifies that all control measures, devices, and technologies have been properly calibrated and maintained, all appropriate facility staff has been trained on the proper application of and operation of all control measures, devices, and technologies. Further, the calculation of maximum indoor and outdoor bulk storage capacity as noted herein in Section II is also certified by the facility owner.

Signature: [signature]

Printed Name: SAMUEL H. BELL

Title: V.P./S.H. BELL COMPANY

Date: © 24 April 2019.

II. Facility Description

The S.H. Bell Co. Chicago Terminal (the "facility") consists of the following: an office building; an enclosed jaw crushing/screening plant and screening plant; storage buildings for packaged materials; storage buildings for primary bulk materials; a scale house; barge unloading docks and slips; maintenance shop; packing operations housed inside storage buildings and gravel-covered, landscaped, and asphalt-paved areas.

The entire facility is approximately 25 acres in size with buildings and paved areas constituting more than 95% of the total area. Facility characteristics, as required by Section 3.0(3.a)) of the Regulation are shown on Figures 1 and 2, including approximate locations of:

- Facility boundaries
- Buildings
- Internal roads
- Utilities on facility property
- Roadways within one quarter mile
- Outdoor storage piles
- Control devices, air monitors and the weather station
- Location of primary unloading and transfer operations:
    - Crushing/Screening Plant and Screening Plant
    - Bag Filling with Dust Collector
    - Box Filling with Dust Collector
    - Truck Loading/Unloading
    - Barge Loading/Unloading
    - Railcar Loading/Unloading

Although not specified in this list, each emission unit/source also includes associated transfer points, such as hoppers associated with box and bag filling and the crushing/screening plant. All facility operations are batch processes. The overall duration of each operation is typically based on the amount of material to be handled and may range from less than an hour to across several days, with only intermittent generation of fugitive dust.

Bulk Solid Material Storage Capacity

Approximate indoor area available for storage
Ryerson: 55,000 square feet
Norcon: 28,000 square feet
Total indoor available storage area:83,000 square feet
Average material storage: 0.8 tons/square foot
Maximum density of material: 280 lbs/cubic foot
Indoor bulk material storage capacity: 66,400 tons

Approximate outdoor area available for storage (based on 20' setback from water)
Middle slip: 550' x 75' = 41,250 square feet
West of office: 200' x 150' = 30,000 square feet
Southern Corner: ½ (300' x 300') = 45,000 square feet
Total outdoor available area: 116,250 square feet
Average material storage: 1.2 tons/square foot
Maximum density of material: 280 lbs/cubic foot
Outside bulk material storage capacity: 139,000 tons or 37,000 cubic yards

III. Operations Summary

Materials processed and/or stored at the facility are transported to the facility by barge, rail, and truck. Typical bulk materials currently handled at the facility include: ferro alloys, direct reduced iron (DRI) (not fines), hot briquetted iron (HBI), pig iron, iron ore, and silicon metal.[1] The facility also handles materials that are not bulk materials which do not have the potential to become airborne or scattered by wind, such as graphite electrodes, cast aluminum and steel shapes, including billets, sheet, coil, plates, and slab, packaged materials, and other materials that do not meet the definition of a Bulk Solid Material under Section 2.0(3) of the Regulation.

Ferro alloy materials (bulk or super sacks) that are unloaded are stored within storage buildings or under roof in stall-type bins (Roofed Stall Bins) prior to processing and/or reloading for customer shipment. These materials (alloys) typically cannot be watered, as they lose value if they become wet. Among other problems, wetted steel alloys could create adverse or unintended reactions when used. The maximum indoor storage capacity for bulk materials, including the covered bins, is approximately 66,000 tons. Typically, indoor storage is at 70% capacity. Figure 1 provides a facility layout which shows the location of facility buildings.

For purposes of this Fugitive Dust Plan, “Affected Materials” at S.H. Bell are defined as “ferromanganese materials and other materials with a manganese content (raw material, intermediate, or finished product) that are processed or otherwise handled on site in such a manner that could cause the generation of stack or fugitive emissions containing ferromanganese or manganese compounds. Affected Materials shall not include materials that contain manganese, such as steel ingots, where material is not a source of stack or fugitive emissions containing ferromanganese or manganese compounds.”[2] Affected Materials are a “Manganese-Bearing Bulk Material” as defined under Section 2.0(14) of the Regulation.

On average, Affected Materials make up approximately 45% - 60% of the materials handled at the facility. Affected Materials are not stored outdoors.

Bulk materials currently stored outdoors include pig iron, HBI and other non-Affected Materials (aka alloys designated by customer preference). Materials, such as graphite electrodes and cast aluminum and steel shapes, that are not “bulk solid materials” under the Regulation because the material does not have the potential to become airborne or be scattered by wind, are stored outdoors as well. Approximately 25% of the materials handled at the facility, primarily pig iron and alloys, are stored outdoors. S.H. Bell Co. limits the materials that can be stored in outdoor storage piles to those materials that are of predominantly large particle size (greater than ½ inch) and/or materials that can be watered, crusted, and/or tarped. The bulk materials that are stored outdoors are not dusty and are not susceptible to being windblown. Inbound shipments of DRI fines are no longer accepted for storage or re-loading at the facility. The maximum outdoor storage capacity is approximately 140,000 tons. However, typically, outdoor storage piles cover less than half of the available outdoor storage area. The number, size, and composition of outdoor piles vary based on customer requirements and specifications. Figure 1 illustrates the typical location and general size of outdoor storage piles.

Some unloaded bulk and super sack materials are designated for further processing, packaging or both. These process operations include batch crushing, screening, and packaging operations. No crushing or

[1] This plan will be updated if additional materials are to be handled at the facility.

[2] “Affected Materials” are as defined by the Ohio EPA within prior Director’s Final Findings and Orders (DFFO) for S.H. Bell Co.’s Stateline Terminal.

screening or packaging of Affected Materials will occur outdoors. Roadways are swept and watered, with dust suppressant applied as needed. All vehicles do not exceed a speed of 8 miles per hour (mph).

Ongoing regular observation of both the source of fugitive emissions and the nearest property line (based on wind direction) are used to determine if additional control or mitigation measures need to be employed in order to meet the source and property line limits. For purposes of this Plan "Visible Fugitive Dust at Source" is defined as observation of opacity at an operation/activity that approaches the applicable opacity limit.

Details of facility control and monitoring measures are provided in the following sections.

IV. Control Measures

This section provides a detailed discussion of the control measures employed by the facility to comply with the applicable regulatory requirements in the Regulation and the additional best management practices that go above and beyond the Regulation for the specific operations and activities performed at the facility. Fugitive Dust is prohibited by the Regulation, such that fugitive dust is not visible beyond the perimeter property line of the facility and opacity at any pile, transfer point, roadway, or parking area does not exceed 10%.

The control measures are presented in the following section, organized by activity type/location:

A. Transfer Points
B. Transport by Truck
C. Roadways
D. Outdoor Storage Piles
E. Affected Material Storage
F. Dust Collectors

For clarity, a summary of the regulatory language is followed by the practices and methods S.H. Bell is using to demonstrate compliance. Sections E and F contain additional dust control measures employed by the facility that do not directly fit within the specific regulatory requirements in the Regulation. A description of the specific Operating Procedures (in decision-tree format) employed at the facility to minimize fugitive dust emissions is also provided for each of the specific operations and activities performed at the facility. Table 1 contains a summary of control measures at transfer points. Appendix A contains the General Operating Procedures employed at the facility for dust control that are detailed in the subsequent sections of this Plan.

A. TRANSFER POINTS

Regulatory Requirements:
Section 3.0(8) of the Regulation (Transfer Points) requires that: All material transfer points need to be maintained such that fugitive dust does not exceed a 10% opacity limit by using one of four options: a) total enclosure, b) water spray system sufficient to control fugitive dust emissions during operations, c) vented to air pollution control equipment, or d) transfer only moist material in a manner that minimizes the exposed drop.

Section 5.0 of the Regulation requires that all Transfer Points for non-packaged Manganese-Bearing Bulk Material (Affected Materials) be in a total enclosure with: an air pollution control system and/or the ability to apply water to control fugitive dust emissions sufficiently at designed vents and other openings; and overlapping flaps or sliding doors that are to remain closed except to allow material or Vehicles to enter and leave or to allow people to enter and exit or an equivalent or superior device for the performance for dust control at the openings.

Facility Compliance Methods:
The majority of Transfer Points at the facility are controlled by either total enclosure and/or venting to air pollution control equipment (*i.e.*, a dust collector). Once approved and upon completion of the construction

activities in the Enclosure Plan, all Transfer Points for Affected Materials will be controlled by total enclosure meeting the requirements of Section 5.0 of the Regulation. The remaining limited number of Transfer Points are controlled through a "water spray system" that is accomplished in one of several methods at the facility: direct application, mobile misters, and dry foggers. Each of these methods sufficiently controls fugitive dust emissions during operations and is further described below.

- Direct application of water to bulk material, using a spray system or water addition such as with a front end loader;
- Use of mobile misters to control fugitive dust; dry fugitive dust particles absorb water droplets from the misters causing them to increase in weight and cohesiveness to cause the particles to settle out of the air; and
- Use of dry fogging unit to control fugitive dust, appropriate for use in freezing temperatures; dry foggers have a special air-atomizing nozzle that produces a dry fog consisting of ultra-fine water droplets which wet the dust particles and increase the weight to allow settling.

The goal of the mobile misters and the dry fogging unit is to create a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air. Appendix A contains the General Operating Procedure for positioning and use of the mobile misters and/or dry fogging unit, applicable to their use anywhere in the facility.

The control measures and operating procedures used at each of the Transfer Points at the facility are provided in detail below. Table 1 provides a summary of the controls used at the Transfer Points at the facility. Additionally, activities at outdoor transfer points are also conducted in accordance with the procedures noted in Section IX, High Wind Events, whenever wind speeds exceed 15 mph over two consecutive 5 minute intervals. The control measures and operating procedures are further delineated between Wetted Materials and Dry Materials and Affected Materials and non-Affected Materials where applicable.

"Wetted Materials" are those bulk materials that are permitted to get wet per customer specifications. The facility ensures that Wetted Materials are sufficiently moist to control fugitive dust emissions through the direct application of water to the material prior to and/or while the material is being deposited at the limited number of Transfer Points controlled through a "water spray system." During freezing conditions, the moisture already existing in the Wetted Materials will freeze and trap fugitive particles.

"Dry Materials" are bulk materials that are not permitted to get wet per customer specifications. For Dry Materials, the facility uses the mobile misters or the dry fogging unit to control fugitive dust emissions when the Dry Materials are being deposited at the limited number of Transfer Points controlled through a "water spray system." The Dry Materials consist mainly of steel alloys, including the majority (but not all) of Affected Materials received at the facility, which are used by the steel industry. Based on customer demand, the Dry Materials may only be at the facility for as short as 48 hours. Steel alloys cannot get wet because of the high potential for risk of explosion and other catastrophic safety concerns when added to molten metal at a furnace.

1. OUTDOOR STORAGE PILES TRANSFER ACTIVITIES

    Compliance Method: water spray system
    Additional Measures: minimize drop height, outdoor storage limitations

Affected Materials are not stored outdoors. The Facility limits the type of bulk non-Affected Materials that can be stored in outdoor storage piles to the following:

- Wetted Materials that have a predominantly large particle size (greater than ½ inch);
- Dry Materials that have a predominantly large particle size (greater than ½ inch), but only if tarped during storage; and
- Wetted Materials that have a small particle size less than ½ inch in diameter, but only if a very hard cohesive crust forms over the surface of the pile when watered.

The bulk materials that are stored outdoors are not dusty and are not susceptible to being windblown or are tarped.

S.H. Bell Co. in Chicago has restricted the types of materials handled or stored at the facility. As previously committed, inbound shipments of DRI fines are no longer accepted for storage or re-loading at the facility.

The following decision tree diagram (Figure 3) is the operating procedure for **Transfer Activities of Bulk Materials at Outdoor Storage Piles**.

FIGURE 3. LOADING FROM OUTDOOR STORAGE PILES / OUTDOOR TRUCK LOADING - FUGITIVE DUST CONTROL

BEGIN MATERIAL LOADING ACTIVITIES:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations (i.e., wind alert)

Preplan - Check crusting / moisture of material to determine mitigation needs

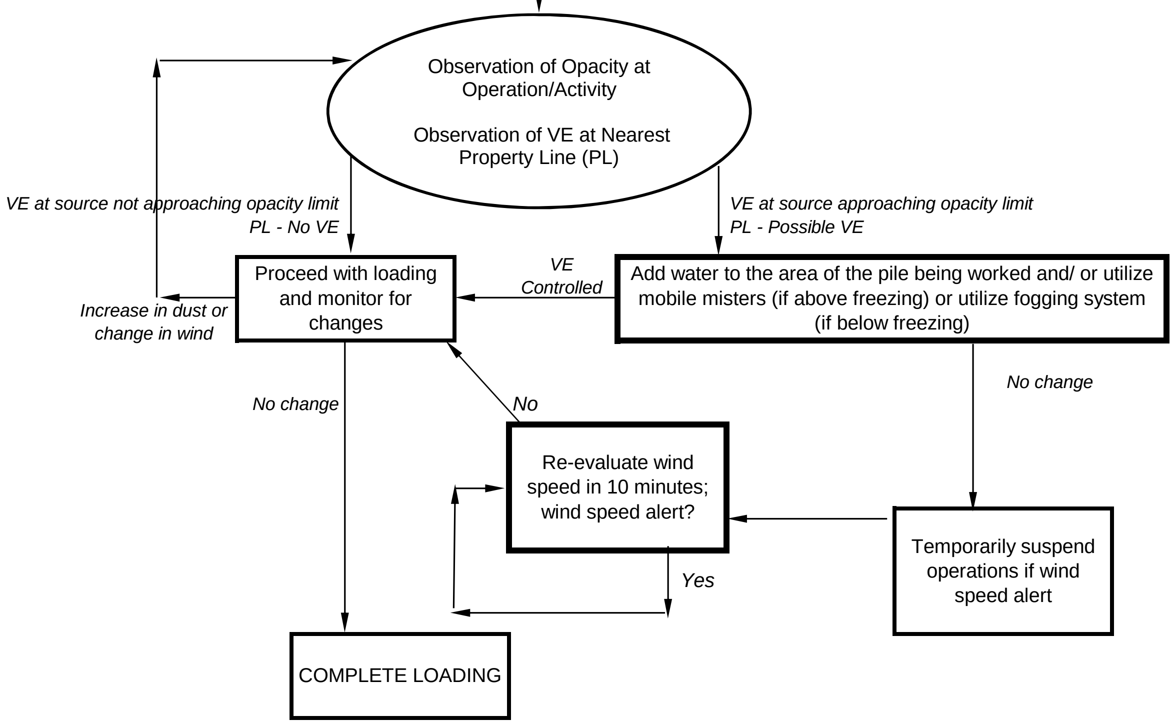
Preplan- Position loading operations as favorably as possible, accounting for location within the facility and weather conditions

Mitigation- dampen wetted material and/or position mobile misters (if above freezing) and/or use dry fogging system (if above freezing or below freezing) (dry materials) to impact fugitive emissions

Mitigation- Adjust position of mobile misters/fogging system throughout loading activities to minimize fugitive emissions when utilized

Operations Step- WETTED and DRY Materials stored outside are loaded into trucks with a front end loader/moved with a front end loader **NO AFFECTED MATERIALS ARE STORED OUTDOORS**

Operations Step- Drop heights are minimized by the inherent limitation of the front end loader lift height



2. TEMPORARY OUTDOOR PILE TRANSFER ACTIVITIES

Compliance Method: water spray system
Additional Measures: minimize drop height

As discussed in the additional transfer point sections below, certain operations require temporary outdoor piles. With the exception of Affected Materials, the above operating procedures (Figure 3) for transfer activities of bulk materials at outdoor storage piles is followed for transfer activities involving temporary outdoor piles.

The facility employs more stringent controls for Affected Materials. Temporary outdoor piles of Affected Materials at the facility are not permitted.

3. CRUSHING/SCREENING

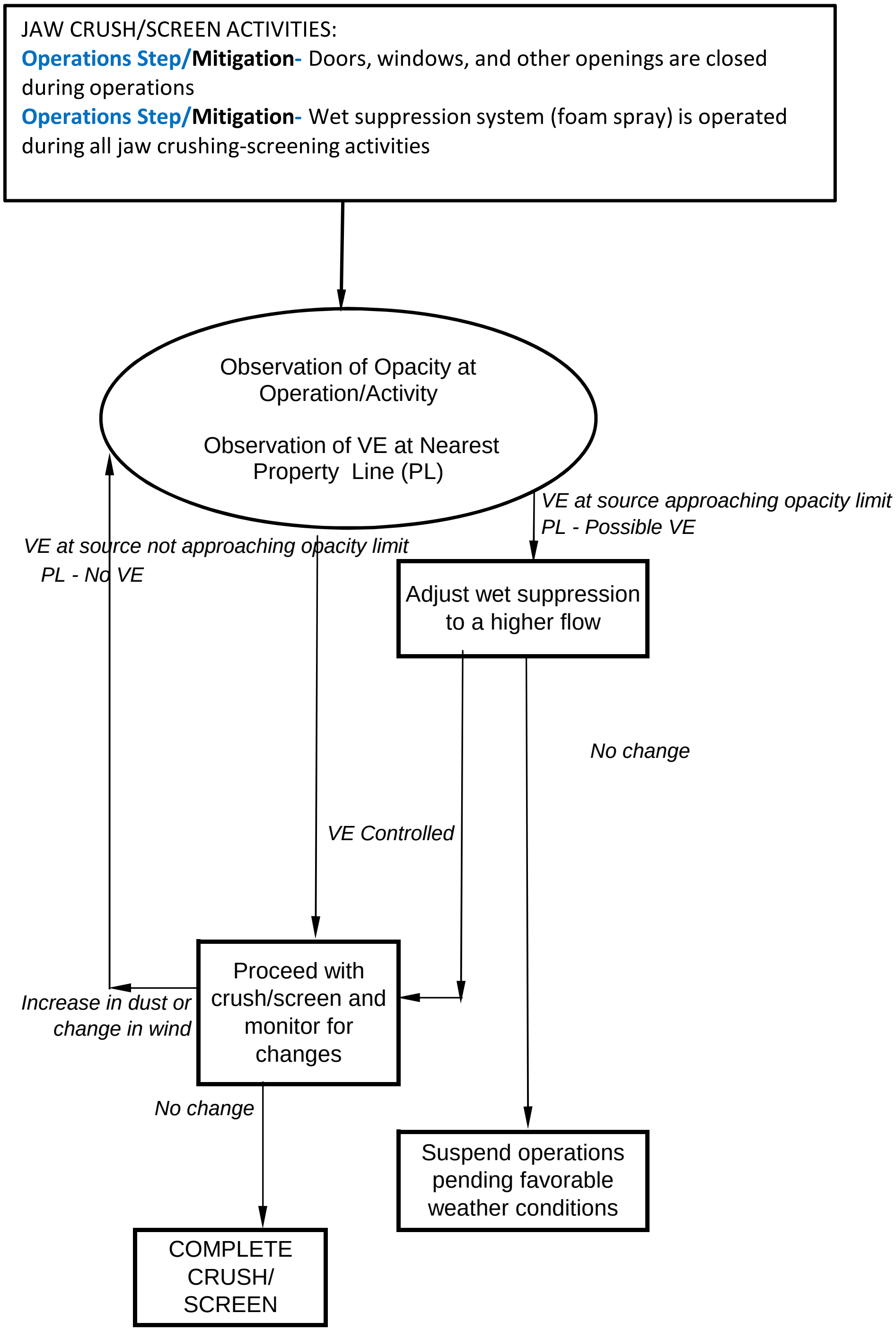
Compliance Method: enclosure, foam dust suppressant system
Additional Measures: minimize drop height

There is a crusher/screener and a screener at the facility, both of which are enclosed within a building. Table 1 provides list the enclosed transfer points associated with the crusher/screener and a screener at the facility. On Figure 1, the crusher/screener building is labeled “Processing Area.”

For the crusher/screener, a foam dust suppressant spray system is operated at the initial drop to the crusher and at the crusher during all jaw crushing/screening operations to reduce fugitive dust emissions from the processed materials. Drop height to the opening of the crusher is minimized by a chute that extends from the bottom of the hopper to the opening of the crusher. There is also a full-length dust curtain at the face of the enclosure to the hopper. Facility personnel are trained to keep doors, windows, and other openings closed during jaw crushing/screening operations. As an alternative control measure, there is ductwork available to operate the portable baghouse, located above the crusher/screener deck and bins. The facility does not process Affected Materials at the Screener.

The following decision tree diagram (Figure 4) is the operating procedure for the **Crusher/Screener** at the facility.

FIGURE 4. CRUSHING/SCREENING - FUGITIVE DUST CONTROL



4. BOX SCREENING

Compliance Methods: enclosure, water spray system
Additional Measures: minimize drop height limitation on outdoor activities

Four (4) portable box screeners are used at the facility. Dry Materials are screened inside a facility building unless space is not available. If screening of Dry Materials is performed outdoors, the mobile misters or dry fogging unit will be deployed which will create a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air. Wetted Materials may be screened outdoors. Wetted Materials are directly sprayed with water or dampened prior to start of screening if moisture is not sufficient.

No box screening of Affected Materials is performed outdoors. Any box screening of Affected Materials is done inside a total enclosure meeting the requirements of Section 5.0 of the Regulation.

The following decision tree diagram (Figure 5) is the operating procedure for **Box Screeners**.

FIGURE 5. BOX SCREENING - FUGITIVE DUST CONTROL

BOX SCREENING SUMMARY :

Preplan- If using screen boxes outside, evaluate winds to determine windspeed and direction during screening activities

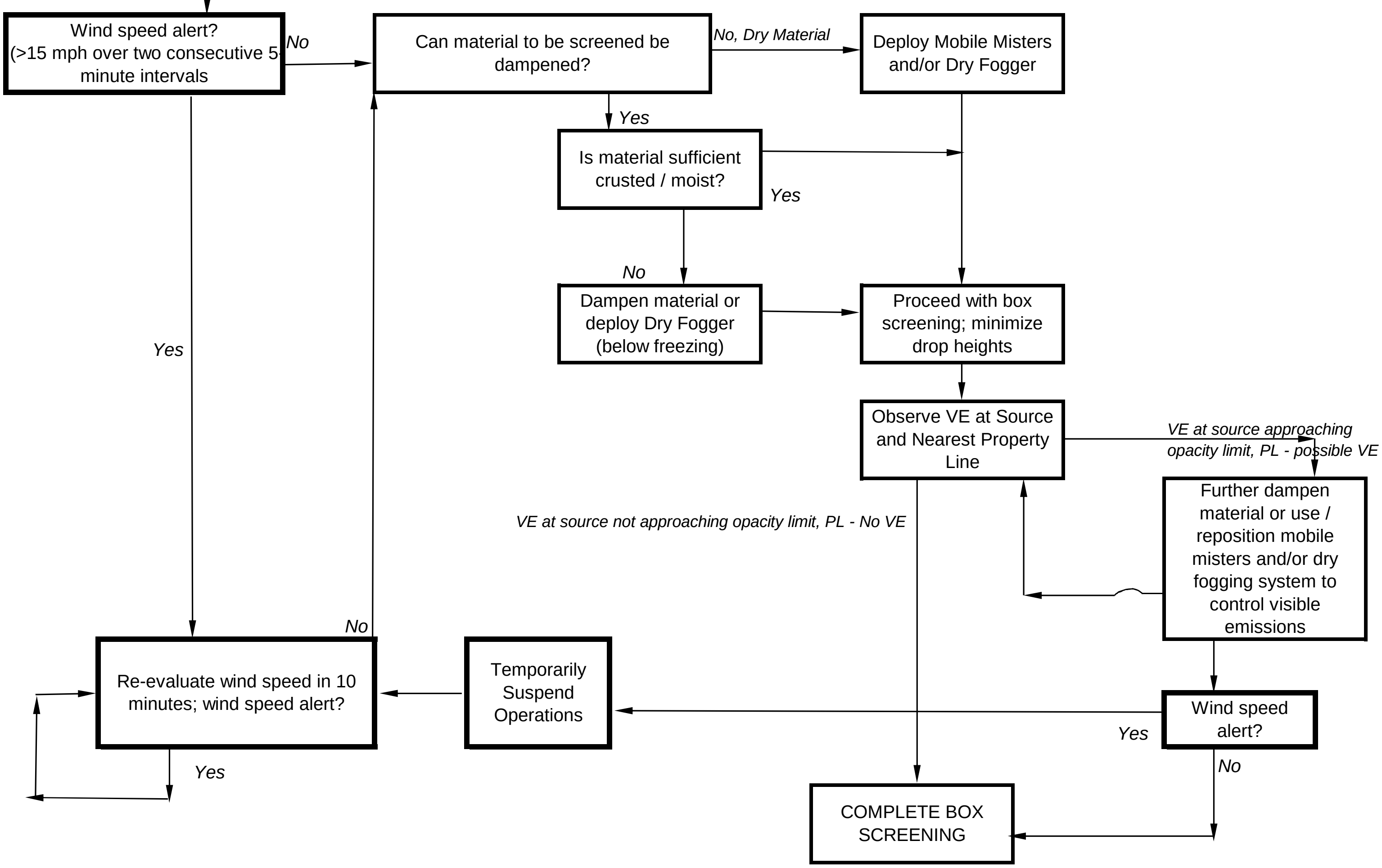
Preplan - if using screen boxes outside, check crusting/moisture of material

Operations Step/Control- Use of screen boxes for dry materials are conducted indoors, unless space is not available - **AFFECTED MATERIALS ARE SCREENED INDOORS IN THE RYERSON BUILDING WITH DOORS CLOSED AND IN PROXIMITY TO THE LOADOUT SHED BAGHOUSE PICKUP POINTS**

Operations Step/Mitigation- Use of screen boxes for dry materials outdoors controlled with mobile misters and/or dry fogging unit

Operations Step- Use of screen boxes for wet materials may be performed outside

FOR USE OF SCREEN BOXES OUTSIDE (NON-AFFECTED MATERIALS)



5. TRUCK LOADING/UNLOADING

Compliance Methods: enclosure, water spray system, air pollution control equipment
Additional Measures: minimize drop height, choke feed, limitations on outdoor loading

Indoor Truck Loading – Dry Materials

Loading operations of Dry Materials (including Affected Materials) involving trucks are completed within an enclosure, either within a loadout shed or within a bulk material storage building. There are two loadout sheds, one at the Norcon building and one at the Ryerson building, the locations of which are shown on Figure 1. These loadout sheds have been renovated, including the construction of upgraded enclosures, installation of metal roll-up garage doors at the entry/exit of each loadout shed, and installation of a 40,000 cfm stationary dust collector at each loadout shed. Loading will not commence until both doors are closed; the dust collector fans will be interlocked to actuate upon closure of both doors. Additional work practice procedures include a minimum one-minute wait time for trucks after loading before the doors are opened to allow fugitive dust to settle and/or be captured.

The following decision tree diagram (Figure 6) is the operating procedure for **Indoor Truck Loadout** at the Ryerson and Norcon Buildings.

FIGURE 6. INDOOR TRUCK LOADOUT - FUGITIVE DUST CONTROL

Ryerson and Norcon Buildings

BEGIN TRUCK LOADOUT ACTIVITIES:

Operations Step- Position truck completely within loadout shed

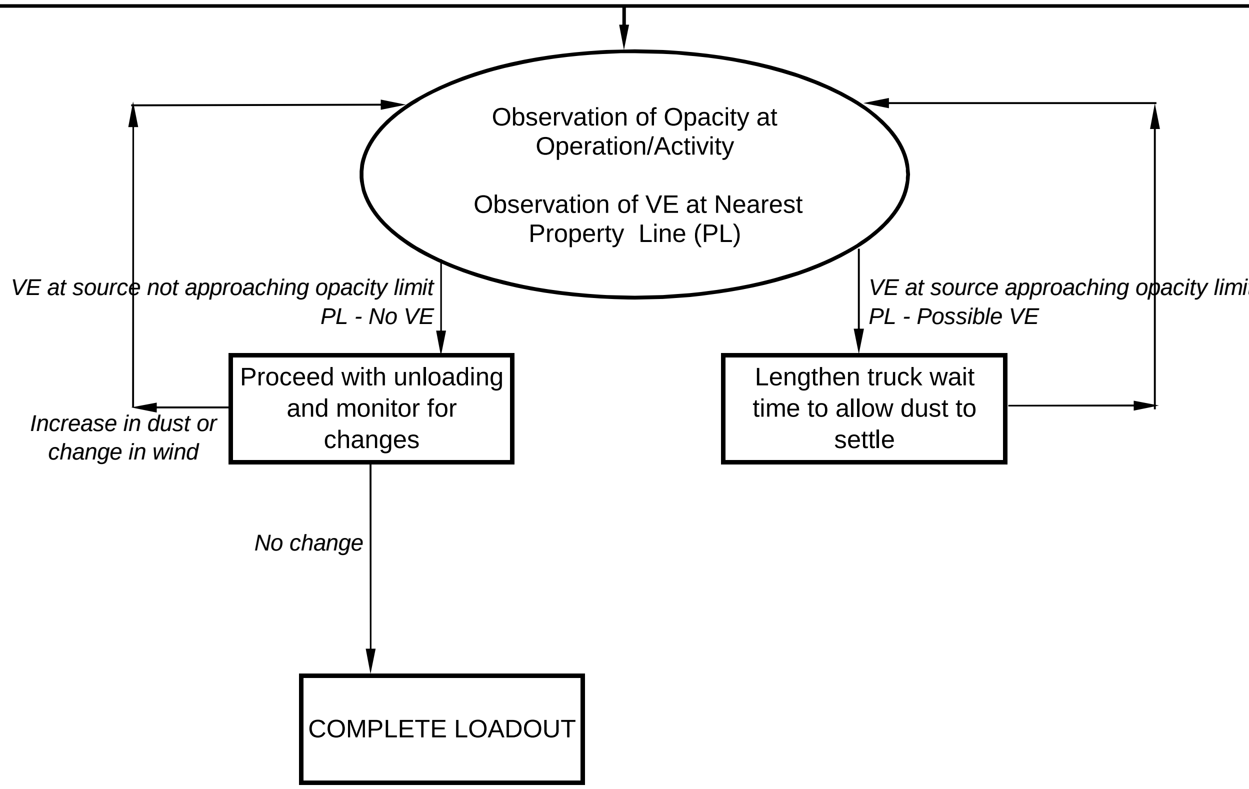
Operations Step - Close entry/exit roll-up garage doors at each end of the loadout shed

Control- Ensure stationary dust collector is turned on and operational; dust collector fans are interlocked to actuate upon closure of both doors

Operations Step- Load material into the truck while minimizing drop height

Operations Step- Ensure that truck driver waits for at least one minute after load is complete to allow for dust settling/capture before driving out of the loadout enclosure

Operations Step- Ensure driver tarps the load after safely clearing the exit of the loadout shed prior to driving through the facility



Outbound Truck Loading from Outdoor Storage Piles –

As noted previously, no Affected Materials are stored outside and the facility limits the Non-Affected Materials that can be stored in the Outdoor Storage Piles to the following:

- Wetted Materials that have a predominantly large particle size (greater than ½ inch);
- Dry Materials that have a predominantly large particle size (greater than ½ inch), but only if tarped during storage; and
- Wetted Materials that have a small particle size less than ½ inch in diameter, but only if a very hard cohesive crust forms over the surface of the pile when watered.

The bulk materials that are stored outdoors are not dusty and are not susceptible to being windblown or are tarped.

Materials stored outdoors are loaded into trucks with a front end loader. Proper loading methods include minimizing material drop heights by placing the hinge pin of the front end loader as near as possible to the top of the side of the truck bed which results in the bottom portion of the bucket being contained inside the truck bed when the material in the bucket is off-loaded. Trucks are not loaded to the full depth of the truck bed to ensure material is contained. Additionally, per the operating procedure below, Wetted Materials are directly sprayed with water or dampened if moisture is not sufficient or the mobile misters or dry fogging unit are deployed prior to and/or during the truck loading.

Figure 3 is the operating procedure for transfer activities of bulk materials at outdoor piles, which is representative of **Outbound Truck Loading** from Outdoor Storage Piles.

