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February 19, 2015

Mr. Otis Omenazu Chief Air Engineer Department of Public Health City of Chicago 333 South State Street, Suite 200 Chicago, IL. 60604

Re: Horsehead Corporation June 13, 2014 Variance Request - Response to January 26, 2015 Request for Additional Information

Dear Mr. Omenazu:

On behalf of Horsehead Corporation ("Horsehead"), this letter responds to your January 26, 2015 letter and provides the additional information you requested regarding Horsehead's variance application dated June 13, 2014. Horsehead's application sought a variance from certain of the City of Chicago Air Pollution Control Rules and Regulations for Control of Emissions from Handling and Storage of Bulk Material Piles (the "Rules"). This response provides the following information:

- (a) Horsehead's decision not to pursue a variance from Section 3.0(2)(c) of the Rules pertaining to the use of Method 9 to measure opacity and from Section 3.0(8)(d) of the Rules pertaining to the use of a wheel wash station and rumble strips;
- (b) Horsehead's completion of the activities for which it previously requested an extension of time;
- (c) Additional information in support of Horsehead's request for a variance from Sections 3.0(4) and 5.05(b) of the Rules which require, respectively, the installation, operation and maintenance of fugitive dust monitors and the application of dust suppressants when temperatures fall below 32° F.

Each of the above categories is discussed in further detail below. Horsehead submits that the additional information provided in this response, together with the information contained in Horsehead's June 13, 2014 variance application, satisfies Horsehead's burden of proof to obtain the requested variance relief pursuant to Section 8.0 of the Rules.

I. Clarification of Section 3.0(2)(c) of the Rules (Use of Method 9) to measure opacity and Section 3.0(8)(d) Wheel Wash Station and Rumble Strip Provisions (CDPH January 26, 2015 Letter at Paragraphs 1 and 3)

In Horsehead's variance application, it sought a variance from the requirements of Sections 3.0(2)(c) and 3.0(8)(d) of the Rules. In paragraph 1 of the Chicago Department of Public Health's ("CDPH") January 26, 2015 letter, it noted the subsequent correction the CDPH made to Section 3.02(c) that changed the reference from 35 III. Admin. Code 212.107 to 35 III. Admin. Code 212.109. The CDPH further confirmed that under this corrected reference to Section 212.109, Method 9 is the correct method for measuring opacity under the Rules and therefore, a variance request to use Method 9 to measure opacity is not required. The CDPH requested that Horsehead advise if it still seeks a variance from any part of Section 3.0(2)(c). Horsehead appreciates the City's clarification that Method 9 is an allowed test method for measuring opacity. Horsehead agrees that a variance from Section 3.0(2)(c) is not required and confirms that it is not seeking a variance from any part of this section.

Horsehead also sought a variance from the requirement in Section 3.0(8)(d) regarding the installation of a wheel wash station and rumble strips. At the time Horsehead submitted its variance request, it was not certain that the Rules allowed the use of alternative measures to a wheel wash station and rumble strips to ensure that trucks leaving its Chicago plant will not cause track-out of materials onto the public way. Paragraph 3 of the CDPH January 26, 2015 letter clarifies that Section 3.08(d) does not mandate the use of a wheel wash station and rumble strips if other measures are specified in the plant's Fugitive Dust Plan to prevent track-out of materials. The CDPH correctly notes that Horsehead's June 11, 2014 Fugitive Dust Plan includes a discussion of truck cleaning and roadway cleaning. Therefore, the CDPH requests that Horsehead withdraw its variance request if Horsehead believes that the materials submitted adequately demonstrate that the measures it uses are effective to ensure that trucks do not cause track out from the facility onto the public roadway. Based on the City's clarification of the requirements of Section 3.0(8)(d), Horsehead has decided to withdraw its request for a variance from this section of the Rules.

II. Horsehead's completion of the activities for which it previously requested an extension of time. (CDPH January 26, 2015 Letter at Paragraph 5)

In paragraph 5 of the CDPH January 26, 2015 letter, the CDPH correctly notes that for the three items in Horsehead's variance request for which it asked for an extension of time, the timeframe in the three extension requests has since passed. The CDPH requests that Horsehead advise whether or not a further extension of time is needed.

Horsehead does not need a further extension of time for the three items included in its June 13, 2014 variance request. Horsehead has completed the installation of a wind monitoring station to comply with the requirement in Section 3.0(5) of the Rules. Horsehead also has completed the work necessary to have a dust suppressant system available "at all times" for its outdoor IRM storage areas as required in Section 5.0(5)(a) of the Rules. Finally, Horsehead completed the grading work necessary to reduce the height of all of its IRM storage piles to satisfy the 30-foot height restriction in Section 5.0(5) of the Rules.

II. Response to CDPH Requests for Additional Information (CDPH January 26, 2015 Letter at Paragraphs 2 and 4)

Horsehead requested a variance from Section 3.0(4) of the Rules that requires the installation, operation and maintenance of fugitive dust monitors and from Section 5.05(b) of the Rules that requires the application of dust suppressants when temperatures fall below 32°F. The CDPH January 26, 2015 letter requests that Horsehead submit additional information concerning these two requests. The requested information is provided below.

A. Fugitive Dust Monitors

Paragraph 2 of the CDPH's January 26, 2015 letter requests additional detailed information demonstrating that there will be no off-site fugitive dust impacts from the material handling activities conducted at the Horsehead Chicago Plant and that installing the fugitive dust monitors would cause an unreasonable hardship. More specifically, the CDPH correctly notes that included in the supporting information Horsehead submitted were the "results of opacity testing showing that the opacity at the facility during the two test days was 0% with a limited exception that did not exceed 5%." The CDPH further stated that the opacity testing documentation evidencing the testing performed at a number of locations "did not explain whether or not the test observed the full range of activities that are conducted at the site, including mixing and processing, bull dozing and grading, drop operations, and vehicle and equipment travel over bulk materials."

While Horsehead will address the CDPH's specific question regarding the Horsehead Chicago Plant activities that were ongoing at the time of the May 2014 opacity testing addressed in the CDPH's January 26, 2015 letter, since the variance application was submitted there have now been two additional quarters of opacity testing conducted at the plant. The reported results of the third and fourth quarter 2014 opacity testing are enclosed with this response as Exhibits A and B, respectively. The results are summarized below. For all three quarters of opacity testing conducted to date, the testing was performed in the location of storage piles and transfer points for IRM and coke, as well as for roadways and parking areas. The testing was conducted during dry conditions (i.e., there was no precipitation during testing) and also captured windy conditions.

The additional 2014 quarterly opacity testing results provide further detailed information demonstrating that there will be no off-site fugitive dust impacts from the material handling activities at the Horsehead Chicago Plant. The opacity testing has monitored all of the bulk solid materials activities which are conducted at the plant. There also has been on-site vehicle traffic occurring during each of these tests. A more detailed description of the bulk solid materials handling activities and on-site vehicle traffic that were occurring during the time of the opacity testing during each of the three quarters of the 2014 opacity testing is provided below.

1. Second Quarter (May 2014) Opacity Testing Conditions and Results

The results of the May 19, 2014, and May 23, 2014 opacity tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to Sections

3.0(2)(a) and (b), respectively, of the Rule, with most of the readings showing 0% opacity. The highest opacity reading was 5%. There were no visible emissions at the property lines. A copy of the May 19, 2014 and May 23 Opacity Testing Reports were attached as Exhibit N and O, respectively, to Horsehead's variance request.

First day of Testing: On the first day of opacity testing (May 19), the recorded wind ranged from 10 mph to 15 mph. (The National Weather Service (NWS) data for Chicago Midway Airport on May 19 shows wind conditions ranging from 14 to 17 mph, with gusts ranging from 21 to 31 mph during this time period.) A total of 14 locations were tested by a certified observer in accordance with Method 9 (for internal locations) and Method 22 (for property line locations), including five locations along the property boundary line: east, south, southwest corner, west and north. Based on the south, southeast wind direction at the time of the opacity testing, the west and north property line locations were downwind. In addition to the property boundary line locations, several internal locations also were tested. These included bulk solid materials storage area locations (*i.e.*, various IRM and petcoke/metcoke storage areas). In addition, an opacity test was conducted during a truck loading operation at an IRM storage pile.

Second day of Testing: The second day of opacity testing, May 23, 2014, coincided with IRM barge loading operations, including both the transfer of IRM from the front-end loader vehicle into the conveyor hopper and the operation of the conveyor to load IRM onto the barge. The barge-loading was not occurring at the time of the May 19, 2014 opacity testing and the May 23 tests were deliberately scheduled to coincide with this activity. Wind conditions ranged from 0 to 10 mph during this activity. Opacity readings also were taken at multiple unpaved roadway locations as various vehicles (e.g., car, van, tractor trailer, front-end loader) traveled over the Chicago Plant Internal Roads.

2. Third Quarter (September 2014) Opacity Testing Conditions and Results

The results of the September 15 and 16, 2014 tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to Section 3.0(2)(a) and (b), respectively, of the Rules.

First day of Testing: On the first day of opacity testing (September 15), the recorded wind ranged from calm to 9 mph. (The National Weather Service (NWS) data for Chicago Midway Airport on September 15 shows wind conditions ranging from calm to 11 mph.) Sky conditions were overcast throughout the observations.

Second day of Testing: On the second day of opacity testing (September 16), the recorded wind ranged from calm to ~6 mph. (The National Weather Service (NWS) data for Chicago Midway Airport on September 16 shows wind conditions ranging from calm to 10 mph.) Sky conditions were clear throughout observations.

The results of the Third Quarter tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to Section 3.0(2)(a) and (b), respectively, of the Rules. Opacity tests were performed at 14 different locations at the facility, which included all coke storage and handling areas, IRM storage and handling areas, paved and unpaved roadways. Additionally, there were eight property line visible emissions tests and there were no visible emissions observed. Opacity testing occurred while coke

was being loaded into the hopper, while IRM was being loaded into trucks (a total of four trucks were loaded), and while IRM was being loaded into the barge. IRM piles and the coke storage piles were not being disturbed during the tests, but coke was being unloaded into the coke loading pile during the test observation period. Paved and unpaved roadways were observed for 4 vehicle passes on each specified road during the test period.

The Method 9 opacity test results for the coke storage areas, coke pile material handling, IRM storage piles, IRM pile handling, IRM barge loading, paved roadways, and unpaved roadways were all below the 10% opacity standard promulgated in the CDPH's Bulk Storage Rules. Additionally, the Method 22 test results of visible emissions at the property boundaries showed no visible emissions crossing the plant property lines.

3. Fourth Quarter (December 2014) Opacity Testing Conditions and Results

The results of the December 15 and 19, 2014 tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to Sections 3.0(2)(a) and (b), respectively, of the Rules. Sky conditions were overcast throughout both days of observations. The test event was expanded to December 19 to include truck loading operations.

First day of Testing: On the first day of opacity testing (December 15), the recorded average wind speed ranged from 4 mph to 12 mph, with gusting to 17 mph.

Second day of Testing: On the second day of opacity testing (December 19), the recorded average wind speed ranged from 3 mph to 6 mph, with gusting to ~8 mph.

The results of the Fourth Quarter tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to CDPH Rules Sections 3.0(2)(a) and (b), respectively. Opacity tests were performed at 14 different locations at the facility, which included all coke storage and handling areas; IRM storage and handling areas; paved and unpaved roadways. Additionally, there were eight property line visible emissions tests: north property line looking east and west, east property line looking north and south, south property line looking east and west, southwest property line looking northeast, and the west property line looking north. There were no visible emissions observed. Opacity tests were performed while coke was being loaded into the hopper and observations were taken while IRM was being loaded into trucks (a total of three trucks were loaded). The coke storage piles were not being disturbed during test periods, but IRM was being added to the IRM storage area near the barge unloading process via a conveyor belt during the testing period. Paved and unpaved roadways were observed for 4 vehicle passes on each specified road during the test period. barge loading was not tested because no barges were scheduled to be loaded for the remainder of the fourth quarter.

The Method 9 opacity test results for the coke storage areas, coke pile material handling, IRM storage piles, IRM pile handling, IRM truck loading, paved roadways, and unpaved roadways were all below the 10% opacity standard promulgated in the Rules. Additionally, the Method 22 test results of visible emissions at the property boundaries showed no visible emissions crossing the plant property lines.

The successful and consistent results of the three quarters of opacity testing conducted to date by Horsehead are not unexpected. They are fully consistent with the factual information Horsehead provided in its variance request concerning the nature and quantities of bulk solid materials which Horsehead handles at its Chicago Plant. First, with respect to the limited volume of coke materials which Horsehead stores at the Chicago Plant for use in its operations, the coke material comes in to the Chicago Plant at moisture levels well above the level which the Rules define as "Moist Material." Under Section 2.0 (15) of the Rules, "Moist Material" means a material with a moisture content of 3% by weight. Typically, as per the results of a daily moisture content sample analysis performed on coke material by the Chicago Plant, coke delivered to the plant contains approximately 7% moisture by weight. In addition, specified coke size is about the size of a pea. Years of experience has shown that because of the moisture content and grain size of the coke delivered to the Chicago Plant, there are not off-site fugitive emissions impacts when the coke material is off-loaded or transferred on site.