FIGURE 3. LOADING FROM OUTDOOR STORAGE PILES / OUTDOOR TRUCK LOADING - FUGITIVE DUST CONTROL

BEGIN MATERIAL LOADING ACTIVITIES:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations (i.e., wind alert)

Preplan - Check crusting / moisture of material to determine mitigation needs

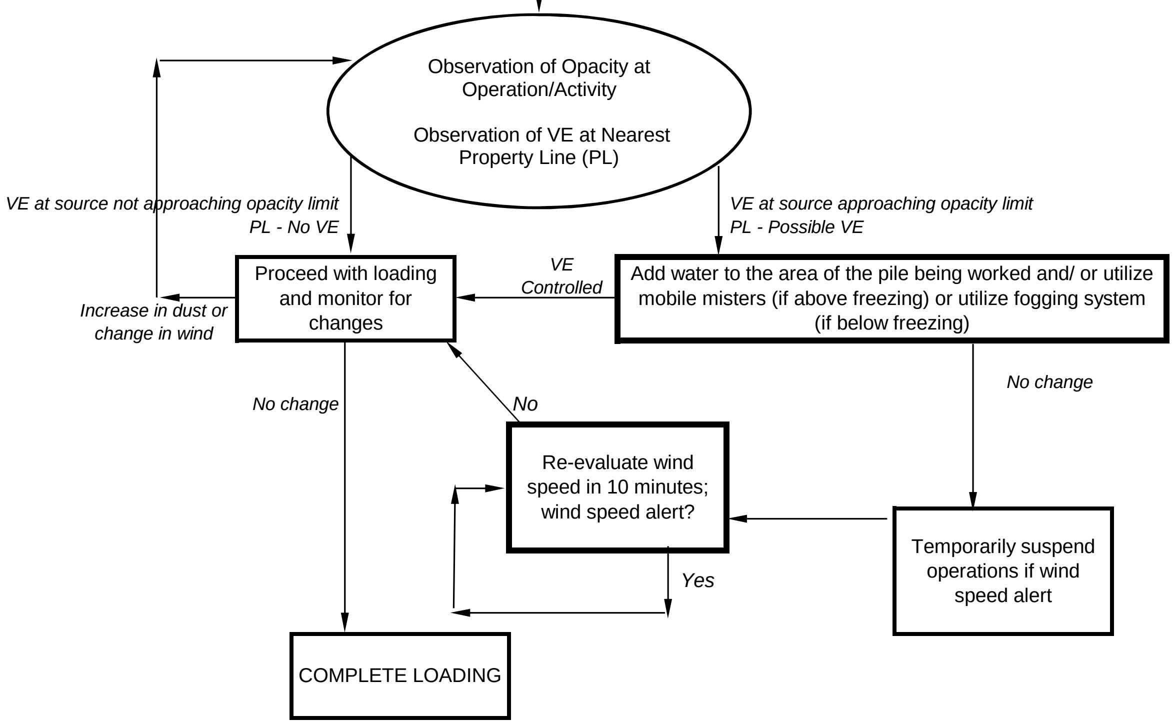
Preplan- Position loading operations as favorably as possible, accounting for location within the facility and weather conditions

Mitigation- dampen wetted material and/or position mobile misters (if above freezing) and/or use dry fogging system (if above freezing or below freezing) (dry materials) to impact fugitive emissions

Mitigation- Adjust position of mobile misters/fogging system throughout loading activities to minimize fugitive emissions when utilized

Operations Step- WETTED and DRY Materials stored outside are loaded into trucks with a front end loader/moved with a front end loader **NO AFFECTED MATERIALS ARE STORED OUTDOORS**

Operations Step- Drop heights are minimized by the inherent limitation of the front end loader lift height



Truck Unloading

For truck unloading, Dry Materials (including Affected Materials) carried by in-house drayage trucks are unloaded within an enclosed bulk material storage building. Dry Affected Materials may be unloaded outside using a mobile mister or dry fogger for mitigation and then covering the pile with a tarp on a temporary basis.

Materials that have a predominantly large particle size (greater than ½ inch) and/or can be watered (Wetted Materials) carried by in-house drayage trucks or that are being delivered from off-site full size trucks that are to be stored outside are unloaded directly to outdoor storage piles.

Full size trucks from off-site that are delivering non-Affected Materials are unloaded to ground in a manner which minimizes drop heights. Based on the nature of the truck unloading process, the material is being choke fed to the ground, and the driver usually has to pull forward to ensure that all material is discharged from the truck. Wetted Material will be dampened in the truck prior to unloading if moisture is not sufficient and a mobile mister or dry fogging unit will be deployed while unloading of Dry Materials.

The facility employs more stringent controls for Affected Materials. Full size trucks from off-site, that are delivering Affected Materials, are choke fed to a dump pan enclosure that is connected to a portable dust collector. The dump pan enclosure has vinyl strips on the side that receives the truck to enclose the area around the truck opening during the unloading process and the top of the truck remains tarped during the entire unloading process. Additional work practice procedures include a minimum one-minute wait time for trucks after unloading is complete to allow fugitive dust to settle and/or be captured. The dump pan enclosure with portable dust collection can also be used for non-Affected Materials.

The following decision tree diagrams (Figures 7a and 7b) represent the operating procedures for **Truck Unloading from Off-Site Full Size Trucks** for non-Affected Materials and Affected Materials, respectively.

FIGURE 7a. BULK FULL-SIZE TRUCK UNLOADING (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations

Preplan - Determine if material is wetted or dry

Operations Step - Ensure truck is tarped

Operations Step/Control - Based on the nature of truck unloading activities, materials are choke fed to ground (drivers typically have to pull forward to ensure all material is discharged from truck)

Mitigation/Control- Dampen wetted material if not already moist or deploy dry fogger in freezing temperatures

Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials

Alternative Mitigation / Control - Use 3-sided steel receiving pan with portable dust collector (see Figure 7b)

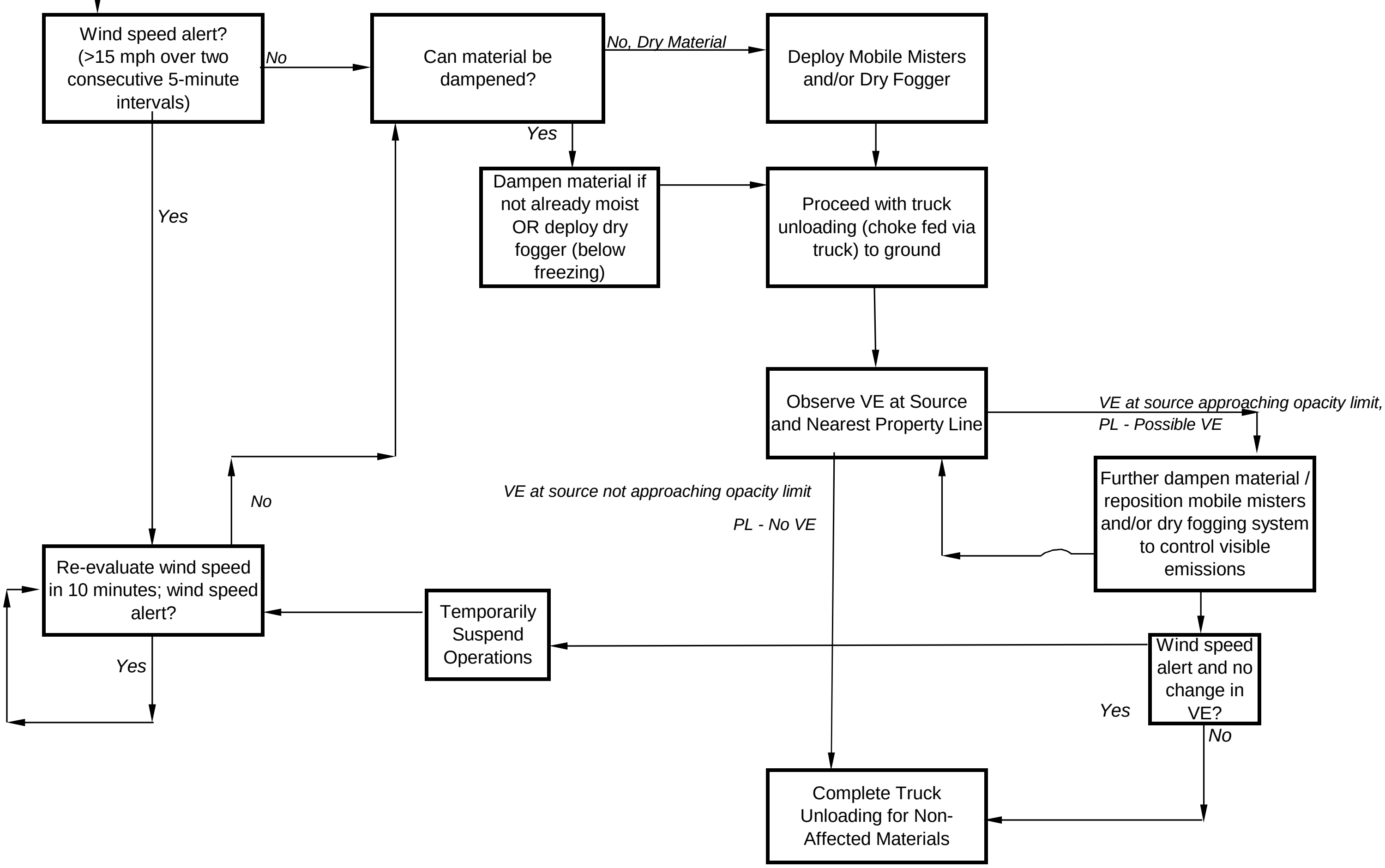
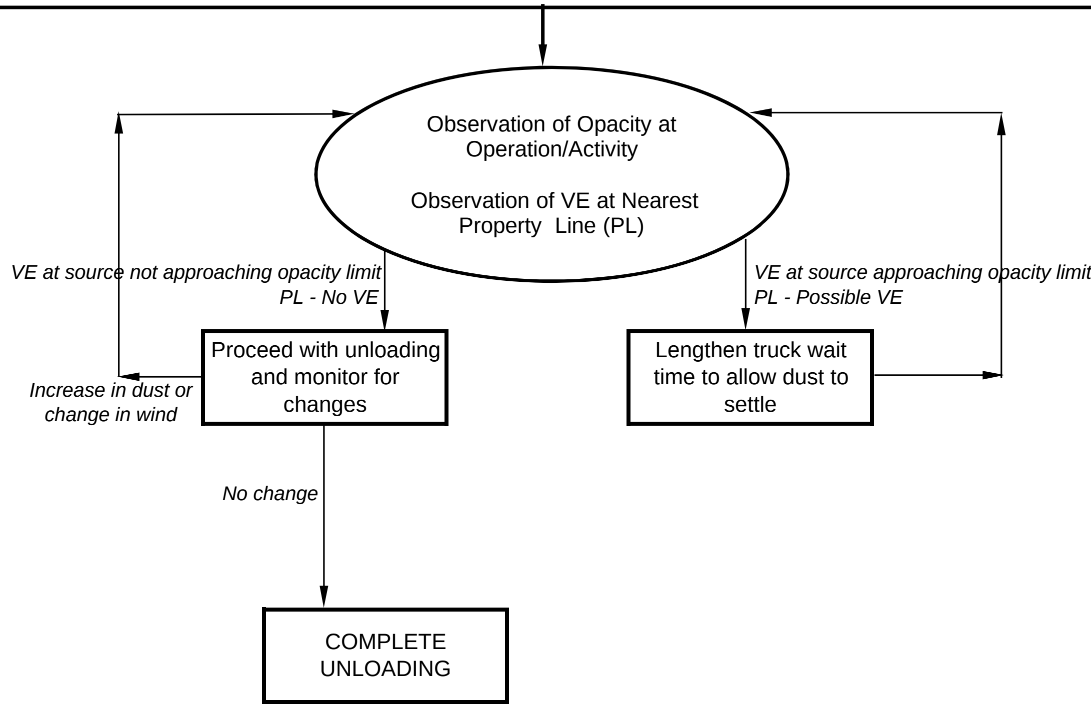


FIGURE 7b. BULK FULL-SIZE TRUCK UNLOADING (AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

BEGIN TRUCK UNLOADING ACTIVITIES:
Control- Ensure portable dust collector is turned on and operational
Operations Step - Ensure truck is tarped
Operations Step- Based on the nature of truck unloading activities, materials are choke fed to a dump pan enclosure (drivers typically have to pull forward to ensure all material is discharged from truck)
Operations Step- Ensure that truck driver waits for at least one minute after load is complete to allow for dust settling/capture before pulling away from pan



6. BARGE UNLOADING/LOADING

Compliance Methods: water spray system
Additional Measures: enclosure, air pollution control equipment, minimize drop height, more stringent controls for Affected Materials

Barge Unloading – Bulk Materials (non-Affected Materials)

Barge unloading operations of non-Affected Materials that are Dry Materials are completed so as to minimize drop height to reduce fugitive dust emissions. If excess wind speed is observed, the facility manager will consult the on-site met station to determine wind speeds at the facility and determine if loading/unloading operations should be temporarily suspended. Due to the range of movement of the equipment required for barge unloading (there is not a fixed swing location for the excavator from the barge to a waiting truck), as well as the size of the barges (200 feet in length), and the need to reposition the barge during unloading activities, enclosure of barge unloading activities is not feasible.

The non-Affected Materials are unloaded directly to truck beds with a large dock excavator, adhering to barge unloading procedures as illustrated in Figure 8a below that are designed to reduce fugitive particulate emissions. Key mitigation actions include placing the excavator bucket as far as possible into the truck bed being loaded, in turn minimizing drop height of the bucket to truck transfer. Additionally, when unloading Dry Materials from a barge, the mobile misters or dry fogging unit will be deployed during unloading activities, which will create a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air.

Wetted Materials are directly sprayed with water or dampened prior to start of unloading the barge if moisture is not sufficient. In freezing temperatures, in the rare event that moisture is not sufficient, the dry fogging system will be deployed and appropriately positioned as a dust mitigation measure while unloading, which will cause a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air.

The following diagram (Figure 8a) is the operating procedure for **Barge Unloading - Bulk Materials (non-Affected Materials).**

FIGURE 8a. BULK BARGE UNLOADING (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations

Preplan - Determine if material is wetted or dry

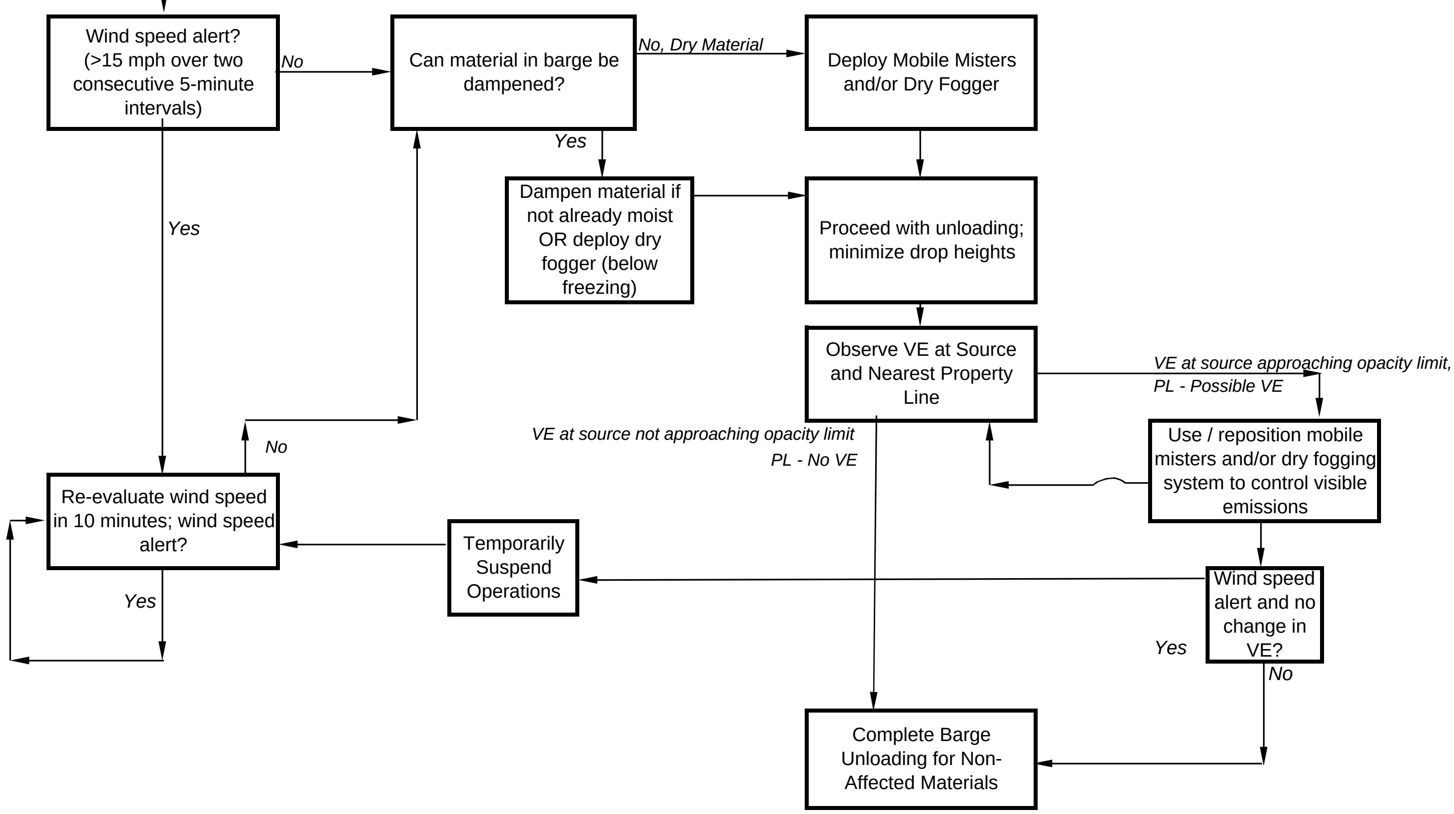
Mitigation/Control- Dampen wetted material or deploy dry fogger in freezing temperatures if moisture not sufficient

Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials

Operations Step- Remove material from the barge via large dock excavator

Operations Step- Minimize drop heights while loading trucks; place excavator bucket as far as possible into truck bed being loaded

Operations Step- Load material directly from the excavator into the truck bed



Barge Unloading – Bulk Materials (Affected Materials)

The facility employs more stringent controls for barge unloading operations of Affected Materials. All barges of Affected Materials arriving at the facility are covered with stackable fiberglass lids, stackable metal lids, or sliding metal lids. The lids cannot be removed and barge unloading of Affected Materials cannot start during High Wind Conditions (as defined by the Regulation); the lids can only be removed and barge unloading can only start when High Wind Conditions are not occurring. If the material in the barge is wetted, then all the lids may be removed from the barge. Additionally, the facility will suspend unloading of Affected Materials from the barge when High Wind Conditions occur and will only be able to resume when High Wind Conditions are not occurring.

If allowed by the customer, Affected Materials will be wetted once the lids are removed and prior to the start of unloading the barge. The facility will ensure that the wetted Affected Materials have sufficient moisture to prevent fugitive dust when barge unloading operations are suspended during High Wind Conditions. In freezing temperatures, in the rare event that moisture is not sufficient, the dry fogging system will be deployed and appropriately positioned as a dust mitigation measure, which will cause a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air.

If the customer requires that the Affected Materials remain dry, the lids on the barges will remain in place except when the lids are removed to allow excavators to unload the material from that portion of the barge unless this operation cannot be done in a safe manner. Additionally, the mobile misters or the dry fogging unit will be deployed during any unloading of dry Affected Materials and also when barge unloading operations are suspended during High Wind Conditions until the lids are placed back on the barge. The mobile misters/dry fogging unit will be positioned based on the wind direction to create a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air.

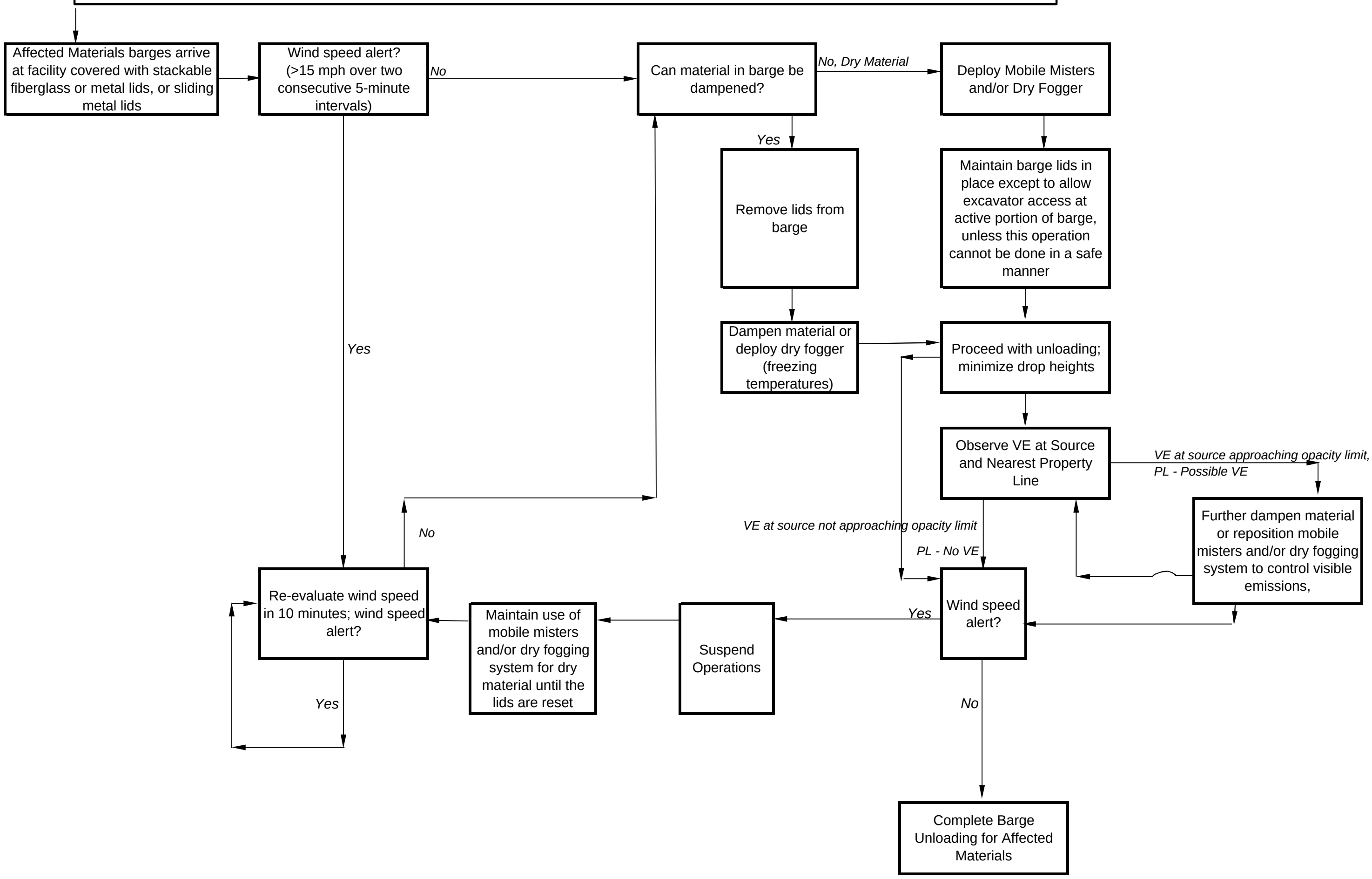
All Affected Materials are unloaded directly to truck beds with a large dock excavator, adhering to barge unloading procedures as illustrated in Figure 8b below designed to reduce fugitive particulate emissions. Key mitigation actions include placing the excavator bucket as far as possible into the truck bed being loaded, in turn minimizing drop height of the bucket to truck transfer.

The facility will be constructing an enclosure that meets the requirements of Section 5.0 of the Regulation for the barge unloading Transfer Point for Affected Materials as provided for in the Enclosure Plan.

The following diagram (Figure 8b) is the operating procedure for **Barge Unloading – Bulk Materials (Affected Materials)**.

FIGURE 8b. BULK BARGE UNLOADING (AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Mitigation /Control - Barges arrive at facility covered with stackable fiberglass lids, stackable metal lids, or sliding metal lids; lids cannot be removed under a wind speed alert
Mitigation / Control - For dry Affected Materials, lids to remain in place except for excavator access to unload material from active portion of barge
Mitigation/Control- Dampen wetted material or deploy dry fogger in freezing temperatures
Mitigation/Control- Deploy mobile misters and/or dry fogger for dry material
Operations Step- Remove material from the barge via large dock excavator
Operations Step- Minimize drop heights while loading trucks
Operations Step- Load material directly from the excavator into the truck bed



Barge Unloading – Super Sacks Converted to Bulk

When super sacks of non-Affected Materials that are to be converted to bulk are unloaded from a barge, the sack material is first released to a pile at the dock. During the conversion to bulk, Wetted Materials are dampened if moisture is not sufficient and the mobile misters or the dry fogging system are deployed for Dry Materials according to the procedures as illustrated in Figure 8c below. The drop height of the material from the sack to the ground or pile is minimized to approximately 5 feet or less. Material is then moved from the pile to a truck. The truck is positioned in a three-sided enclosure located at the northeast corner of the American Ship Building, which is equipped with dust curtains and exhausted to a portable dust collector. During truck loading, front end loader drop heights are minimized by placing the hinge pin of the bucket as near as possible to the top of the side of the truck which results in the bottom portion of the bucket being contained inside the truck bed when the material in the bucket is off-loaded. Trucks are not loaded to the full depth of the truck bed to ensure material is contained. Additional control is provided by mobile misters or water dampening according to the procedures as illustrated in Figure 8c below.

All packaged/super sacks of Affected Materials arriving by barge are not opened outdoors at the dock and are transported from the barge directly to storage inside a building. Conversion to bulk occurs within a building / enclosure by way of raising the super sack using a fork truck and then slitting the bottom of the super sack, utilizing a minimal drop height. During this activity, the facility uses the mobile misters or the dry fogging system to apply water in order to provide coverage at the door area of the Punch Shop to control fugitive dust at the entrance / exit.

The following diagram (Figure 8c) is the operating procedure for **Barge Unloading – Super Sacks (non-Affected Materials)**.

FIGURE 8c. SACK BARGE UNLOADING (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations

Preplan - Determine if material is wetted or dry

Mitigation/Control- Dampen wetted material or deploy dry fogger in freezing temperatures at sack release to ground transfer point (at dock)

Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials at sack release to ground transfer point (at dock)

Operations Step- Remove supersacks from the barge via large dock excavator

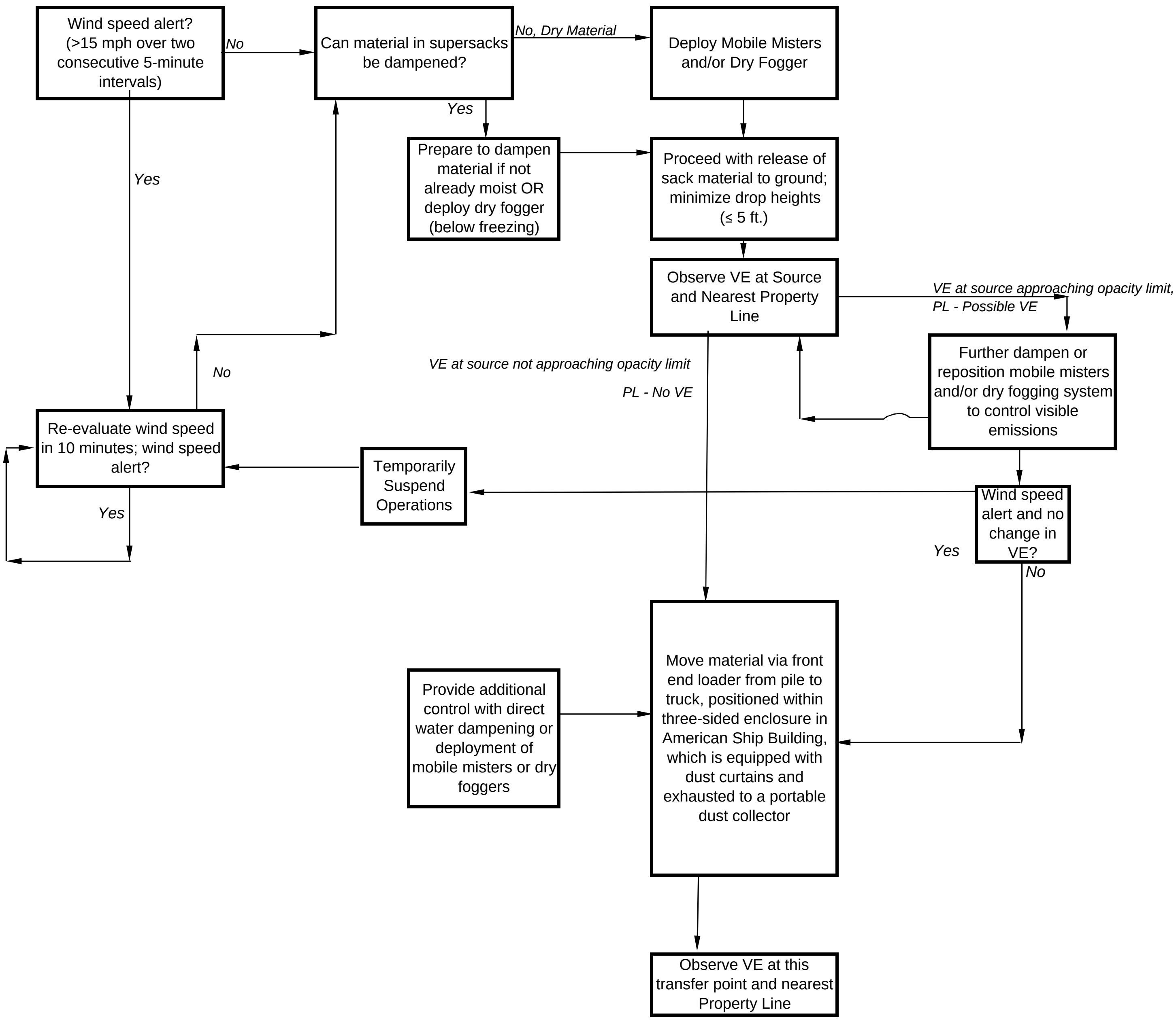
Operations Step- Release sack material to ground while minimizing drop heights;

Operations Step- Load material (via front end loader) from pile to truck positioned within three-sided enclosure within American Ship Building, which is equipped with a portable dust collector

Mitigation/Control- Dampen wetted material or deploy dry fogger in freezing temperatures at front end loader to truck transfer point

Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials at front end loader to truck transfer point

Control- Ensure portable dust collector is turned on and operational



Barge Loading (Non-Affected Materials)

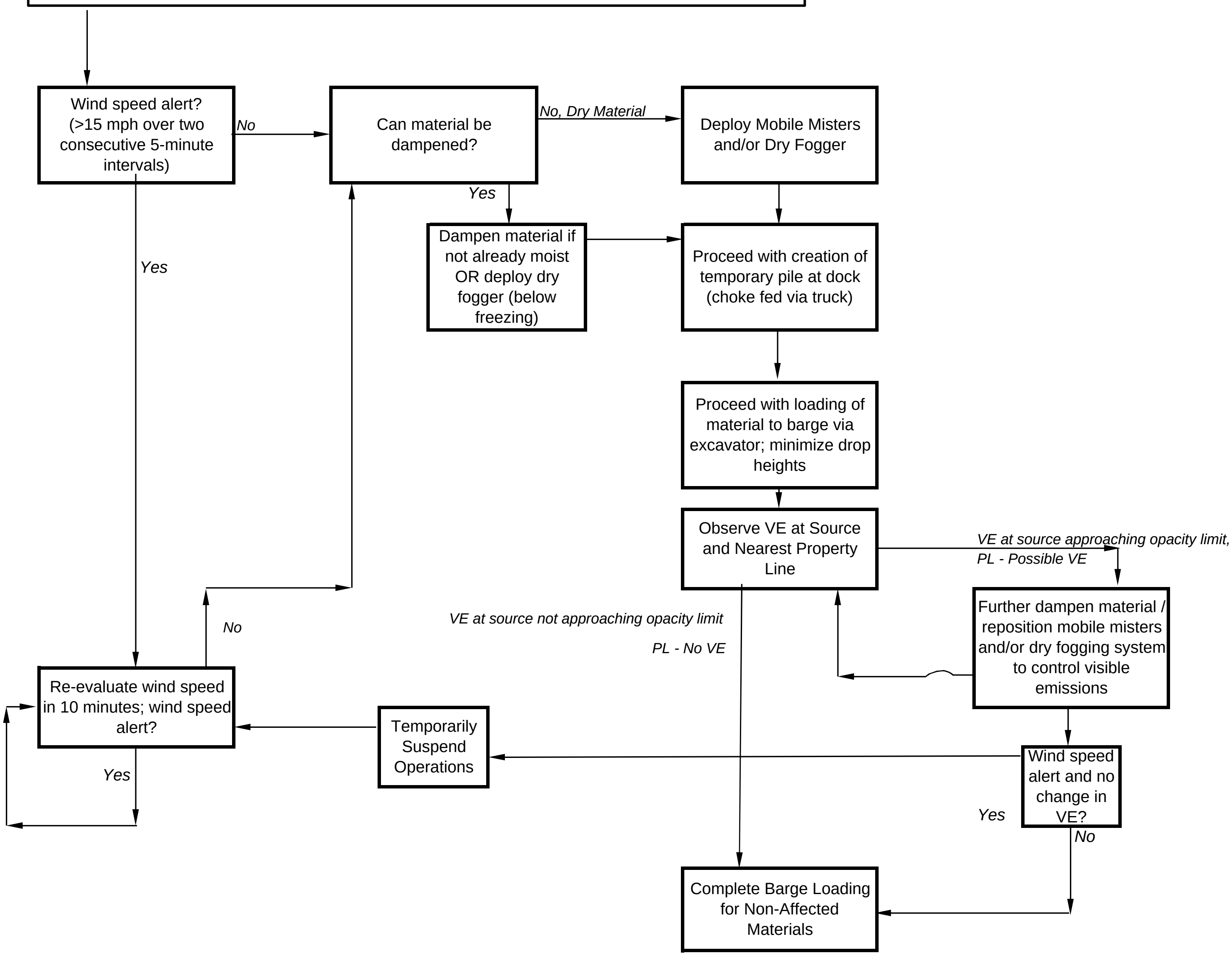
Barge loading is an infrequent activity. On the occasions when S.H. Bell Co. does load barges of non-Affected Materials, it uses an excavator to load the bulk material and minimize emissions. Bulk barges are loaded with material originating from either indoor or outdoor storage. The truck containing material to be loaded will drive to the appropriate location near the barge to create a temporary pile. Based on the nature of transfer of material from the truck, there is no need to minimize drop height as the material is choke fed to the ground; the driver typically has to pull forward in order to ensure that all material is discharged from the truck. From the temporary pile, a dock excavator scoops material from the dock and places it directly into the barge hold. The excavator has sufficient boom length to reach the barge bottom, minimizing drop height and any fugitive emissions. Wetted Materials are dampened if moisture is not sufficient and mobile misters or the dry fogging unit is utilized for Dry Materials according to the procedures as illustrated in Figure 8d below.

The facility does not load barges with Affected Materials.

The following diagram (Figure 8d) is the operating procedure for **Barge Loading (Non-Affected Materials)**.

FIGURE 8d. BULK BARGE LOADING (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

LOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Preplan - Determine if material is wetted or dry
Operations Step- Remove material from inside storage or outdoor storage to create a pile at the dock (choke fed to ground)
Operations Step- Remove material from pile on dock with an excavator for transfer directly into the barge
Operations Step- Drop height and fugitive emissions from placement in the barge are minimized by the ability of the excavator to reach directly into the barge
Mitigation/Control- Dampen wetted material or deploy dry fogger in freezing temperatures
Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials



7. RAILCAR UNLOADING/LOADING

Compliance Methods: enclosure, water spray system, air pollution control equipment
Additional Measures: , minimize drop height choke feed

Bottom Unloading Railcars (non-Affected Materials only)

Railcars can be unloaded via bottom discharge into a below grade pit that is partially covered by the railcar and which functions like choke feeding. The pit is below ground level, accessible by a steep ramp, and walled off on the three other sides, which significantly shields the unloading operation from the wind. There is no need to minimize drop heights as material cannot be discharged from the railcar until there is space available in the covered pit (choke feeding). Material is moved from the pit to storage via front end loader. Wetted Materials are dampened if moisture is not sufficient and mobile misters or the dry fogging unit is utilized for all materials at the initial bottom discharge transfer point and Dry Materials for subsequent transfer via front end loader according to the procedures as illustrated in Figure 9a below. Bottom unloading of railcars does not occur for Affected Materials.

The following decision tree diagram (Figures 9a) is the operating procedure for **Railcar Unloading - Bottom Unload** for non-Affected Materials.

FIGURE 9a. BOTTOM UNLOADING RAILCARS (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:

Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations

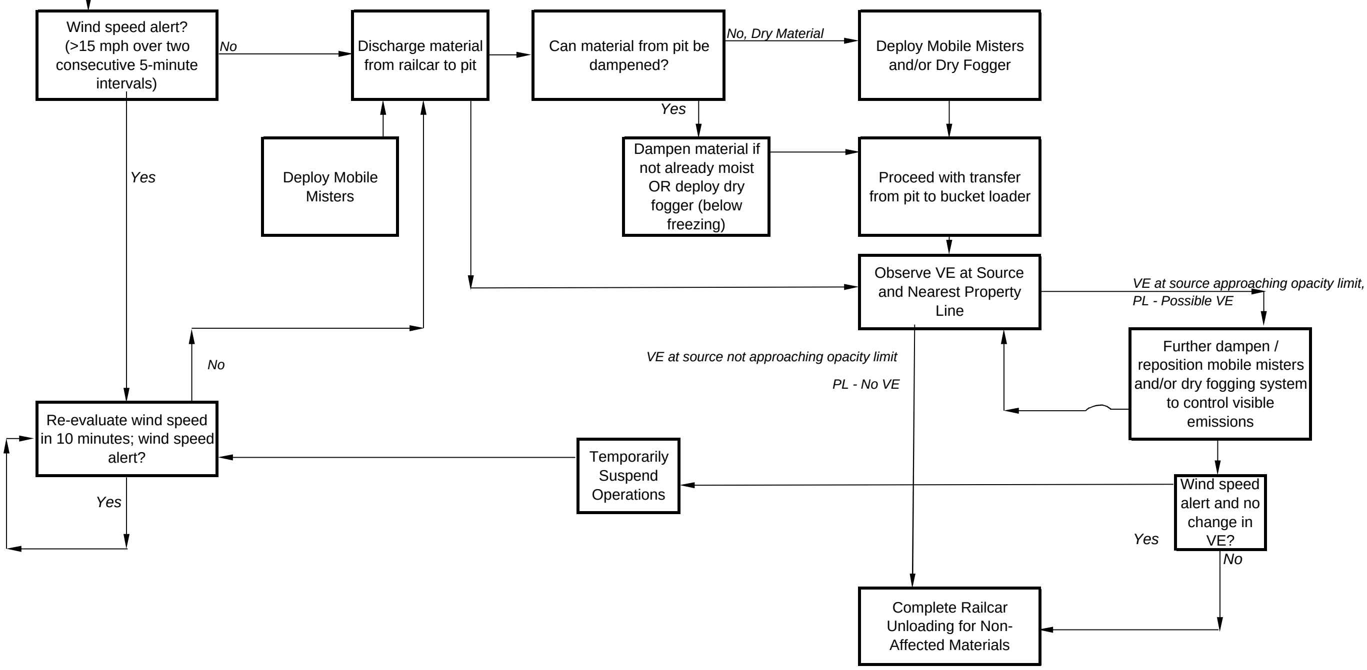
Preplan - Determine if material is wetted or dry

Operations Step/Control- Remove material via bottom discharge of railcar into a below grade pit which functions like choke feeding, no more can come out of the railcar until material is removed from the pit; deploy mobile misters

Mitigation/Control- Dampen wetted material if not already moist or deploy dry fogger in freezing temperatures at transfer from pit to bucket loader

Mitigation/Control- Deploy mobile misters and/or dry fogger for dry materials at transfer from pit to bucket loader

Operations Step- Move material from the pit to final storage location via front end loader



Box Car Unloading

Box cars are unloaded using a skid steer into an unloading box enclosure. A portable dust collector is used at the hopper enclosure according to the procedures as illustrated as illustrated in Figures 9b and 9c below. Use of the portable dust collector is always required for unloading of Affected Materials. For non-Affected Materials, wetted Materials are dampened if moisture is not sufficient and mobile misters or the dry fogging unit is utilized for Dry Materials as an alternative control measure.

The following decision tree diagrams (Figures 9b and 9c) are the operating procedures for **Railcar Unloading - Box Car Unload** for non-Affected Materials and Affected Materials, respectively**.**

FIGURE 9b. RAILCAR UNLOADING - BOX CARS (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Preplan - Determine if material is wetted or dry
Mitigation - Dampen wetted material if not already moist or deploy dry fogger in freezing temperatures
Mitigation- Position mobile misters and/or dry fogging unit to address fugitive emissions for dry material
Operations Step- Remove material via skid steer from box car
Operations Step- Load material from skid steer into unloading box enclosure and remove with front end loader
Mitigation/Control- Utilize unloading box enclosure for initial material transfer
Alternative Mitigation / Control - Use of portable dust collector (see Figure 9d)

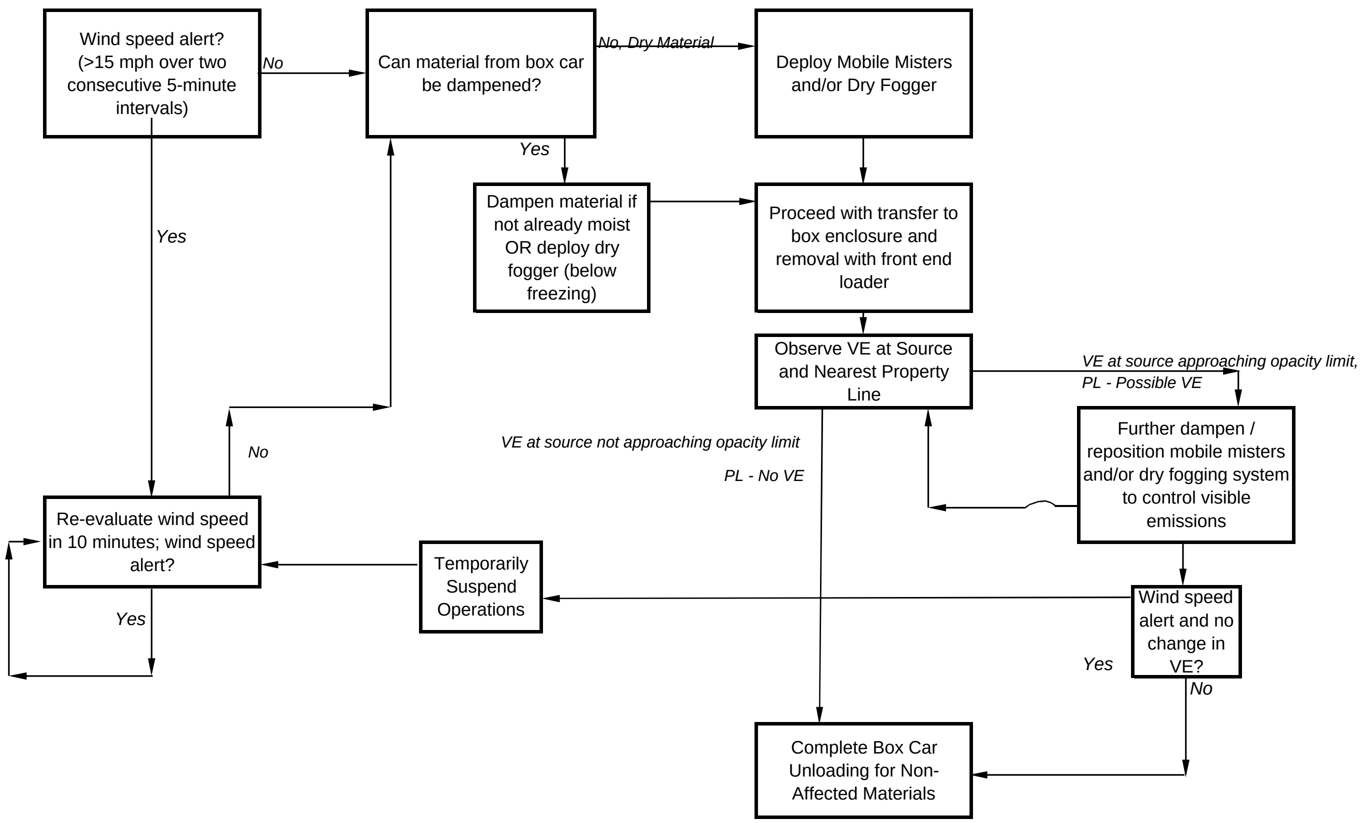


FIGURE 9c. RAILCAR UNLOADING - BOX CARS (AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:

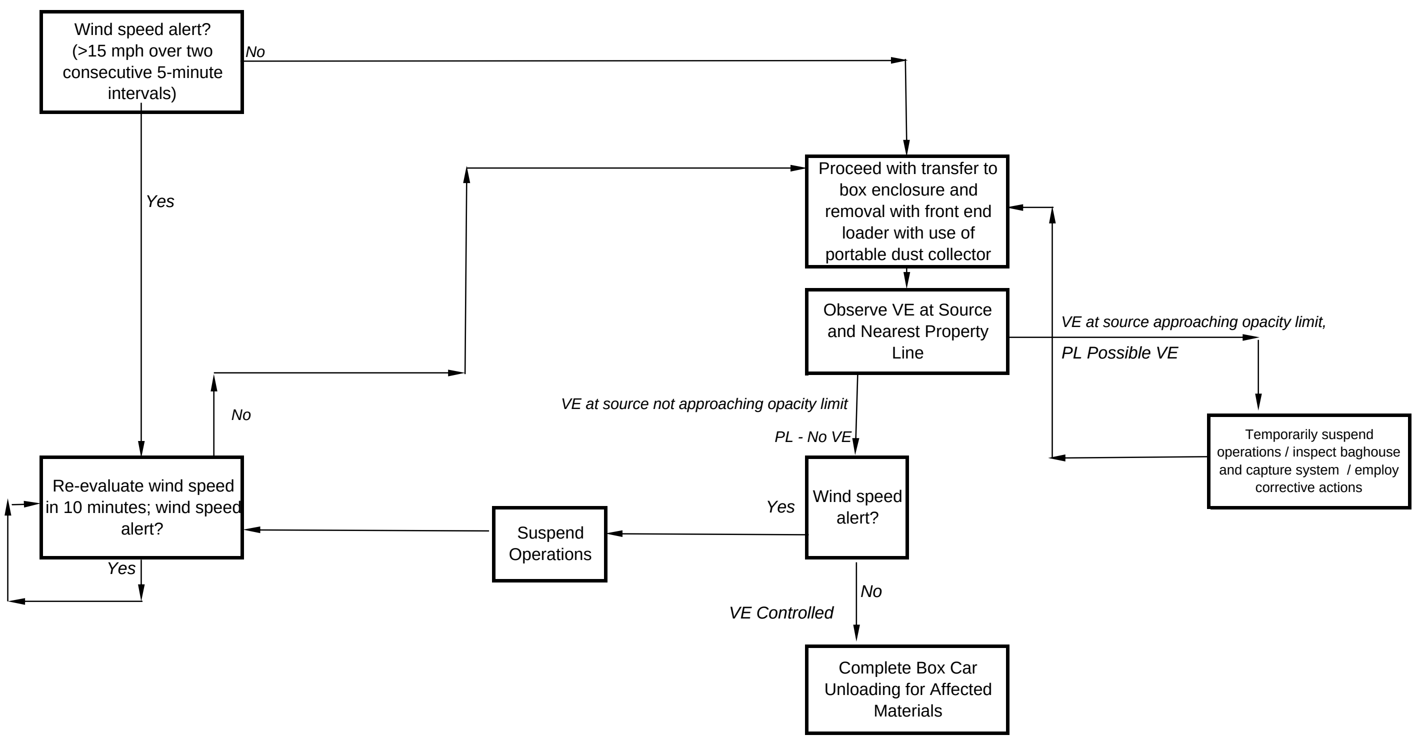
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations

Control- Ensure portable dust collector is turned on and operational, including capture system

Operations Step- Remove material via skid steer from box car

Operations Step- Load material from skid steer into unloading box enclosure and remove with front end loader

Mitigation/Control- Utilize unloading box enclosure for initial material transfer



Railcar Loading – Covered Hopper Railcars

Covered hopper (CHOP) railcars are loaded with material removed from either indoor or outdoor storage. Material is choke fed from a front end loader into the rail conveyor hopper enclosure which then feeds the material onto the covered inclined belt conveyor. The conveyor, covered as required by Section 3.0(7) of the Regulation, is positioned and field adjusted to minimize the drop height from the top of the conveyor into the railcar. The conveyor height is adjustable and is set to a height just above the railcar. There is a hood / cover on the end of the conveyor, set above the railcar to provide full enclosure. Vinyl strips extend down from this enclosure to the top of the railcar. The portable dust collector used at the box car dock enclosure described above will be used with this operation as well for Affected Materials, with pickup points associated with all transfer points, according to the procedures as illustrated in 9d and 9e below. For non-Affected Materials, wetted Materials are dampened if moisture is not sufficient and mobile misters or the dry fogging unit is utilized for Dry Materials as an alternative measure.

The following decision tree diagrams (Figures 9d and 9e) is the operating procedure for **Railcar Loading - CHOP Railcars**.

FIGURE 9d. RAILCAR LOADING - COVERED HOPPER RAILCARS (NON-AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

LOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Preplan - Determine if material is wetted or dry
Mitigation- For dry materials, position first mobile mister at the top of the conveyor (drop point into the railcar); use hood / enclosure and vinyl strips at end of conveyor for all materials
Mitigation- For dry materials, position second mobile mister or dry fogging system at the open face of the three-sided hopper that is used to feed the conveyor
Mitigation - Dampen wetted material if not already moist or deploy dry fogger in freezing temperatures
Mitigation- Reposition the mobile misters as needed throughout operations to impact fugitive emissions
Operations Step- If necessary, remove material from inside storage or outdoor storage to create a pile at the railcar
Operations Step- Position conveyor to minimize drop height into railcar
Operations Step- Choke feed the material from the front end loader into the hopper
Alternative Mitigation / Control - Use of portable dust collector (see Figure 9e)

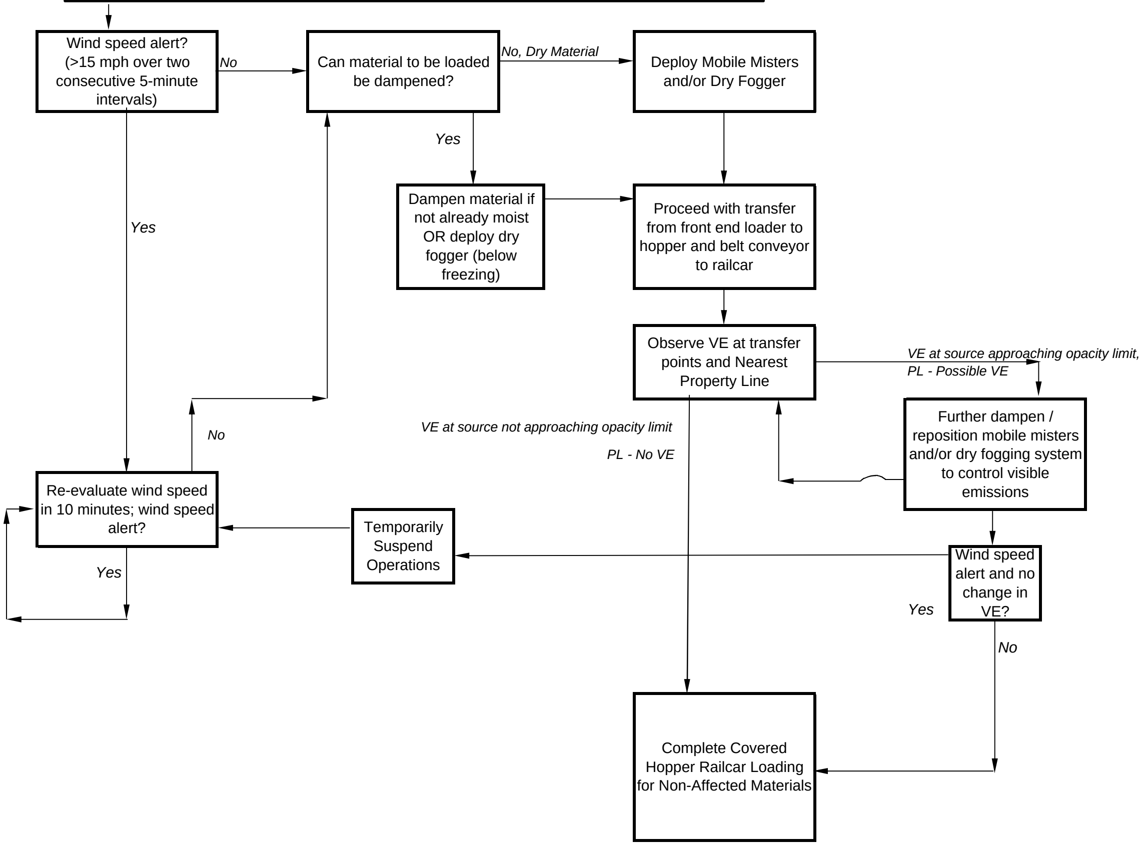
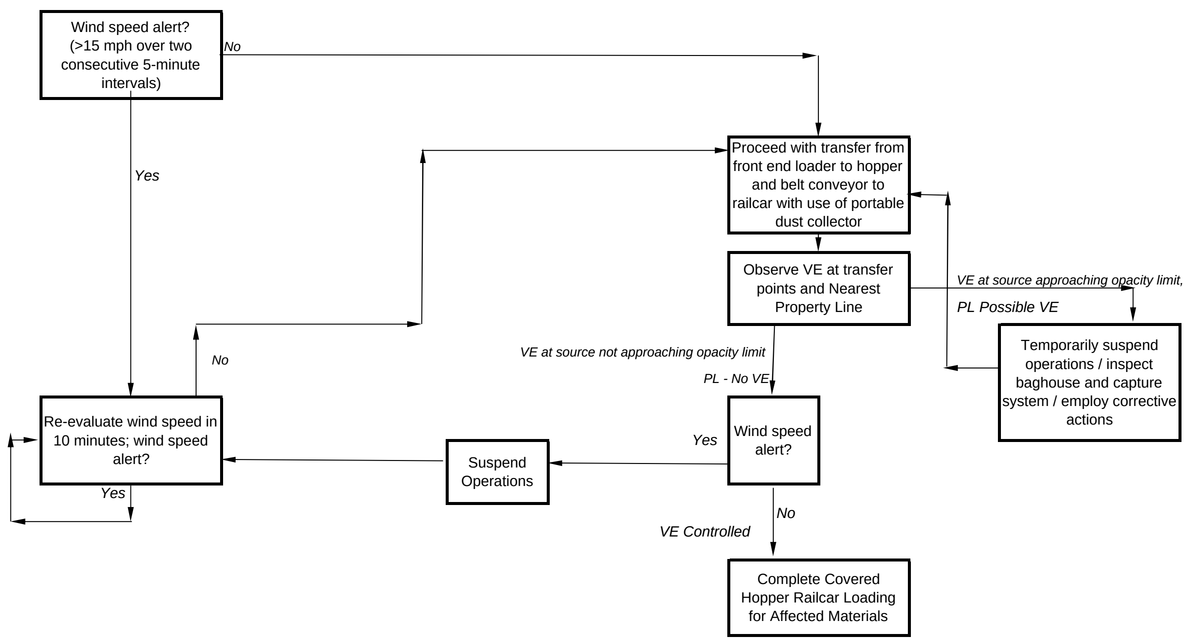


FIGURE 9e. RAILCAR LOADING - COVERED HOPPER RAILCARS (AFFECTED MATERIALS) - FUGITIVE DUST CONTROL

LOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Control - Ensure portable dust collector is turned on and operational, including capture system
Operations Step- Use hood / enclosure and vinyl strips at end of conveyor for all materials
Operations Step- Choke feed the material from the front end loader into the hopper



<u>Railcar Loading – Open Top Railcars (Non-Affected Materials only)</u>

Only Wetted Material is permitted in Open Top Railcars and such material will be dampened prior to loading if moisture is not sufficient. In freezing temperatures, in the rare event that moisture is not sufficient, the dry fogging system will be deployed and appropriately positioned as a dust mitigation measure while unloading, which will cause a curtain or cloud that encapsulates fugitive particulate matter and causes the fugitive particulate matter to settle out of the air.

Open top rail cars are loaded directly with a front end loader, which allows drop height to be minimized more than through use of a conveyor. Drop height is minimized by placing the hinge pin of the bucket as near as possible to the top of the side of the railcar which results in the bottom portion of the bucket being contained inside the railcar when the material in the bucket is off-loaded.

Affected Materials are no longer loaded into Open Top Railcars.

The following decision tree diagram (Figure 9f) is the operating procedure for **Railcar Loading – Open Top Railcars**.

Railcar Loading – Box Cars

For railcar loading of box cars, a front-end loader retrieves the desired material from a storage location and proceeds to dump it into the railcar dumping pan enclosure with an attached portable baghouse. A front-end loader is then used to move the material from the dumping pan into the box car. The facility uses mobile misters or the dry fogging system to provide coverage at the railcar door opening at all times during loading of Affected Materials to control fugitive dust at the entrance / exit of the box car.

The following decision tree diagram (Figure 9g) is the operating procedure for **Railcar Loading – Box Cars** for Affected Materials.

FIGURE 9f. RAILCAR LOADING - OPEN TOP RAILCARS (WETTED MATERIALS) - FUGITIVE DUST CONTROL NON-AFFECTED MATERIALS

LOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Mitigation/Control- Dampen wetted materials or deploy dry fogger in freezing temperatures prior to loading
Operations Step- If necessary, remove material from inside storage or outdoor storage to create a pile at the railcar
Operations Step- Transfer material from bucket loader into the railcar; drop height of material is minimized by operating procedure for bucket placement

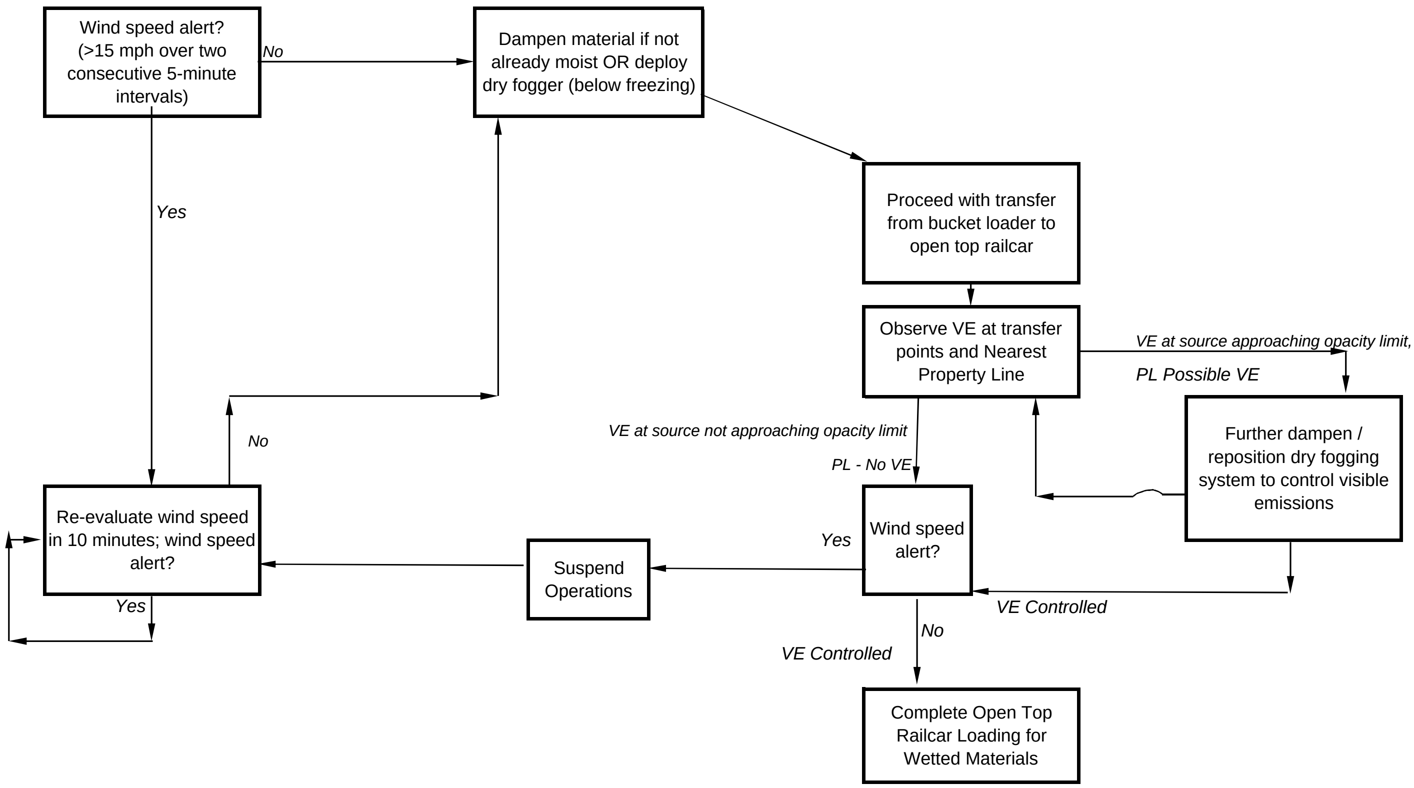
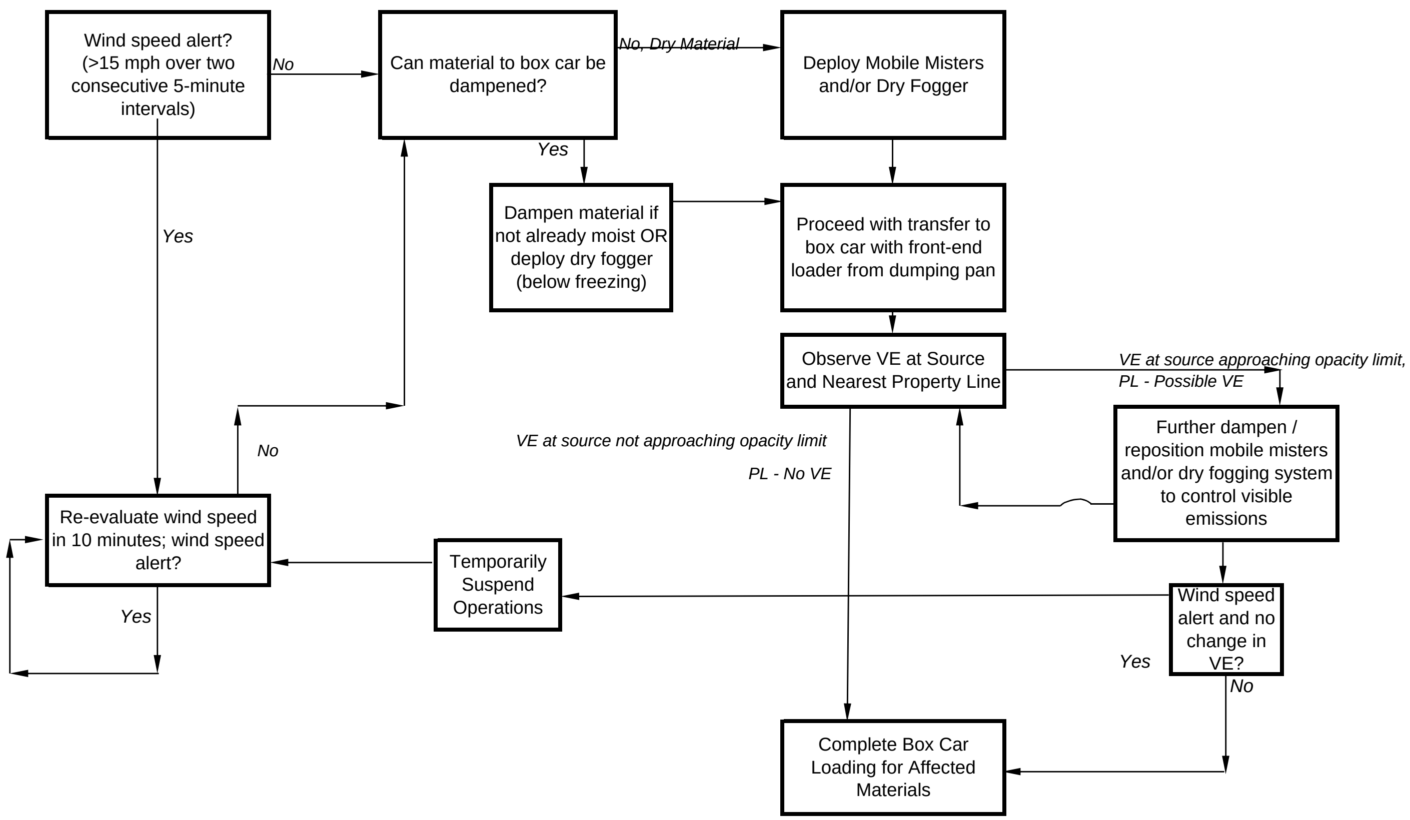


FIGURE 9g. RAILCAR LOADING - BOX CARS (ALL MATERIALS) - FUGITIVE DUST CONTROL

UNLOADING ACTIVITIES SUMMARY:
Preplan- Evaluate winds to determine if windspeed will exceed 15 mph as an average over two consecutive five minute intervals during transfer operations
Preplan - Determine if material is wetted or dry
Mitigation - Dampen wetted material if not already moist or deploy dry fogger in freezing temperatures
Mitigation- Position mobile misters and/or dry fogging unit to address fugitive emissions for dry material
Operations Step- Retrieve material from storage location with front end loader and dump into railcar dumping pan enclosure with attached portable baghouse
Operations Step- Load material from dumping pan to box car using front-end loader
Mitigation/Control- Utilize mobile misters or dry fogger during loading of material to provide coverage at railcar door opening to control fugitive dust



8. BAG AND BOX FILLING OPERATIONS

Compliance Methods: enclosure, air pollution control

The box filling operation is performed in the Covered Dock building (shown on Figure 1), with fugitive emissions from the filling operation captured and directed to a dedicated dust collector. For the initial transfer point from front end loader to the hopper/feeder, a loader tunnel has been installed along with a new stationary dust collector. The box filling operation also has dust curtains which cover the face of the hopper. The bag filling operation is located inside the Bowstring Building (shown on Figure 1), with fugitive emissions from the operation captured and directed to a dedicated dust collector. The initial drop to the hopper is performed by front end loader within an enclosure which provides control of fugitive emissions. For the initial drop when processing Affected Materials, wetted material is dampened if moisture is not sufficient; for dry materials, a mobile mister or dry fogging system is deployed. The bag filling operation has a sliding door that covers the open face of the hopper when not in use.