By its nature, IRM, which is the other bulk solid material handled outdoors at the Chicago Plant, is not susceptible to wind erosion. A crust forms on the IRM piles, because of the iron oxide in the material (IRM contains up to 50% iron.) The crust binds together the material in the surface of the IRM pile, essentially forming a blanket over the less-consolidated IRM material lying beneath. The density of IRM also prohibits any wind transport. The independent data generated from three quarters of third-party opacity testing results, independently demonstrates that IRM does not become airborne nor does it become mobile in surface rainwater runoff due to the character of the material, its composition, and its density. These findings are consistent with Horsehead's observations over the last several years.

The detailed information provided above and in the three quarters of opacity testing conducted to date at the Horsehead Chicago Plant clearly demonstrates that there will be no off-site fugitive dust impacts from the bulk solid material handling activities at the plant.

4. Demonstration of Arbitrary or Unreasonable Hardship

Turning to the CDPH's request for additional evidence that installing the fugitive dust monitors would cause an arbitrary or unreasonable hardship, the question of whether Section 3.0(4)'s requirements impose an unreasonable hardship on Horsehead's Chicago Plant is not limited to solely the costs associated with those monitors. The review of the hardship issue is a balancing process which must balance the hardship of complying with the monitoring requirement, which includes the imposition of additional costs, against any adverse impact on the environment. *Marathon Oil Co. v. E.P.A.*, 242 III.App.3d 200, 206 (1993) (interpreting the same "arbitrary or unreasonable hardship" language used in Section 35 of the Illinois Environmental Protection Act, 415 ILCS 5/35(a)). If, as here, the evidence demonstrates that there is no reasonable likelihood of any off-site fugitive dust impacts in violation of the Rules, then the costs associated with the fugitive dust monitors do not need to be as significant before the facts demonstrate that the requirement does impose an "arbitrary or unreasonable hardship." Rule §8.0(2)(e)(i); see also 415 ILCS 5/35(a) (authorizing variances for "arbitrary or unreasonable hardship[s]").

Indeed, the immediate situation is similar to one the Illinois Pollution Control Board (the "Board") confronted when reviewing the variance request of a City that would

be required to immediately spend \$140,000 on disinfection and monitoring equipment if forced to comply with new effluent limitations. *City of Morrison v. E.P.A.*, PCB 79-144, 1979 WL 10667 (III. Pol. Control Bd. Oct. 4, 1979). The Board concluded that a variance delaying the effective date of the regulation was appropriate, because there was no "particular environmental impact" that would result from granting the benefit (*e.g.*, the city was not upstream from any sensitive water bodies).

In its variance request, Horsehead provided the CDPH with the following cost information associated with the installation, operation and maintenance of the fugitive dust monitors:

- \$150,000 cost of infrastructure work (e.g, electrical power supply to monitors and construction of meteorological tower base)
- \$152,000 (equipment leasing arrangement) to \$157,741 (equipment purchasing arrangement) cost of the first year of PM-10 monitoring.
- \$361,741 (equipment purchasing) to \$392,000 (equipment leasing) cost of three years of monitoring with four monitors)

The above cost estimates do not include any additional time spent by Horsehead personnel regarding oversight of the PM-10 monitoring and reporting work. Also, the additional costs and effort associated with the fugitive dust monitoring requirement should properly be evaluated in the context of all of the other additional costs of compliance which the Rules have caused and will continue to cause Horsehead to incur, such as the addition of a new dust suppression system, a covered conveyor system and a wind monitoring station as explained in Horsehead's variance request. To date, these additional requirements of the Rules have caused Horsehead to incur well over \$200,000 in compliance costs and the costs of operating and maintaining these systems will continue in order to maintain compliance with the City's Rules. Horsehead also is in the planning phases to construct an enclosure for its coke piles, at which point even the minimal existing potential for fugitive dust emissions will be further reduced.

In addition to the results of the three quarters of opacity testing which show that there is no reasonable likelihood of off-site fugitive dust emissions from Horsehead's operations, it should also be considered that Horsehead performs inspections and observations relating to fugitive dust controls that go beyond what is required by the Rules. As documented in Horsehead's updated Fugitive Dust Control Plan (submitted to the DPHE in January 2015), specifically Section 3.1.7 of the Plan, Horsehead conducts weekly inspections for fugitive dust at the facility's property lines and at interior property sources of fugitive dust. The forms used for these inspections are included in Appendix E of Horsehead's Fugitive Dust Control Plan. These inspections along with the quarterly opacity testing conducted pursuant to the Rules provide adequate and reasonable protection against adverse off-site impacts from fugitive dust emissions.

In conclusion, when Horsehead's variance request is viewed in its entire context, the imposition of the additional costs associated with the fugitive dust monitors when the evidence demonstrates that there will be no injury or adverse impact to the public or the

environment from granting Horsehead the variance, satisfies the "arbitrary or unreasonable hardship" burden under Section 8.0(2)(e)(1) of the Rules.

B. Below-Freezing Dust Suppression Measures

With respect to Section 5.0(5)(b), Horsehead maintains that its alternative measures for applying dust suppressants when temperatures fall below 32 degrees is adequate to prevent fugitive dust from IRM and coke piles. As stated in the updated January 2015 Fugitive Dust Plan, the nature of IRM (i.e., the crusting which occurs naturally on the IRM piles) and the higher moisture content of the coke received at Horsehead's facility are major contributing factors to why there is minimal generation of dust from these sources even under the type of weather conditions that typically promote the generation of fugitive dust. If the temperature falls below 32 degrees Fahrenheit, the facility may use either a Chemical Stabilizer, supplied by a contractor that is on-call, or suspend the disturbance of Bulk Material piles that could cause fugitive dust.

II. Response to Public Comments

In its January 26, 2015 letter, the CDPH also invited Horsehead to respond to any public comments regarding its variance request. Horsehead appreciates the opportunity to do so.

The September 2, 2014 comment filed by the Southeast Environmental Task Force and the Natural Resources Defense Council ("SETF/NRDC Comments") attached and cited to the issuance of an April 14, 2014 Notice of Violation by the U.S. EPA Region 5 (the "NOV"). The SETF/NRDC significantly mischaracterized the contents of the NOV regarding the matter of fugitive dust emissions at the Horsehead facility. The NOV did not allege that there were off-site fugitive dust emissions emanating from the Horsehead facility. Instead, the allegations that pertain to fugitive dust emissions stemmed from the alleged absence of a written fugitive dust control plan for the facility. As the CDPH is aware, there is a written fugitive dust control plan for the Horsehead facility. As required by the Rules, Horsehead submitted a written fugitive dust control plan to the CDPH in June 2014 and an updated plan in January 2015. Both the June 2014 and January 2015 versions of the fugitive dust control plan contain the required and necessary procedures and controls for preventing unacceptable off-site fugitive dust emissions both under the Rules and the requirements of the facility's Title V Permit. Further, the NOV does not allege there were actual off-site fugitive dust emissions in violation of any applicable limits. The NOV is a recitation of unproven allegations for which Horsehead does not admit the truth or accuracy and is contesting those allegations in continuing negotiations with the U.S. EPA Region 5.

The SETF/NRDC Comments also incorrectly contend that a facility cannot satisfy the requirements for a variance from the above-discussed requirement to install continuous dust monitors until and unless it has already installed the monitors and collected the continuous monitoring data. (SETF/NRDC Comments at 3-4) This is not a correct interpretation of the Rules. The Rules expressly allow for a variance from this requirement pursuant to the requirements of Section 8. Further, Horsehead has shown both by the nature of the bulk solid materials it handles, the procedures in place at its

facility to prevent off-site fugitive dust emissions and now with the results of three quarters of opacity testing that there is no reasonable potential for fugitive dust emissions from its facility to exceed the limits prescribed by the Rules. The three-quarters of opacity testing have monitored all of the activities at the facility which the SETF/NRDC Comments (at p. 4) identify as being a potential source of off-site fugitive dust emissions (e.g., material dropping operations, equipment travel and vehicle travel) which must be monitored. Thus, contrary to the SETF/NRDC's argument, there is objective and conclusive empirical testing data showing that the Horsehead facility will not cause off-site fugitive dust emissions in violation of the Rules. Horsehead has not failed to establish that it is entitled to a variance.

The SETF/NRDC Comments also challenge Horsehead's request for a variance from Section 5.0(6)(d) of the Rules' requirement to prevent "any" pooling of water at the facility. The SETF/NRDC Comments contend that Horsehead made an "unsubstantiated claim" that it is not discharging stormwater off-site, including to the adjacent Calumet River. This contention completely ignores the factual information presented in Horsehead's variance request in support of this finding. As Horsehead stated in its variance request, stormwater discharges to the adjacent Calumet River are prevented by both a berm which runs parallel to the Calumet River along the eastern side of the facility and an on-site stormwater retention basin. There are no City sewer connections at the Horsehead facility and hence, there are no entry points to the City sewer system to which stormwater may be discharged. These are undisputable facts and City inspectors have observed these stormwater controls numerous times in the past during inspections of the Horsehead facility. Horsehead provided a photograph as Exhibit D to its variance application to document the existence of the stormwater retention pond. For the record here, to avoid any doubt as to the existence of the berm, Horsehead has attached as Exhibit C photographs showing the berm. Also attached as Exhibit D is a Master Site Diagram indicating the location of the berm that protects the Calumet River from stormwater runoff.

Stormwater in the vicinity of the coke storage areas flow to collections points and is directed to the stormwater retention pond as follows.

- Storm water in the immediate area north of the larger Coke Storage Area (south
 of Kiln #2), flows to the storm water collection drains located just north of the
 Coke Storage Area.
- Storm water in the immediate area to the south, east and west of the larger Coke Storage Area flows to pit 2 directly south of the Kiln Feed Building.
- Storm water in the immediate area of the smaller Coke Storage Area and the Coke Hopper Feed Pile flows to pit 4 located adjacent to the Coke Process Hopper.

The attached Master Site Diagram (Exhibit D) also indicates this stormwater drainage in the vicinity of the coke storage areas.

Hence, this stormwater control system effectively eliminates the coke material from a vector into the Calumet River

Because of these stormwater controls and the absence of sewer connections, there is no threat of off-site stormwater discharges from the Chicago Plant.

The SETF/NRDC Comments also speculate, without any supporting information, that any pooling water at the Horsehead facility is threatening soils, subsurface materials, groundwater and "may have complex hydrologic and hydrogeologic pathways." Even assuming for argument's sake that there is a subsurface pathway from Horsehead's facility to the Calumet River, the only bulk solid materials stored at the south end of the property (the most likely area for any purported subsurface pathway to the River), are the IRM piles. IRM is not the type of material that presents environmental risks. In fact, it is a type of material that can be used to filter out certain contaminants. IRM has been the subject of studies which have identified its suitability as a material to be used for "treatment of metal bearing water and acid rock drainage (ARD)" based on the following IRM characteristics: high alkalinity, high cation exchange capacity, high adsorptive capacity, high porosity, high surface area, high strength, and high permeability. These characteristics of IRM have been described as "an almost perfect combination of desirable properties" for use in these treatment applications. Hence, based on these studies, rather than leaching materials into stormwater runoff, it is more likely that IRM that is present in any areas of pooled water at the facility serves as a "filter" that removes certain substances which may be present in stormwater. Moreover, even after IRM is used in such treatment or remediation applications, it may still be disposed of as a non-hazardous waste - - further evidence that IRM is not prone to generating harmful leachate. A copy of an abstract reporting on one such IRM study is attached to this response as Exhibit E. A full copy of the report may be found on the U.S. EPA's website for control technologies for use in contaminated site cleanup http://www.clu-in.org/products/tins/tinsone.cfm?num=10370. Other technical literature reporting on IRM studies that suggests IRM acts as a passive removal medium of selected substances were cited in Horsehead's variance request.

Horsehead believes that any of the remaining issues raised in the SETF/NRDC Comments have been addressed sufficiently by the information contained in the original variance request and in this supplemental submission. However, should the CDPH have any additional questions arising from the SETF/NRDC Comments, Horsehead will certainly cooperate to address them.

III. CONCLUSION

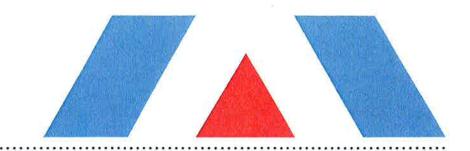
Horsehead respectfully submits that it has satisfied the requirements for a variance in Section 8.0 of the Rules and requests that the Commissioner of the CDPH grant the requested variances for the reasons described above and in the Horsehead Petition for Variance.