B. TRANSPORT BY TRUCK

Regulatory Requirement:

The applicable requirements at Section 3.0(9) of the Regulation addresses Transport by Truck as follows:

- All vehicles must adhere to a posted speed limit of no more than 8 mph.
- All outgoing material transport trucks are cleaned so that there is no loose material on the exterior tire surface and the material removed by truck cleaning is collected.
- All outgoing material transport trucks pass through a wheel wash station and pass over rumble strips unless other measures are specified to ensure that the trucks will not cause any track-out of materials onto the public way.

Facility Compliance Methods:

- The maximum speed limit for all vehicles at S.H. Bell Co. is 8 mph.
- Physical barriers prevent transport trucks from accessing unpaved areas.
- Chemical dust suppressant is applied at a minimum of once per month.
- Daily road sweeping / watering with ongoing monitoring and recordkeeping of same as described more below in Section C, Roadways.
- Sweeping of the truck route from Avenue N up to South 100th Street, unless the external routes are determined to be free and clear of material from the facility.
- All outgoing material transport trucks are cleaned by rumble strips at the inbound and outbound truck scales to remove loose material.
- Truck tires are observed at the weigh scale upon departure to assure material is not tracked out.
- Roads are also inspected for material track-out as further described below in Section C, Roadways.
- Towards the end of the last shift, visual inspection of internal roads is made and additional sweeping is made at any areas that have debris based on the visual inspection.
- Towards the end of the last shift, one final sweeping of ingress and egress routes of the facility is made regardless of the results of the visual inspection.

The procedures identified above effectively ensure that material trackout from the facility does not occur. Wheel wash stations are only necessary when trucks are traveling on unpaved roads, and as noted above, the transport trucks are physically prohibited from accessing the few unpaved areas at the facility.

Monthly chemical dust suppressant applications and the daily watering/sweeping schedule, including final sweeps at the end of the day, also help ensure that material does not accumulate on the paved roads that could attach itself to transport truck tires in the first place. Additionally, the rumble strips installed at the inbound and outbound truck scales knock off any of the wet material that may have accumulated on the transport truck tires (as noted previously and discussed in detail in Section C below, the facility frequently waters and/or applies dust suppressant to roads). The wet material that is knocked off from the wheels is accumulated in a pan/pit below the rumble strips. Truck tires are observed at the weigh scale upon departure to assure material is not tracked out. Roads are also inspected for material track-out as further described below in Section C. Accordingly, the combination of the facility's road sweeping / watering schedule with ongoing monitoring and recordkeeping of same, the limit of access to the few unpaved areas, as well as the rumble strips installed at the truck scales ensures control equivalent to a wheel wash station such that trucks will not cause any track-out of materials onto the public way.

Regulatory Requirement:
Section 3.0(10)(a) of the Regulation (Vehicle Covering and Other Dust Control) requires that truck trailers need to be immediately covered after being loaded.

Facility Compliance Methods:
All semi-trucks carrying materials out of the facility are covered, using the cover supplied by the truck owner/operator that meets the cover requirements in Section 3.0(10)(a) of the Regulation. Trucks loaded within a loadout shed are covered once the truck has safely cleared the exit of the loadout shed. Trucks loaded from outdoor storage piles are covered immediately upon completion of material loading. In-house drayage trucks are also covered in accordance with the cover requirements in Section 3.0(10)(a) for all bulk materials, including Affected Materials.

C. ROADWAYS

Regulatory Requirement:
Section 3.0(15) of the Regulation requires that all internal roads used for transporting or moving material shall be paved and maintained, with a durable material that is not susceptible to becoming windborne, and in a manner sufficient to bar the expected level of traffic at the facility.

Facility Compliance Method:
All internal roads at the facility that are used for transporting or moving material are paved in accordance with Section 3.0(15) of the Regulation.

Regulatory Requirement:
The regulatory requirement at Section 3.0(16) of the Chicago Bulk Materials Regulation, Roadway Cleaning, includes use of a street sweeper with a water spray and vacuum system, sweeping to be performed so that not more than 4 hours elapses between each street sweeper cleaning or after every 100 truck material receipts or dispatches, but not less than one time daily when the facility is open for business, unless the roads are free and clear of any material transported to or from the facility, and recordkeeping of the sweeping.

Facility Compliance Methods:
S.H. Bell Co.'s street sweeper meets the requirements of Section 3.0(16)(a) of the Regulation as it is equipped with both a water spray and vacuum system.

The Facility's street sweeping schedule complies with Section 3.0(16)(b)-(c) of the Regulation which requires that sweeping be performed so that not more than 4 hours elapses between each street sweeper cleaning or after every 100 truck material receipts or dispatches, but not less than one time daily when the facility is open for business, unless the roads are free and clear of any material transported to or from the facility. The Facility documents the street sweeping and whether the roads are free and clear of any material transported to or from the facility on a daily basis during facility operations. A sweeper with a water spray bar and vacuum system is used for roadway sweeping.

Additionally, as noted in Section B, towards the end of the last shift, visual inspection of internal roads is made and additional sweeping is done at any areas that have debris based on the visual inspection. Further, towards the end of the last shift, one final sweeping of ingress and egress routes of the facility is made regardless of the results of the visual inspection.

S.H. Bell Co. also sweeps the truck route (Avenue N up to South 100th Street) which is within one-quarter mile of the facility, unless the external routes are determined to be free and clear of material from the Chicago Terminal.

Paved roads are also sprayed daily during working shifts, unless observed pavement condition indicates it is unnecessary and/or chemical suppressants are in use. Following a precipitation event and drying of the yard, sweeping will typically precede the application of dust suppressant. Otherwise, the performance of the dust suppressant in terms of binding and pavement adherence may be less than desired. Application equipment is equipped with a spray bar.

Additional watering/chemical suppressant application above and beyond the requirements of the Regulation is dependent upon observed conditions which are documented in the recordkeeping logs. For example, less watering may be required in cooler, calm conditions whereas additional watering may be required in hot, dry conditions. All roads are also sprayed when warranted by visual observation and at least on a monthly basis with a dust suppressant for the purpose of reducing fugitive dust emissions caused by wind or vehicular/equipment traffic. In the winter, salt will be applied to the roadways during working shifts when warranted to prevent icing while reducing potential fugitive emissions. Only two small segments of unpaved road exist at the facility and access to these segments is physically limited.

Regulatory Requirement:
Section 3.0(11) of the Regulation notes that vehicles cannot leak material or liquid onto an internal road or waterway. Section 3.0(16) requires that areas not normally used for storage be free of any spilled or misplaced material.

Facility Compliance Methods:
In the rare event that bulk material leaks from cracks in a truck bed or otherwise leaks from a truck onto an internal road, the road will be cleaned within one hour according to the procedures provided above. Any areas not regularly used for storage of bulk materials will be kept free of any spilled or misplaced material and to the extent present will be removed by the end of a regular working shift. In the unique circumstance where there is a material leak or spill that does create airborne dust or is otherwise hazardous, the facility will take immediate remedial measures. Any material that has the potential to leak or spill into a waterway will be cleaned immediately.

D. OUTDOOR STORAGE PILES

No Affected Materials are stored outdoors. The Facility limits the type of bulk non-Affected Materials that can be stored in outdoor storage piles to the following:

- Wetted Materials that have a predominantly large particle size (greater than ½ inch);
- Dry Materials that have a predominantly large particle size (greater than ½ inch), but only if tarped during storage; and
- Wetted Materials that have a small particle size less than ½ inch in diameter, but only if a very hard cohesive crust forms over the surface of the pile when watered.

The bulk materials that are stored outdoors are not dusty and are not susceptible to being windblown or are otherwise tarped.

Regulatory Requirement:
The regulatory requirement at Section 7.0 of the Regulation addresses Outdoor Storage Pile requirements, including pile height limits (Section 7.0(2)) and required setbacks from waterways (Section 5.0(1)).

Facility Compliance Methods:
S.H. Bell Company requested and received a variance from this requirement from the City of Chicago on October 17, 2016, for a modified setback of 20 feet. This modified setback, in conjunction with current storm water pollution prevention practices as included in the facility's Storm Water Pollution Prevention Plan (SWPPP), effectively provides protection of waterways. This modified setback only pertains to limited areas of the facility, namely the strip of land adjacent to the Middle Slip and the southwestern shoreline as indicated in Figure 1 (Facility Diagram). The maximum pile height allowed is 30 feet; based on the inherent limitations of the equipment used to construct piles, pile heights at the facility are limited to heights between 16 and 30 feet.

Further protection of waterways is achieved by storing only non-water soluble materials outside, absorbent materials are used along the perimeter of outdoor storage areas, and barriers between the site and the river prevent materials from falling, blowing or running off into waterways. In areas near the water, piles consist of materials that are primarily greater than ½" diameter in size.

Regulatory Requirement:
Section 7.0(4) of the Regulation requires disturbance of outdoor storage piles be suspended during High Wind Conditions unless alternate measures are implemented to effectively control dust.

Facility Compliance Method:
The procedures for High Wind Conditions are provided in Section IX, including criteria for suspending operations for outdoor storage piles.

Regulatory Requirement:
Dust suppressant systems are addressed in Section 7.0(5) of the Regulation, which notes that dust suppressant systems must be operable and able to dispense water, water-based solutions, and/or chemical stabilizers, including when the temperature falls below freezing. If the dust suppressant system

becomes inoperable, disturbance of outdoor storage piles which are controlled by the inoperable portion must be suspended until the system is operable again.

Facility Compliance Method:
All outdoor storage piles are continually observed throughout the day and a recorded inspection of active piles is performed at least daily to ensure no fugitive dust is generated. Wetted Materials that have a predominantly large particle size (greater than ½ inch) are sprayed with water if moisture is not sufficient to ensure that there is no fugitive dust generated or are tarped when no material transfer is occurring. Materials stored outdoors and which consist of particles one-half inch in size or less are sprayed daily (weather permitting) with water, until crusted and firm or are tarped when no material transfer is occurring. Pile crusting refers to watering the pile until the material is fused, creating a cohesive layer over the pile such that the surface withstands direct pressure, preventing any of the material from becoming airborne or scattered by the wind. Crusting is similar to how granulated sugar will crust when dampened. In freezing temperatures, the surface of the pile is generally frozen preventing fugitive emissions as the moisture in the pile is sufficient to encapsulate particles. Dry fogging is available for use in freezing temperatures. If both the mobile misters and the dry fogging system are unavailable for use, then no active disturbance of the piles will take place.

The number, size, and composition of outdoor piles vary based on customer requirements. Figure 1 illustrates the typical location and general size of outdoor storage piles.

E. Affected Material Storage

No Affected Materials are stored outdoors.

All Affected Materials small-particle piles are stored fully indoors within the bulk material storage buildings. As provided in the Enclosure Plan, these buildings will be upgraded as needed to meet the enclosure requirements of Section 5.0. S.H. Bell sweeps the aisles and applies dust suppressant (water or calcium chloride solution) to the exterior doorways (weather permitting) of the indoor bulk storage buildings (Norcon and Ryerson buildings) when warranted by a visual observation to prevent Affected Materials from exiting the indoor bulk storage buildings and also (1) at least once per shift when an indoor storage building is in use for handling and/or processing Affected Materials; and (2) at least once per operating day for indoor bulk storage buildings in use for storing Affected Materials.

Large material (predominantly greater than ½ inch diameter material) piles of Affected Materials are not stored outdoors and are stored either indoors within the bulk material storage buildings or in roofed material storage bins, which consist of three-sided, roofed, paved areas and are designed to prevent exposure to wind (the "Roofed Stall Bins"). The Roofed Stall Bins that store large particle Affected Materials will be renovated to meet the enclosure requirements of Section 5.0 as provided for in the Enclosure Plan. In the interim, when material transfer activities of large particle Affected Materials are performed, misters or foggers will be used at the point where fugitive dust may be anticipated to emanate. Transfer activities of Affected Materials will be suspended during high wind events. A chemical dust suppressant is sprayed in front of the Roofed Stall Bins when warranted by visual observation and at least on a monthly basis. No small-particle Affected Materials are stored within the Roofed Stall Bins.

F. DUST COLLECTORS

There are seven dust collectors currently in use at the facility:

- Norcon Loadout Dust Collector
- Ryerson Loadout Dust Collector
- Box Filling Dust Collectors (2)
- Bag Filling Dust Collector
- Portable Dust Collectors (2)

Each of these dust collectors is inspected daily when in operation according to specific operational and maintenance requirements. The daily and weekly inspection items, as well as semi-annual maintenance items, are tailored to the type and configuration of each dust collector. As applicable, these items include, but are not limited to, the following:

<u>Daily Inspection</u>

- Differential pressure
- Check operation of pressure gage
- Functioning of filter cleaning system
- Check for unusual fan noise or vibration
- Proper functioning of fan
- Check for visible stack emissions
- Check that hopper is empty
- Hopper discharge device(s) operating
- Check fan and drive belts
- Check compressor functioning
- Check hoses and fittings for leaks
- Check pulse air system manifold for condensation
- Drain condensation from air receiver
- Material collection valve operational and normally closed
- Material collection container in good repair and emptied as required
- Filter media access doors closed and secured

<u>Weekly Inspection</u>

- Check fan and drive belts

<u>Semi-Annual Maintenance</u>

- Inspect fan drive belt
- Lubricate fan bearings

- Change filters (as required)
- Inspect tube sheet condition
- Change material collection container

Records are kept of the daily inspections of each dust collector. Facility personnel perform the inspections as well as any needed operation and maintenance. Any maintenance performed is also recorded. Spare parts for the dust collectors are maintained on site. If during the inspection of the dust collector, it is determined that the dust collector is faulty or not operational, an alternate control measure (as applicable) is instituted, in addition to the contingency measures outlined in Section VIII, until the control device is functional.

V. Description of Truck Routes

The Regulation requires a description of the truck routes within one quarter mile of the perimeter of the facility be included in this plan. Figure 2 shows the roadways in the direct vicinity of the facility and highlights those which are used by trucks coming to and leaving from the facility.

All trucks enter and leave the facility over the truck scales at the northeastern corner of the property. Trucks enter from the intersection of South Avenue N and East 100th Street. These two roads are the most used access roads by truck traffic into the facility. Trucks coming from the west will typically travel east along East 100th Street and then travel south along South Avenue N to the facility entrance. Trucks leaving the facility and heading west will follow the reverse of this route. Trucks coming from the east will typically travel northwest along Indianapolis Boulevard to East 100th Street and head west, turning south to travel along South Avenue N to the facility entrance. Trucks leaving the facility and heading east will follow the reverse of this route.

All roads used by trucks entering or leaving the facility are paved - South Avenue N, East 100th Street, and Indianapolis Boulevard. The City of Chicago regularly sweeps roads in the vicinity of the facility and S.H. Bell Co. has included the truck routes within one quarter mile of the perimeter of the facility (Avenue N up to East 100th Street) in their roadway sweeping activities. Current dust control measures employed on roadways, as described above, including sweeping, dust suppression, tarping, and a maximum vehicle speed of 8 mph acts to prevent the amount of loose material carried out of the facility by trucks.

VI. Dust Suppressant Application Summary

The following summarizes the use of dust suppressants at the facility:

Location	Suppressant Type	Application Frequency
Paved areas	Water	Minimum once daily during working shifts, unless pavement is noted to be controlled (e.g., already wet from rain) or unless one of the two following alternatives are in use:
	Chemical Dust Suppressant	At least once per month
	Salt	When warranted in freezing conditions
Outdoor small-particle piles	Water	Minimum once daily during working shifts, or until crusted/firm
Operations at outdoor storage piles	Water	Whenever operations are performed, per the operating procedures described above
Crusher/screener	Water/suppressant	Whenever operations are performed at hopper above crusher
Railcar Loading / Unloading	Water	Whenever materials are loaded or unloaded via railcar when using water spray systems per the operating procedures described above in Section IV
Barge Loading / Unloading	Water	Whenever materials are loaded or unloaded per the operating procedures described above in Section IV
Multiple locations	Mobile Misters	Per the operating procedures described above in Section IV when temperatures are above freezing
Multiple locations	Dry Fogging System	Per the operating procedures described above in Section IV when temperatures are above and below freezing

VII. Dust Surveillance and Monitoring Plan

The dust control strategy at the facility is a proactive approach as outlined in this Fugitive Dust Plan, including documented observations and real-time corrections as required. Visible emissions are monitored and managed at the source of fugitive emissions so as to maintain no visible emissions at the property line. The facility deploys equipment and manpower as needed to immediately correct or otherwise mitigate dust or housekeeping issues and meet internal housekeeping goals and standards. The facility's strategy provides the ability to assess and mitigate unforeseen challenges brought about by "present conditions" in a matter that is prudent and expedient for the identified conditions or situation. Additionally, continuous Federal Equivalent Method (FEM) PM10 source monitors as required by Section 3.0(3)(f)(i) of the Regulation are installed at the locations shown on Figure 1.

A. Daily Monitoring and Action Plan

Facility operations are characteristic of batch processing, with the duration of each operation typically based on the amount of material to be handled. The intermittent nature of operations is incompatible with a rigid schedule of observations. Therefore, on a daily basis, when the source is in operation, a facility general condition review is completed at the beginning of the shift, mid-day, and at the end of the shift to evaluate transportation routes, building entrances and exits for general condition and housekeeping status. The appropriate resources, including manpower and equipment, are dispatched to remedy any noted deficiencies.

The daily production plan is then reviewed with the Terminal Manager to generally plan the fugitive emission observations for the day. The following items are evaluated prior to start of facility activities:

- Review updated weather forecast for the day in order to anticipate any adjustments in control measures;
- Equipment deployment and work practice adjustments based on an objective review (assessment) of conditions present at the start of work activity to match controls to conditions present or otherwise anticipated conditions;
- Anticipate periods of high volume truck loading/unloading to coordinate other terminal activities to allow for increased observations;
- Plan for any rail or barge loading or unloading, as the nature of those activities has the potential for sustained fugitive emissions, to include the following:
    - Series of consecutive observations to validate opacity at excavator to truck transfer work site as well as no visible emissions at the property line in proximity to the unloading activity at the 70-foot Dock, 200-ft Dock, or Dry Dock;
    - Emission mitigation/control activities adjusted for identified conditions, including wind direction, duration, and speed as well as the observed duration of fugitive emissions and plume duration and direction, and possible containment of fugitive emissions.

Adjustments to daily observations are made when there is a change in wind conditions, a change in operating plan/schedule, implementation of corrective action, etc.

B. Visual Emissions Inspections

In addition to ongoing observations for Fugitive Dust at the Source and VE near the property line as described above Section IV in the Operating Procedures for active operations at the facility, the facility implements a Visual Emissions Inspections program that also goes above and beyond the requirements in the Regulations. At least three times per working shift, visible emissions are observed both at the point of generation for each active operation as well as at the property line closest to each active operation that is not controlled by total enclosure or a dust collector. For active operations controlled by total enclosure or a dust collector, a daily visible emissions inspection is undertaken of the processing enclosure egress points and the dust collector exhaust stack. The intermittent nature of active operations at the facility is incompatible with a rigid schedule of observations, however, more frequent inspections are generally performed at outdoor activities such as barge unloading, truck unloading, and working outdoor piles.

The visual emissions inspections are made and documented by facility personnel who are Method 9 certified and familiar with operations and the historical associated visible emissions under normal operating conditions. Visible emissions at the point of generation are observed to determine the presence or absence of Fugitive Dust at the Source and VE near the property line. The criteria for observing visible emissions at the nearest property line based on wind direction is presence / absence and the criteria for Fugitive Dust at the Source is the observation of opacity at an operation / activity that approaches the applicable opacity limit. Corrective measures including additional control are implemented at the point of generation, and are adjusted as needed for current conditions, including wind direction and speed.

If Fugitive Dust at the Source is observed to be approaching an opacity limit and/or the potential for visible emissions at the property line is noted, the following will be undertaken:

- The appropriateness of controls as outlined in Figures 3-9g will be critiqued by the site management team and amended to resolve a recurrence of similar incident.

- A Method 22 reading will be performed after initial corrective actions. Further periodic visible emission observations will be made during the operation. If the Method 22 reading does not confirm the absence of visible emissions, additional controls will be instituted or the operation will be suspended.

- If the operations are not suspended and further corrective actions are instituted, a Method 9 reading will be performed after completion of the corrective actions. Additional periodic Method 22 observations will be made during the operation.

Initiating corrective action and any subsequent decision to increase the frequency of these observations will be dependent on discussion with the Terminal Manager or his designee and upon circumstances of observed conditions and deviations from the controls scheme as illustrated in the operating procedures in Figures 3 – 9g. When necessary, operating procedures will be amended to reflect best management practices and/or control improvements initiated as a result of a negative observation finding.

C. Quarterly Opacity Testing

Although the Regulation only requires quarterly visible emission evaluations pursuant to 35 IAC 212.107 (Method 22, presence or absence of visible emissions), an individual trained and certified to evaluate visible emissions will perform quarterly visible emission evaluations in accordance with the measurement method specified in 35 IAC 212.109 (Method 9). Opacity reads will be performed at each of the three source types at the facility:

- outdoor storage pile
- roadway
- material transfer point

For purposes of the reads, the outdoor storage pile that contains the material present in the largest quantity at the terminal on the day of the read and the outdoor storage pile containing the smallest size materials will be selected as the read locations. A roadway segment that has heavy truck vehicle traffic on the day of the read will be observed as the representative location. The material transfer point reads will be taken at barge unloading, truck unloading, railcar unloading, and pile creation to the extent in operation on the day of the read. These opacity read locations are designed to detect the greatest amount of dust emissions.

In general, the opacity reads will be performed on clear days or partly cloudy days to provide the appropriate background contrast for Method 9 reads. The Regulation requires testing during a range of weather conditions, noted by the CDPH to include variations in temperature and wind conditions. Quarterly opacity reads will be completed during the second or third week of the last month of each quarter (i.e., March, June, September, and December). The specific day(s) will be selected by the certified reader, whose decision will be in part based on weather conditions, including temperature and wind, on previous days that opacity reads were taken, in order to choose reading days on which opacity readings will be conducted during a range of weather conditions. For example, during at least one of the quarterly opacity reads, the certified reader will endeavor to select specific day(s) with hourly average wind speeds over 10 mph.

Opacity reads will be conducted if the weather conditions are suitable for compliance with US EPA Method 9 requirements. If it is raining, snowing, and/or foggy on the test date such that it would affect the ability to follow the US EPA Method 9 procedure, the testing will either be conducted later in the day, or rescheduled to the next available date.

Opacity reads of the representative storage piles and transfer points will be conducted pursuant to 35 IAC 212.109, which references Method 9, 40 CFR Part 60, Appendix A. In general, EPA Method 9 requires that the observation point for transfer points and piles will be the point of maximum opacity at a 4-foot elevation above the transfer point or pile surface. If no opacity is visible, the readings will be taken at the midpoint of the source. Also in accordance with 35 IAC 212.109, opacity reads of roadways will be performed for a duration of 4 trucks passing. Three readings for each truck pass will be taken at 5-second intervals. The first reading will be at the point of maximum opacity, and the second and third readings shall be made at the same point, with the observer standing at right angles to the plume at least 15 feet away from the plume and observing 4 feet above the surface of the roadway. After four trucks have passed, the 12 readings will be averaged.

VIII. Dust Monitoring Contingency Plan

The FEM PM10 monitors are installed at the four cardinal points of the facility in accordance with the U.S. EPA-approved monitor siting plan. The FEM PM10 monitors record PM10 on an hourly basis and store the data electronically. The hourly data for each FEM PM10 monitor, together with the meteorological station data, is provided to CDPH via email at CDPHPermits@cityofchicago.org within 14 days of the end of the month in which the data was collected. An automated system alerts facility personnel of elevated PM10 readings. The system transmits the alerts via email and text message. Upon receipt of an alert, the Terminal Manager or his designee will determine if the Reportable Action Level (RAL) has been exceeded.

Under the Regulation, the RAL is defined as the positive difference between the level of PM10 measured at an upwind monitor(s) and the level of PM10 measured at a downwind monitor(s) that will trigger response activity. The response activities should consist of a range of increasingly aggressive measures appropriate to different levels of exceedance. The Regulation further provides that the RAL may vary based on the value of the difference, and based on the concentration of PM10 detected at the downwind monitor(s) at a Facility. This Dust Monitoring Contingency Plan satisfies each of these requirements.

S.H. Bell will utilize a 24-hour average calendar day approach (the "24-Hour Contingency Procedure"), with regards to definition of RAL because it is most justifiable to compare the RAL to the 24-hour National Ambient Air Quality Standard (NAAQS) for PM10. For purposes of this Dust Monitoring Contingency Plan, the RAL is conservatively set below the 24-hour National Ambient Air Quality Standard (NAAQS) for PM10 of 150 micrograms per cubic meter ($\mu g/m^3$). Accordingly, under the 24-hour Contingency Procedure, if the positive difference between the upwind monitor(s) and the downwind monitor(s) is greater than 125 $\mu g/m^3$ on a calendar day that the facility is operating, a "RAL Event" occurs triggering the requirement to make a report to the City under Section 3.0(4)(d) and to undertake the Response Activities outlined below.

Additionally, S.H. Bell will evaluate hourly PM10 and wind data from the monitors while the facility is operating to determine if there are potentially elevated levels of PM10 at the facility where prudence would dictate implementing the Response Activities below even though it would not be a reportable RAL Event (the "Hourly Contingency Procedure"). Under this Hourly Contingency Procedure, no action is required if the levels from the upwind / downwind monitor difference stay equal to or below 250 $\mu g/m^3$ while the facility is operating, which is below the concentration approved by the CDPH in May 2016 for KCBX[3]. If the positive difference between any upwind monitor(s) and the downwind monitor(s) is greater than 250 $\mu g/m^3$, an "Hourly Event" occurs and S.H. Bell will undertake the Response Activities outlined below. An Hourly Event is further characterized as follows in the Response Activities outlined below that results in a range of increasingly aggressive measures appropriate to these different levels of exceedance:

- "Low" Hourly Event: 250 $\mu g/m^3$ < Upwind/Downwind Concentration Difference < 500 $\mu g/m^3$
- "Medium" Hourly Event: 500 $\mu g/m^3 \leq$ Upwind/Downwind Concentration Difference < 750 $\mu g/m^3$
- "High" Hourly Event: 750 $\mu g/m^3 \leq$ Upwind/Downwind concentration Difference

[3] The hourly contingency procedure level of 250 $\mu g/m^3$ is very conservative. The OSHA Permissible Exposure Limit (PEL) for General Industry and the CAL/OSHA PEL for respirable dust are both 5 mg/m^3 (5,000 $\mu g/m^3$), which is more than 15 times greater than hourly contingency procedure level.

Response Activities

Step 1: Investigate suspected on-site activities and on-site sources to determine the potential cause:

(1) If a RAL Event, submit a written report to the CDPH within 24 hours.
(2) If an on-site activity or source is identified as having caused a "High" Hourly Event, immediately proceed to Step 4 (Suspend).
(3) If an onsite activity or source is identified for a RAL Event or a "Low" or "Medium" Hourly Event, proceed to Step 2 (Mitigation).
(4) If no potential onsite activities or sources are able to be identified for the RAL Event or the Hourly Event, proceed to Step 6 (Record).

Step 2: Mitigation

a. If a potential onsite activity or source is identified for a RAL event or "Low" Hourly Event, the first and primary response will be water application, whether added directly to material or applied via mobile misters or dry foggers and in accordance with the operating procedures in Figures 3 - 9g and as described in Section IV.
   i. For an outdoor pile, pile maintenance and housekeeping (rotary brush wet sweep) will be performed and/or targeted water addition (via water truck or front end loader).
   ii. For material transfer activities, ensure that drop height is minimized, reduce material feed rate and/or choke feeding is used as possible.
   iii. For roadways, conduct additional sweeping and/or apply targeted water through water truck spray bars and/or apply dust suppressant.
   iv. For wind direction changes, reposition mobile misters or dry foggers as warranted.
b. For a "Medium" Hourly Event, if a potential onsite activity or source is identified conduct the following regardless of the onsite activity or source:
   i. Automatically deploy the mobile misters or the dry fogging unit for Dry Materials.
   ii. Automatically directly water Wetted Materials.
   iii. Conduct Method 9 readings at the onsite source,
   iv. Proceed back to Step 2.a. for further mitigation if the Method 9 reading indicates an exceedance of the applicable opacity limit.

c. Proceed to Step 3 (Monitor).

Step 3: Monitor

a. Monitor PM10 readings after mitigation is implemented:
   i. If the upwind/downwind difference in the monitor at issue in the first hourly reading available to S.H. Bell after completion of mitigation activities in Step 2 is less than or equal to 250 $\mu g/m^3$, proceed to Step 6.
   ii. If the upwind/downwind difference in the monitor at issue in the first hourly reading available to S.H. Bell after completion of mitigation activities in Step 2 is greater than 250 $\mu g/m^3$, institute additional mitigation activities. If the upwind/downwind difference in the monitor at issue in next hourly reading available to S.H. Bell after completion of the additional mitigation activities continues to exceed 250 $\mu g/m^3$, proceed to Step 4.

Step 4: Suspend

Suspend the on-site activity or source identified in Step 1 above and conduct mitigation activities; monitor hourly PM10 levels at the monitor at issue until the upwind/downwind difference in readings is less than or equal to 250 $\mu g/m^3$. In which case, proceed to Step 5.

Step 5: Restart

Restart sources/activities suspended under Step 4 when the upwind/downwind difference between the hourly PM10 levels at the monitor at issue is less than or equal to 250 $\mu g/m^3$.

Step 6: Record

Record and retain a report that contains PM10 data, meteorological information, time of notification/alert, timing of suspension and restart (if applicable), description of mitigation efforts, and any other pertinent information related to the event.

As part of the base plan described in Section VII, short-term PM10 monitoring values will be known throughout a given day, and the Terminal Manager or his designee will make adjustments to the operating plan /schedule, reposition the mobile misters or dry foggers, apply additional dust suppressant application to roadways, etc. as a response to relatively higher hourly or consecutive hourly PM10 upwind / downwind concentration differences considered to be excursions projecting to a possible RAL Event.

Contingency Plan for Monitors

Appendix B contains the Quality Assurance Project Plan (QAPP) for the PM10 monitors and includes operation and maintenance activities associated with the PM10 monitoring program. Any time monitoring equipment has malfunctioned so that readings or data logging is not occurring, the CDPH will be notified within 24 hours. Reporting is not required for maintenance or calibration activities.

If the wind monitor is out of service, web-based local weather data will be used.

If a PM10 monitor is out of service for more than 48 hours, Method 22 opacity readings will be performed daily at the location of the out of service PM10 monitor.

IX. High Wind Events

Wind direction and wind speed data are collected at the onsite meteorological station and stored electronically, as required by Section 3.0(6). The meteorological monitoring system will be calibrated on a semi-annual basis and the wind speed sensors will be swapped and bearings replaced. On an annual basis, the wind direction sensors will be swapped and bearings replaced.

Section 5.0(4) notes that disturbance of outdoor piles, including loading, unloading, and processing, shall be suspended during High Wind Conditions unless alternative measures are implemented to effectively control fugitive dust. As part of production planning, barge unloading and rail unloading activities are generally planned for conditions with anticipated wind speeds of 15 mph or less. Nonetheless, as detailed in Section IV.A, outdoor activities associated with Affected Materials that are not controlled with a dust collector, such as barge loading/unloading, will automatically be suspended for High Wind Conditions. For outdoor activities involving non-Affected Materials, facility personnel will be cognizant of High Wind Conditions, and will suspend these activities if control measures are found to be ineffective in controlling fugitive dust, as per Section 5.0(4).

An alert is provided for "High Wind Conditions," which consistent with Section 2.0(12) of the Regulations, is when average wind speeds exceed 15 mph over two consecutive five minute intervals of time. The alerts are provided via flashing light on the met station and on an alert light on the met station "live" readout screen. When an alert is received, the following activities are initiated:

Notification:

- Operators are notified that a high wind alert has occurred.

Visual Observation:

- Visual monitoring for dust will continue and any required response steps will be performed as outlined in Section IV and Figures 3-17. These figures contain procedures for each type of operation provided in decision tree format which include criteria for determining if temporary suspension of activities is warranted.

X. Recordkeeping

The following records are kept in accordance with fugitive dust control measures, on the schedule noted below, and maintained for a minimum period of three (3) years from the date the record is created. For daily records, the records are kept daily when the facility is operating.

Area	**Item**	**Recordkeeping Frequency**
Paved areas	Condition	Daily
Piles	Condition	Daily
Paved areas	Water/chemical suppressant application	Whenever performed
Paved areas	Sweeping	Daily, whenever performed
Control Devices	Inspection, maintenance and repair	Daily when associated source is in operation
Barge unloading / loading Truck loading / unloading Railcar loading / unloading Crusher / screener	Following proper procedures; corrective actions, VE observations	Whenever performed
Small-particle piles	Water application	Whenever performed
Active piles	Following proper procedures, corrective actions, water application as needed	Whenever performed
PM10 Monitor Records	Difference in PM10 readings, corrective actions as appropriate	Whenever PM10 monitor readings meet the criteria outlined in Section VIII
Meteorological Station Records	Hourly wind direction and wind speed	Continuous/daily
Off-site Areas	Dust presence	Whenever sweeping of external truck routes occurs
Facility wide	Water and/or chemical stabilizer application*	Whenever control measures are used
Facility wide	Instances of suspension of water and/or chemical stabilizer application*	Whenever control measures were not used
Facility wide	Date and time of suspension of operations	Whenever operations are suspended due, in part, to high winds (>15 mph)
Facility wide	Date and time when application of control of any transfer point was suspended	Whenever control was not performed
Facility wide	Results of quarterly opacity readings	Quarterly
Facility wide	Result of presence/absence of VE near property line and Fugitive Dust at the Source	Three per shift minimum per operation not controlled by total enclosure or a dust collector. Once daily minimum per operation controlled by total enclosure or a dust collector

The facility will also adhere to the manufacturer's recommendations and schedule for inspection, maintenance, and any required testing of the wet suppressant spray systems, mobile misters, dry fogging system, and the street sweeper referenced in Section IV. As noted in Section IV.F, the dust collectors are inspected daily. Routine maintenance and testing of the dust collectors occurs in accordance with manufacturer's recommendations and any applicable permit requirements. The inspection, maintenance, and testing for the PM10 Monitors and the Meteorological Station is provided in the Quality Assurance Project Plan (QAPP) provided at Appendix B.