Respectfully Submitted,

John A. Marta Plant Manager

EXHIBIT A

Quarterly Visible Emissions and Opacity Report Horsehead Corporation - Chicago Plant 3rd Quarter 2014 Report



QUARTERLY VISIBLE EMISSIONS AND OPACITY REPORT

Horsehead Corporation > Chicago Plant

3rd Quarter 2014 Report

Prepared By:

TRINITY CONSULTANTS

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September 2014

Project 141401.0179



Environmental solutions delivered uncommonly well

On September 15 and 16, 2014, Trinity Consultants (Trinity) performed visible emissions observations at the Horsehead Corporation (Horsehead) Chicago Plant. These observations were conducted to comply with the City of Chicago Department of Public Health (CDPH) Rules and Regulations for Bulk Materials Storage (CDPH Bulk Storage Rules)¹, Sections 3.0(2)(d) and 3.0(3)(f)(ii) which require the facility to conduct quarterly testing to demonstrate compliance with the prohibition on fugitive dust set forth in 3.0(2)(b). The quarterly testing followed the protocol established in section 3.1.7.1 – Quarterly Visible Emissions and Opacity Testing of the Consolidated Fugitive Dust Control Plan and Operating program for Fugitive Particulate Matter for Horsehead Corporation (Chicago Plant), June 11, 2014.² The opacity observations were conducted in accordance with the requirements of 40 Code of Federal Regulations (CFR) 60, Appendix A, Method 9 (USEPA Method 9) and the visible emissions observations were conducted in accordance with the requirements of 40 CFR 60, Appendix A, Method 22 (USEPA Method 22).³

Supporting information for the report is included in the appendices. All of the visible emissions and opacity observations for the third quarter report were conducted by Mr. Jacob Beckerman of Trinity. A copy of Mr. Beckerman's current Method 9 certification is included in Appendix A.⁴ A site plan of the Chicago Plant, denoting the locations of fugitive dust emissions sources, is included in Appendix B. The visible emissions and opacity observations data sheets are included in Appendix C. Meteorological data from September 15 and 16, 2014 for the Horsehead Chicago Plant is included in Appendix D which indicates that the observations were included over a range of weather conditions occurring over this period.⁵ Data from Chicago Midway Airport, Lansing Municipal Airport, and Gary Chicago International Airport are included as these sites are all approximately equidistant from the Chicago Plant and representative of the weather conditions of that day.⁶

The results of the September 15 and 16, 2014 tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to CDPH Bulk Storage Rules Section 3.0(2)(a) and (b), respectively. A summary of the results is included in Section 2 of this report.

¹ Article II. Air Pollution Control Rules and Regulations, Part B: Bulk Solid Material Facilities.

² While Horsehead submitted the Consolidated Fugitive Dust Control Plan and Operating Program for Fugitive Particulate Matter for Horsehead Corporation (Chicago Plant) to the City of Chicago on June 11, 2014, there has been no formal approval of such plan from the City of Chicago to Horsehead.

³ Visible emissions and opacity observation methods used as specified in CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a).

⁴ Per CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a) a professional trained and certified to read opacity in accordance with 40 CFR 60, Appendix A, Method 9 shall conduct the opacity observations.

⁵ Per CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(b), observations were included over a range of weather conditions.

⁶ Horsehead has not yet commenced the wind monitoring requirements per CDPH Bulk Storage Rules Section 3.0(5) per the variance request submitted to the City of Chicago dated June 13, 2014.

2. VISIBLE EMISSIONS AND OPACITY OBSERVATIONS RESULTS SUMMARY

The following table summarizes the results of all of the visible emissions and opacity observations conducted for the third quarter of 2014. As previously discussed, all observations of opacity for fugitive dust emissions sources were conducted in accordance with USEPA Method 9, and all of the property line visible emissions observations were conducted in accordance with USEPA Method 22.7 Observation points were selected to comply with the requirement of CDPH Bulk Storage Rules Section 3.0(2)(a) to verify that there was no fugitive dust that is visible beyond the property line and with CDPH Bulk Storage Rules Section 3.0(2)(b) to verify that any bulk solid material storage pile, transfer point, roadway, or parking area does not exceed the 10% opacity limit.^{8,9}

Table 2. Horsehead Corporation (Chicago Plant) 3rd Quarter 2014 Visible Emissions and Opacity Summary

Location	Type of Fugitive Emissions Source	Duration of Observation (Minutes)	Average Opacity (%)
East Coke Storage Pile	Material Storage Pile	20	0
West Coke Storage Pile	Material Storage Pile	20	0
Coke Loading Pile	Material Storage Pile	20	0
Off Spec Coke Pile	Material Storage Pile	20	0
Coke Hopper ¹	Transfer Point	6	0
IRM Storage Bunkers	Material Storage Pile	20	0
Main IRM Storage Pile	Material Storage Pile	20	0
Temporary IRM Storage Pile	Material Storage Pile	20	0
IRM Truck Loading ²	Transfer Point	9.5	1.5
IRM Barge Loading Hopper	Transfer Point	20	0
IRM Barge Loading Conveyor/Chute	Transfer Point	20	0
Paved Road - Main Truck Road (west side of	Roadway	4 vehicle passes	0
plant)			
Unpaved Road - Road to IRM Truck Loading	Roadway	4 vehicle passes	0
Unpaved Road – Section of 114th St.	Roadway	4 vehicle passes	0
Property Line Locations (Method 22) ³	Property Line	8 x 10 minutes	No visible emissions

- 1. Observations were taken while coke was being loaded into the hopper. The process of loading the coke only took a total of 6 minutes.
- 2. Observations were taken while IRM was being loaded into trucks. A total of 4 trucks were loaded, lasting a total of 9.5 minutes
- 3. There were 8 property line observations conducted using EPA Method 22: North property line looking east and west, east property line looking north and south, south property line looking east and west, southwest property line looking northeast, and the west property line looking north.

⁷ Visible emissions and opacity observation methods used as specified in CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a).

⁸ There was no traffic movement in the parking area during the test period, the roadway test is representative of testing of a parking area.

⁹ CDPH Bulk Storage Rules Section 2.0 an Internal Road is defined as, any route within a facility that is not located in an area normally used for staging or storage of material and that has evidence of repeated prior travel by, or is otherwise regularly used by vehicles for transporting materials to, from or, or within the facility. A Transfer Point is the location at or within a facility where material being moved, carried, or conveyed is dropped or deposited.

The Method 9 opacity observation results for the coke storage areas, coke pile material handling, IRM storage piles, IRM pile handling, IRM barge loading, paved roadways, and unpaved roadways were all below the 10% opacity standard promulgated in the CDPH's Bulk Storage Rules. Additionally, the Method 22 observations of visible emissions at the property boundaries showed no visible emissions crossing the plant property lines.

As discussed in the executive summary, supporting information for the report is included in the appendices. A copy of Mr. Beckerman's current Method 9 certification is included in Appendix A. A site plan of the Chicago Plant, denoting the locations of fugitive dust emissions sources, is included in Appendix B. The visible emissions and opacity observations data sheets are included in Appendix C. Meteorological data from September 15 and 16, 2014 for the Horsehead Chicago Plant is included in Appendix D.

APPENDIX A: METHOD 9 VISIBLE EMISSIONS OBSERVER CERTIFICATION



AeroMei

Engineering, Inc.

Certification of Visible Opacity Reading

Jacob Beckerman

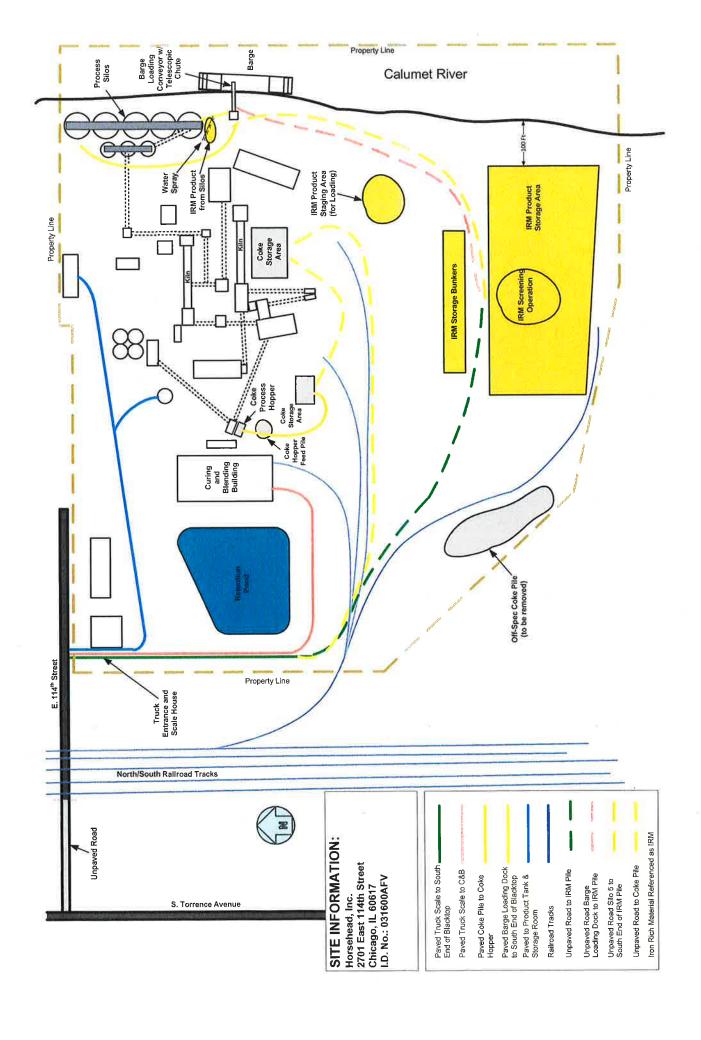
qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: March 25, 2014