Responsible personnel for each of these items will vary, but overall responsibility for implementation of the inspection, maintenance, and testing requirements will remain with the Terminal Manager.

<u>Note:</u>
*For transfer points, vehicles loading, and truck, railcar, and barge loading and unloading, if water and/or chemical stabilizer is applied, the application must be recorded as well as any time when application is suspended for any reason.

XI. Training

Operating facility personnel are trained annually on methods used to reduce fugitive dust emission levels at the facility as indicated by the provisions of this program, including review of this Fugitive Dust Plan, the operating procedures (Appendix A) and recordkeeping requirements. Personnel are trained in monitoring and recordkeeping as required by the responsibilities of their position. New personnel are trained as part of their orientation. Dated records of all employee training are maintained at the facility.

At least two people at the facility maintain EPA Method 9 certification.

XII. Program Update

Facility operations are periodically reviewed in conjunction with this Fugitive Dust Plan. The plan will be updated on an annual basis and submitted to the CDPH for review and approval on or before January 31 each year.

XIII. Filter-Based Metals Monitoring Plan

S.H. Bell Co. is a Manganese-Bearing Bulk Material Facility in accordance with the revised definitions in the January 25, 2019 revision of the Regulation. As such, pursuant to the new Section 6.0 of Part D of the Regulation, S.H. Bell must install, operate, and maintain, according to manufacturer's specifications, one Federal Reference Method (FRM) PM10 filter-based monitoring site at the Facility in accordance with specific noted requirements in the referenced section. These requirements include the following:

- FRM Monitor Location and Operation
- Sample Analysis
- Maintenance and Calibration Activities
- Data Submission

S.H. Bell Co. has already installed and is currently operating a FRM PM10 filter-based monitoring site at the Facility at U.S. EPA's direction and approval that meets these requirements contained in new Section 6.0 of Part D of the Regulation as described further in the paragraphs which follow.

A. FRM Monitor Location, Operation and Maintenance (Section 6.0(a)-(d), (f)-(g) of Part D of the Regulation)

In accordance with the December 5, 2016 Stipulated Settlement and Final Consent Order between S.H. Bell Co. and U.S. EPA filed in Case No. 1:15-cv-07955 before the U.S. District Court for the Northern District of Illinois, S.H. Bell Co. installed two FRM PM10 Monitors at the northern end of the Facility at location PS4 as set forth in the monitor siting plan that was approved by U.S. EPA on February 15, 2017. A copy of the monitor siting plan and U.S. EPA's approval thereof is provided at Appendix D. CDPH was involved in the monitor siting discussions and copied on U.S. EPA's February 15, 2017 approval. The U.S. EPA approved monitor siting plan is consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring siting criteria. Specifically, as approved by U.S. EPA, S.H. Bell installed two (2) Tisch Environmental HiVol 6070 DV-BL Filter-Based FRM PM10 Monitors at location PS4 as shown on Figure 1.

The two FRM PM10 Monitors, which operate on a staggered one-in-six day sample schedule so that a sample is collected every three days, collect ambient particulate matter samples though a size-selective inlet that is designed to allow only particles with an aerodynamic diameter < 10 um to pass through the measurement apparatus. PM10 is measured using the Tisch Environmental Model 6070 DV-BL sampler (EPA designated Federal Reference Method RFPS-0202-141).

The FRM PM10 Monitors are operated and maintained in accordance with the U.S. EPA-approved QAPP, Revision 2, dated May 25, 2018 (Appendix B). This QAPP was prepared in accordance with 40 CFR Part 50, Appendix J and is consistent with the most recent U.S. EPA protocols and guidance for ambient air quality monitoring, including those for quality assurance, data completeness, calibration, inspection, maintenance, and site and instrument logs. As provided in the U.S. EPA-approved QAPP, Revision 2 (Appendix B), the operation, calibration, and maintenance of these FRM PM10 Monitors is in accordance with the August 10, 2010 revision of the Tisch Environmental, Inc. Operations Manual for 6000-Series PM10 High Volume Air Samplers (Tisch, 2010). A hard copy of this manual is kept in the monitoring station building at PS4. Specific maintenance and calibration activities for these FRM PM10 Monitors are also detailed the U.S. EPA-approved QAPP, Revision 2, dated May 25, 2018 (Appendix B). S.H. Bell Co. maintains a log of all routine and non-routine maintenance and calibration activities.

Further, as provided in the U.S. EPA-approved QAPP, Revision 2, dated May 25, 2018 (Appendix B), the FRM PM10 Monitors operate from midnight-to-midnight on a staggered one-in-six day sample schedule so that a filter-based sample is collected every three days in accordance with 3-day U.S. EPA Monitoring Schedule as posted on U.S. EPA's website. All data collected is consistent with the PM10 NAAQS units ($\mu g/m^3$).

B. Sample Analysis (Section 6.0(e) of Part D of the Regulation)

PM10 is collected on numbered, pre-weighted filters (8' x 10") supplied by Inter-Mountain Labs, Inc. in Sheridan, Wyoming. The filters are generally shipped weekly back to Inter-Mountain Labs for analysis. In accordance with Section 6.0(e) of Part D of the Regulation, the filters will undergo gravimetric analysis and determination of the concentration of manganese.

The gravimetric determination of PM10 mass concentration is performed using 40 CFR 50, Appendix J to Part 50 – "Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere." Following gravimetric analysis, filters are extracted using microwave or hot acid, then analyzed by inductively coupled plasma/mass spectrometry (ICP/MS). The extraction procedure is performed in accordance with U.S. EPA's Inorganic Compendium Method IO-3.1 (U.S. EPA, 1999b); the determination of manganese by ICP/MS is performed in accordance with U.S. EPA's Inorganic Compendium Method IO-3.5 (U.S. EPA, 1999c). This method is also valid for determination of other target metals, should analysis of other metals be required by the CDPH.

C. Data Submission (Section 6.0(i) of Part D of the Regulation)

Raw laboratory data and a monthly filter-based monitoring report, which contains the data from the FRM PM10 Monitors that has undergone quality assurance and quality control, will be submitted monthly, within 28 days of the end of the month in which the data was collected, to the CDPH via email at CDPHPermits@cityofchicago.org. S.H. Bell Co. has already been voluntarily providing a monthly filter-based monitoring report to CDPH and will continue to do so in the same format for manganese (unless a different format is requested by CDPH) within 28 days of the end of the month in which the data was collected.

TABLES

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s)				Alternative Control Measure	Additional Comments
		Enclosure	Water Spray System	Vented to Air Pollution Control Equipment	Additional Control/Mitigation Measures Implemented		
Outdoor Storage Piles Activities (Wetted / Dry, Non-Affected)	Front end loader to truck, barge, or rail or processing operation (receipt, internal transfer, loadout)		X (dampen material and/or position mobile misters and/or dry fogging system)		minimize drop heights; trucks covered immediately after being loaded		inbound shipments of DRI fines no longer accepted for storage or re-loading
Bag Filling Station	Front end loader to hopper/feeder	X	X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry materials)				Sliding door closed when not in use
	Hopper/feeder to weigh hopper	X		X			
	Weigh hopper to small storage bag or can	X		X			
Box Filling Station	Front end loader to hopper/feeder	X		X	Loader tunnel		Hopper curtain covering face of hopper
	Vibratory feeder to box or bulk bag	X		X			
Screen Boxes (Non-Affected Materials)	Front end loader to screen box	X (dry materials to the extent possible)	X (if performed outdoors, material is dampened and/or mobile misters or dry fogging unit used)				
	Screening (first pass through)	X (dry materials to the extent possible)	X (if performed outdoors, material is dampened and/or mobile misters or dry fogging unit used)				
	Screening (second pass through)	X (dry materials to the extent possible)	X (if performed outdoors, material is dampened and/or mobile misters or dry fogging unit used)				

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s)				Alternative Control Measure	Additional Comments
		Enclosure	Water Spray System	Vented to Air Pollution Control Equipment	Additional Control/Mitigation Measures Implemented		
Screen Boxes (Affected Materials)	Front end loader to screen box	X		X			
	Screening (first pass through)	X		X			
	Screening (second pass through)	X		X			
Crusher-Screener	Primary Crush	X	X (foam spray)				
	Primary Screen	X	X (foam spray)				
	Secondary Crush	X	X (foam spray)				
	Secondary Screen	X	X (foam spray)				
	Front end loader to hopper	X	X (foam spray)				
	Hopper to Crusher	X	X (foam spray)				
	Crusher to Screen	X	X (foam spray)				
	Screen to Storage 1	X	X (foam spray)				
	Screen to Crush 2	X	X (foam spray)				
	Crush 2 to Screen 2	X	X (foam spray)				
	Screen 2 to Storage 2	X	X (foam spray)				
	Screen 2 to Storage 3	X	X (foam spray)				

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s): Enclosure	Control Measure(s): Water Spray System	Control Measure(s): Vented to Air Pollution Control Equipment	Control Measure(s): Additional Control/Mitigation Measures Implemented	Alternative Control Measure	Additional Comments
Screener (non-Affected Materials only)	Primary Screen	X					
	Front end loader to Vibratory Tray	X					
	Vibrator to Bin	X					
	Vibrator to Conveyor	X					
	Conveyor to Screen	X					
	Screen to Bin, top size	X					
	Screen to Bin, mid size	X					
	Screen to Bin, fine size	X					
Product Transfer	Storage bins/outdoor pile to storage piles via front end loader	X (for materials stored indoors, including all affected materials)	X (for non-affected materials stored outdoors, dampen material if moisture not sufficient	X (at loadout sheds)	minimize drop height; sweeping of aisles in buildings once per shift when affected materials are being transferred or handled in that building	mobile misters and/or dry fogging system for non-affected dry materials	Only non-affected materials are stored outdoors
	Loadout sheds (Ryerson / Norcon buildings), front end loader to truck	X		X (stationary dust collectors)	1) Close entry/exit roll-up garage doors at each end of the loadout sheds, 2) Minimize drop height; 3) driver waits at least one minute after load is complete before exiting loadout enclosure; 4) Tarp load after safely clearing the exit of loadout shed	Lengthen truck wait time if there is VE approaching opacity limit	
	Direct bulk transfer to outbound trucks		X (dampen material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry materials)		minimize drop height; trucks covered immediately after being loaded		

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s): Enclosure	Control Measure(s): Water Spray System	Control Measure(s): Vented to Air Pollution Control Equipment	Control Measure(s): Additional Control/Mitigation Measures Implemented	Alternative Control Measure	Additional Comments
Truck Unloading (Non-Affected Materials)	Truck to ground (outside)		X (for materials stored outdoors, dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry materials)		choke feed; dry materials tarped following initial transfer	X (portable dust collector)	
Truck Unloading (Affected Materials)	Truck to dump pan enclosure	X		X (portable dust collector)	choke feed		
Barge Unloading - Bulk (Non-Affected Material)	Barge to truck via excavator		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry materials)		Minimize drop height; trucks covered immediately after being loaded		
	Truck to storage	X (for materials stored indoors)	X (for outdoor storage, dampen material if moisture not sufficient		Minimize drop height		
Barge Unloading - Bulk (Affected Material)	Barge to truck via excavator		X (Wetted Materials - dampen if moisture not sufficient, including adding water to barge with water truck or excavator) Dry Materials - mobile misters and/or dry fogging system)		Minimize drop height; maintain barge lids in place for dry material except to allow excavator access at active portion of barge unless presenting a safety risk; trucks covered immediately after being loaded; suspension during High Wind Conditions		

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s): Enclosure	Control Measure(s): Water Spray System	Control Measure(s): Vented to Air Pollution Control Equipment	Control Measure(s): Additional Control/Mitigation Measures Implemented	Alternative Control Measure	Additional Comments
	Truck to storage	X			Minimize drop height; sweeping of aisles in buildings once per shift when affected materials are being transferred or handled in that building		
Barge Unloading - Sacks and Conversion to Bulk (Non-Affected Material)	Sack material release to pile at dock		X (Wetted Materials - dampen if moisture not sufficient, including adding water to barge with water truck or excavator) Dry Materials - mobile misters and/or dry fogging system)		Minimize drop height to approximately 5 feet		
	Pile to truck via front end loader		X (secondary use of direct dampening and/or mobile misters and/or dry fogging system)	X (primary use of portable dust collector)	Minimize drop height; trucks covered immediately after being loaded		
Packaged Material/ Sacks Conversion to Bulk (Affected Materials)	Sack material release inside building	X	X (deploy mobile misters and/or dry fogging system to provide coverage at the door area of the building / enclosure)				
Barge Loading (Non-Affected Material)	Storage to dock (ground for non-affected material)		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)		choke feed		
	Excavator to barge		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)		Minimize drop height (ability of excavator to reach directly into bottom of barge)		

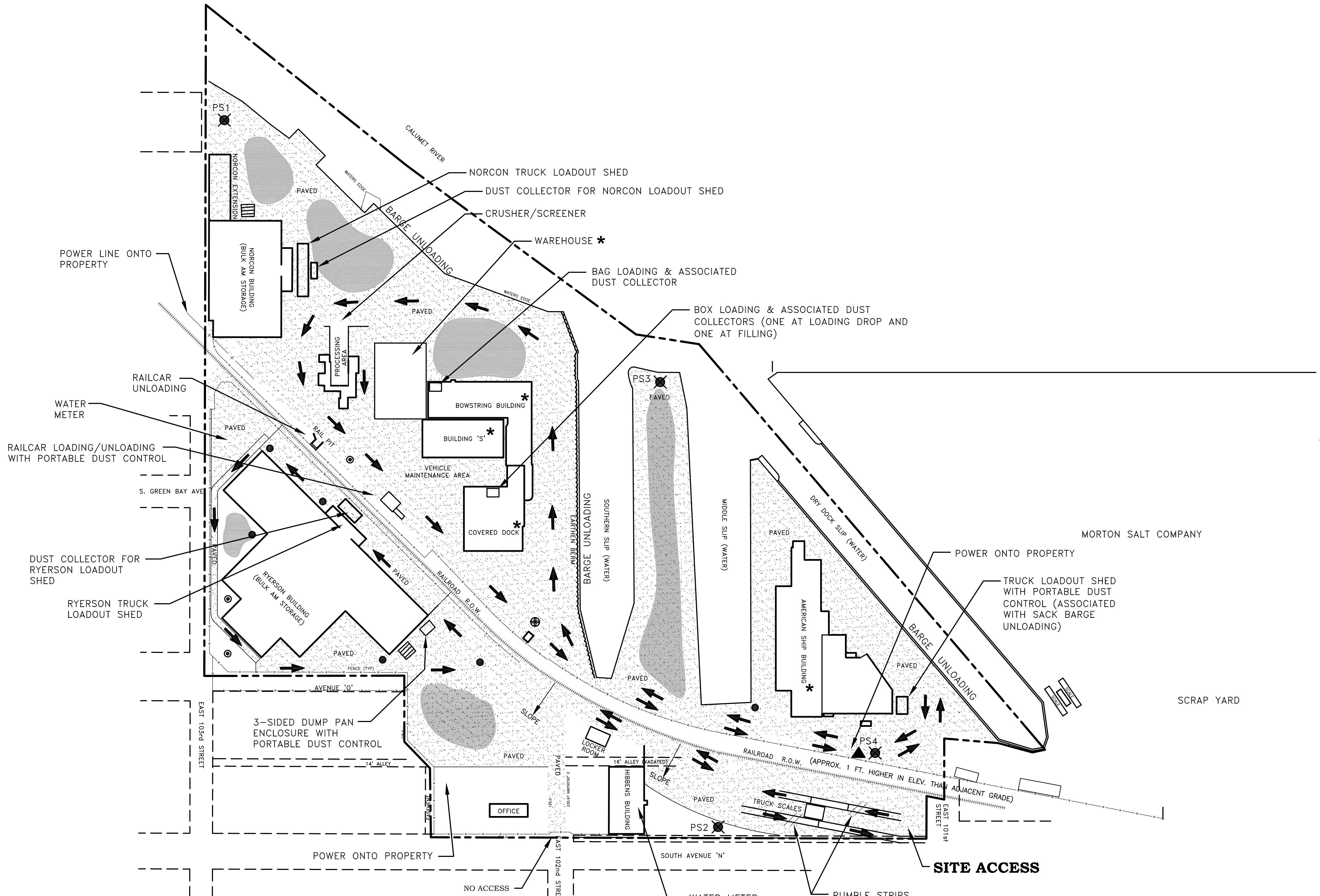
Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

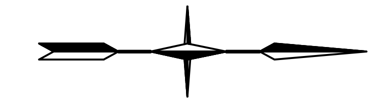
Emission Source	Transfer Point(s) / Activity	Control Measure(s): Enclosure	Control Measure(s): Water Spray System	Control Measure(s): Vented to Air Pollution Control Equipment	Control Measure(s): Additional Control/Mitigation Measures Implemented	Alternative Control Measure	Additional Comments
Railcar Unloading - Bottom unload (Non-Affected Materials)	Railcar to pit pile (bottom unload)		X (deploy mobile misters)		Choke feed		
	Pit to storage via front end loader		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)				
Railcar Unloading - Box cars (Affected and Non-Affected Materials)	Skid steer to box enclosure	X		X (primary use of portable dust collector)		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)	Alternative control measure for non-Affected Materials Only
	Material removal via front end loader	X		X (primary use of portable dust collector)		X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)	Alternative control measure for non-Affected Materials Only
Railcar Loading - Box Cars (Affected Material)	Front-end loader from storage to dumping pan	X		X (use of portable dust collector)			
	Front-end loader from dumping pan to box car	X	X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)				
Railcar Loading - Covered hopper railcars (Affected and Non-Affected Materials)	Front end loader to hopper / belt conveyor	X		X (primary use of portable dust collector)	choke feed	X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)	Alternative control measure for non-Affected Materials Only
	Belt conveyor to railcar	X		X (primary use of portable dust collector)	vinyl strips; minimize drop height	X (dampen wetted material if moisture not sufficient; deploy mobile misters and/or dry fogging system for dry material)	Alternative control measure for non-Affected Materials Only

Table 1. Summary of Control Measures at Transfer Points
S.H. Bell Company
Chicago Terminal
Revised: April 2019

Emission Source	Transfer Point(s) / Activity	Control Measure(s)				Alternative Control Measure	Additional Comments
		Enclosure	Water Spray System	Vented to Air Pollution Control Equipment	Additional Control/Mitigation Measures Implemented		
Railcar Loading - Open top railcars (Non-Affected Materials)	Front end loader to railcar		X (dampen material with water truck or front end loader if moisture not sufficient or deploy dry fogging system in sub freezing temperatures)		minimize drop height		

FIGURES





KEY
(ALL LOCATIONS APPROXIMATE)

- APPROXIMATE FACILITY BOUNDARY
- TYPICAL NON–AM BULK STORAGE PILE LOCATIONS (MIN. 20 FT SETBACK)
- TYPICAL TRAFFIC PATTERNS
- COVERED MANHOLE
- INLET TO COMBINED SEWER
- WIND SPEED MONITOR
- PRIMARY AREAS OF TRUCK UNLOADING
- FRM PM10 MONITOR
- FEM PM10 MONITOR
- AM AFFECTED MATERIAL
- * PACKAGED AM STORAGE LOCATION

THE INFORMATION ON THIS SHEET WAS TAKEN FROM:
GREMLEY & BIEDERMANN, INC.
PLAT PLAN
DATED JAN. 25, 1984
AND FROM
ROWLAND A. FABIAN
DATED JAN. 29, 1997

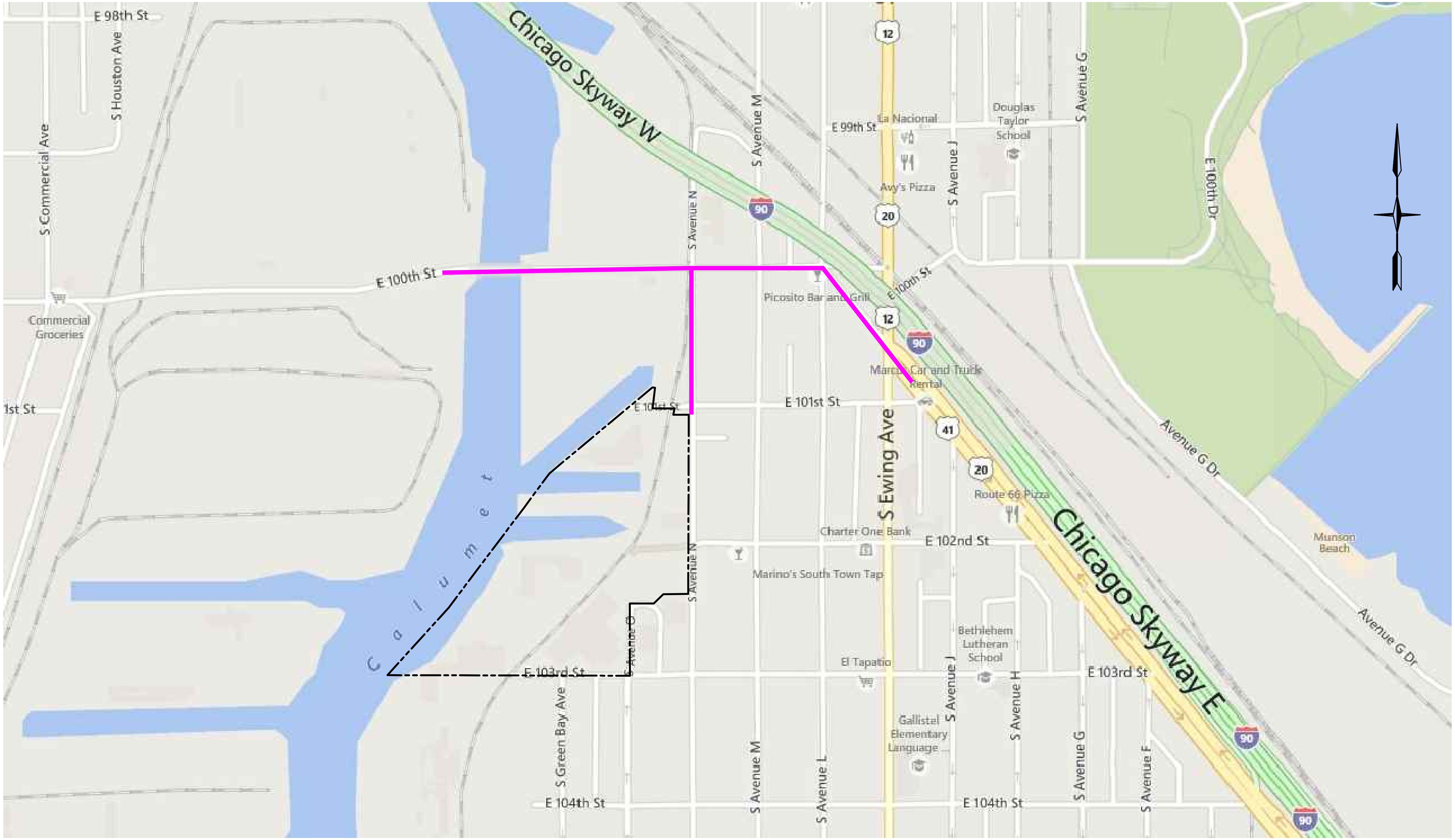
GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 200 ft.

wood.

FACILITY DIAGRAM
Chicago Terminal
S.H. Bell Company
Chicago, IL

FIGURE 1

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
GAP	3410140990	KP	10/23/14	04/23/19



LEGEND:

— · — · — APPROXIMATE SITE BOUNDARY

▬▬▬ PRIMARY TRUCK TRAFFIC ROUTES

GRAPHIC SCALE

250 0 250 500 1,000

(IN FEET)
1 inch = 500 ft.

wood.

ROADWAY LOCATION MAP
Chicago Terminal
S.H. Bell Company
Chicago, IL

FIGURE
2

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
GAP	3410140990	KP	10/23/14	04/03/17

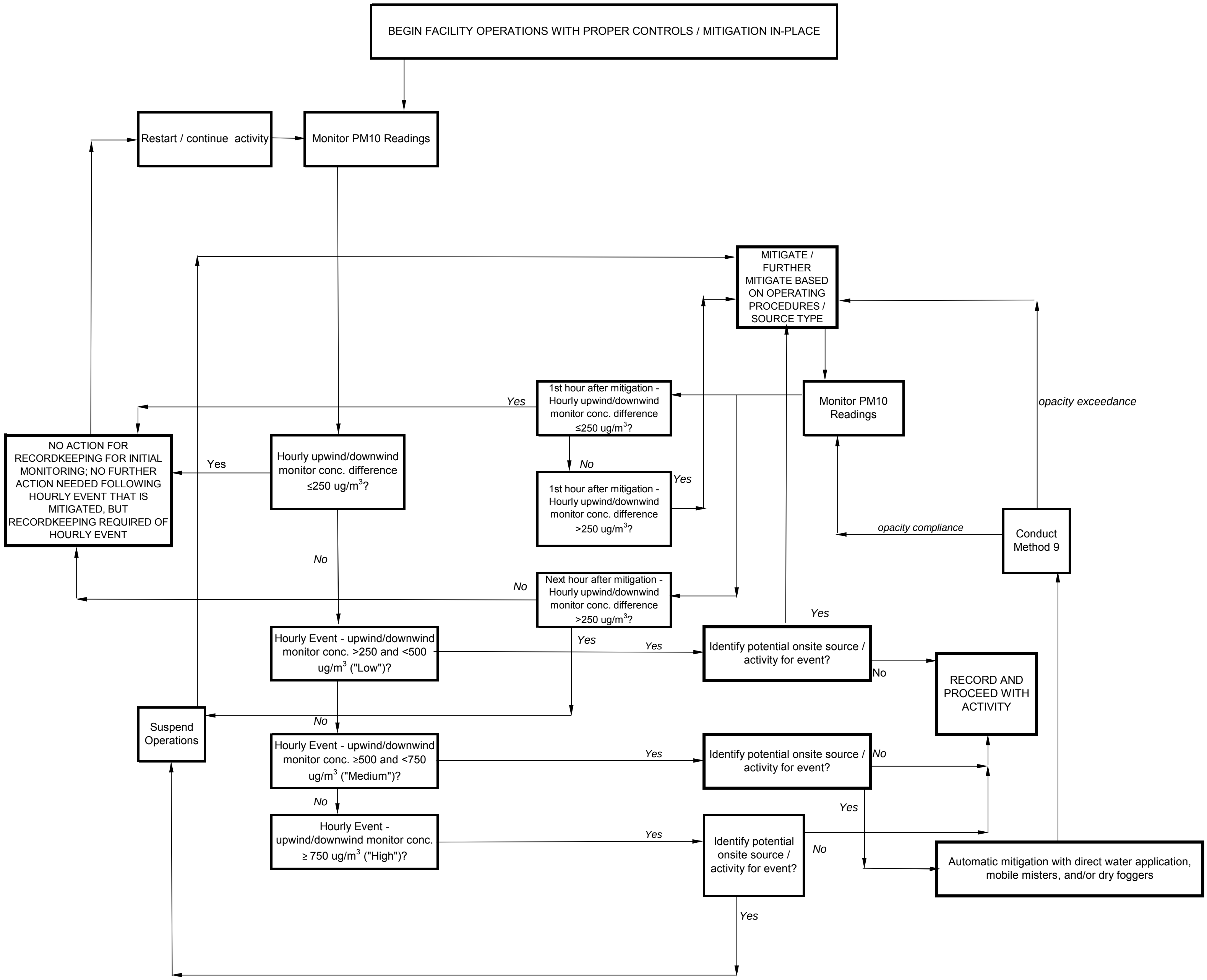
2/19/2019 1:49 PM P:\Env\3410 - SH Bell Co Chicago\CADD\3410140990 Fig 1 01-29-18.dwg FIG-2

APPENDIX A

General Operating Procedures

APPENDIX A

Reportable Action Level (RAL) - Hourly Contingency Procedure



APPENDIX B

Quality Assurance Project Plan (QAPP) for PM10 Monitoring

Quality Assurance Project Plan

S. H. Bell Company Chicago, Illinois
Revision 2
May 25, 2018

Prepared for:

S.H. Bell Company
10218 South Avenue O
Chicago, Illinois 60617

Prepared by:
RTP Environmental Associates, Inc.
1591 Tamarack Ave.
Boulder, CO 80304

Quality Assurance Project Plan
S. H. Bell Company Chicago, Illinois
Revision 2
May 25, 2018

Prepared for:
S.H. Bell Company
10218 South Avenue O
Chicago, Illinois 60617

Prepared by:
RTP Environmental Associates, Inc.
1591 Tamarack Ave.
Boulder, CO 80304

Approved by:

May 25, 2018

S. H. Bell Project Manager — Date

May 25, 2018

RTP Project Manager — Date

May 25, 2018

RTP QA Coordinator — Date

US EPA Region 5 Representative — Date

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Distribution List

The following individuals have been provided a copy of this Quality Assurance Project Plan (QAPP).

Table Intro-1 Distribution List for QAPP

Personnel	Organization	Email Address	Business Address	Telephone Number
John Bedeck	S.H. Bell Company	jbedeck@shbellco.com	S.H. Bell Company 644 Alpha Drive P.O. Box 11495 Pittsburgh, PA 15238	(412) 963-9910
James Langbehn	S.H. Bell Company	jlangbehn@shbellco.com	S.H. Bell Company 10218 South Avenue O Chicago, IL 60617	(773) 375-1010
Nicole Cantello	USEPA Region 5	cantello.nicole@epa.gov	USEPA Region 5 77 W. Jackson Boulevard Chicago, IL 60604	(804) 527-5178
Scott Dismukes	Eckert Seamans Cherin & Mellott, LLC	sdismukes@eckertseamans.com	Eckert Seamans Cherin & Mellott, LLC 600 Grant Street, 44th Floor Pittsburgh, PA 15218	(412) 566-19984
John Podrez	RTP Environmental Associates, Inc.	jpodrez@google.com	RTP Environmental 8452 North Terrace Niles IL 60714	(847) - 292 1631
Mark Podrez	RTP Environmental Associates, Inc.	podrez@rtpenv.com	RTP Environmental 1591 Tamarack Ave Boulder CO 80304	(303) 444-6046

A. PROJECT MANAGEMENT

This Quality Assurance Project Plan (QAPP) documents the policies and procedures to be implemented at the S.H. Bell Company facility in Chicago, Illinois to meet the United States Environmental Protection Agency (USEPA) guidelines for conducting environmental monitoring programs. This QAPP has been prepared in accordance with the guidance outlined in USEPA's "EPA Guidance for Quality Assurance Project Plans", (USEPA, 2002) and "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," (USEPA, 2001). The purpose of this document is to describe the sampling and analytical methods that will be used to gather the monitoring data, and the procedures employed to assess, control, and document the data quality.

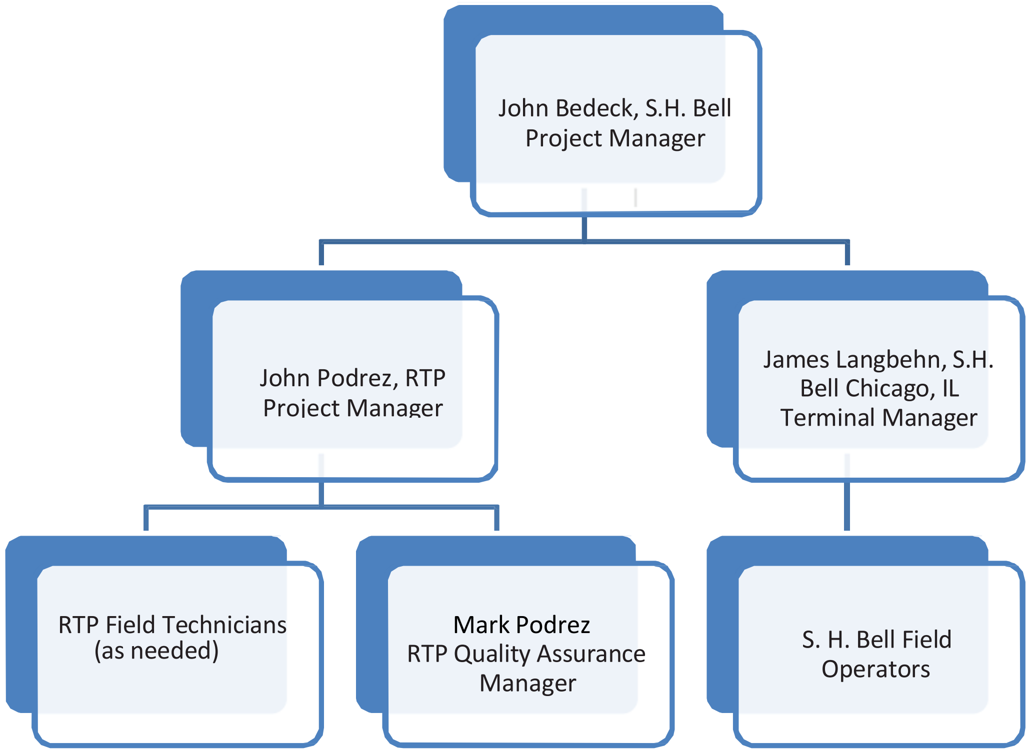
Following this format, this QAPP is divided into five sections with the following contents:

- Section A – Project Management – Provides a description of the project organization, administrative functions, and goals, as well as an overview of the project approach.
- Section B – Measurement and Data Acquisition – Provides a detailed description of all the elements of the monitoring strategy and methods, including the methods for sampling, sample handling, analytical methods, quality control, instrument calibration, and data management;
- Section C – Assessment and Oversight - Provides a description of the procedures that will be used to assess and report on the QA/QC elements employed in the project;
- Section D – Data Validation and Usability - Provides a description of the methods that will be used for data review, verification, and validation; and
- Section E – References – Provides references to applicable regulatory and method specific documents that form the basis for obtaining the measurement data.

A1 Project/Task Organization

The organizational structure for the air monitoring program at the S.H. Bell facility in Chicago, Illinois and a description of the responsibilities of those within it are described in this section. Figure A-1 shows key personnel and team roles, including the S. H. Bell Project Manager, the RTP Project Manager, the S.H. Bell Field Installation/Operations Manager, and the RTP Quality Assurance Officer. Key individuals and their responsibilities are identified below:

Figure A-1. Project Organizational Chart



S.H. Bell Project Manager – The principal contact person for S.H. Bell Company is Mr. John Bedeck (or his designee). Mr. Bedeck's responsibilities include the following:

- Provide direct oversight of the S.H. Bell monitoring project
- Serve as USEPA's communication contact for all activities at the S.H. Bell Chicago, Illinois facility
- Any changes to the scope of the monitoring program will be made only with the written approval of the S.H. Bell Project Manager and review by EPA Region 5
- Review and submit monthly monitoring reports to USEPA

S.H. Bell Chicago, Illinois Terminal Manager – The S.H. Bell Chicago, Illinois Terminal Manager is Mr. James Langbehn (or his designee). Mr. Langbehn's responsibilities include the following:

- Provide oversight of monitoring activities conducted at the S.H. Bell Chicago, Illinois facility
- Coordinate on-site record keeping, including site visits, operator activities, and monitoring system conditions and corrective actions

- Report exceedences and corrective actions to USEPA Region 5
- Maintain records of S.H. Bell operations (such as dates and duration of material unloading and processing)
- Notify USEPA of any barge unloading operations of direct reduced iron
- Record observations of possible interferences at nearby facilities

RTP Project Manager – Mr. John Podrez is the RTP Project Manager. Mr. Podrez's responsibilities include the following:

- Communicate with S.H. Bell to ensure the full implementation of the QAPP and notification of general corrective actions
- Oversee day to-day project activities, including ensuring the proper execution of the monitoring work.
- Coordination with the contract laboratory.
- Ensure QAPP objectives are met in accordance with USEPA requirements
- Develop and ensure QA/QC procedures and Standard Operating Procedures are followed
- Report non-confirming conditions to S.H. Bell and follow up corrective actions taken using appropriate documentation procedures.
- Perform monthly maintenance visits and quarterly calibrations
- Supervise field staff to collect field parameters and samples (including filters for laboratory analysis)
- Report non-confirming conditions to S.H. Bell Project Manager and follow up corrective actions taken using appropriate documentation procedures.
- Prepare monthly reports for S.H. Bell's review and submittal to USEPA

RTP Quality Assurance Manager – Mr. Mark Podrez is the RTP Project QA Manager. He is responsible for the following tasks:

- Perform data validation and auditing activities as needed
- Verify required QC activities are performed and that measurement quality objectives are met as prescribed in this QAPP
- Verify data and flags from continuous monitors
- Review laboratory analytical data packages

- Prepare report information in appropriate format
- Report non-confirming conditions to S.H. Bell Project Manager and follow up corrective actions taken using appropriate documentation procedures.

S.H. Bell Field Operators – Several S.H. Bell employees provide operations support tasks as described below (each have previously been trained and their activities are overseen by the S.H. Bell Terminal Manager:

- Collect manual samples
- Record relevant field data

A2 Problem Definition and Background

S.H. Bell has been asked to provide information to the United States Environmental Protection Agency (USEPA) under Section 114 of the Clean Air Act (CAA), 42 U.S.C. Section 7414(a) (USEPA, 2015), herein referred to as the Request for Information (RFI). To meet this request, S.H. Bell has submitted, and USEPA Region 5 Air and Radiation Division has approved proposed monitoring site locations for Federal Equivalent Method (FEM) real-time PM10 monitoring and Federal Reference Method (FRM) PM10 filter-based monitoring as well as wind speed and direction monitoring. Per the requirements of the RFI, S.H. Bell will conduct PM10 and meteorological monitoring for a period of one year from the date of installation and will submit reports of monthly data to USEPA (S.H. Bell Company, 2016-2017 "Siting Plan"). A copy of the Siting Plan was previously attached to Revision 1 of this QAPP.

In addition, the RFI requires a 10-meter meteorological station be operated at the S.H. Bell facility to measure and record wind speed and direction through the area during the one-year study period. The meteorological station is located near the center of the S.H. Bell Chicago Facility, as shown on Figure B-1. The meteorological monitors meet the specifications of USEPA's Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements Version 2.0 (Final) (USEPA, 2008). The meteorological station is equipped to record the following meteorological parameters:

- Wind Speed
- Wind Direction
- Ambient Temperature
- Barometric Pressure

A3 Project/Task Description and Schedule

This project is conducted to provide air quality and meteorological data from four monitoring sites located around the S.H. Bell Chicago, Illinois facility.

The monitoring stations incorporate continuous Federal Equivalent Method (FEM) real-time PM10 monitors, data loggers, and Federal Reference Method (FRM) PM10 filter-based monitors as outlined in the Siting Plan (S.H. Bell, 2016-2017) - included as Appendix D of this document. Continuous (FEM) monitors are operated to obtain hourly continuous average data. Filter-based FRM monitors are operated to follow the USEPA's 3-day Monitoring Schedule for 2017 (included as Appendix C). PM10 filters collected from the FRM filter-based monitors undergo both gravimetric analysis and determination of lead and toxic metals (arsenic, cadmium, chromium, manganese, nickel, and vanadium) at an off-site laboratory in accordance with FRM/FEM laboratory methods (see Section B for additional detail on laboratory analysis). The meteorological conditions are also continuously measured and are stored in an onsite data logger as five-minute averages. Meteorological equipment (wind speed and wind direction equipment and data logger) was initially installed at the S.H. Bell facility in 2014. The system was updated in December 2016 to include temperature and barometric pressure sensors integrated with the meteorological data logger.

The commissioning of the particulate monitoring stations took place February 27-28, 2017. The first filter-based FRM sample was collected March 2, 2017, and additional samples are to be collected in accordance with USEPA's 3-day Monitoring Schedule (See Appendix C). Deliverables for the project include the following items:

1. This QAPP;
2. Hourly data from each continuous monitor and the meteorological monitoring site (in ASCII comma-delimited files) and laboratory data from filter-based sample analysis (in laboratory reporting format) provided to EPA on CD every month; and
3. Monthly data submittal of items detailed in Item 2 above submitted to EPA by email within 14 days of the end of the month being reported for a period of one year. Please see Section B7 for additional detail.

A4 Data Quality Objectives and Criteria for Measurement Data

The EPA has developed a Data Quality Objective (DQO) process for use in the planning of environmental measurement projects. The DQO process has been used in the preparation of this QAPP and in the planning for this project. The results of the 7-step DQO process are shown in Figure A-2. The benefits of the DQO process are that it prompts a statement of the problem or issue, identifies the decision(s) to be made and the inputs needed to make the decision(s), and specifies a decision rule.

Following the DQO process, a set of quality criteria is defined for the measurement data. For this project, those criteria are given in Table A-1. These criteria are designed to provide accurate measurements of PM10 and determination of lead and toxic metals (arsenic, cadmium, chromium, manganese, nickel, and vanadium). The criteria for meteorological data measurements are patterned after the onsite regulatory meteorological monitoring guidance published by EPA (USEPA, 2008).

A5 Special Training/Certifications

All assigned to S.H. Bell monitoring activities will be thoroughly trained in the proper operation, calibration, and maintenance of the equipment to ensure continued collection of valid, representative data. The RTP Project Manager will document the type of training conducted and when the training was performed. This documentation will be kept in the RTP project file archived in RTP's Boulder, CO facility. RTP Personnel assigned to this project will have met the educational, work experience, responsibility, and training requirements for their position. Ambient monitoring professionals with several years of experience will have responsibility for conducting the significant quality control and quality assurance activities on site.

RTP will provide training updates to S.H. Bell staff, including the S.H. Bell Chicago facility Terminal Manager to understand basic site functionality and perform maintenance of the monitoring equipment as required. RTP will communicate with the S.H. Bell personnel and provide them with the required supplies and assistance, as needed.

Table A-1. DQO Process for S.H. Bell Company Chicago, IL Project

STEP 1	State the Problem	S. H. Bell has agreed to establish a program to conduct both FEM real-time PM10 monitoring at four monitoring locations and FRM PM10 filter-based monitoring at one monitoring location to determine on-site or off- site (whether upwind and/or downwind) contributions, if any, to the monitors. Additional manual sampling is needed to provide speciation data for metals and PM10.
STEP 2	Identify the Decision	An ambient air monitoring program conducted at the areas identified by predominant wind flow and potential for community impact. The speciation data will be used to assist in possible determination of PM10 sources.
STEP 3	Identify the Inputs to the Decision	Measurements of PM10 concentrations will be made at four (4) locations as 1-hour averages. Meteorological data (wind speed, wind direction, ambient temperature, barometric pressure) will be collected on a 5-minute basis at the existing meteorological station located in the central portion of the S.H. Bell Facility. Speciation samples will be obtained from two instruments located at monitoring station S4 (See Figure B-2).
STEP 4	Define the Study	The sampling locations and frequency of sampling are defined in Section B of the QAPP document.
STEP 5	Develop a Decision Rule	S.H. Bell will use the reported concentration levels and meteorological data to help assess net facility impacts and upwind background.
STEP 6	Specify the Limits of Decision Error	Calibration of the monitoring equipment will be conducted as specified in EPA guidance documents and quality control limits will conform to guidance. See Tables A-1 and A-2.
STEP 7	Optimize the Design	If the current system does not conform to the required QA/QC protocols, S.H. Bell will initiate corrective action to bring the program into conformance.

A6 Documentation and Records

The dataset created for this monitoring program will consist of these components stored for a minimum of five years in the project database:

- The hourly PM10 data from each of the four monitoring sites (from FRM continuous monitors);
- The laboratory analyses of manual samples (from FEM filter-based monitors) for PM10 gravimetric mass and select metals; and
- The 5-minute average wind speed, wind direction, ambient temperature, and barometric pressure at the meteorological monitoring site.

The following sources of information will support these data:

- Station log books (in hard copy and electronic format);

- Calibration and maintenance records for all measurement systems;
- Laboratory reports with quality control results;
- Operational information collected internally by each monitor or sampler;
- Data validation and editing instructions; and
- QA audits of field operations and monitor performance.

S.H. Bell's Chicago, Illinois facility is committed to fully documenting the PM10 monitoring program, including all activities related to data collection, analysis, and reporting. Table A-2 contains a list of the records maintained by the air monitoring program. These records can be electronic, bound in notebooks, logbooks, and/or forms that are used for specific applications. Electronic records and copies of the field logbook will be stored on a secured network computer and archived at RTP's and SH Bell's offices.

Table A-2. Documentation and Records Retention for S.H. Bell Company Chicago, IL Project

Documentation Type	Frequency	Responsible Person	Archive	Retention Period
Monitoring Data	Hourly Downloads for BAM 1020 Periodic Lab Reports for Filter-Based samples	RTP Project Manager	RTP Server (with backup)	> 3 years
High-Volume PM10 filters	1 in 3 sample schedule	Inter-Mountain Labs, Inc.	Inter-Mountain Labs, Inc.	> 3 years
BAM Filter Tape	Replaced as needed, approximately bi-monthly	RTP Project Manager	SH Bell facility	> 3 years
QAPP	Updated as needed	RTP/S.H. Bell	RTP	> 5 years
Copies of Field Logbooks	After the site visit	RTP Project Manager	SH Bell (copies to RTP)	> 5 years
Data Reports	Monthly	RTP/S.H. Bell	RTP	> 5 years

Table A-3. Quality Criteria for Measurement Data

1. Measurements of PM_{10} using EPA Federal Equivalent Method (FEM) Monitor (BAM-1020, EQPM-0798-122	
Sensitivity	Lower Detection Limit <4.8 µg/m³ 2cr, 1-hour average
Accuracy	Meets EPA Class III FEM Standard for additive and multiplicative bias; flow rate measurement accuracy ±4% at 16.7 LPM
Range	1-1000µg/m³
Completeness	75% sample capture rate or better quarterly for each monitor at each site (with the exception of Acts of God, loss of power, scheduled calibration/audit events, or other situations over which neither S.H. Bell nor their monitoring contractor have control)
Cycle Time	One hour
2. Measurements of Metals using EPA Method IO-3.5 (ICP-MS)	
Accuracy	±20% for analytical results above the reporting limit
Precision	±10% for analytical pairs above the reporting limit
Completeness	80% or better quarterly for each sampler (with the exception of Acts of God, loss of power, or other situations over which neither S.H. Bell nor their monitoring contractor have control)
3. Measurements of PM_{10} using EPA Federal Reference Method (FRM) Sampler (Tisch Environmental TE-6070 DV-BL, Federal Reference Number RFPS-0202-141)	
Accuracy	Flow rate measurement accuracy ±7% of the calculated Qa [Orifice] (USEPA, 1999a)
Precision	Not Applicable
Completeness	75% sample capture rate or better quarterly for each sampler (with the exception of Acts of God, loss of power, or other situations over which neither S.H. Bell nor their monitoring contractor have control)
3. Measurements of Meteorological Parameters using weather instruments (Climatronics/MetOne Wind Speed, Wind Direction, Temperature, Barometric Pressure)	
System Accuracy	As listed in Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 4, Appendix C
Precision	Not Applicable
Completeness	90% or better quarterly for meteorological data based on hourly averages with a minimum 75% completeness of 5-minute data to construct a valid hourly average (with the exception of Acts of God, loss of power, scheduled calibration/audit events, or other situations over which neither S.H. Bell nor their monitoring contractor have control)

B. MEASUREMENT DATA ACQUISITION

B1 Sampling Process Design

S.H. Bell will establish four monitoring sites at its Chicago, Illinois facility in accordance with the requirements detailed in USEPA's Section 114(a) request. Details of the source area, sampling methods, sample handling, analytical methods, Quality Control (QC), instrument testing and calibration and data management are described in the following sections.

B1.1 Source Environment Description

S.H. Bell's Chicago, Illinois facility is located in south Chicago, approximately 13 miles south of the city center, in the community of East Side between Lake Michigan and the Calumet River. The S.H. Bell facility is located approximately ½ mile west of Lake Michigan and is bordered to the west by the Calumet River. The elevation of the area is approximately 590' above sea level, and terrain is relatively flat.

The local land use categories include refining and heavy industry in the corridor along the Calumet River. Surrounding areas to the east and south are primarily residential. Minor river ports and canals are present in the area and provide access to Lake Michigan.

The climate of the area where the Terminals are located is characterized by cold winters and warm summers with occasional heat waves. The average temperature in January is 22 F and the average temperature in July is 73.3 F, although 90 F summer days are not uncommon.

The annual average snowfall in winter is 37.5" and the annual average precipitation total is about the same. The proximity of S.H. Bell to Lake Michigan's southernmost tip brings wind effects year-round. Annual wind roses for the S.H. Bell facility indicate a strong NW component. In general, the predominant wind direction in the vicinity of the site is from southwest to northeast. (See Figure B-2).

B1.2 Monitor Site Description

Figure B-2 shows the locations of the monitoring stations S.H. Bell will operate as part of this program. The yellow outline indicates the approximate property boundaries. An example historical wind rose plot from the S.H. Bell facility is shown in Figure B-2. Table B-1 lists the monitoring network configuration by site.

Figure B-1: Monitoring Site Locations for the S.H. Bell Chicago Facility

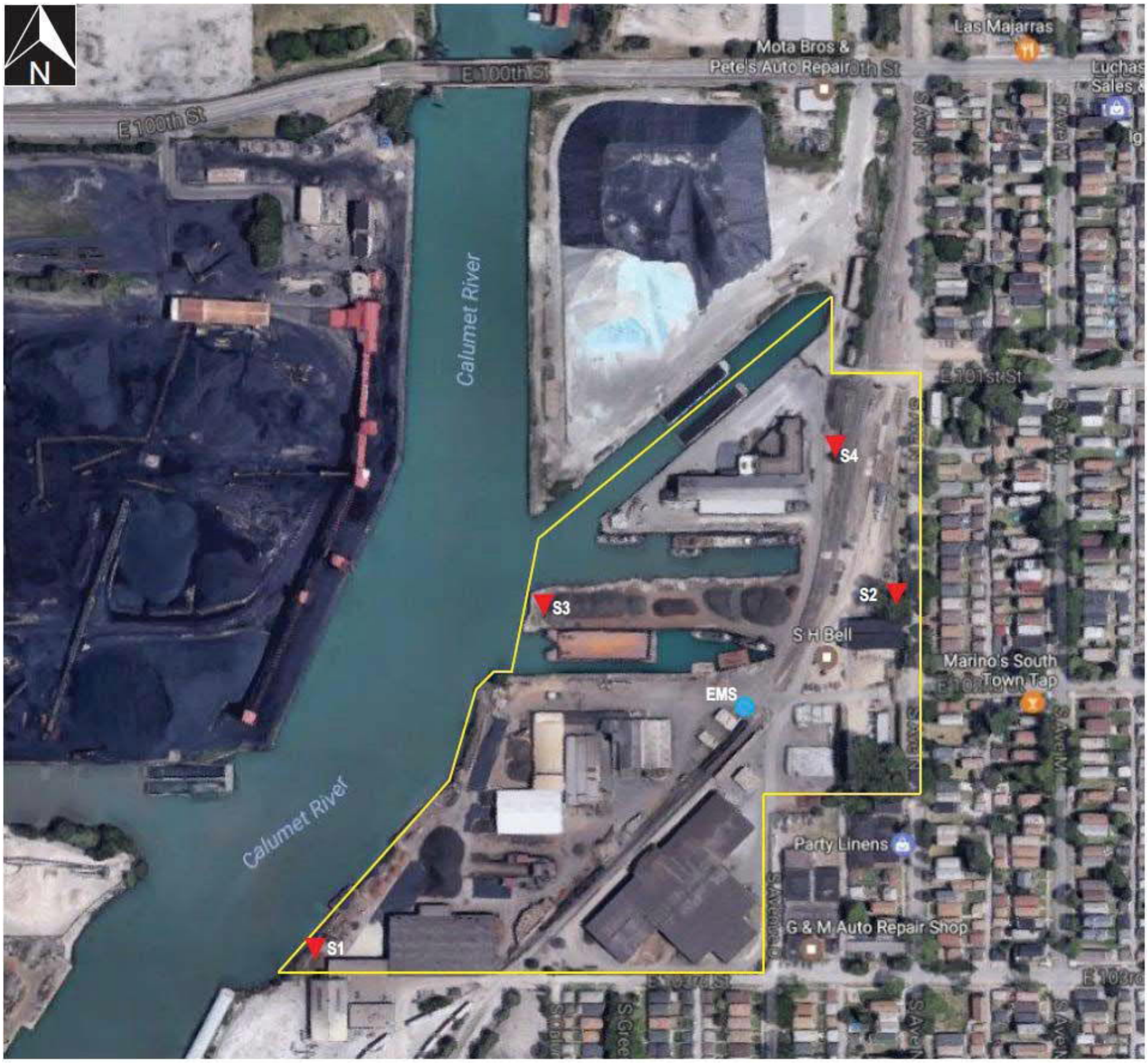
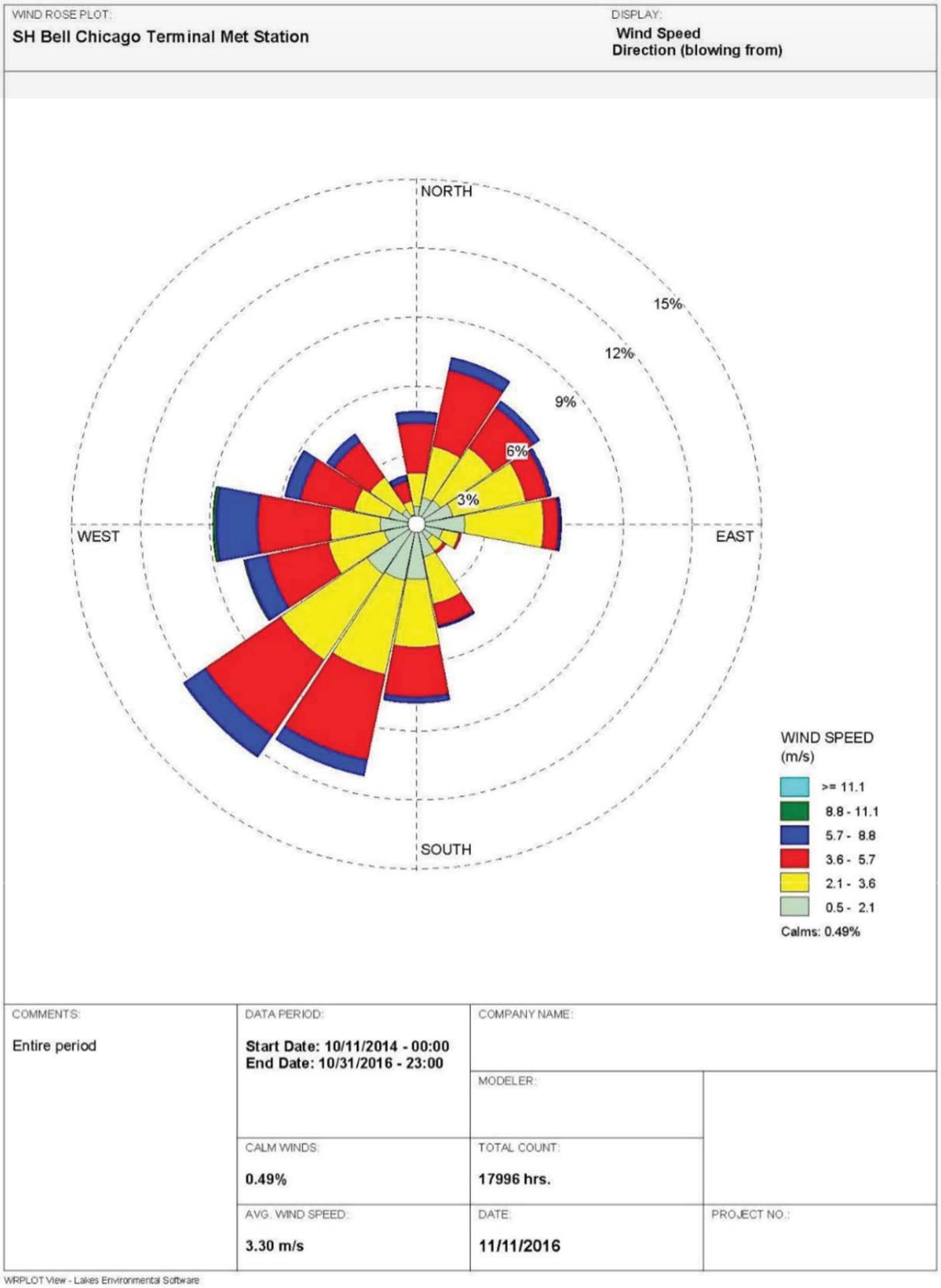


Figure B-2: Historical Wind Rose Data (October 2014 thru October 2016) for S.H. Bell Chicago Facility



B2 Sampling Methods Requirements

Sample collection methods are presented in this section as are sample documentation and control requirements that are applicable to the network. Three types of sampling methods have been identified for the S.H. Bell monitoring network. Hard copies of equipment manuals are kept on-site at the S.H. Bell facility inside each equipment shelter at S1, S2, S3, and S4. Electronic copies of the manuals are also stored on the RTP project server maintained at RTP's Boulder, CO facility.

Table B-1. S.H. Bell Monitoring Network Configuration by Site

Monitoring Site ID	Approximate Location		Monitoring Equipment
	Northing	Easting	
S1	41.708239	-87.544058	BAM-1020 monitor for PM10 (Continuous FEM)
S2	41.710553	-87.539204	BAM-1020 monitor for PM10 (Continuous FEM)
S3	41.710552	-87.542043	BAM-1020 monitor for PM10 (Continuous FEM) Agilaire 8872 Datalogger
S4	41.711541	-87.539607	BAM-1020 monitor for PM10 (Continuous FEM) Two (2) Tisch Environmental HiVol 6070 DV-BL Filter-Based FRM PM10Monitors
EMS (Existing Monitoring Station)	41.709841	-87.540376	Meteorological monitors (Climatronics: Wind Speed, Wind Direction, Temperature, Barometric Pressure, Data Logger)

B2.1 Sample Collection Methods

BAM-1020 FEM PM_{10}

The PM10 continuous monitors collect ambient particulate matter samples through a size-selective inlet that is designed to allow only particles with an aerodynamic diameter <10 µm to pass through to the measurement apparatus. PM10 is measured using the MetOne Instruments Model BAM-1020 (EPA designated Class III Federal Equivalent Method EQPM-0798-122).

At the beginning of each sample hour, a small 14C (carbon-14) element emits a constant source of high-energy electrons (known as beta rays) through a spot of clean filter tape. These beta rays are detected and counted by a sensitive scintillation detector to determine a zero reading. The BAM-1020 then advances this spot of tape to the sample nozzle, where a vacuum pump pulls a measured and controlled amount of outside air through the filter tape, loading it with ambient dust. At the end of the sample hour, this dust spot is placed back between the beta source and the detector, thereby causing an attenuation of the beta ray signal which is used to determine the mass of the particulate matter on the filter tape.

This mass is used to calculate the volumetric concentration of particulate matter in ambient air.

Specifications for the BAM-1020 are provided in Table B-2. The operation, calibration, and maintenance requirements of the BAM unit are outlined in the MetOne BAM-1020 manual "BAM 1020 Particulate Monitor Operations Manual, BAM-1020-9800, Rev H" (MetOne 2008). A hard copy of the BAM-1020 manual is kept in each of the four monitoring station buildings at S.H. Bell monitoring sites where they operate (S1, S2, S3, and S4). In addition, an electronic copy of the manual is available on the RTP server. The sample inlet height is approximately 3 meters, within the 2-7 meter inlet height specification.

Table B-2. BAM-1020 Specification

Parameter	Specification
Range	1 - 1000 µg/m3
Sensitivity Std Deviation (cr; 1 hr)	<2.4 µg/m3
Flow Rate	16.7 liters/ minute (LPM)
Beta Source	Carbon-14; 60µCi ±15 µCi
Operating Temperature*	0 to 50 C
Humidity Control	Active control inlet heater; 35% RH setpoint
Analog Output	0-1 VDC std; selectable voltage and current ranges
Memory	182 days @ 1 record/hour

*Operating temperature inside the equipment shelter

Tisch Environmental HiVol 6070 DV-BL Filter-Based FRM PM10

The Tisch Environmental Hi-Vol PM10 FRM samplers collect ambient particulate matter samples through a size-selective inlet that is designed to allow only particles with an aerodynamic diameter <10 µm to pass through to the measurement apparatus. PM10 is measured using the Tisch Environmental Model 6070 DV-BL sampler (EPA designated Federal Reference Method RFPS-0202-141). Specifications for the Model 6070 DV-BL are provided in Table B-3. The operation, calibration, and maintenance of the unit is in accordance with the August 10, 2010 revision of the Tisch Environmental, Inc Operations Manual for 6000-Series PM10 High Volume Air Samplers (Tisch, 2010). A hard copy of the Tisch Environmental Manual is kept in the monitoring station buildings at S.H. Bell monitoring site S4. In addition, an electronic copy of the manual is available to all project team members on the RTP server. The sample inlet height will be approximately 60 inches from the platform.

Table B-3. Tisch Environmental 6070 DV-BL Specification

Parameter	Specification
Particle Size	PM10
Flow Range	40 cubic feet per minute
Filter Size	8" x 10"
Federal Reference Method	RFPS-0202-141
Flow Control	Volumetric
Motor Type	Brushless
Timer	Digital, 11 day

Meteorological Measurements

An existing 10-meter meteorological tower was installed at the S.H. Bell Chicago facility in 2014. The tower is equipped with wind speed, wind direction, temperature and barometric pressure monitors. The tower continuously measures and records wind speed and wind direction at one-hour intervals. S.H. Bell is able to correlate 1-hour and 24-hour ambient PM10 measurements with wind speed and wind direction data to determine source direction and the effects of wind speed on PM10 concentrations. The meteorological tower also includes calibrated ambient temperature and pressure instrumentation to determine corrected (actual) PM10 concentrations as recorded by the monitors. The meteorological monitoring tower data collection, archiving, and monthly reporting will be performed regularly by RTP, following procedures described in EPA's Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 4, Appendix C. Table B-4 lists specifications for meteorological sensors.

Each meteorological monitor is wired into a Climatronics data logger with a network interface module at the meteorological tower. The data logger program for the meteorological equipment is LoggerNet. Meteorological monitoring tower remote data collection, archiving, and reporting will be performed regularly by RTP via cellular modem. Data will be archived and edited as necessary. Reports with hourly average meteorological data including wind speed, and wind direction will be provided to USEPA by S.H. Bell monthly. Semi-annual calibrations of the meteorological monitoring system will be performed using NIST-traceable test equipment. Wind speed sensors will be swapped and/or bearings replaced every 6 months. Wind direction sensors will be swapped and/or bearings replaced every 12 months. Completed calibration logs will be provided to S.H. Bell.

Table B-4. Meteorological System Components

Components	Climatronics/MetOne* Part Number)
Wind Speed Sensor (2)	100075S
Wind Direction (2)	100076S
Platinum Temperature Probe	T-200A*
Six Plate Radiation Shield	5980*
Barometric Pressure Sensor	102663-2*
Crossarm	101994-1
External Heaters	101235-G1
Heater AC Cable	101255-40
Wind Cable	100605-40
Data Logger in Enclosure	102700-G1
Battery Back-Up Power Supply	101139
AC Surge Protector	415
Signal Line Surge Protector	101904
Network Link Interface	CNL201
Windows Data Logger Software	LOGGERNET
Tower Kit - 34'	970895
Full Height Grounding Kit	100924

*Denotes MetOne part number. All others are Climatronics part numbers

Additional measurements of ambient temperature and barometric pressure will be collected from each BAM-1020 unit using onboard sensors, which enable them to calculate the correct flow rates for PM10 monitoring. Sensors will be sited according to EPA guidelines.

Shelters

Temperature controlled shelters (RTP 9004 series) with an equivalent insulation value of R-25 will be installed at each of the four monitoring sites (S1, S2, S3, and S4). Each shelter is equipped with a commercial-grade climate control system. All internal wiring meets or exceeds National Electrical Code (NEC). Each shelter is equipped with a sample inlet flange through which the BAM-1020 inlet tubing is routed. Roof flange also accommodates the BAM-1020 temperature/pressure data signal cable.

Data Systems and Software

The BAM-1020 units have onboard data logging capability of up to six months, so data values and diagnostic information are readily accessible. Agilaire's AirVision software is used to communicate with the BAM-1020s.

An Agailaire Model 8872 data logger is located at monitoring site S3. It is connected to the other three monitoring sites (S1, S2, and S4) with the use of radio modems to receive data from the BAM-1020 FEM monitors. The radio modem at S3 is a base unit that receives communication from the other remote radio modems at S1, S2, and S4. Data from the

Agilaire 8872 data logger is transmitted via cellular modem to RTP computers in Niles IL and Boulder CO. Figure B-3 provides an overview of shelter configurations at the four monitoring sites

Each meteorological monitor is wired into a Climatronics data logger with a network interface module at the meteorological tower. The data logger program for the meteorological equipment is LoggerNet.

Access to Monitoring Sites

In the event of a natural or man-made event which limits access to the site, sampling will be suspended until it is safe to access the site and resume sampling operations that may have been impacted. A record of the event and its impact will be documented in the appropriate site logbook and electronic project files and archived for a period of at least 5 years.

Figure B-3. Overview of Shelter Configurations

S1 (Monitoring Site 1)

S2 (Monitoring Site 2)

S3 (Monitoring Site 3)

S4 (Monitoring Site 4)

All datalogger, monitor, and sampler time settings will be set within ±60 seconds of the site technician's reference time obtained from a local cell phone network and checked at least once every 30 days. Instrument clocks that are more or less than 60 seconds from the reference clock shall be reset to within 60 seconds of the reference clock. Records of resets will be recorded in the appropriate site logbooks housed at each of the monitoring sites.