Expiration Date: September 25, 2014

AeroMet Instructor: Wayne Redden

Wayne Redden



APPENDIX C: VISIBLE EMISSIONS AND OPACITY OBSERVATIONS DATA SHEETS

SOURCE NAME		OBSERVATION DATE START TIME START TIME START TIME						STOP TIME				
Horsehead Corporation	ıt)		15/1	4		1:3	3 pm	1	1:5	3 pr	ч	
ADDRESS			SEC					SEC			- 1	
2701 East 114th Street			MIN	0	15	-30	45	MIN	0	15	30	45
			1	0	0	1	0	31				
		Y-27-2	2	0	\sim	X	7	32			_	
CITY	STATE	ZIP		<u> </u>		<u> </u>	7	-				
Chicago	IL	60617	3	0	(1)	0	0	33				
724-773-2284	SOURCE ID NUME 031600AFV		4	0	0	0	0	34				
PROCESS EQUIPMENT		ATING MODE	5	0	Ö	0	6	35			11/22	
East Cole Storage	Pile NIA			\prec	\times	X	10	-				
CONTROL EQUIPMENT	OPER/	ATING MODE	6	()	0	Q		36				
Watering	I W		7			0	0	37				
DESCRIBE EMISSION POINT			8	0	0	5	O	38				
START Coke Storage HEIGHT ABOVE GROUND LEVEL	Pile		9	ň	0	6	N	39				
HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE	TO OBSERVER		X	~	X	X					
1 15 ++	START 15	STOP 15++	10	V	0	U	0	40				
DISTANCE FROM OBSERVER	DIRECTION FROM		11	0	0	0	0	41				
START 50 FTSTOP 55 FF	START E	STOP _	12	0	Ó	0	6	42				
DESCRIBE EMISSIONS		m (a.C		Ò	X	Ŏ	Ö	_			_	
START NO Emussions	STOP NO E	missions	13	V	0	V	D	43				
EMISSION COLOR START N/A STOP N/A	ONTINUOUS T	14	0		0	0	44					
WATER DROPLETS PRESENT:	ET PLUME: VA	15	0	0	0	1	45					
NOT YES	DETACHED TO	16	Ŏ	5	Õ	1	46	,	-			
POINT IN THE PLUME AT WHICH OP			-	+	×		\sim					
START 4FT above surf	EDSTOP 4 CH	have curface	17	V	\cup	Q	0	47				
DESCRIBE BACKGROUND			18	0	\circ	0	0	48				
START SIKY - OVERTOUS!	STOP SKY	> overcast	19	0	0	0	0	49				
START SKY - OVERCOST BACKGROUND COLOR	SKY CONDITIONS	3	20	Ŏ	6	ŏ	~	50				
	STARTO vercast	-STOP Overcast		U		V	1			ļ		
WIND SPEED	WIND DIRECTION	From C	21					51				
START S-OMPNSTOP U-5 MPH	START FOR D	STOP 1.5	22		5			52				
STARTGY STOP Grey WIND SPEED START STAPP START 67 F STOP 590 F	WET BULB TEMP	RH.percent	23					53				
START 6/ STOP 51 F	1 W/A	N/A								-		
Source Layout Sketch	Draw North	Arrow	24					54				
Source Layout Oketon	DIEW NOIL	Allow	25					55				L
		\bigcirc N	26					56				
1	i i	711	27					57				
1	X Emission Point		-									
	1 Linission Folia		28					58				
			29					59				
	Coke	`	30					60				
Sun - Wind	The state of the s		AVERA	GE OPA	CITY FO	OR at		NUMBI	B OF	READIN	GS ABC	VE
Plume and	Observers Position	on N	HIGHES	ST PERI	od (26		All	()	% WERE		
Stack		RANGE	OF OP	ACITY R	EADIN	GS	01				(41).=II.=-2	
	•		10	MINIM	MUN	ζ	16	MAXIN	ИUM			
\$un Loc	ation Line	T I	OBSER	VER'S	VAME (F	RINT)	25 -52.63					
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COMMENTS			BSER	VER'S	FIGNATU	- Pa		_	Pal	/15	114	
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Horsehead Corporation	t)	9/1	5/14	ť		3	:17 1	PM	3:	37P	27		
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2701 East 114th Street				MIN	0	15	30	45	MIN	0	15	30	45
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				2	X	6	K	T	32	_			
CITY	STATE		ZIP		V	0	-	4					
Chicago	IL		60617	3	0		\circ	0	33				
PHONE TOO 22 CH	80URCE 10 031600		ER	4	0	0	0	0	34				
724-773-2284	031000		TINO MODE	5	0	7	5	5	35				
Wast Coke Pile		N/	TING MODE		1	X	×	\times					
CONTROL EQUIPMENT			TING MODE	6	0	2	2		36				
Watering		NI		7	0	0	()	0	37				
DESCRIBE EMISSION POINT		1-11	i	8	0	0	5	0	38				
START West Coke stor	race onl	10			Ó	~	~	1					
HEIGHT ABOVE GROUND LEVEL	HEIGHT RE	LATIVE	TO OBSERVER	9	12	()	2	12	39		ļ		
1 15 F+			STOP 15 ft	10	0	0	()		40				
DISTANCE FROM OBSERVER	DIRECTION	FROM	OBSERVER	11	10	0	0	0	41				
START 50 H STOP 50 F	START	NE	OBSERVER STOP NE	12	1	~	X	1	42				
DESCRIBE, EMISSIONS		r			X	X	$\stackrel{\smile}{\sim}$	K		_	-		
START NO emissions	STOP	00	nissions	13	0	U	0	()	43				
EMISSION COLOR START NA STOP NA	PLUME TY	PE CC	SUOUNITM	14	0	0	0	0	44			1	
START NA STOP NA			RMITTENT 🔲	15	0	0	7	A	45		1		
WATER DROPLETS PRESENT:			T PLUME: VA		X	~	$\vdash \simeq$	1			+		
NO YES			ETACHED [" °	16	12	Q	17	0	46				
POINT IN THE PLUME AT WHICH OP	ACHY WAS	DETERM	MINED	17	0	O	0	0	47				
DESCRIBE BACKGROUND PILE	3100-	CODA	poveple Freel	18	10	0	0	0	48				
START green free / brown be				19	5	7	X	6	49		 		
BACKGROUND COLOR CO.	SKY COND	DITIONS	n but loing		14	X	2	1					
START TO STOP STOP	START/	omet	STOP Overcast	20		U	0	0	50				
I WIND SPEED	WIND DIRE	CTION	From	21					51				
STARTO-SMPHSTOP 0-5 mph	START 3	3000	STOP SE	22					52				
AMBIENT TEMP	WET BULB		RH.percent		-			-		-	 		
START 57°F STOP 57°F	N/	4	N/A	23					53				
	Comment of the Commen			24					54				
Source Layout Sketch	Drav	w North	Arrow	25					55			,	
		15	$\sim N$	26	-			·	56	1	†		
		(\mathcal{N}							-			
		- 62		27					57				
1	Emission	Point		28					58				
ر	1			29			7		59				
1	Coke				-	-		-		-	+		_
0 - h was	Pile		/	30	CE OB	CITY	OB	1	60	ED OF	READIN	CC ADO	100
Sun -Q Wind	Observers		on \	AVERA	GE OPA	OD	nº2		12/1		% WERI		IVE
Plume and	4	RANGE OF OPACITY READINGS											
Stack		1				1	19/2	MAXII	MUM				
Sun Loc		OBSERVER'S NAME (PRINT) OBSERVER'S NAME (PRINT)											
- Guil Edd		Jacob Beckerman											
COMMENTS				PRSER	VER'S	MGNAT	URE .	100	WI	198/	ΓĘ	.1	
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			Trif		WEN	1/9	nte						
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SOURCE NAME		OBSERVATION DATE START TIME STOP					STOP	OP TIME				
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ADDRESS	(omong	0 1 10110)	SEC		<u> </u>	, mee		SEC		-		
2701 East 114th Street				0	15	30	45		0	15	30	45
2701 East 114th Street			MIN	-		30		MIN	U	10	30	40
			1	1)			0	31				
CITY	STATE	IZIP	2	0	0	0	0	32				
	IL	60617		\times	\times	\rightarrow	\rightarrow	_				
Chicago			3	1)	1		9)	33				
774 777 2704		D NUMBER	4	0	0		4	34				
PHONE 724-773-2284	03160			A	ŏ	0	0					
PROCESS EQUIPIVIENT		Storage Coke	5	1	5	0	0	35				
Coke Loading Pile		storage/ coke	6	()	$ \cap $	0	\bigcirc	36				
CONTROL EQUIPMENT		OPERATING MODE	7	0	3	7	7	37				
L N/A	Control of the	I N/A		/	1	\leq	-					
DESCRIBE EMISSION POINT	S		8	()		()	(\cdot)	38				
START Coke pole -dus	turboun	ice occurryng	9	0	0	0	0	39				
HEIGHT ABOVE GROUND LEVEL	HEIGHT R	ELATIVE TO OBSERVER		~	~	$\stackrel{\smile}{\sim}$		-				
10 17		OHT STOP 10 FT	10	0	0	\mathcal{O}		40				
DISTANCE FROM OBSERVER	DIRECTIO	N FROM OBSERVER	11	0	0	(0	41				
START 40 FFSTOP 40 FF	START	5W STOP SW		O	7	~					******	
DESCRIBE EMISSIONS			12	V	1		0	42				
START Nane	STOP	None	13	0	0	0	()	43				
EMISSION COLOR		PE; CONTINUOUS	14	1	0	1	0	44				
START WIA STOP NIA		INTERMITTENT [1	$\stackrel{\sim}{\sim}$	1	4	_				
WATER DROPLETS PRESENT:		DROPLET PLUME: NIA	15	()	(2	0		45				
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START 4FT above pie	4ftabae pile	17	0	0		C	47			<u> </u>		
DESCRIBE BACKGROUND		tri debe pire	18	(0	1	0	48				
START White lavey vaile	A STOP	white/	19	0	1	0	1	49		-		
BACKGROUND COLOR	SKY CON	DITIONS		\times	1	<u> </u>	-	49				
START WHITE STOPWHITE	STARTO	revaststop Devast	_ 20	0	0		0	50				\$
WIND SPEED	WIND DID	ECTION	21					51				
WIND SPEED MPH START 0-5 MSTOP 0-5 MPH	STADE	SECTION TO DAY										
AMBIENT TEMP	WET BULL	B TEMP RH.percent	22					52				
START 57F STOP 57F	WE 1977	Rripercent	23					53				
START DIT STOP 371	N()-	1 10/21						_	-		-	
Source Layout Sketch	Dec	w North Arrow	24					54				
Source Layout Sketch	Dia	W NOUL Allow	25			700		55				
		$\dot{\sim}$	26					56				
		(\cdot) .										
		JAN.	27					57				
	X Emission	n Point	28					58				
			29					59				
			30					60				
Sun -O- Wind			AVERA	GE OPA	CITYF	OR.		NUMBE	R.OF	READIN	GS ABC	VE
Plume and	s Position	HIGHES	T PERI	od 🏻	7/2		All	0	% WERE			
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our presents se	Cal	op was loaded into	ORGAN	IZATIO		W DN	non		1 4	0160	4-	
Sun Interference	no oth	during part of obs.	7.	101	<i></i>	000	11	2 - L-	-			
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SIGNATURE	Aeromet Engineering Inc 3/25/14											
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SOURCE NAME		OBSERVATION DATE START TIME S							STOP TIME 4:14 pm				
Horsehead Corporation	t)	9/	151	14		3		PM	4:	14P	(SA)		
ADDRESS				SEC				ATTION E	SEC				
2701 East 114th Street				MIN	0	15	30	45	MIN	0	15	30	45
				1	0	0	0	\circ	31				
CITY	STATE	-	ZIP	2	0	0	0	0	32				
Chicago	IL	3	60617	3	T	6	Õ	T	33				
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724-773-2284		0AFV		4	0	\sim	2	1	34				
DDOCESS FOLIDMENT	G1		TING MODE	5	0	0	()	0	35				
Off Spec Coke P	rle	Stor	Ing Coke	6	0	0	0	0	36				
CONTROL EQUIPMENT		OPERA	TING MODE	7	0	0	0	0	37				
DESCRIBE EMISSION POINT		iO	11	8	0	T	0	0	38				
START Coke pile 7 ve	Pag Fr l	-fnnn	Con Com		\approx	\times	X	×					
HEIGHT ABOVE GROUND LEVEL	MEIGHT	RELATIME	TO OBSERVER	9	X	X	V	1V	39				
15+	START	bft	STOP 15 ft	10	0	0	0	O	40				-
DISTANCE FROM OBSERVER			OBSERVER	11	0	0	\circ	0	41				
START 75 # STOP 75 #	START 5	w	STOP 5W	12	0	0	0	0	42				
DESCRIBE EMISSIONS START NO EMISSIONS	CTOD	Man	. land	13	0	1	Ŏ	5	43				
EMISSION COLOR	PLUME T	YPE CO	missians	14	X	0	5	X	44				-
START WA STOP WA	FUGITIVE	EZ INT	ERMITTENT 🗖		X	$\vdash \times$	1	1	-			Name of the least	-
WATER DROPLETS PRESENT:	IF WATER	RDROPL	ET PLUME: NA-	15	2	0	Q	10	45				
NO YES			ETACHED 🗖 🐪	16	Q	Q	0	0	46				<u> </u>
POINT IN THE PLUME AT WHICH OP	MINED	17	0	0	0	0	47						
DESCRIBE BACKGROUND	STOP	1111	abovepile	18	0	0	0	0	48				
START Green Foliage	STOP	gree	an follage	19	0	0	0	0	49				
BACKGROUND COLOR	SKY CON	IDITIONS		1 00	0	O	n	M	50	- 22/21			·
STARTGREEN STOP Green	START	vercasi	STOP DIVERCES	21	1		~	1	51				<u> </u>
START ()- SMAN STOP () 5 Mg/	WIND DIE START	RECTION	STOP 5					-	-	-		-	
START () - 5 Mpl STOP () - 5 Mpl	WET BUL	BTEMP	RH.percent	22					52				
START 57°F STOP 57°F	NIA		NIA	23					53				
Water Company of the Australia Company of the	1 1001		11477	24					54				
Source Layout Sketch	Dr	aw North	Arrow	25					55				
	-	7	\sim	26		-			56				1
	(3	\mathcal{D}	(75) M	27	-	-	-		57			-	-
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11/1	Coke	2 1	2	29					59				
	PILE		1	30					60				
Sun - Wind -	Observe		nn	1		CITYF	OR		NUMBI	-	READIN		OVE
Plume and	2	io i Usiti	OI I	RANGE			U ADIN	Ce	HU	U	% WER	E	
Stack	000	de		KANGE	70/		KEADIN MUM		2%	MAXII	MUM		
Sun Location Line					OBSERVER'S NAME (PRINT)								
Overcast, roun					cob	B	eck	ern	an				
COMMENTS				PBSER	VER'S	SIGNAT				DAT	E /	- 1 at	á
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				I.									

SOURCE NAME								STOP TIME			
Horsehead Corporation	(Chicago Plant)	19/1	6/1	1		1.0	13P	m	1:4	ta pi	7
ADDRESS	*	SEC					SEC				772
2701 East 114th Street		MIN	0	15	30	45	MIN	0	15	30	45
		1	Ω_{-}	0	(1)	()	31				
CITY	STATE ZIP	2	0	0	0	0	32				
Chicago	IL 60617	3	(0	0	0	33				
PHONE	SOURCE ID NUMBER	4	0	(5	n	34				
724-773-2284	031600AFV	5	0	ŏ	n	0	35		-		
PROCESS EQUIPMENT COKE HOPPER	OPERATING MODE		8	X	X	X			-		
CONTROL EQUIPMENT	OPERATING MODE	6	0	0	0	0	36				
l N/A	NIA	7					37				
DESCRIBE EMISSION POINT	the being baded into	8					38				
START (ne hopper -	hopper	9					39				
HEIGHT ABOVE GROUND LEVEL	START () FL STOP () F	10					40				
DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER	11					41				
START 30 FLSTOP 30 FT	START () STOP ()	12			-	 	42				
DESCRIBE EMISSIONS	1 - 1 - 1			-	-				-		
START NO EMISSIONS	STOP NO EMISSIONS	13			-		43		-		
START NA STOP NA	FUGITIVE TO INTERMITTENT	14					44				
WATER DROPLETS PRESENT:	IF WATER DROPLET PLUME: I // A	15					45				
NOT YES []	ATTACHED DETACHED	16					46				
POINT IN THE PLUME AT WHICH OP	17					47					
DESCRIBE BACKGROUND	r stop 4 ft above hopper	18					48				
START Tan building	STOP Tan building	19					49				
BACKGROUND COLOR J	SKY CONDITIONS	20		-	-		50		-		
START TOP STOP ON	ISTART Clear STOP (lear		-	-	-	ļ		-	-	-	
START 0-5 MSh STOP 0-5 MSh	WIND DIRECTION START FROM STOP FROM	21		-	 	ļ	51		-	-	
AMBIENT TEMP	WET BULB TEMP RH.percent	22				ļ	52				
START 62 F STOP 62 F	N/A N/A	23					53				
	1	24					54				
Source Layout Sketch	Draw North Arrow	25					55				
	A.1	26					56				
1	$k \qquad \mathcal{O}_{N}$	27	1	 	1	1	57		1		dillion of the
	K Emiseton Point	28		-	-	1	58				
			-	-	-		-			┼─	
		29	-	-	-		59	-	-		-
1 0 4 115-4	1 1 7	AVERA HIGHE	05.00	ACITY F	000		60	ED 05	READIN	ICE AR	WE
Sun -Q- Wind	Observers Position	HIGHE	ST PER	IOD J	5%	^	Ali		% WER		JVE
Stank	E.				READIN		1/711	0			
		04	O MINI	MUM		Olo	MAXI	MUM			
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COMMENTS II - 12			COD	SIGNAT	CKER	ma	<u>n</u>	DA	TE		
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) 1) tola	DATE	A CLAR	WI.			-			. –		
		-									