B2.2 Sample Documentation and Control Requirements

Field operation records include site visit and maintenance logs, checklists, chain of custody forms, continuous monitor calibration documents, high-volume sampler calibration and flow verification records, and meteorological calibration documents. All of these records are in electronic form, as spreadsheets or text files. All field operation records are returned at least monthly to the RTP project manager for inclusion in the project files. The automatic data polling systems for the continuous monitoring network is password protected and only RTP team members have access. Sample checklists and calibration documents are presented in Appendix A and an example chain of custody form for laboratory samples is presented in Appendix B. The chain of custody protocol will follow the general guidance of Section 8 of Volume II of the EPA QA Handbook and sample specific requirements for storage and handling in each applicable analytical method.

B3 Analytical Methods Requirements

The monitoring program will collect 24-hour PM10 filter samples from the Tisch Environmental High Volume Filter-Based FRM PM10 monitors that will undergo both gravimetric analysis and determination of lead and toxic metals. To optimize the sampling schedule, RTP will operate two Tisch Environmental Model 6070 DV-BL PM10 samplers at monitoring site S4. These samplers will operate from midnight to midnight, every three days, according to USEPA's 3-day sampling schedule. The USEPA's 2018 3-day sampling schedule is included as Appendix C. Particulate matter is collected on numbered, pre-weighted 8" x 10" filters supplied by Inter- Mountain Labs, Inc. in Sheridan, Wyoming. Samples will be collected approximately weekly, after every 1-3 sample events as determined by the sampling schedule and S.H. Bell's operating hours and returned to the Inter-Mountain Labs, Inc. in Sheridan, Wyoming for gravimetric analysis and determination of lead and toxic metals. Filter samples will be shipped to Inter-Mountain Labs, Inc. in Sheridan, Wyoming along with a signed Chain-of- Custody form. Shipping to the laboratory will be via UPS. Once samples arrive at the laboratory, the Chain-of-Custody is marked with sample receipt date, time, and initials. Copies of completed Chain-of-Custody forms will be submitted with laboratory data and archived in the electronic files at RTP for a period of at least 5 years.

Inter-Mountain Labs, Inc. will initially perform a gravimetric analysis of the filters to determine PM10 mass concentration using USEPA Compendium Method IO-2.1 (USEPA, 1999a). The mass concentrations produced should provide a general indication of measurement agreement with the BAM-1020 continuous monitors at each of the S.H. Bell Chicago facility's four monitoring sites.

Following gravimetric analysis, for the determination of lead and toxic metals (arsenic, cadmium, chromium, manganese, nickel, and vanadium), filters are extracted using microwave or hot acid, then analyzed by inductively coupled plasma/mass spectrometry (ICP/MS). Inter-Mountain Labs, Inc. performs the extraction procedure in accordance with USEPA's Inorganic Compendium Method IO-3.1 (USEPA, 1999b). Inter-Mountain Labs, Inc. performs the determination of metals by ICP/MS in accordance with USEPA's Inorganic Compendium Method IO-3.5 (USEPA, 1999c). The estimated Method Detection Limit (MDL) for each of the target metals is listed in Table B-5.

Table B-5. Estimated Method Detection Limits for Target Metals

Metal	Method Detection Limit (in ng/m^3)
Arsenic	0.52
Cadmium	0.10
Chromium	0.26
Lead	0.10
Manganese	0.26
Nickel	0.52
Vanadium	0.52

*ng/m3 - nanograms per cubic meter

Laboratory records include sample filter IDs, chain-of-custody forms matching filter ID to sample ID, raw data files from the analysis, QC check data, analysis reports, and electronic data files for transmittal to the project database. The laboratory is responsible for maintaining these records, and long-term archival of records is accomplished using a well-defined laboratory procedure. Each time that the lab receives field samples, sample login e-mail verification is sent to RTP as a scanned Adobe Acrobat file of the chain-of custody form.

An important consideration of the analytical work is the treatment of data at low concentrations near the method detection limit for the laboratory. Each laboratory has two boundaries within its S.H. Bell reporting protocol: the Method Detection Limit (MDL) and the Reporting Limit (RL). Each target compound on the S.H. Bell list has a unique MDL and RL. The RL is typically five times higher than the MDL, and results reported within this concentration range between MDL and RL are flagged as such. The precision and accuracy specifications are applicable to measurement data at or above the RL, and lower concentration data are possibly outside the quality specifications and should be treated accordingly by data users. The laboratory analysis conditions, such as sample or digestate volume can vary slightly from sample to sample, so these numbers are not absolute.

In accordance with Appendix B-9 of the RFI, Inter-Mountain Labs, Inc. will archive all filters from the PM10 filter-based instruments for at least three years. SH Bell will archive all filter tape from the PM10 continuous monitors for at least three years as well.

B4 Quality Control Requirements

The quality control (QC) methods employed in the S.H. Bell Chicago monitoring network are described in this section. Field QC efforts are described in Section B4.1 and lab QC efforts are described in Section B4.2.

B4.1 Field Quality Control

Field quality control encompasses several areas of concern. The tasks required of the field technician to promote quality are as follows (calibration tasks are discussed in Section B5):

Documentation

The operator will maintain a file of site information that will include site visit and maintenance logs, operator checklists and calibration data. A logbook and field forms are kept in the monitoring equipment shelters at each of the S.H. Bell Chicago monitoring stations (S1, S2, S3, and S4). Copies of this documentation will be forwarded to the project team at least monthly, and these items will be retained in the project files. Submittal via electronic mail is acceptable. Examples of the calibration data sheets and operator checklists are presented in Appendix A.

PM10 Continuous Monitor Checks (BAM-1020)

Monthly leak check, quarterly flow rate check and temperature/pressure transducer checks, and yearly 72-hour zero checks will be performed on the BAM-1020s. In addition, leak checks and flow or temperature/pressure checks will also be performed after any major maintenance, as recommended in the BAM-1020 manual. Additional maintenance checks are listed on the monthly QC spreadsheet used for this project (an example is shown in Appendix A).

High-Volume PM10 Monitor Checks (TE 6070 DV-BL)

Appendix B includes a sample Chain-of-Custody (COC) form and sample Particulate Sampler Field Envelope for the contract laboratory performing gravimetric analysis and determination of lead and toxic metals (Inter-Mountain Labs, Inc.). Five-point multi-point calibrations will be performed on the TE 6070 DV-BLs annually, and single point flow verifications will be performed quarterly. Checks will be recorded on a QC spreadsheet. Additional maintenance checks are listed on the monthly QC spreadsheet used for this project (an example is shown in Appendix A).

Meteorological Equipment Checks

The field technician will visually inspect the meteorological equipment at each visit (approximately weekly) for signs of deterioration or damage. Any damage will be reported to RTP. The meteorological sensors will be calibrated with NIST-traceable test equipment. The field technician will also review recent data and compare it to local weather reports or National Weather Service conditions for the area.

All sensors are initially calibrated and certified by the instrument manufacturer and then compared to a traceable standard under ambient conditions every six months when deployed to the field.

The ambient temperature and barometric pressure sensor outputs will be compared to traceable temperature and pressure standards of known accuracy every six months with the meteorological system calibration. The monthly check for the onboard temperature and pressure sensors for the BAM is documented on the BAM QC form, since the temperature and pressure readings are critical to subsequent PM10 mass calculations. A summary of service checks is proved in the BAM manual (refer to Section 7 of the manual).

Shelter Checks

The shelter's role in quality control is to provide a temperature-controlled environment in which the monitoring equipment can operate at optimum performance. Monitors and data loggers must be housed in a shelter capable of fulfilling the following requirements:

- The shelter must protect the instrumentation from precipitation and excessive dust and dirt, provide third wire grounding as in modern electrical codes, meet federal Occupational Safety and Health Administration regulations, and be cleaned regularly to prevent a buildup of dust.
- The shelter must protect the instrumentation from any environmental stress such as vibration, corrosive chemicals, intense light, or radiation.

B4.2 Laboratory Quality Control

The following lists present some of the common quality control procedures required by the methods for each type of analysis. Specific quality control measures are provided in the laboratory SOP documents kept on file and available via request at Inter-Mountain Labs, Inc..

Gravimetric Analyses

Laboratory quality control for gravimetric mass analyses by USEPA Compendium Method IO-3.1 includes the following:

- Use media that meet the requirements for sampling presented in IO Method IO-3.1 Section 4.
- Equilibrate media under the temperature and humidity control requirements of the Method before weighing.
- Use the same microbalance for pre- and post-sampling weighing events.
- Calibrate the microbalance using Class S standard weights.
- After every tenth weighing, re-zero the balance and perform a standard weight check.
- Reweigh 10% of the samples using a different analyst.

Metals Analyses

Laboratory quality control procedures for metals analyses by USEPA Compendium Method IO-3.5 includes the following:

- Use at least two calibration standards, and one calibration blank while performing initial calibration.
- While performing calibration verification checks, use calibration standards from a different vendor.
- Analyze a calibration blank before each run.
- Run interference check standards though the analyzer.
- Use continuing calibration standards to check the response of the instrument, as required, depending on the number of filters in a batch.
- A reagent blank should be tested.
- Laboratory control spikes should be used after each batch of samples.
- Analyze a matrix spike during each run.
- Test a duplicate or spike duplicate after testing a group of samples.

Sample Naming Convention

RTP will be using the following sample naming convention to create unique sample identification (ID) designations for each field sample collected during the S.H. Bell monitoring study. Samples will be identified using the following format:

AABBB-MMDDYY-V

Where:

- AA is the collection location; S1 for Site 1, S2 for Site 2, S3 for Site 3, and S4 for Site 4
- BBB is the instrument #, HV1 for High-Volume Sampler #1, and HV2 for High-Volume Sampler #2
- MMDDYY is the sample month, day, and year
- V is the type of sample; R indicates a routine sample and B indicates a trip blank

For example, S4HV1-030817-R represents a regular sample collected on March 8, 2017 at High-Volume Sampler # 1 at Monitoring Site S4.

B4.3 Equipment Testing, Inspection, and Maintenance

Specific tasks for periodic testing, inspection, and maintenance are required for the air sampling and monitoring equipment to provide sufficient quality control to remain within the manufacturer's operating specifications and ensure that the project quality goals are met. Initial system integration testing and verification of each instrument and sampler was performed prior to deployment to the field. Additional setup tasks, operational checks and verifications were performed during commissioning of the particulate monitoring stations February 27-28, 2017. The maintenance tasks are summarized for each type of equipment below. These activities must be documented in the site visit logbook kept at each of the S.H. Bell Chicago monitoring locations. The Project Manager should provide a schedule for all activities and checklists to the field technician. Common consumable parts are maintained in the field technician's possession at the S.H. Bell Chicago facility. Additional parts may be obtained from RTP facility located in Boulder, CO. Less common replacement parts and consumables are available for expedited delivery to site via common carrier.

PM10 Continuous Monitor Maintenance (BAM-1020)

Each BAM-1020 PM10 monitor requires periodic maintenance as specified by the manufacturer. Instrument Manuals are provided at each of the S.H. Bell Chicago monitoring sites, and detail the required periodic maintenance tasks (Refer to Section 7.1 of the BAM-1020 manual). To assure proper instrument functionality, the maintenance tasks and schedule must be followed and performed at prescribed intervals or in response to an identified decrease in instrument performance. At minimum, the Continuous PM10 monitor requires the following maintenance:

- nozzle and vane cleaning,
- leak check
- one-point flow system check
- capstan shaft and pinch roller tire cleaning
- PM10 inlet particle trap cleaning
- inspection of filter tape
- checking error logs
- checking real-time clock

High-Volume PM10 Maintenance (TE 6070 DV-BL)

Maintenance of the High Volume PM10 Samplers, TE-6070 DV-BL, is to be performed in accordance with the procedures outlined in in the Operations Manual (Refer to Routing Maintenance Section). Manufacturer prescribed routine maintenance includes the following items (Refer to Sampler Operation Section for procedures and maintenance tasks):

- inspection of all gaskets and seals
- inspection of filter screen and removal of any foreign objects
- inspection of filter media holder
- inspect elapsed time indicator
- clean any excess dirt

Additional quarterly maintenance includes:

- cleaning of the inlet and motor/housing gaskets

Meteorological System Maintenance

The operator must perform an inspection of the tower and associated equipment and perform maintenance activities regularly. The inspection should include verifying the functionality of the wind vane and anemometer and verifying that the temperature/pressure aspirator shield fin set is free from debris. A visual inspection of the signal cables and fastening hardware should be conducted at three-month intervals and during either a system calibration or audit.

B4.4 Acceptance Requirements for Supplies and Consumables

Instrument spare parts, replacement parts and consumables are obtained either directly from the original equipment manufacturer (OEM), authorized distributor, or from a scientific equipment/ materials vendor whose products meet or exceed the OEM specifications or are commonly available (i.e. silicone grease).

B5 Instrument Calibration and Frequency

This section describes the calibration methodology and frequency for each type of measurement conducted in the S.H. Bell PM10 monitoring network.

B5.1 Calibration Requirements for PM10 Continuous Monitors (BAM-1020)

Each BAM-1020 unit deployed to the field carries a factory calibration. Copies of the Certificate of Calibration are included in the 3-ring binders at each of the S.H. Bell Chicago monitoring sites.

During the first quarterly maintenance, the BAM-1020 is subjected to the Background Zero Test (BKGD). The zero-correction check is a 72 hour test utilizing a zero-filter kit installed in place of the PM10 sample inlet heat. Refer to Manual for detailed procedure. Upon completion of the BKGD, a new zero offset value is updates in the monitor's firmware. Subsequent BKGD tests are performed during the Annual Service visits or after major repairs but not less frequently than every 12 months.

Annual Three Point Flow System Calibration. All flow calibrations require a traceable reference flow meter and must include measurements for flow, temperature and pressure in one unit. Each flow calibration process should include an initial leak check, nozzle and vane cleaning, final leak check, three-point flow check (15.0, 18.4 and 16.7 LPM) and calibration if required. Refer to Manual Sections 5.4 - 5.8 for procedures.

The Filter Relative Humidity (RH), Filter Temperature Sensor Test and Smart Heater Test should be performed annually. Refer to Instrument Manual for procedures.

Additional checks include the Beta detector count rate and dark count test check, zero background check, span foil check and should be performed annually.

Factory recalibration is not required except for units sent in for major repairs.

B5.2 Calibration Requirements for High-Volume PM10 Samplers (TE 6070 DV-BL)

Flow Verification/Calibration of the TE-6070DV-BL is to be performed upon initial installation, then quarterly and after any motor maintenance.

The TE-5028 is the preferred method to calibrate PM10 High Volume Air Samplers. It simulates change in the resistance by rotating the knob on the top of the calibrator. The infinite resolution lets the technician select the desired flow resistance. The TE-5028 calibration kit includes: 30" slack tube water manometer, adapter plate, 3' piece of tubing, and TE-5028A orifice with flow calibration certificate. Each annual calibration consists of five points, of which three must be within 36 to 44 CFM.

After calibration, the calculated % difference of calibrator versus sampler flow rates must be within +/-4%. Refer to Sampler Manual, Calibration Procedure for TE-6070DV-BL for complete calibration procedure, including the initial leak check requirement.

B5.3 Calibration Procedures for Meteorological Monitors

Meteorological sensors are calibrated in accordance with the EPA guidance and performed not less frequently than annually. Verifications and calibrations will be performed in accordance with the manufacturer procedures as listed in the sensor manuals. Additional calibrations will be performed following any sensor repair or replacement.

B6 Data Acquisition Requirements

The BAM-1020 instruments produce signals which are transmitted to the Agiliaire 8872 data acquisition system via radio modem, where the signals are digitized and converted to engineering units and stored in electronic memory. The BAM 1020 units are polled hourly by the Agilaire 8872 data acquisition system located at S3. The data is then polled via the RTP server.

Data collected from S.H. Bell Chicago will be reviewed daily. Computerized inspection and visual inspection of these data will be performed daily. Values that fall outside of prescribed limits (Tables B-6, B-7, and B-8) will be evaluated by a data reviewer and corrections to data will be documented. Abnormal data values or problems will be reported as soon as possible to the RTP Project Manager who will initiate corrective action and determine if a special site visit is required.

Table B-6. Critical Criteria for PM10 Monitoring

Requirement	Frequency	Acceptance Criteria	Reference	Action
PM10 Continuous (BAM-1020)				
Sampling Period	Every 24 hours of operation	1440 minutes ± 60 minutes midnight to midnight local standard time	40 CFR Part 50, App. J Section 9.15	Verify prior to sampling
One Point Flow Rate Verification	1/month	::±7% of transfer standard	40 CFR Part 58, App. A Section 3.2.3 3) Method 2.10 Table 3-1	If values outside acceptance criteria, leak-check/recheck flow
PM10 Filter-Based (TE 6070 DV-BL)				
Sampling Period	All filters	1440 minutes ± 60 minutes midnight to midnight local standard time	40 CFR Part 50, App. J Section 7.1.5	Verify prior to sampling
One Point Flow Rate Verification	1/3 months	::±7% of transfer standard and 10% from design	40 CFR Part 58, App. A Section 3.2.3 3) Method 2.11 sec 3.5.1, Table 2-1	If values outside acceptance criteria, inspect/recheck flow

Table B-7. Operational Criteria for PM10 Monitoring

Requirement	Frequency	Acceptance Criteria	Reference	Action
PM10 Continuous (BAM-1020)				
System Leak Check	Within 5 days of beginning sampling; 1/month	1.5 SLPM	Method 2.11 sec 2.3.2	Check O-Rings Check Vacuum line to pump Inspect Nozzle
Multi-Point Flow Rate Verification	1/year following startup	3 of 4 cal points within + 10% of design	40 CFR Part 50 App J sec 8.0 2 and Method 2.10 Sec 2.2.4	If values outside acceptance criteria, leak-check/recheck
Semi-Annual Flow Rate Audit	1/6 months	16.67 SLPM ± 10%	40 CFR Part 58, App A, sec 3.2.4 and Method 2.10 Sec 7.1.5	Check O-Rings Check Vacuum line to pump Inspect Nozzle
Inlet/Downtube Cleaning	1/3 months	Clean	Method 2.10 sec 6.1.2	
PM10 Filter-Based (TE 6070 DV-BL)				
Multi-point flow rate Verification/Calibration	1/yr	3 of 4 cal points within + 10% of design	1, 2 and 3) Method 2.11 sec 2.3.2	Points outside acceptance criteria are repeated. If still outside, consult manufacturer's manual
Field Temp M-point Verification	at installation, then 1/yr	+ 2°C	1,2 and 3) Recommendation	
Semi Annual Flow Rate Audit	1/6 mo	+ 7% of transfer standard and 10% from design	1 and 2) 40 CFR Part 58, App A, sec 3.3.3 3) Method 2.11 sec 7 Table 7-1	Tighten VFC device to blower. Check for leaks at the orifice plate
Maintenance of Impactor Plate	1/month	Clean/Re-grease	Manufacturer recommendation	
Manufacturer-Recommended Maintenance	per manufacturers' SOP	per manufacturers' SOP	NA	

Table B-8. Systematic Criteria for PM10 Monitoring

Requirement	Frequency	Acceptance Criteria	Reference	Action
PM10 Continuous (BAM-1020)				
Sampler/Monitor	NA	Meets requirements listed in FRM/FEM/ARM designation	40 CFR Part 58 App C Section 2.1 NA 40 CFR Part 53 & FRM/FEM method list	
Siting	1/year	Meets siting criteria or waiver documented	40 CFR Part 58 App E, sections 2-5 Recommendation 40 CFR Part 58 App E, sections 2-5	
Data Completeness	24-hour quarterly	23 hours > 75%	Recommendation 40 CFR Part 50 App. K, sec. 2.3	
Reporting Units	all filters	µg/m3 at standard temperature and pressure (STP)	40 CFR Part 50 App K	
Verification/Calibration Standards and Recertification		All standards should have multi-point certifications against NIST Traceable standards		
Flow Rate Transfer Std.	1/yr	+ 2% of NIST-traceable Std.	1,2 and 3) 40 CFR Part 50 App J sec 7.3	
Field Thermometer	1/yr	+ 0.1° C resolution, + 0.1° C accuracy	1,2 and 3) Method 2.10 section 1.1.2	
Field Barometer	1/yr	+ 1 mm Hg resolution, + 5 mm Hg accuracy	1,2 and 3) Method 2.10 section 1.1.2	
Clock/timer Verification	1/6 mo	15 min/day	1,2 and 3) Method 2.10 sec 9	

Table B-8. Systematic Criteria for PM10 Monitoring (Continued)

Requirement	Frequency	Acceptance Criteria	Reference	Action
PM10 Filter-Based (TE 6070 DV-BL)				
Sampler/Monitor	NA	Meets requirements listed in FRM/FEM/ARM designation	40 CFR Part 58 App C, Section 2.1 NA 40 CFR Part 53 & FRM/FEM method list	
Siting	1/year	Meets siting criteria or waiver documented	40 CFR Part 58 App E, sections 2-5 Recommendation 40 CFR Part 58 App E, sections 2-5	
Data Completeness	quarterly	> 75%	1,2 and 3) 40 CFR Part 50 App. K, sec. 2.3b & c	
Reporting Units	all filters	µg/m3 at standard temperature and pressure	1,2 and 3) 40 CFR Part 50 App K sec. 1	
Precision				
Single analyzer	1/3 mo.	Coefficient of variation (CV) < 10% > 15 µg/m3	1,2 and 3) Recommendation	
Single analyzer	1/ yr	CV < 10% > 15 µg/m3	1,2 and 3) Recommendation	
Verification/Calibration Standards and Recertification		All stds should have multi-point certifications against NIST Traceable stds		
Flow Rate Transfer Std.	1/yr	+ 2% of NIST-traceable Std.	40 CFR Part 50, App.J sec 7.3 Method 2.11 Sec 1.1.3 40 CFR Part 50, App.J sec 7.3	
Field Thermometer	1/yr	+ 0.1° C resolution, + 0.5° C accuracy	1,2 and 3) Method 2.11 Sec 1.1.2	
Field Barometer	1/yr	+ 1 mm Hg resolution, + 5 mm Hg accuracy	1,2 and 3) Method 2.11 Sec 1.1.2	
Clock/timer Verification	4/year	5 min/mo	recommendation	

B7 Data Management

The proper management of all data is critical to assuring the quality and usability of the monitoring results. As such, procedures have been implemented to ensure robust data acquisition, validation, reduction, reporting, and storage of electronic data. PM10 monitoring data will be recorded and stored at the site using an Agilaire Model 8872 data logger. PM10 data will be retrieved from the monitoring site hourly via internet connection to the RTP server. In addition, the monitoring site can be called from any computer having the correct software and the IP address and appropriate credentials.

All electronic calculations and statistical analyses will be performed using standard software (Microsoft Excel) and the software associated with the Agilaire Model 8872 data logger. All project documentation, records, data, and reports will be stored for at least five years following project completion. The data are stored on the RTP server at which are backed up nightly and are archived on and offsite.

PM10 data will be reviewed routinely by the RTP Project Manager. These data will be subjected to several levels of quality control, validation and quality assurance as discussed in Section Validated data are compiled into the final database for further analysis and report preparation. The final database is processed and stored on the RTP server and then archived on various storage media and maintained in duplicate in more than one location for protection.

The Data Manager will archive data on the RTP server which is backed up nightly and archived on and off-site. Additionally, BAM filter tape will be collected from site and archived by SH Bell for at least 3 years. Inter-Mountain Labs, Inc. will archive filters for a period of at least 3 years at their facility in Sheridan, Wyoming.

PM10 Continuous Monitor (BAM-1020) Data Reporting

The PM10 hourly concentrations from continuous monitors will be reported on a monthly basis in accordance with the USEPA Region 5 RFI dated March 9, 2015 (USEPA, 2015, Appendix B, 18), within 14 days of the end of the month in which it was collected (i.e., continuous data collected March 1-31, 2017 will be reported by April 14, 2017.

High-Volume PM10 (TE 6070 DV-BL) Data Reporting

Reporting of the data from the PM10 filter-based samplers which undergo gravimetric analysis and determination of lead and toxic metals specified in the USEPA Region 5 RFI dated March 9, 2015 (USEPA, 2015, Appendix B, 4.e), will be in the format submitted by the contract laboratory. Gravimetric concentrations are reported based on standard conditions, while metal concentrations are based on actual conditions.

Below is an example timeline detailing the sample collection and reporting process for filter-based samples. Please note that sampler pick-up for the High-Volume PM10s can vary by 2 days (e.g., if the sampler finishes collecting on a Friday at Midnight, the filter pick up will not be until Monday morning based on S.H. Bell's normal business operation hours).

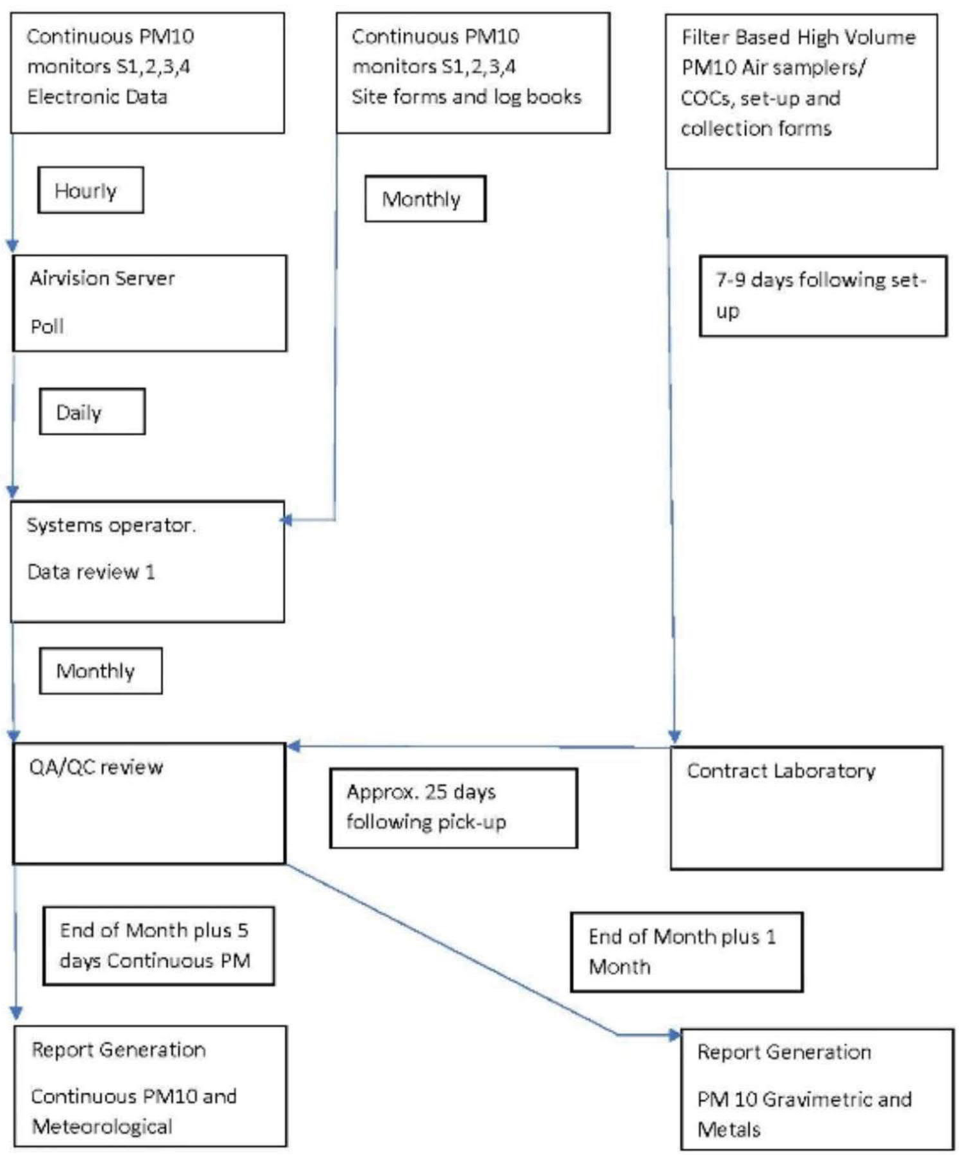
- Days 0-6 - Samples are collected from S4HV1 and S4HV2 in accordance with the USEPA 3-day sampling schedule (Appendix C)
- Day 7 - On the first business day following the completion of the sampling events, the two samples are collected (one from S4HV1 and one from S4HV2).
- Day 8 - Samples are shipped to Inter-Mountain Labs, Inc. in Sheridan, Wyoming
- Day 9 - Transport to laboratory
- Day 10 - Laboratory check in
- Day 11-12 - Filter conditioning (pre-gravimetric analysis)
- Day 13-18 - ICP/MS analysis
- Day 19-20 - Report preparation by the laboratory
- Day 20-25 - RTP receipt and review and final QA/QC of the data
- Day 26 - Reporting*

*Note: Date received after the 26th will be included with the high-volume data for the following month.

Data may also be marked with a qualifier code (Null Code) to denote suspect or invalid data if necessary.

Figure B-4 presents the data flow path for collecting, storing, and managing all data generated in the network.

Figure B-4. Data Management Tasks for S.H. Bell Chicago Monitoring Network



C. ASSESSMENT AND OVERSIGHT

C1 Assessment and Response Actions

The project team includes a quality assurance (QA) specialist who is responsible for independent assessment of the measurement efforts. This individual may be part of the same corporate organization as the project team, but performs no duties or holds no interests in the operation of any of the monitoring sites and networks that undergo audits. Assessments conducted for this project are divided into two categories: Technical Systems Audits and Performance Evaluation Audits. Technical audits qualitatively document the degree to which the procedures and processes specified in the QAPP are followed. Performance evaluations quantitatively test the ability of a measurement system to obtain acceptable results. Both provide information regarding the compliance of environmental data collection efforts as described in the QAPP. All performance and technical systems audits are conducted following the guidance documents in the "EPA Quality Assurance Handbook" series, Volumes I, II, and IV.

C1.1 Technical Systems Audits

Technical Systems Audits (TSAs) are conducted to determine the project personnel and equipment are functioning as prescribed in the QAPP. TSAs are performed onsite and may examine facilities, equipment, personnel, training, procedures, record keeping data validation, data management and analysis of a measurement system. The audit is conducted employing a checklist as a guide to the major topics to be assessed, and the auditor is free to allot greater amounts of time to any particular area as needed. A checklist is prepared in advance of the audit and is based on information presented in the QAPP and the guidance of the EPA QA Handbook series (USEPA, 2000).

From this assessment, the auditor is able to determine the level of adherence to the specifications relating to quality assurance objectives detailed in the QAPP. This review includes traceability documentation for standards and test equipment used to conduct quality control checks on pollutant monitors and meteorological sensors. Where the specification appears incomplete or inadequate, the auditor should be able to apply EPA guidance document information and personal experience in assessing whether the quality of the monitoring activity will produce defensible data. An example TSA field checklist for a BAM-1020 is presented in Figure C-1.

Figure C-1. Example TSA Checklist for BAM-1020

BAM-1020 Audit Sheet

Model: BAM-1020 **Site/Serial #:** ______

Audit Date: ______ **Audited By:** ______

Flow Audits				
Flow/Temp/Pressure Standard Used:	Model: BGI deltacal	Serial No: 156665	Calibration Date: 4/4/2018	

		BAM	Ref. Std.		BAM	Ref. Std.
Leak Check Value:	as found:	Slpm		as left:	slpm	
Ambient Temperature:	as found:	C	C	as left:	C	C
Barometric Pressure:	as found:	mmHg	mmHg	as left:	mmHg	mmHg
Flow Rate 15.0 lpm:	as found:	lpm	lpm	as left:	lpm	lpm
Flow Rate 18.4 lpm:	as found:	lpm	lpm	as left:	lpm	lpm
Flow Rate 16.7 lpm:	as found:	lpm	lpm	as left:	lpm	lpm

Mechanical Checks					
Pump muffler unclogged:	as found ☐	as left ☐	PM10 particle trap clean:	as found ☐	as left ☐
Nozzle/Vane clean:	as found ☐	as left ☐	PM10 drip jar empty:	as found ☐	as left ☐
Sample spot sharp edges:	as found ☐	as left ☐	PM10 bug screen clear:	as found ☐	as left ☐
Capstan shaft clean:	as found ☐	as left ☐		☐	☐
Rubber pinch rollers clean:	as found ☐	as left ☐	Inlet tube water-tight seal OK:	as found ☐	as left ☐
Chassis ground wire installed:	as found ☐	as left ☐	Inlet tube perpendicular to BAM:	as found ☐	as left ☐

Analog Voltage Output Audit		N/A ☐
DAC Test Screen	BAM Voltage Output	Logger Voltage Input
0.000 Volts	Volts	Volts
0.500 Volts	Volts	Volts
1.000 Volts	Volts	Volts

Span Membrane Check	
LAST m:	mg/cm2
ABS:	mg/cm2
Difference:	mg/cm2
Difference:	%

BAM Clock	
BAM Date:	
BAM Time:	
Actual Time:	
Set? (Y/N)	

SETUP > SAMPLE Settings		
Parameter	Expected	Found
RS232	9600	
BAM SAMPLE	50 min	
STATION #	001	
MET SAMPLE	60 min	
RANGE	1.000 mg	
OFFSET	-0.015 mg	
CONC UNITS	mg/m3	
COUNT TIME	4 min	

SETUP > CALIBRATE Settings		
Parameter	Expected	Found
FLOW RATE	16.7 lpm	
FLOW TYPE	ACTUAL	
CONC TYPE	STD	
Cv	NA	
Qo	NA	
ABS	NA	
µ sw	NA	
K	NA	
BKGD	NA	
STD TEMP	25 C	
HEATER	AUTO	

Other Settings		
Parameter	Expected	Found
e1	-0.015 mg	
Cycle Mode	STANDARD	
RH Control	YES	
RH Setpoint	35%	
Datalog RH	YES	
Delta-T Control	NO	
Delta-T Setpoint	99	
Datalog Delta-T	NO	

Last 8 Errors in the BAM-1020 Error Log					
Error	Date	Time	Error	Date	Time
1			5		
2			6		
3			7		
4			8		

Notes:

C1.2 Performance Evaluation Audits

Continuous PM10 monitor and FRM sampler performance audits consist of a leak check, a flow rate measurement accuracy check, and verification of the temperature and pressure transducer measurement accuracy (for continuous monitors).