SOURCE NAME Llowed and Comparation (Chicago Plant)	OBSERVATION DATE					TIME 3 PI	40	STOP		76.0
Horsehead Corporation (Chicago Plant)	SEC	16/	-	Γ	C	SEC	~ 1	2-6	-3/	1
2701 East 114th Street	MIN	0	15	30	45	MIN	0	15	30	45
	1	0	0	0	0	31				
CITY STATE ZIP	- 2	0	0	0	0	32				
Chicago IL 60617	3	0	0	0	0	33				
PHONE SOURCE ID NUMBER 031600AFV	4	0	Ö	0	0	34				
	5	0	0	0	Ó	35				
IKM Storage Dunlows \ U/A	6	0	0	0	0	36				
CONTROL EQUIPMENT OPERATING MODE	7	Ŏ	0	0	0	37				
DESCRIBE EMISSION POINT	8	0	0	O	0	38				
START IRM Storage Dunkers	9	Ó	0	0	0	39				
HEIGHT ABOVE GROUND LEVEL HEIGHT RELATIVE TO OBSERVER START & F STOP & F	10	O	0	0	0	40				
DISTANCE FROM OBSERVER DIRECTION FROM OBSERVER	11	0	Ŏ	0	0	41	-			
START 20 FF STOP 20 FF START WE STOP NE	12	5	0	0	6	42	COLUMN			
DESCRIBE EMISSIONS START NO emissions STOP No emissions	13	0	0	0	0	43		 		
EMISSION COLOR PLUME TYPE: CONTINUOUS	14	Ŏ	Ŏ	10	ñ	44				
START NA STOP NA FUGITIVE W INTERMITTENT	15	0	ŏ	0	8	45		1		1
WATER DROPLETS PRESENT: IF WATER DROPLET PLUME: N/A NO™ YES ATTACHED DETACHED	16	0	Ŏ	0	n	46		1		†
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	17	0	0	0	O	47				
START 4 Ft above surface STOP 4 Ft above surface	18	0	0	0	0	48				
START Blue Sky STOP Blue Sky	19	0	0	ŏ	5	49	-	\vdash		1
BACKGROUND COLOR LSKY CONDITIONS	20	0	7	1 o	M	50	-	1		
START Blue STOP Blue START CLEAN STOP CLEAN	21	1		1	1	51				
WIND SPEED START 5-10 mph STOP 5-10 mph START 5 STOP	22	 			 	52				
START 62 F STOP 62 F WET BULB TEMP RH. percent	23	<u> </u>			-	53		1		
START OL P STOP GLT 10/71 N//1	24	-		1	_	54	1	1		1
Source Layout Sketch Draw North Arrow	25	—		1	1	55		1	 	1
~ KN	26					56	ļ —	1		1
	27		1	†		57	1	1		
X Emission Point	28		1			58	1			\top
	29		<u> </u>	1	1	59	1			
Bunkers	30	+-	-	-	1	60	1	+		1
Sun - Wind	AVERA	GE OP	_	_	\	NUME	-	READIN	IGS AB	OVE
Plume and Observers Position	HIGHE				100	All	0_	% WER	Ē	
Stack \$140°	RANGE OF OPACITY READINGS MINIMUM MAXIMUM									
Sun Location Line Sun	OBSERVER'S NAME (PRINT)									
COMMENTS		RVER'S		CKE	m	an	DA	TE		
JOHN LIVIO	Que	al	Be	her	non		9	716/	14	
	- April	VIZATIO	and the	1.1	ſ Ĩ.			- Haring		
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS	CERTI	N/TY	COV	isult	unt	5_	IDA	TE		
SIGNATURE			-				1 4	3/25	114	
The state of the s	Aero	IED BY:	Mal	need	Mci 1	W		JE	20-1	

SOURCE NAME	D1 ()	OBSERVATION DATE				START TIME			STOP 12	TIME	Y21.	
Horsehead Corporation	(Unicago	o Plant)	SECI	10/	19		11/		im	12	20	pm
2701 East 114th Street			MIN	0	15	30	45	SEC	0	15	30	45
			1	0	0	0	0	31				
CITY	STATE	ZIP	2	\bigcirc		0	0	32				
Chicago	IL	60617	3	Ŏ	0	0	6	33				
PHONE 724-773-2284	50URCE 03160	DNUMBER DAFV	4	O	O	O	Ŏ	34				
PROCESS EQUIPMENT		OPERATING MODE	5	0	0	0	0	35				
Main IRM Storage	e Pile	NIA	6	0	0	0	0	36				
CONTROL EQUIPMENT		OPERATING MODE	7	0	0	0	0	37				
DESCRIBE EMISSION POINT		1	8	0	0	0	0	38	0,-00,0,4,5			
START IRM Storage	e pile	TATUE TO DESCRIPTION	9	0	0	0	0	39				
HEIGHT ABOVE GROUND LEVEL 7	START /	ELATIVE TO OBSERVER	10	0	0	0	0	40				
DISTANCE FROM OBSERVER	DIRECTIO	N FROM OBSERVER STOP SW	11	0	0	0	O	41				
START 100 F + STOP 100 F + DESCRIBE EMISSIONS	START S	W STOP DVV	12	0	0	0	0	42				
START NORMISSIONS	STOP	Je emissions	13	0	0	0	0	43				
EMISSION COLOR	PLUME TY	PE CONTINUOUS [14	0	0	0	0	44				
START NA STOP NA WATER DROPLETS PRESENT:	FUGITIVE	DROPLET PLUME: W/A	15	0	0	0	6	45				00111
NOT YES -	ED LI DETACHED LI	16	Ó	0	6	(46					
POINT IN THE PLUME AT WHICH OP	DETERMINED	17	0	0	0	5	47					
DESCRIBE BACKGROUND	4ft above surface	18	0	0	0	0	48					
START Sky/Green T	∕02\$TOP	ky/green trees	19	0	5	6	O	49				-
START SUPPRESTOP GREEN	SKY CONI	DITIONS	20	0	0	Ŏ	Õ	50				
WIND SPEED	START(lear STOFC Par	21			-		51				
START 0-5 STOP 0-5	WIND DIR START	STOP FOM	22	J.				52	-			
AMBIENT TEMP	WET BULL	TEMP RH.percent	23					53				
START 62°F STOP 62°F	NI	4 N/A	24					54		<u> </u>		
Source Layout Sketch	Dra	w North Arrow	25	-				55			-	
		\bigcirc	26				-	56		-	_	
		(-)	27			-	_	57	-	-		
3	X Emission	n Point	28					58				
			-				-			-		
	T	rm	29				-	59	-	-	-	
Sun - Wind -	T	ile	30 AVERA	SE OPA	CITY F	OR		60 NUMB	ER OF	READIN	GS ABC)VE
Plume and	Observer	s Position	HIGHEST PERIOD () 1/9 All () % WERE									
Stack		RANGE OF SPACITY READINGS O MINIMUM O MAXIMUM										
Sun Loc		OBSER				(10	MAXIN	NUM			
Out Edu	attori Ento	oun			Bec		mai)				
COMMENTS		111 1×10/4	QBSER	VER'S	SIGNATI	URE			DAT	5101	rrt	
			Occol Bechermon 9/16/14						4_			
					-	nsul	tan	15				
THAVE RECEIVED A COPY OF THES	OBSERVATIONS	CERTIFIED BY. DATE										
SIGNATURE	Aeromet Engineering Inc 3/25/14											
11166	DATE	VERGER		100				DAI	=			

SOURCE NAME		OBSERVATION DATE					TIME	0.4.4	STOP	TIME						
Horsehead Corporation	(Cnicago	Plan	[]	SEC	16/1	1_		1'		DIN	1 - 4	-010	~			
2701 East 114th Street				MIN	0	15	30	45	SEC	0	15	30	45			
				1	0	0	0	0	31							
CITY	STATE		ZIP	2	0	7	0	0	32							
Chicago	IL		60617	3	ŏ	3	$\overline{\wedge}$	ă	33							
PHONE 724-773-2284	SOURCE ID			4	1	0	A	0	34							
PROCESS EQUIPMENT	031600		TING MODE	5	K	0	6	0	35							
PROCESS EQUIPMENT TEMPORALY IRM FI	0	N/A	TING MODE	6	5	6	X	5	36							
CONTROL EQUIPMENT	`	OPERA	TING MODE	7	0	6	X	O	37							
DESCRIBE EMISSION POINT		N/	4	8	O	ð	8	Ŏ	38							
START TEMPORAN IRM STOR	age pile	2		9	0	ŏ	ŏ	Ŏ	39	*						
HEIGHT ABOVE GROUND LEVEL	HEIGHT RE	LATIVE	TO OBSERVER STOP 15 FT	10	0	ŏ	ŏ	ŏ	40	,						
DISTANCE FROM OBSERVER	DIRECTION	FROM	OBSERVER	11	Ŏ	Ö	ŏ	Ŏ	41							
START 50 FF STOP 50 FF	START 1)	STOP N	12	Ŏ	7	7	6	42			-				
START NO EMISSIONS	STOP A	100		13		\sim	0	X	43							
EMISSION COLOR	PLUME TY	PEY CO	MISSIONS NTINUOUS	14	0	3	5	X	44							
START N/A STOP N/A WATER DROPLETS PRESENT:			RMITTENT 🗖	15	6	$\tilde{\sim}$	5	8	45		<u> </u>					
WATER DROPLETS PRESENT:	NOW YES ATTACHED DETACHED						Š	8	46							
POINT IN THE PLUME AT WHICH OP	INED	16 17	00	X	8	0	47									
START Uft above surface DESCRIBE BACKGROUND	ibove surface	18	ŏ	8	Ó	$\vdash \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$	48									
ISTART SKILL FOR SILO	STOP 5	Ku/I	an silo	19	0	0	Õ	1	49			·	-			
BACKGROUND COLOR BINE/ START FINE TON STOP	SKY COND	ITIONS	0.	20	0	T	8	0	50							
START TON TanSTOP /Tan	START C	CTION	STOP Clean	21		The second of			51							
WIND SPEED MAN STOP 0-5 MPN AMBIENT TEMP	START FY	gw.	STOP FROM	22				1	52							
START 62°F STOP 62°F	WET BULB	TEMP	RH.percent	23				-	53		·					
START 62 STOP 62	N/	4 1	I WA	24					54							
Source Layout Sketch	Drav	North	Arrow	25					55							
ול	10	1	R	26					56							
		1	\mathcal{D}	27					57				-			
	K Emission	Point	į.	28					58							
Pile		10;	La	29					59							
1116		j	16	30					60							
Sun - Wind -	Ohearvare	Pacifia	n	AVERA		CITYF	OR)%	-	NUMB		READIN		VE			
Plume and	Plume and Observers Position								1711	U	% WERE					
Stack 1		RANGE	5%			.(0%	MAXIN	MUM							
Sun Loc	ation Line			1		VAME (F			17523							
COMMENTS			***************************************		VER'S S	IGNAT		rmo	<u>(/)</u>	DAT 9	716/1	if				
				ORGAN	IZATIO	<i>_</i>	2/192	Itani	-		,0,0					
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS					IED BY:		N DV	11001		DAT						
SIGNATURE					Aeromet Engineering Inc 3/25/14											
11166	TITLE DATE								VERIFIED BY: J DATE							

SOURCE NAME		OBSERVATION DATE START TIME STOP							TIME			
Horsehead Corporation	(Chicago	Plant)		1/16/	14		8-2	23 a	m	8:3	3 an	1
ADDRESS			SEC					SEC				
2701 East 114th Street			MIN	0	15	30		MIN	0	15	30	45
			1	0	0	5	0	31				
CITY	STATE	ZIP	2	0	5	0	0	32				
Chicago	IL	60617	3	Ö	5	0	0	33				
DHONE	SOURCE II	O NUMBER	4	0	1-	0	0	34			-	
724-773-2284 PROCESS EQUIPMENT IFM Truck Landing CONTROL EQUIPMENT	031600				2		12					
PROCESS EQUIPMENT		OPERATING MODE	5	5	0	0	0	35				
IKM I WICK LOCALINA	9	Landing	6	5	0	0	0	36				
LVA	,	OPERATING MODE	7	0	5	0	0	37				
DESCRIBE EMISSION POINT		observe above	8	0	Ó	5	Õ	38				P
START Dading IRM into to	wke	truck	9	0	5		1					
START LOADING TRM INTO to HEIGHT ABOVE GROUND LEVEL	HEIGHT RE	LATIVE TO OBSERVER			_	0	2	39		-		
10++	START /	2 ft stop 12 ft	10	0	Q			40				
DISTANCE FROM OBSERVER START 40 ft STOP 40 ft DESCRIBE EMISSIONS	DIRECTION	FROM OBSERVER	11					41				
START 4077 STOP 40 TT	START	STOP SW	12					42				
START BLOW dump of due	L STOP	Black plume of dust	13					43				
START Black plume of dus	PLUME TY	PE; CONTINUOUS [14					44				
START Black STOP Black	FUGITIVE	INTERMITTENT []	15					110.00				
WATER OPENITO PRESENT.	WATER DROPE ETS OPESENT: LE WATER DROPE ET DE LIME: 4 / //							45				
NOM YES IN NOTE ATTACHED I DETACHED								46				
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED						9:		47				
START 2 FT above truck	STOP 2	eff above truck	18					48	100			
START Bline St.	STOP	Bluesky	19					49	-			_
START Blue Sky BACKGROUND COLOR 1	SKY CONE	Blue Sky DITIONS				-					-	
START Blue STOP Blue	STARTCH	POUR STOP () POUR	20					50				
WIND SPEED	I WIND DIRE	STOP TO	21					51				
STARTO-5mph STOPO-5mph AMBIENT TEMP START 52 F STOP 52 F	START 7	JW STOP NW	22					52				
START 57 F STOR 50 F	WET BULE	TEMP RH.percent	23					53				
31AKT 927 310P 92	1 10/	7 10/7	24					54				
Source Layout Sketch	Dra	w North Arrow	25				-	55		-		
		4		-				-				
		(1)N	26					56				
			27					57				
1	K Emission	Point	28					58				
/n	ļ		29					59				
			30					60				
Sun - War C		r	AVERA	GE OPA	CITYF	OR			ER OF	READIN	GS ABC	VE
Plume and	Observer	s Position	HIGHES	T PERI	OD I	50	0			% WERE	_	5
Stack	100		RANGE	~ A.			GS				~	
A	-		0% MINIMUM 5% MAXIMUM									
Sun Loc		OBSERVER'S NAME (PRINT)										
COMMENTS		Jacob Beckerman OBSERVER'S, SIGNATURE DATE										
4 trucks loaded with	Jacab Beckernan 9/16/14											
Trucks reduced with	ORGAN	IZATION	<u>vec</u>	*cer	ronc	n-	1 4	10/1	-			
IRM when loaded into tracks.				1/2	Con	1541	tourt	-5				
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS				ED BY					DAT	The state of the state of	III III III III III III III III III II	
SIGNATURE			Aeromet Engineering Fac 3/25/14 DATE									
TITLE		DATE	VERIFIE	:D RA:	9		J		DAT	E		
			1200000000	West of the second								

SOURCE NAME	····							STOP	7:20 am			
Horsehead Corporation	o Plant)	91	16/	4		102	00	am	10:	20	2M	
ADDRESS			SEC					SEC				
2701 East 114th Street			MIN/	0	15	30		MIN	0	15	30	45
			1	0	0	0	0	31				
CITY	STATE	ZIP	2	0	(1)	0	0	32				
Chicago	IL	60617	3	0	0	0	0	33				
PHONE 724-773-2284	SOURCE	D NUMBER	4	0	0	0	0	34				
121-112-2201	03160		5	7	7	0	A	35				
PROCESS EQUIPMENT BOYAGE LONGING HOPP CONTROL EQUIPMENT	12.	OPERATING MODE	6	X	*	X	~					
CONTROL EQUIPMENT	<u> </u>	OPERATING MODE		1	1	2	X	36		0.000		
Mono		NA	7	X	1	2	Y	37				
DESCRIBE EMISSION POINT	- L		8	\subseteq	1	()	Ž	38				
DESCRIBE EMISSION POINT START LONG OF IRM (A HEIGHT ABOVE GROUND LEVEL	THEIGHT R	ELATIVE TO OBSERVER	9	0	0	()	0	39				
15 FF	START I	5FT STOP 15FT	10	0	0	0	0	40				
DISTANCE FROM OBSERVER		N FROM OBSERVER	11	0	0	0	0	41				
START 50 FF STOP 50 FF	START	J STOP N	12	0	0	0	0	42				
DESCRIBE EMISSIONS START Black dust expe	STOP	Markey 15glans	13	0	0	0	0	43				
EMISSION COLOR	PLUME TY	PE: CONTINUOUS	14	ñ	Ö	6	0	44				
START NONE STOP NONE	M INTERMITTENT	15	0	X	13	0	45	-				
WATER DROPLETS PRESENT:	DROPLET PLUME: W/A		K	X	1	×	-					
POINT IN THE PLUME AT WHICH OP	DETERMINED	16	X	12	1	X	46		-			
START 2 Ft above home	2. Frahousehana	17	10	12	12	N	47		-			
DESCRIBE BACKGROUND			18	0	(1)	Q	0	48				
START Tan 516	STOP	Tansto	19	0	()	0	0	49				
BACKGROUND COLOR START Tan STOP Tan	SKY CON	lew stopClear	20	0		0	10	50				
			21			11,1 (-16,-1		51				
START 8-5 MAN STOP 8-5 MAN	START	OM ESTOP E	22					52				
AMBIENT TEMP START 60 T STOP 60 F	WET BULL	RH.percent	23					53				
START OF T STOP OF T	10/2	+ N/4	24			 		54		†		
Source Layout Sketch	Dra	w North Arrow	25		 	-	-	55		-		
		#		-	-		-	-	-	-		
		(†)	26		-	-		56	-	-	-	
1		<u> </u>	27					57	ļ	ļ		
hopper [X Emission	Point	. 28					58				
hoppe.	-	PONVEYOR	29					59				
1	11	has 1	30					60				
Sun - Wind -	dheerver	s Position	AVERA	GE OP	ACITY F	98/_	,	NUMB	_	READIN		OVE
Plume and	5 (Coldon	RANGE OF OPACITY READINGS OPC WERE										
Stack 1		O% MINIMUM O% MAXIMUM										
Sun Loc	ation Line	Tsun	OBSER	VER'S	NAME (
2011			cob			rmo	in	1575				
COMMENTS TRACE LEVEL 1	20.00	L. Just hut	OBSER		SIGNAT	0		سر ده	PA	16/	14	
IRMIS natured to	reven	t dust, but	ORGAN	IZATIO		NULL	inc		1 /	10/		
steam is present		dumping	Try	NEW	Con	sulto	mts					
I HAVE RECEIVED A COPY OF THES	E OPACITY	OBSERVATIONS	CERTIF	IED BY	-		A1 59	Τ-	DAT	12-	lice	
SIGNATURE	IDATE	Aero VERIFI	met FD RV	Eng	neer	ing	שמב	DA	125,	17		
F		J. 11 E	V LIXII							_		

SOURCE NAME Howard Corneration (Chicago Plant)	OBSERVATION DATE					TIME		STOP		
Horsehead Corporation (Chicago Plant)	SEC	161	11		10.	41 a		41.	11	am
2701 East 114th Street	MIN	0	15	30	45	MIN	0	15	30	45
	1	O	0	0	0	31				
CITY STATE ZIP	2	0	0	0	0	32				
Chicago IL 60617	3	0	1	0	T	33				
PHONE SOURCE ID NUMBER	4	1	8	T	X	34				-
724-773-2284 031600AFV PROCESS EQUIPMENT OPERATING MODE		1	8	6	X	35				
724-773-2284 031600AFV PROCESS EQUIPMENT I KM Bruge Conveyor Chute Normal/10ad/		1	X		3	36				
CONTROL EQUIPMENT OPERATING MODE	7	X	X	8	\approx	37	(20.2	8 stop	<u> </u>	-
Covered conveyor and chule N/A DESCRIBE EMISSION POINT	8	8	8	7	0	38	Bre	the.		
START Chute into burge		8		X	N		10:21	Shan	-5	
HEIGHT ABOVE GROUND LEVEL HEIGHT RELATIVE TO OBSER	VER 9	2	$\frac{2}{2}$	(1)	\mathcal{Q}	39				
START OFF STOP OF	· f 10	0	Q	0	0	40				
START 30 + STOP 30 CH START N STOP NE		0	0	0	0	41				
START 20 FF STOP 30 FF START NE STOP NE	12	0	0	0	0	42				
ISTART Black duck expected STOP NO emission'S	13	0	0	0	0	43				
EMISSION COLOR PLUME TYPE; CONTINUOUS	14	0	0	0	0	44				
START NA STOPNA FUGITIVE INTERMITTENT WATER DROPLETS PRESENT: IF WATER DROPLET PLUME: I		0	0	0	0	45				
NOL YES COMMENT ATTACHED DETACHED		0	()	0	1	46				
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	47	0	0	0	0	47				
START 2 Ft whove TRM pile STOP 2 Ft above TRU DESCRIBE BACKGROUND	1 10	Õ	0	Õ	0	48				
START Grey boward STOP GVEY DOWNER	19	Ó	Õ	Ŏ	0	49		-		
START Grey Downe STOP GVEY Downe BACKGROUND COLOR GVEY SKY CONDITIONS START DOWNESTOP DOWNE START CLEAR STOP C	20	ñ	0	0	Ŏ	50				
			_			51				
START 2-5 MUNSTOP D- Fron START 35 STOP 5	m 22				-	52		-		-
AMBIENT TEMP START GOT STOP GOT NA WET BULB TEMP RH.perc	cent 23		-			53	-	-		
START GOT STOP 60 F NIT VIII	24					54		-		
Source Layout Sketch Draw North Arrow	25			-		55				-
A	-							-		-
Chute of 1	26	-		-		56		-		
X Emission Point	27	_				57			_	
Littlession Foliat	28				ļ	58				-
IRMPlie	29					59				
Sun - Wind -	30	CE ODA	CITYE	OB	L	60	ED OF	TEA EVIN	CC ADO	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
Plume and Observers Position	Elizabeth Control	AVERAGE OPACITY FOR HIGHEST PERIOD 2% WERE								JVE
Stack	-	RANGE OF OPACITY READINGS								**********
<	(1/0	MINI		{	<u> </u>	MAXIN	MUM		
Sun Location Line '5wn	OBSER	ver's i		ecke						
COMMENTS IRM observed at strap pt in barg	QBSER	VER'S	IGNAT	URE	Maria de la composición dela composición de la composición de la composición de la composición de la composición dela composición de la composición dela composición dela composición dela composición de la composición dela composición de	10)	DAT	E		
above pile and at conveyor thate IRM is natered, steam is present when	Jaco	OBSERVER'S SIGNATURE OACH BUSINESS 9/16/14 ORGANIZATION							4	
JEM 15 watered, Steam 15 present when	ORGAN	DITATION		1	beat	4				
THAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS	ÇERTIF		_	1sul	w) V)	DAT	Ę		
SIGNATURE	Aere		Eng	(nees	ing]	NC		125	114	
TITLE DATE	VERIFIE	ED BY:	,		J		DAT	E		

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

company: Horsehead Corporation			Provide sketch of observer's position relative to the source:			
Address: 2701 E. 14th St Chicago, IL 60617						
Facility ID: 031600AFV			THICK			
Date: 9/16/14			Franci both ways			
Location Description: Page	from el to	oth way 5	15 ft			
Control Device: Welling	7					
Hours of Observation: M Z hr			From 1	Φ		
Observer's Name: Jacob Beckerman			Wind North	Observer	Note: Not to Scale.	
Certification Date of Observer: 3/25/14			Observer's Affiliation: Trylly			
Point of Emissions: Roadway/Tire In		terface	Height of Discharge Point: 0		it: 0 ft	
CLOCK TIME		Initial	9:99 am	Final	9:08	
OBSERVER LOCATION						
Distance to discharge		15 ft		15 ft		
Direction from dischar	ge	90 degrees		90 degrees		
Height of observation point		4 ft		4 ft		
BACKGROUND DESCRIPTION		Green Foliage		Green Foliage		
WEATHER CONDITIONS						
Wind Direction		From the Wast		From the West		
Wind Speed		0-5 mph		0-5 mph		
Ambient Temperature		60 F		60 F		
SKY CONDITIONS (e.g., cle	ar,	Clear		Clear		
overcast, % clouds, etc.) PLUME DESCRIPTION		CIEOU		Cracy		
Color		No dust		No dust		
Distance Visible						
OTHER INFORMATION		No emission miles		No enission miles		
SUMMARY OF AVERAGE OPACITY						
		Time		Opacity (%)		
Set Number	Start - End		Sum	Average		
1	9:01:00 - 9:01:15			0	0	
2	9:03:20 - 9:03:15			0	0	
3	9:05:15 - 9:00		5:39	0	0	
4	9:07:45 - 9:08		3:00	0	6	
Readings ranged from to % opacity.						
Average of 12 readings:						