Performance audits for meteorological sensors are accomplished by direct comparison with an audit standard. For the wind direction sensor, the output of the sensor with the vane turned to a series of known directions is assessed, as is the orientation of the vane with respect to true north. The wind speed sensor is tested using a traceable certified motor drive unit. The ambient temperature and barometric pressure audits are conducted using collocated audit standards. A digital thermistor unit with certified traceability is used for temperature and a traceable barometer is used to test the site pressure transducer.

C1.3 QAPP Revisions

If revisions to the S.H. Bell Company Chicago, IL facility QAPP are needed, any modifications will be approved by S.H. Bell Company, submitted to USEPA Region 5 for review and comment, and a revised edition will be distributed to all appropriate individuals on the distribution list presented as table Intro-1 of this document. S.H. Bell Company will be responsible for QAPP revision and distribution.

C2 Reports to Management

Reports for field performance and technical systems audits include a statement of the scope of the audit, summary presentation of results, and a listing of specific observations or findings related to the specifications under review. The field data and traceability documents for each audit standard employed are included. The auditor should always provide the field technician and/or the operations task leader a list of preliminary findings and recommendations during a debriefing meeting held at the conclusion of the audits. If significant deficiencies are determined that impact the ability of the system to properly function, the RTP Project Manager will be notified immediately. The RTP Project Manager will notify S.H. Bell representatives of the situation. A formal report should be provided to the project team within two weeks of completion of the audits. If there are no corrective action items, the auditor may close the audit. If further action is required, the audit will be classified as open pending verification that the corrective action was completed and the audit specification is being met. This information will be supplied to EPA as part of the standard reporting effort.

The designated project team member will have the responsibility for follow-up on audit recommendations and provide a written response to the findings and communicate the outcome of the corrective action effort. If the auditor does not receive a response or the response is inadequate, he must communicate the situation to the Project Manager.

Accuracy, precision, and completeness statistics are also computed for each measurement as applicable, per the quality assurance guidance in 40 CFR Part 58, Appendix A. A review of laboratory detection limits will be conducted to ensure that the reported limits meet the nominal values stated in this QAPP. The computations for flow rate measurement accuracy are as described in Volume II and the computations for meteorological measurement accuracy are as described in Volume IV of the EPA QA Handbook (USEPA, 2013 and USEPA, 2008, respectively).

Precision of PM10 measurements between the two methods that are employed is evaluated by least squares regression slope comparison of FEM and FRM PM10 data for sample data pairs <60µg/m3 at S.H. Bell Chicago monitoring Site S4, where these samplers are co-located. Laboratory analysis precision is compared to the method requirements for analytical duplicate analyses.

Completeness is calculated as the ratio of valid samples or hours of data compared to the total planned number of samples or operational hours of data attempted to be collected, expressed as a percentage.

Accuracy data are generated by the audit staff, as the spreadsheet results from measurement audits. Precision data are generated by the data management staff, in the form of statistics created from precision check data, or QC data from the subcontract laboratory as required by the analytical method. Completeness data are also generated by the data management staff.

D. DATA VALIDATION AND USABILITY

D1 Data Review, Validation, and Verification Requirements

Data review, validation, and verification procedures are presented in this section. Three types of data are collected for this project: continuous data from PM10 monitors, gravimetric and speciation data from manual samplers, and continuous data from meteorological sensors. Collected data is specific to the function of each device. Daily data review is the responsibility of the data management task leader for the project, in parallel with operations staff. The task leader also performs the routine monthly review and validation functions or delegates and supervises them.

In the event the daily data review indicates any irregularity or elevated result, the reviewer notifies the Project Manager and Data Management task leader. All abnormal data is to be be flagged. The data editor gathers all pertinent QC data for the date and time of the result of interest and reports to the project manager regarding the validity of the measured values. This typically occurs within 24 hours of first discovery of the situation. If the measurements are valid, the Project Manager immediately notifies S.H. Bell and provides associated meteorological data so that the client may investigate any potential events or sources that could have contributed to the result of interest.

Analytical laboratory reports for manual samples will be forwarded in electronic format and loaded into the database. The data management task leader is responsible for ensuring that the data are properly loaded and the supporting documentation is in the central project file.

Data will be declared invalid whenever documented evidence exists demonstrating that a monitor, sampler, or meteorological sensor was not collecting data under representative conditions or was malfunctioning. In rare cases where a consistent offset in continuous measurements can be verified, a factor may be applied to the averages in a data set with clear identification of the affected data. The project data documentation files will contain the supporting documentation of the use of and justification for the factor.

Data validation will be performed or supervised for each monthly data set by the Project Manager. They will verify that the continuous monitor data and the meteorology measurement data are complete for the month, and then initiate the validation process.

All continuously generated data is stored on the data logging system (DAS) and is transferred via cellular modem during the daily automated network data retrieval routine. The activities involved in validation of the data in general include the following:

- Reviewing all site visit logs, calibration data, audit data, and other relevant information for indications of malfunctioning equipment or instrument maintenance/calibration events;
- Reviewing each laboratory report
- Reviewing all available BAM-1020 performance data
- Examining the continuous PM10 and meteorological data for outliers in the data, unusual persistence, unusually high rates of change, or measurement values that seem incongruous with normal measurement ranges and/or diurnal variations.

Any Suspect data is flagged and subject to further examination and review prior to being invalidated. The cause of abnormal or unavailable data is investigated and determined. The results from all quality control and quality assurance checks are evaluated to determine if the data quality objectives for each measurement are being met. Evidence of measurement bias, external influences on the representativeness of the data, or lack of reproducibility of the measurement data may be cause for the data to be considered invalid.

After the edit and validation review is complete, the editor returns a set of instructions to the data manager for application to the data set. The final edited version of the data is produced and peer reviewed to ensure that the edits were properly applied and that the validation process was consistent with project requirements and applicable guidelines. A record of the edit instructions is retained in the project files, as is the final data product (Validated Data). Once the project manager has reviewed and approved the edited data set, it is released and reported to the client.

D2 Reconciliation with Data Quality Objectives

Periodically the project progress is evaluated to assess measurement goals and data collection efforts. This evaluation will occur at a minimum on an annual basis. Two areas will be reviewed: the performance of the project in respect to the quality goals specified in the QAPP and the limitations (if any) on the measurement data for their intended use.

D2.1 Assessment of Measurement Performance

As part of the annual review, the performance of the monitoring network will be assessed to determine if the requirements of the data user are met. Key indicators relating to precision, accuracy, completeness, representativeness, and comparability goals for the monitoring effort are evaluated. Specific quantitative measures of precision, accuracy, and completeness are defined for use in estimating the quality of the data set. These measures will be calculated and compared to the goals for the project.

D2.2 Data Quality Assessment

If any of the data quality measures deviate from established performance objectives (e.g., an audit result outside the project specification or a monthly data completeness less than the project goal) the data is not considered useless without further examination. The burden is on the project team to determine the extent to which a quality issue affects the related data, and ultimately how the issue impacts the fitness for use of the data.

A single isolated incident affecting the performance objective does not automatically render the data invalid, but rather reduces the confidence that the measurement is reliable, and indicates that increased quality control measures are needed. Any data confidence question should be appropriately flagged in the database. The data quality objectives are assessed periodically throughout the monitoring effort. A month in which the completeness statistic for a given site is below the objective is cause for concern and corrective action, but if the other months are within the objective the confidence in the complete data set should remain high.

Any potential limitations of the validated data set will be identified and communicated. The project team will present all known or potential limitations on the data with each data submittal, and will clearly flag any such data so that users may determine if the data should be used for a particular conclusion or decision.

E. REFERENCES

MetOne (2008), BAM 1020 Particulate Monitor Operations Manual, BAM-1020-9800, Rev H, MetOne Instruments, Inc., Grants Pass, OR.

S.H. Bell Company 2016 - 2017. "Response to Request to Provide Information Pursuant to the Clean Air Act, Appendix B, PM10 Monitors and Siting, Proposed Monitoring Sites and Locations", January4, 2017. (Monitoring Plan), Amendments and revisions as noted below:

- 01/11/2017 – USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request for clarification to proposed monitoring site selection)
- 01/18/2017 – S.H. Bell Letter "Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection"
- 01/25/2017 – Conference Call between USEPA Region 5 and S.H. Bell (request for evaluation of PS2, PS2.1, PS2.2, and PS2.3)
- 01/30/2017 – S.H. Bell S. Letter Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection (Response to 01/25/2017 conference call requesting written evaluation of PS2, PS2.1, PS2.2, PS2.3)
- 02/02/2017 – Conference Call between USEPA Region 5, the City of Chicago, S.H. Bell, Eckert Seamans Cherin & Mellot, LLC and Consolidated Analytical Systems, Inc. (request to re-evaluated alternative proposed monitoring site PS2.2)
- 02/06/2017 – S.H. Bell Letter "Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection" (Re-Evaluation of alternative proposed site PS2.2)
- 02/07/2017 - USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request to locate proposed monitoring site PS2.2)
- 02/10/20117 – S.H. Bell Letter "Response to February 7, 2017 Email Request to Locate Proposed Monitoring Site PS2.2"
- 02/13/2017 – USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request to resubmit S.H. Bell siting plan for approval)
- 02/24/2017 - USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago S. Avenue O Terminal - QAAP" (providing links to be researched in the development of the site specific QAPP)
- 03/02/2017 - USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago S. Avenue O Terminal – Monitoring and Siting" (approval of the S.H. Bell Siting Plan)
- 03/10/2017 – S.H. Bell Letter "Letter Updates to S.H. Bell's December 30, 2016 Response to: Request to Provide Information Pursuant to the Clean Air Act Appendix B, PM10 Monitors and Siting Proposed Monitoring Sites and Locations"

(Tisch Environmental, Inc. 2010), OPERATIONS MANUAL, TE-6000 Series TE-6070, TE-6070-BL, TE-6070D, TE-6070D-BL TE-6070V, TE-6070V-BL, TE-6070DV, TE-6070DV-BL, PM10, Particulate Matter 10 Microns and less High Volume Air Sampler, U.S. EPA Federal Reference Number RFPS-0202-141", Tisch Environmental, Inc., Village of Cleves, OH, August 10, 2010.

(USEPA, 1994) - United States Environmental Protection Agency, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 1 -- A Field Guide to Environmental Quality Assurance", EPA-600/R-94/038a, April 1994.

(USEPA, 1999a) - United States Environmental Protection Agency, Office of Research and Development, Cincinnati, Ohio "Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, Compendium Method IO-2.1, Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM10 Using High Volume (HV) Sampler", EPA/625/R-96/010a., June 1999.

(USEPA, 1999b) - United States Environmental Protection Agency, Office of Research and Development, Cincinnati, Ohio "Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, Compendium Method IO-3.1, Selection, Preparation and Extraction of Filter Material", EPA/625/R-96/010a, June 1999.

(USEPA, 1999c) - United States Environmental Protection Agency, Office of Research and Development, Cincinnati, Ohio "Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, Compendium Method IO-3.5, Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma/Mass (ICP-MS) Spectroscopy", EPA/625/R-96/010a., June 1999.

(USEPA, 2000a) - United States Environmental Protection Agency, "Guidance on Technical Audits and Related Assessments for Environmental Data Operations, EPA QA/G-7 Final", EPA/625/R-99/080a., January 2000.

(USEPA, 2000b) - United States Environmental Protection Agency, "On-Site Meteorological Program Guidance for Regulatory Modeling Applications", EPA 454/R-99-005, February 2000.

(USEPA, 2001) - United States Environmental Protection Agency, "EPA Requirements for Quality Assurance Project Plans", EPA QA/R-5, March 2001.,

(USEPA, 2002) - United States Environmental Protection Agency, "EPA Guidance for Quality Assurance Project Plans", EPA QA/G-5, EPA/600/R-02/009, December 2002.

(USEPA, 2008) - United States Environmental Protection Agency, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV –Meteorological Measurements Version 2.0 (Final)", EPA-454/B-08-002, March 2008.

(USEPA, 2013) - United States Environmental Protection Agency, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II -- Ambient Air Quality Monitoring Program", EPA-454/B-13-003, May 2013.

(USEPA, 2015) - United States Environmental Protection Agency Region 5, "Request to Provide Information Pursuant to the Clean Air Act", March 9, 2015.

Appendix A: Example Calibration Data Spreadsheets and Operator Checklists

TE-6070V Sampler Calibration Worksheet
(Using G-Factor)

Site and Calibration Information

Site		Calibration Orifice	
Location:	SH Bell Chicago	Make:	TE-5028A
Date:	Apr 12, 2018	Model:	Tisch Environmental
Tech.:	J. Podrez	Serial:	3303
Sampler:	S4-HV1	Qa Slope (m):	0.95005
Serial #:	P10244BL (HV1)	Qa Int (b):	-0.01903
VFC G-Factor:	0.0250025280	Calibration Due Date:	03/22/19

Ambient Conditions

Temp (deg F):	70.9		
Ta (deg K):	295	Barometric Press (in Hg):	28.98
Ta (deg C):	21.6	Pa (mm Hg):	736.1

Calibration Information

Run Number	Orifice "H2O	Qa m3/min	Sampler "H2O	Pf mm Hg	Po/Pa	Calculated m3/min	% of Diff
1	3.10	1.192	5.50	10.265	0.986	1.206	1.17
2	3.00	1.173	9.30	17.356	0.976	1.194	1.79
3	2.99	1.171	11.40	21.276	0.971	1.187	1.37
4	2.80	1.134	17.20	32.100	0.956	1.168	3.00
5	2.75	1.124	20.80	38.819	0.947	1.157	2.85

Calculate Total Air Volume Using G-Factor

Enter Average Temperature During Sampling Duration (Deg F)	70.88
Average Temperature During Sampling Duration (Deg K)	294.60
Enter Average Barometric Pressure During Sampling Duration (In Hg)	28.98
Average Barometric Pressure During Sampling (mm Hg)	736.09
Enter Clean Filter Sampler Inches of Water	21.00
Enter Dirty Filter Sampler Inches of Water	21.00
Average Filter Sampler (mm Hg)	39.19
Enter Total Runtime in Hours (xx.xx)	24.00
Po/Pa	0.947
Calculated Flow Rate (m3/min)	1.156
Total Flow (m3)	1664.64

Calculations

Calibrator Flow (Qa) = 1/Slope*(SQRT(H20*(Ta/Pa))-Intercept)

Pressure Ratio (Po/Pa) = 1-Pf/Pa

% Difference = (Look Up Flow-Calibrator Flow)/Calibrator Flow*100

NOTE: Ensure calibration orifice has been certified within 12 months of use

Appendix B: Example Chain-of-Custody Form

Inter-Mountain Labs
Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

All shaded fields must be completed.
This is a legal document; any misrepresentation may be construed as fraud.

#WEB

Client Name	Project Identification	Sampler (Signature/Attestation of Authenticity)	Telephone #
RTP Environmental	SH Bell - Chicago		

Report Address	Contact Name
1591 Tamarack Ave Boulder, CO 80304	Mark Podrez
	Email: podrez@rtpenv.com
	Phone: 303-444-6046

Invoice Address	Purchase Order #	Quote #
Same	NA	RTP803051

ANALYSES / PARAMETERS

ITEM	LAB ID (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SAMPLE IDENTIFICATION	Matrix	# of Containers	PM10 Gravimetric	IO-3.1 for air filters	IO-3.5 Metals on air						REMARKS
1		03/03/18		S4HV1-030318-R	FT	1	x	x	x						See Field Envelope
2		03/06/18		S4HV2-030618-R	FT	1	x	x	x						See Field Envelope
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															

LAB COMMENTS	Relinquished By (Signature/Printed)	DATE	TIME	Received By (Signature/Printed)	DATE	TIME
	Rob Patterson					

SHIPPING INFO	MATRIX CODES		TURN AROUND TIMES	COMPLIANCE INFORMATION		ADDITIONAL REMARKS
❑ UPS	Water	WT	**Check desired service**	Compliance Monitoring ?	Y	
✠ FedEx	Soil	SL	✠ Standard turnaround	Program (SDWA, NPDES,...)	CAA 114a	
❑ USPS	Solid	SD	❑ **RUSH - 5 Working Days**	PWSID / Permit #		
❑ Hand Carried	Filter	FT	❑ **URGENT - < 2 Working Days**	Chlorinated?	N	
❑ Other________	Other	OT	***Rush & Urgent Surcharges will be applied***	Sample Disposal: Lab X	Client	

Appendix C: USEPA (3-day) Sampling Schedule, 2018

IML Air Science
a division of Inter-Mountain Laboratories, Inc.
555 Absaraka, Sheridan, WY 82801
(307) 674-7506 *www.imlairscience.com*

Year 2018 U.S. EPA Ambient Particulate Monitoring Sample-Day Schedule

Legend: 12 day sample schedule · 6 day sample schedule · 3 day sample schedule

1st Quarter (includes **8** 12-day sample days, **15** 6-day sample days, **30** 3-day sample days)

January

Su	Mo	Tu	We	Th	Fr	Sa
	1	**2**	3	4	**5**	6
7	**8**	9	10	**11**	12	13
14	15	16	**17**	18	19	**20**
21	22	**23**	24	25	**26**	27
28	**29**	30	31			

February

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	**7**	8	9	**10**
11	12	**13**	14	15	**16**	17
18	**19**	20	21	**22**	23	24
25	26	27	**28**			

March

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	**3**
4	5	**6**	7	8	**9**	10
11	**12**	13	14	**15**	16	17
18	19	20	**21**	22	23	**24**
25	26	**27**	28	29	**30**	31

2nd Quarter (includes **7** 12-day sample days, **15** 6-day sample days, **30** 3-day sample days)

April

Su	Mo	Tu	We	Th	Fr	Sa
1	**2**	3	4	**5**	6	7
8	9	10	**11**	12	13	**14**
15	16	**17**	18	19	**20**	21
22	**23**	24	25	**26**	27	28
29	30					

May

Su	Mo	Tu	We	Th	Fr	Sa
		1	**2**	3	4	**5**
6	7	**8**	9	10	**11**	12
13	**14**	15	16	**17**	18	19
20	21	22	**23**	24	25	**26**
27	28	**29**	30	31		

June

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	**4**	5	6	**7**	8	9
10	11	12	**13**	14	15	**16**
17	18	**19**	20	21	**22**	23
24	**25**	26	27	**28**	29	30

3rd Quarter (includes **8** 12-day sample days, **16** 6-day sample days, **31** 3-day sample days)

July

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	**4**	5	6	**7**
8	9	**10**	11	12	**13**	14
15	**16**	17	18	**19**	20	21
22	23	24	**25**	26	27	**28**
29	30	**31**				

August

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	**3**	4
5	**6**	7	8	**9**	10	11
12	13	14	**15**	16	17	**18**
19	20	**21**	22	23	**24**	25
26	**27**	28	29	**30**	31	

September

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	**5**	6	7	**8**
9	10	**11**	12	13	**14**	15
16	**17**	18	19	**20**	21	22
23	24	25	**26**	27	28	**29**
30						

4th Quarter (includes **8** 12-day sample days, **15** 6-day sample days, **31** 3-day sample days)

October

Su	Mo	Tu	We	Th	Fr	Sa
	1	**2**	3	4	**5**	6
7	**8**	9	10	**11**	12	13
14	15	16	**17**	18	19	**20**
21	22	**23**	24	25	**26**	27
28	**29**	30	31			

November

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	**7**	8	9	**10**
11	12	**13**	14	15	**16**	17
18	**19**	20	21	**22**	23	24
25	26	27	**28**	29	30	

December

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	**4**	5	6	**7**	8
9	**10**	11	12	**13**	14	15
16	17	18	**19**	20	21	**22**
23	24	**25**	26	27	**28**	29
30	**31**					

APPENDIX C

Fugitive Dust Plan Fact Sheet

Fugitive Dust Plan Fact Sheet
S.H. Bell Company Chicago Terminal
April 2019

Description of Operation:

The S.H. Bell Co. Chicago Terminal handles, processes, and stores materials that are transported to and from the facility by barge, rail, and truck. The facility handles bulk materials including ferro alloys, pig iron, iron ore, and silicon metal as well as non-bulk materials which do not have the potential to become airborne or scattered by wind, such as graphite electrodes and cast aluminum and steel shapes. Our Fugitive Dust Plan (FDP) fully meets all the requirements under the City of Chicago Department of Public Health (CDPH) – Rules for Control of Emissions from Handling and Storing Bulk Materials, revised January 25, 2019 (Regulation) and exceeds them in certain areas, aside from those elements of the Regulation covered in the Enclosure Plan submitted concurrently with this April 2019 version of the FDP. The following is a description of the various dust control measures.

Dust Control Measures and Equipment:

Various dust control measures and equipment are used to address potential dust emissions, including:

- Non-Packaged Manganese-Bearing Bulk Materials ("Affected Materials") are not stored outdoors.
- Affected Materials are not processed at Screener, Barge Loading, Railcar Unloading – Bottom Unload, and Railcar Loading – Open Top
- Controls for material transfer points:
  - water spray systems that include direct application to material, mobile misters, and dry foggers
  - total enclosure
  - dust collectors for box and bag filling, truck loadout sheds, and portable dust collectors for use at various other transfer points
- Detailed operating procedures for each operation/transfer point, with specific dust control procedures based on material type – Dry Materials/Wetted Materials and Affected Materials and non-Affected Materials.
- Wet suppressant spray system and enclosure for jaw crushing/screening operations; no outdoor box screening of Affected Materials.
- Sweeping of aisles in buildings once per shift when Affected Materials are being transferred or handled in that building;
- Application of dust suppressant (i.e., water or calcium chloride solutions) to exterior doorways of buildings / enclosures once per shift when Affected Materials are being transferred or handling in that building / enclosure (weather permitting);
- Covered conveyor for rail loading.

Roadway Dust and Track-Out Prevention:

- All internal roads that trucks travel on are paved.
- Maximum vehicle speed of 8 mph.
- Daily road sweeping/watering on all internal roads.
- Street sweeper equipped with a water spray and vacuum system.
- Minimum monthly chemical dust suppressant application.
- All outgoing material transport trucks are tarped immediately after being loaded and are cleaned by rumble strips; in-house drayage trucks are likewise immediately covered after being loaded.
- Public roads are inspected for material track-out and are cleaned if track-out is found.

Fugitive Dust Measurements:

The following fugitive dust measurement actions are used:

- Four (4) continuous Federal Equivalent Method (FEM) PM10 monitors placed within the fence line at the Facility.
- One (1) Federal Reference Method (FRM) PM10 filter-based monitor at the Facility (awaiting approval from CDPH as part of the manganese monitoring plan)
- Meteorological Station to monitor and log wind speed and wind direction and to provide alerts of high wind events.
- Daily observations for fugitive dust at least once per shift for each active operation controlled by total enclosure or dust collector at both the operation and nearest property line (based on wind direction); observations at least three times per working shift for outdoor activities such as barge unloading, truck unloading, and working outdoor piles.
- Quarterly Method 9 opacity reads performed by a certified professional on outdoor storage piles, roadways, and material transfer points.

Contingency Plans:

The Facility has developed contingency plans to respond to various potential fugitive dust conditions.

- Respond to elevated visible dust:
    - Immediate deployment of applicable additional controls such as the mobile misters/dry fogging system.
    - Increased observations for visible dust.
    - If necessary, the activities at the source will be suspended pending favorable weather conditions.

- Respond to high wind events:

- Automated alert system to notify personnel of high wind events;
  - Automatic suspension of outdoor activities involving Affected Materials, such as barge and truck unloading.
  - Employ additional control measures for non-Affected Material operations and suspend activities if additional control is found to be ineffective.

- Respond to elevated PM10 monitor readings:
  - Automated alert system to notify personnel of alert conditions.
  - Investigate to determine suspected source(s).
  - Increasingly aggressive mitigation efforts based on the level of alert.
  - Suspension of suspected source activity if warranted.

APPENDIX D

Monitor Siting Plan and U.S. EPA Approval

From:	Cantello, Nicole
To:	Scott R. Dismukes
Cc:	JIM LANGBEHN; Jessica Sharrow Thompson; Smith, Molly; Miller, Patrick; "McDaniel, Nicholas A. (ENRD)"; "Jones, Lila (ENRD)"; "Hesse, Jennifer"; "Ames, Mort"; JOHN BEDECK; Mendoza, Stephen
Subject:	RE: S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting
Date:	Wednesday, February 15, 2017 6:37:34 PM

Scott:

EPA approves the siting plan submitted by SH Bell, as amended on February 15, 2017.

According to Item 15 of Appendix B, SHB must submit a QAPP within 30 days of EPA's approval of the monitoring sites.

Thanks very much.

Best,

Nicole Cantello
Attorney/Advisor
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604
312/886-2870
cantello.nicole@epa.gov

From: JOHN BEDECK [mailto:jbedeck@shbellco.com]
Sent: Wednesday, February 15, 2017 8:54 AM
To: Cantello, Nicole <cantello.nicole@epa.gov>; 'Scott R. Dismukes' <SDismukes@eckertseamans.com>
Cc: JIM LANGBEHN <jlangbehn@shbellco.com>; 'Jessica Sharrow Thompson' <JSharrow@eckertseamans.com>; Smith, Molly <Smith.Molly@epa.gov>; Miller, Patrick <miller.patrick@epa.gov>; 'McDaniel, Nicholas A. (ENRD)' <Nicholas.A.McDaniel@usdoj.gov>; 'Jones, Lila (ENRD)' <Lila.Jones@usdoj.gov>; 'Hesse, Jennifer' <Jennifer.Hesse@cityofchicago.org>; 'Ames, Mort' <Mort.Ames@cityofchicago.org>
Subject: S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting

Good morning,

Attached is S.H. Bell Company's letter report which documents the location change for proposed monitoring location PS2.

Sincerely,

John R. Bedeck

From: JOHN BEDECK
Sent: Friday, February 10, 2017 6:05 PM
To: Cantello, Nicole; Scott R. Dismukes
Cc: JIM LANGBEHN; Jessica Sharrow Thompson; Smith, Molly; Miller, Patrick; McDaniel, Nicholas A. (ENRD); Jones, Lila (ENRD); Hesse, Jennifer; Ames, Mort
Subject: RE: S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting

Good evening,

Attached is S.H. Bell Company's response to USEPA Region 5's request to relocate proposed monitor site PS2.2.

Sincerely,

John R. Bedeck

From: Cantello, Nicole [mailto:cantello.nicole@epa.gov]
Sent: Tuesday, February 07, 2017 12:29 PM
To: Scott R. Dismukes
Cc: JIM LANGBEHN; Jessica Sharrow Thompson; Smith, Molly; Miller, Patrick; McDaniel, Nicholas A. (ENRD); Jones, Lila (ENRD); JOHN BEDECK; Hesse, Jennifer; Ames, Mort
Subject: S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting

Hello Scott:

Thank you for the additional information that SH Bell submitted last night in response to EPA's concerns about the siting of PS2.2.

Attached please find a map of a portion of SH Bell's facility that encompasses the siting of PS2.2. We proposed SH Bell place the monitor at this location (6.5 feet from the roadway on a platform somewhere in the blue shaded area.) If SH Bell updates its monitoring plan to include this siting, EPA will be in a position to approve the plan.

We look forward to hearing from you.

Best,

Nicole Cantello
Attorney/Advisor
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604
312/886-2870
cantello.nicole@epa.gov

From:	JOHN BEDECK
To:	"Cantello, Nicole"; Scott R. Dismukes
Cc:	JIM LANGBEHN; Jessica Sharrow Thompson; "Smith, Molly"; "Miller, Patrick"; "McDaniel, Nicholas A. (ENRD)"; "Jones, Lila (ENRD)"; "Hesse, Jennifer"; "Ames, Mort"
Subject:	S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting
Date:	Wednesday, February 15, 2017 9:54:44 AM
Attachments:	SH Bell Proposed Monitoring Locations Letter Report Update 021417.pdf

Good morning,

Attached is S.H. Bell Company's letter report which documents the location change for proposed monitoring location PS2.

Sincerely,

John R. Bedeck

From: JOHN BEDECK
Sent: Friday, February 10, 2017 6:05 PM
To: Cantello, Nicole; Scott R. Dismukes
Cc: JIM LANGBEHN; Jessica Sharrow Thompson; Smith, Molly; Miller, Patrick; McDaniel, Nicholas A. (ENRD); Jones, Lila (ENRD); Hesse, Jennifer; Ames, Mort
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Subject: S.H. Bell Company Chicago S. Avenue O Terminal - Monitoring and Siting

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We look forward to hearing from you.

Best,

Nicole Cantello
Attorney/Advisor
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604
312/886-2870
cantello.nicole@epa.gov

February 14, 2017

United States Environmental Protection Agency, Region 5
Air and Radiation Division
Attn: Nicole Contello (Cantello.nicole@epa.gov), George T. Czerniak, and R5enforcement@epa.gov
77 W. Jackson Blvd
Chicago, IL 60604

RE: **S.H. Bell Company**
10218 South Avenue O
Chicago, Illinois 60617
Letter Update to S.H. Bell's December 30, 2016 Response to:
Request to Provide Information Pursuant to the Clean Air Act
Appendix B, PM_{10} Monitors and Siting
Proposed Monitoring Sites and Locations

Dear Ms. Cantello:

S.H. Bell is pleased to submit this update to our December 30, 2016, response to USEPA Region 5 Air and Radiation Division's Request to Provide Information Pursuant to the Clean Air Act dated March 9, 2015. Specifically, this letter report documents the location change for proposed monitoring location PS2 determined during a series of telephone discussions, emails, and letter reports between USEPA Region 5, the City of Chicago, S.H. Bell, S.H. Bell's counsel Eckert, Seamans, Cherin & Mellott, LLC, and S.H. Bell's air monitoring contractor Consolidated Analytical Systems, Inc., as documented below. The final proposed monitoring locations PS1, PS2, PS3, and PS4 are shown on Figure 1.

INCORPORATION BY REFERENCE

- *12/30/2016 – S.H. Bell "Response to Request to Provide Information Pursuant to the Clean Air Act, Appendix B, PM10 Monitors and Siting, Proposed Monitoring Sites and Locations"*
- *01/11/2017 – USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request for clarification to proposed monitoring site selection)*
- *01/18/2017 – S.H. Bell Letter "Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection"*
- *01/25/2017 – Conference Call between USEPA Region 5 and S.H. Bell (request for evaluation of PS2, PS2.1, PS2.2, and PS2.3)*
- *01/30/2017 – S.H. Bell S. Letter Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection (Response to 01/25/2017 conference call requesting written evaluation of PS2, PS2.1, PS2.2, PS2.3)*
- *02/02/2017 – Conference Call between USEPA Region 5, the City of Chicago, S.H. Bell, Eckert Seamans Cherin & Mellot, LLC and Consolidated Analytical Systems, Inc. (request to re-evaluated alternative proposed monitoring site PS2.2)*

- *02/06/2017 – S.H. Bell Letter "Response to January 12, 2017 (sic) Email Request to Provide Justification for Monitor Site Selection" (Re-Evaluation of alternative proposed site PS2.2)*
- *02/07/2017 - USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request to locate proposed monitoring site PS2.2)*
- *02/10/20117 – S.H. Bell Letter "Response to February 7, 2017 Email Request to Locate Proposed Monitoring Site PS2.2"*
- *02/13/2017 – USEPA Region 5 Email from Nicole Cantello "S.H. Bell Company Chicago, S. Avenue O Terminal – Monitoring and Siting" (request to resubmit S.H. Bell siting plan for approval)*

SUMMARY

S.H. Bell looks forward to installing, operating, and maintaining ambient monitoring sites at the facility upon your approval of the proposed plan. Should you have any questions about the proposed monitoring locations, please let me know.

CERTIFICATION

I certify under penalty of law that I have examined and am familiar with the information in the enclosed documents, including all attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true and complete. I am aware that there are significant penalties for knowingly submitting false statements and information, including the possibility of fines or imprisonment pursuant to Section 1(c)(2) of the Clean Air Act and 18 U.S.C. §§ 1001 and 1341.

Respectfully submitted,

J. R. Bell

John R. Bedeck
Project Manager & Dir. of Quality
S.H. Bell Company

Figure 1
Proposed and Existing Monitoring Locations
S.H. Bell Facility, 10218 South Avenue O, Chicago, Illinois 60617

Site ID	Latitude	Longitude
PS1	41.708264	-87.544006
PS2	41.710537	-87.539158
PS3	41.710494	-87.542090
PS4	41.711527	-87.539628
EMS	41.709861	-87.539692