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

Company: Horsehead Corporation			Provide sketch of obs	erver's positi	on relative to the source:	
Address: 2701 E. 114th St Chicago, IL 60617						
Facility ID: 031600AFV					7	
Date: 4/16/14			LA		1 1	
Location Description: Unp	aved Road to	IRM	7. 5		both thechous	
Control Device: Wellwa			irucks	trove!	on directions	
Hours of Observation:	1hr		None 1	A		
Observer's Name: Jacob Beckerman			Wind North Observer Note: Not to Scale.			
Certification Date of Observer: 3/25/14			Observer's Affiliation: Trinity			
Point of Emissions: R	terface	Height of Discharge Point: 0 ft				
CLOCK TIME		Initial	8:44 am	Fina:	1 8:46am	
OBSERVER LOCATION		te .				
Distance to discharge		15 ft		15 ft		
Direction from discharge		90 degrees		90 degrees		
Height of observation point		4 ft		4 ft		
BACKGROUND DESCRIPTION		Green foliage		Green Foliage		
WEATHER CONDITIONS						
Wind Direction		N/A From the		N// From the		
Wind Speed		O mph		O mph		
Ambient Temperature		52 F		52 F		
SKY CONDITIONS (e.g., clear,		Clear		Clen-		
overcast, % clouds, etc.) PLUME DESCRIPTION		Cleour		Clear		
Color		Grey dust		Grey dust		
Distance Visible		> miles		> miles		
OTHER INFORMATION		4 IRM truck pas			MITTER	
SUMMARY OF AVERAGE OPACITY						
		Time		Opacity (%)		
Set Number	Start - End		Sum	Average		
1	8:44:00-8:44:15		44:15	0	0	
2	8:44:45- 8:44		15:00	0	0	
3	8:45:30 - 8:4		15:45	0	0	
4	8:46:20 - 8:4		5:35	0	0	
Readings ranged from to % opacity.						
Average of 12 readings:						

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

company: Horsehead Corporation			Provide sketch of observer's position relative to the source:			
Address: 2701E.114th St Chicago, TL 60617						
Facility ID: 031600AFV			I truck			
Date: 9/16/14					1	
Location Description: Unp	wedportron	of 114th St	track	ections	15 ft	
Control Device: Walthou	3		-			
Hours of Observation: L/hv			From S Wind North Observer D San Note: Not to Scale.			
Observer's Name: Vacob Beckerman						
Certification Date of Obs	7-11	Observer's A	ffiliation:	trinity		
Point of Emissions: R	oadway/Tire In	terface	Height of Discharge Point: 0 ft			
CLOCK TIME		Initial	9:18 am	Final	9:22 am	
OBSERVER LOCATION						
Distance to discharge		15 ft		15 ft		
Direction from discharge		90 degrees		90 degrees		
Height of observation point		4 ft		4 ft		
BACKGROUND DESCRIPTION		Green Follage		Green foliage		
WEATHER CONDITIONS						
Wind Direction		From the South		From the South		
Wind Speed		0-5 mph		O-5 mph		
Ambient Temperature		60 F		60 F		
SKY CONDITIONS (e.g., clear,		Clear		Clear		
overcast, % clouds, etc.) PLUME DESCRIPTION		Crear				
Color		No emissions		No emissions		
Distance Visible						
OTHER INFORMATION		No emissions miles		No owissforsmiles		
SUMMARY OF AVERAGE OPACITY						
	Time		Opacity (%)			
Set Number	Start - End		Sum	Average		
1	9:18:00 - 9:18:15		8:15	0	0	
2	9:19:00 - 9:19:05				0	
3	9:21:00 - 9:2				0	
4	9:22:00 - 9:2			0	0	
Readings ranged from to % opacity.						
Average of 12 readings:						

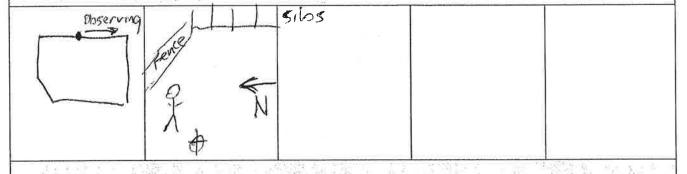
FUGI		EMISSION INSPECTION – METHOD 22	Section Services and Control of the
Company Horsehead Corpo	ration (Chicago Plant)	Observer Jacob 1	Beckerman
Chicago Plant, 270 Location 60617	01 E. 114th St, Chicago, IL	Affiliation Trinity	Consultants
Company Rep. Frank	Condrick	Date 9/16/14	
Sky Conditions Blue/	lear	Wind Direction From	1 NE
Precipitation 0.02 in.	last 48 hrs	Wind Speed 0 - 5 M	
Industry Secondary Refining	of Non Ferrous Metals	Process Unit North	oroperty bandan west
points and/or actual emi	Parting.		
NA Sun Ir obser block	front of ver but ed by shadous		
	OBSER	VATIONS	
	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)
Regin Observation	2.110	and the second second	The state of the same of the

	Clock Time	Observation Period Duration (min; sec)	Actual Emission Time (min:sec)			
Begin Observation	3:48 pm	X EXT				
The state of the s		1 1 1	E . F . 2			
e Ş Eg			11			
		=	1,79			
7 TO A						
77.5			1000			
b)						
		CONTROL OF THE CONTRO				
End Observation	3:58 pm	10:00	00:00			
		Tradal Camala Tri	10.00			

10:00	00:00
Total Sample Tim	e: 10: <i>0</i> 0
Total Emission Ti	me: 00:00
Emission Frequen	cy: 0%

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION – METHOD 22 Horsehead Corporation (Chicago Plant) Observer Chicago Plant, 2701 E. 114th St, Chicago, IL Affiliation Trinity Consultants Location 60617 Company Rep. Frank Condrick Sky Conditions Clear Wind Direction From N last 48 hos Precipitation 0.02 in. Wind Speed Casi Process Unit Mark Industry Secondary Refining of Non Ferrous Metals

Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)			
Begin Observation	3:33 pm					
		18 19 1	, eF			
1.71 1.754						
51		N. 1. 1.	Ť			
	11 to 11 / 20 - 20 - 10 to 20 - 20 - 20 - 20 - 20 - 20 - 20 - 20		- CONTRACTOR OF THE CONTRACTOR			
Ž.	*					
End Observation	3:43 pm	10:00	00:00			

Total Sample Time: 10:00

Total Emission Time: 00:00

Emission Frequency: 00/0
(Total Emission Time/Total Sample Time) x 100%

	OUTSIDE LOCAT		ON INSPEC ETHOD 22				
Company Horsehead Corpo	ration (Chicago Plant)	Observer Jacob Beckerman Affiliation Trinity Consultants					
Chicago Plant, 270	01 E. 114th St, Chicago, IL	Observer	Total	Casaltante			
Location 60617				CONSUMANIS			
Company Rep. Frank			16/14	daadaga			
Sky Conditions Blue /	Clear	Wind Dir	ection From				
Precipitation 0.02 in.	last 48 hrs	Wind Spe	ed 5-10	mph			
Industry Secondary Refining	of Non Ferrous Metals	Process U	nit West p	roperty boundary			
1/2	Rand	gate					
NT A	Sun		2000 C 10 C				
NT ^•	OBSER Clock Time	Observa	tion Period	Actual Emission Time			
Begin Observation	OBSER Clock Time	Observa		Actual Emission Time (min:sec)			
	OBSER	Observa	tion Period	All the contract the first terms of the contract terms of			
	OBSER Clock Time	Observa	tion Period	4.5 et au des des des des la la la companie de l			
Begin Observation	OBSER Clock Time	Observa	tion Period n (min:sec)	4.5 et au des des des des la la la companie de l			
Begin Observation	OBSER Clock Time	Observa	tion Period n (min:sec)	(min:sec)			
Begin Observation	OBSER Clock Time	Observa	tion Period n (min:sec)	All the contract the first terms of the contract terms of			
Begin Observation	OBSER Clock Time	Observa	tion Period n (min:sec)	(min:sec)			
Begin Observation	OBSER Clock Time	Observa	tion Period n (min:sec)	(min:sec)			
Begin Observation	OBSER Clock Time 3:12 Pm	Observa Duratio	tion Period n (min:sec)	(min:sec)			
Begin Observation	OBSER Clock Time	Observa Duratio	tion Period n (min:sec)	(min:sec)			
Begin Observation	OBSER Clock Time 3:12 Pm	Observa Duratio	tion Period n (min:sec)	(min:sec)			

	OUTSIDE LO	OKE EMISSION INS CATION – METHOL	PECTION
Company Horsehea	d Comercia	JITION - METHOL	0 22
Location Chicago P	ant, 2701 E. 114th St, Chicago	Observer, OCO	b Beckerman
		Affiliation Toron	b Beckerman by Consultants
Company Rep. Free	nk Condrick	Date 9/16/14	y consultants
Sky Conditions Due	Clear	The second secon	
Precipitation 0.02	in. last 48 hrs	Wind Direction Fre	
Industry Secondary D	1. 1951 90 hrs	Wind Speed O-5	mph
, secondary R	efining of Non Ferrous Metals	Property 51.	
Sketch Process Unit	: Indicate observer no		indicate potential emission
11.0	~ X	1	l l
N7 I	0BSER	RVATIONS	
	OBSER Clock Time	Observation Period	Actual Emission Time
	Clock Time		Actual Emission Time (min:sec)
	A SECOND	Observation Period	Actual Emission Time (min:sec)
	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Segin Observation	Clock Time	Observation Period	(min:sec)
Begin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Segin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time 2:54 pm	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time 2:54 pm	Observation Period Duration (min:sec)	(min:sec)
Begin Observation	Clock Time 2:54 pm	Observation Period Duration (min:sec) 10:00 Total Sample Time:	(min:sec)
Begin Observation	Clock Time 2:54 pm	Observation Period Duration (min:sec)	(min:sec) 00:00 10:00

FUGI		E EMISSION INSPECTION – METHOD 22	17			
Company Horsehead Corpo	oration (Chicago Plant)					
Chicago Plant, 270	01 E. 114th St, Chicago, IL	Observer Jacob Be Affiliation Trinity	Chermon			
Location 60617		Affiliation MINITY	Consultants			
Company Rep. Frank (Date 9/16/14				
Sky Conditions Blue/([itions Blue/Clear Wind Direction From N					
Precipitation 0.02 in	last 48 hrs	Wind Speed 9-5 mg	,h			
Industry Secondary Refining	g of Non Ferrous Metals					
points and/or actual emi	Fence	on relative to source; inc	dicate potential emission			
	OBSER Clock Time	Observation Period	Actual Emission Time			
Begin Observation	0.016	Duration (min:sec)	(min:sec)			
Begin Observation	2:34 pm	5 W W 1 3 3 3 1				
	Tarata and an analysis of the					
		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				
tota set pay in			-			
MITTAL TO THE REAL PROPERTY.	4					
A SHORT M	A					
para di salah sala						
End Observation	2:44 pm	10:00				
End Observation	2:44 pm	Total Sample Tim	00;00 ne: 10:00			
End Observation	2:44 pm		00;00 ne: 10:00			

4	IVE OR SMOKE I OUTSIDE LOCAT		A	TION	E.		
	ation (Chicago Plant)	Observer)AC	.06 E	Becker	man	1	
Chicago Plant, 2701 Location 60617	Affiliation Tr						
Company Rep. Frank	Condrick	Date 9/16/	14		× :	24	
	Sky Conditions Blue (lear						
Precipitation 0.02 in.	Wind Direction Wind Speed	-5 m	ish				
Industry Secondary Refining	Process Unit 50	ath	imperty	Bord	king west ler		
Sketch Process Unit: Inc points and/or actual emis	licate observer positio sion points.		200	icate pote	> 3 m/s	7.5 x 1	
M TH	Plie						
	Clock Time	Observation Po		V-17 745 Per	Emission	Time	
n de Obsessión	7: 7:	Duration (min	:sec)		min:sec)	100 st.	
Begin Observation	1.51	14"20 1 16	1 1		100	347200	
				80 -	T .	¥	
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	The state of the line	K a T	1.5			- L.	
		7.					
		W 45	10			7	
A WEST PERSONS ASSESSMENT							
Ty Ty					and the second		
End Observation	\$ 8:01			00	: 00		
	· W 0.01	Total Sam		ne: 1010	: 00 00 00		
		Total Emi		ime: O:	00		
		Emission Frequency: 5% (Total Emission Time/Total Sample Time) x 100%					

	a contract of the contract of	EMISSION INSPECTION – METHOD 22			
	ition (Chicago Plant)				
	E. 114th St, Chicago, IL	Observer Jacob B	Consiltants		
	. 6.2 6	Date 9/16/14	Carry		
Company Rep. Frank Co			30		
Sky Conditions Blue / Cle		Wind Direction Wo W	und		
Precipitation 0.02 in. 10	ast 48 hrs	Wind Speed Omph	FO-L		
Industry Secondary Refining of	of Non Ferrous Metals	Process Unit East pr	operty boundary south		
Sketch Process Unit: Ind points and/or actual emiss		on relative to source; inc	dicate potential emission		
N7 Obs	Property	VATIONS			
	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)		
Begin Observation	8:11 am		The state of the s		
THE TAPESANTS					
Landilla Van 14.					
		is			
Part of the second					
ARTICLES.		30.7 11.0			
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	<u> </u>		,		
		THE RESERVE OF THE RE			
End Observation	8:21 am	10:20:00	00: <i>00</i>		
		Total Sample Tin	ne: 10:00		
		Total Emission T			
		Emission Frequer (Total Emission Time/Total			

FUGI	. 10	EMISSION INSPEC ION – METHOD 22	CTION				
	oration (Chicago Plant) D1 E. 114th St, Chicago, IL	Observer Jacob Beckerman Affiliation Trinity Consultants					
Company Rep. Frank Co	endrick	Date 4/16/15	City square				
Sky Conditions Blue/C		Wind Direction From	E				
Precipitation 0.02 in.		Wind Speed 0-5 m	ph				
Industry Secondary Refining	of Non Ferrous Metals	Process Unit East pla	ant boundry north				
Sketch Process Unit: In points and/or actual emi	ission points.	n relative to source; inc	licate potential emission				
Jabserum	9) hourge						
	OBSER Clock Time	VATIONS Observation Period Duration (min:sec)	Actual Emission Time				
Begin Observation	11:21 am	Duration (min.sec)	(min:sec)				
	(1.2120)						
A CONTRACTOR		10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -					
	i.						
		FW E	= (2.7 ±), (e.				
3.7		V					
End Observation	1131 am	10:09	00:00				
L.		Total Sample Tin	ne: 10:00				
		Emission Frequer	ney: 0%				

APPENDIX D: METEOROLOGICAL DATA

September 15, 2014 Meteorological Data from Lansing Municipal Airport - KIGQ

repterimer 23, 2	J14 WIELEOTOIL	igital Data from	n Lansing Willin	cipal Airport - KK	SQ.		Wind	Gust		1	T
Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Speed	Speed	Precip	Events	Conditions
12:15 AM	50.0 °F	48.2 °F	94%	30.19 in	10_0 mi	Calm	Calm		N/A		Clear
12:35 AM	49.5 °F	47.1 °F	92%	30,19 in	10.0 mi	Calm	Calm	14	N/A		Clear
12:55 AM	. 49.1 °F	46.8 °F	92%	30.20 in	10.0 mi	Calm	Calm	3	N/A		Clear
1;15 AM	46.6 °F	45_3 °F	95%	30,19 in	10_0 mi	Calm	Calm	(4	N/A		Clear
1:35 AM	47.5 °F	45_1 °F	92%	30.20 in	10_0 mi	Calm	Calm		N/A		Clear
1:55 AM	47.8 °F	45.3 °F	91%	30,19 in	10.0 mi	Calm	Calm		N/A		Clear
2:15 AM	48.4 °F	47_1 °F	95%	30,19 in	10.0 mi	Calm	Calm	101	N/A		Clear
2:35 AM	48.9 °F	46.4 °F	91%	30,19 in	10_0 mi	Calm	Calm		N/A		Clear
2:55 AM	49.1 °F	46.2 °F	90%	30,19 in	10.0 mi	Calm	Calm	2	N/A		Clear
3:15 AM	48.9 °F	46.9 °F	93%	30_18 in	10 0 mi	Calm	Calm	*	N/A		Clear
3:35 AM	49.1 °F	47.3 °F	93%	30.18 in	10.0 mi	Calm	Calm		N/A		Scattered Clouds
3:55 AM	48.6 °F	46.4 °F	92%	30_17 in	10.0 mi 10.0 mi	SE	3.5 mph		N/A N/A		Scattered Clouds Clear
4:15 AM	48.2 °F	45,9 °F	92% 92%	30.17 in 30.16 in	10.0 mi	Calm Calm	Calm Calm	-	N/A		Mostly Cloudy
4:35 AM 4:55 AM	48.9 °F 49.3 °F	46.6 °F 47.3 °F	93%	30_16 in	10.0 mi	Calm	Calm	-	N/A		Overcast
5:15 AM	50.4 °F	47.8 °F	91%	30.17 in	10.0 mi	SW	4,6 mph		N/A		Overcast
5:35 AM	50.2 °F	48.4 °F	94%	30.17 in	10.0 mi	Calm	Calm		0.02 in		Overcast
5:55 AM	50.9 °F	48.2 °F	90%	30.16 in	10.0 mi	South	4.6 mph		0.02 in	Thunderstorm	Overcast
6:15 AM	51.1 °F	48.4 °F	90%	30.16 in	10.0 mi	Calm	Calm	-	N/A		Overcast
6:35 AM	51.4 °F	49.1 °F	92%	30.16 in	10.0 mi	Calm	Calm	320	N/A		Overcast
6:55 AM	52.3 °F	48.2 °F	86%	30,16 in	10.0 mi	Calm	Calm	-	N/A		Overcast
7:15 AM	52.0 °F	48.6 °F	88%	30.16 in	10.0 mi	South	. 4.6 mph		N/A		Overcast
7:35 AM	52.2 °F	48.6 °F	88%	30.18 in	10_0 mi	SW	3.5 mph	265	N/A	Thunderstorm	Overcast
7:55 AM	52.3 °F	48.7 °F	88%	30.18 in	10.0 mi	Calm	Calm	197	N/A	Rain	Heavy Rain
8:15 AM	51.8 °F	49.5 °F	92%	30.14 in	10.0 mi	SE	6.9 mph	795	N/A	Rain	Light Rain
8:35 AM	52.0 °F	49.6 °F	92%	30.14 in	10.0 mi	SSE	4.6 mph	2.0	N/A	Rain	Light Rain
8:55 AM	53.2 °F	50.9 °F	92%	30.17 in	10_0 mi	North	5.8 mph		N/A		Mostly Cloudy
9:15 AM	54.5 °F	50.7 °F	87%	30.14 in	10.0 mi	SSE	3.5 mph		N/A	Thunderslorm	Mostly Cloudy
9: 35 AM	55.8 °F	51.8 °F	87%	30.13 in	10.0 mi	SSW	4.6 mph		N/A		Mostly Cloudy
9:55 AM	57,2 °F	51.8 °F	82%	30.14 in	10.0 mi	SW	4.6 mph	(to)	N/A		Overcast
10:15 AM	57.2 °F	51.8 °F	82%	30.15 in	10.0 mi	SW	4.6 mph	() *	N/A		Overcast
10:35 AM	57.7 °F	53.1 °F	84%	30.15 in	10.0 mi	North	6.9 mph		N/A		Overcast
10:55 AM	57.4 °F	51.8 °F	82%	30,15 in	10,0 mi	SW	8.1 mph		N/A		Overcast
11:15 AM	57.2 °F	52.7 °F	85%	30.15 in	10.0 mi	South	6.9 mph 5.8 mph		N/A N/A		Overcast Overcast
11:35 AM	57.0 °F	52.5 °F	85%	30.15 in	10.0 mi	South		-	N/A		Overcast
11:55 AM	57.6 °F	52.7 °F	84% 82%	30.14 in 30.13 in	10.0 mi 10.0 mi	South	8.1 mph 6.9 mph	-	N/A		Overcast
12:15 PM 12:35 PM	57.4 °F 57.2 °F	51.8 °F	82%	30.13 in	10.0 mi	SW	8.1 mph	1	N/A		Overcast
12:55 PM	57,2 °F	52.0 °F	83%	30.13 in	10.0 mi	WSW	6.9 mph		N/A		Overcast
1:15 PM	57.7 °F	51_4 °F	79%	30.12 in	10.0 mi	SSW	8-1 mph		N/A		Overcast
1:35 PM	58.1 °F	52.0 °F	80%	30.11 in	10.0 mi	SW	8.1 mph		N/A		Overcast
1:55 PM	56.5 °F	52.3 °F	86%	30.10 in	10.0 mi	SSW	9.2 mph		N/A	Rain	Light Rain
2:15 PM	55.6 °F	52.0 °F	88%	30,11 in	10.0 mi	SSW	5.8 mph	25	N/A	Rain	Light Rain
2:35 PM	55.6 °F	53.2 °F	92%	30.10 in	10.0 mi	SSW	6.9 mph	-83	N/A	Rain	Light Rain
2:55 PM	55.6 °F	53.4 °F	92%	30.09 in	10.0 mi	SSW	5.8 mph	*:	N/A		Overcast
3:15 PM	55.6 °F	53.2 °F	92%	30,09 in	10.0 mi	SW	3.5 mph	- E	N/A		Overcast
3:35 PM	55.6 °F	53.4 °F	92%	30.09 in	7.0 mi	Calm	Calm	*	N/A	Rain	Rain
3:55 PM	55.8 °F	53.6 °F	92%	30.09 in	10.0 mi	Calm	Calm		N/A		Overcast
4:15 PM	55.8 °F	53.6 °F	92%	30.09 in	10.0 mi	Calm	Calm		N/A		Overcast
4:35 PM	55.8 °F	52.5 °F	89%	30.09 in	10.0 mi	Calm	Calm	*	N/A		Overcast
4:55 PM	55.8 °F	53.4 °F	92%	30.09 in	5.0 mi	Calm	Calm	*	N/A	- Dele	Heavy Drizzle
5:15 PM	55.2 °F	53.4 °F	94%	30.10 in	3.0 mi	North	3,5 mph		N/A	Rain	Rain
5:35 PM	54.5 °F	53.4 °F	96%	30.11 in	4.0 mi	North	5,8 mph	+-	N/A	Rain	Rain
5:55 PM	54.5 °F	53.6 °F	97%	30.12 in	4.0 mi	Calm	Calm	1-	N/A N/A	Rain	Rain Light Rain
6:15 PM	54.3 °F	53.1 °F	95%	30.12 in	7.0 mi	Calm	Calm	:	N/A N/A	Rain	Overcast
6:35 PM	54,7 °F 54,5 °F	53.6 °F 53.2 °F	96% 96%	30,12 in 30,11 in	10.0 mi 10.0 mi	Calm	Calm	1	N/A		Overcast
6:55 PM		53,2 °F		30.11 in	10.0 mi	Calm	Calm	1:	N/A		Overcast
7:15 PM 7:35 PM	54.5 °F	53.4 °F	96% 97%	30.12 in	10.0 mi	Calm	Calm	1	N/A		Overcast
7:55 PM	54.5 °F	53.6 °F	96%	30-12 in	5.0 mi	West	4,6 mph		N/A		Overcast
8:15 PM	54.7 °F	53.8 °F	97%	30.12 in	5.0 mi	West	3.5 mph		N/A		Overcast
8:35 PM	54.9 °F	54.0 °F	97%	30.12 in	5.0 mi	NW	4.6 mph		N/A		Overcast
8:55 PM	54.9 °F	54.1 °F	97%	30-13 in	5.0 mi	Calm	Calm	2	N/A		Overcast
9:15 PM	55.0 °F	54.5 °F	98%	30-14 in	5.0 mi	Calm	Calm	-	N/A		Overcast
9:35 PM	55.4 °F	54,5 °F	97%	30.14 in	7.0 mi	Calm	Calm	1	N/A		Overcast
9:55 PM	55.6 °F	54.7 °F	97%	30.14 in	7.0 mi	NNW	3.5 mph		N/A		Overcast
10:15 PM	56.3 °F	54.5 °F	94%	30-15 in	10.0 mi	NNW	5.8 mph		N/A		Overcast
10:35 PM	56,5 °F	54.5 °F	93%	30.15 in	10.0 mi	NNW	4.6 mph		N/A		Overcast
10:55 PM	56.5 °F	54.5 °F	93%	30.16 in	10.0 mi	North	5.8 mph	-	N/A		Overcast
11:15 PM	56.3 °F	53.2 °F	89%	30.16 in	10.0 mi	North	9.2 mph	1	N/A		Overcast
11:35 PM	55,9 °F	52.7 °F	89%	30.16 in	10.0 mi	North	5.8 mph	*	N/A		Overcast
		52.0 °F	90%	30-16 in	10.0 mi	North	5.8 mph	-	N/A		Overcast

^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

September 16, 2014 Meteorological Data from Lansing Municipal Airport - KIGO

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:15 AM	54.0 °F	51,3 °F	91%	30 ₋ 16 in	10,0 mi	NNW	4.6 mph		N/A		Mostly Cloudy
12:35 AM	52.7 °F	50.0 °F	91%	30.17 in	10.0 mi	NNW	4_6 mph		N/A		Scattered Clouds
12:55 AM	52.0 °F	49,5 °F	91%	30,17 in	10.0 mi	NNW	4_6 mph	-	N/A		Clear
1:15 AM	51.4 °F	49.1 °F	92%	30.17 in	10.0 mi	NNW	4.6 mph	-	N/A		Clear
1:35 AM 1:55 AM	50.9 °F	48.4 °F 47.8 °F	91%	30.17 in	10.0 mi	NNW	5.8 mph		N/A		Clear
2:15 AM	49.3 °F	47.3 °F	92% 93%	30.18 in 30.18 in	10.0 mi	WNW	3.5 mph		N/A		Clear
2:35 AM	48.4 °F	46.9 °F	95%	30.19 in	10.0 mi 10.0 mi	West Calm	3.5 mph	12	N/A		Clear
2:55 AM	48.4 °F	47.3 °F	96%	30.19 in	10,0 mi	WNW	Calm 3.5 mph	1 2	N/A	-	Clear
3:15 AM	48.6 °F	47.7 °F	97%	30,19 in	10.0 mi	WNW	3.5 mph	1	N/A N/A		Clear
3:35 AM	48.2 °F	47.3 °F	97%	30,19 in	10,0 mi	Calm	Calm	-	N/A	-	Scattered Clouds Scattered Clouds
3:55 AM	47.8 °F	46.9 °F	97%	30.19 in	10,0 mi	Calm	Calm	1	N/A	1	Mostly Cloudy
4:15 AM	48.9 °F	48.0 °F	97%	30.19 in	10,0 mi	NW	4.6 mph	12	N/A	+	Overcast
4:35 AM	50.0 °F	48.6 °F	95%	30.18 in	10,0 mi	NNW	6.9 mph	1.	N/A	1	Overcast
4:55 AM	49.5 °F	47.7 °F	94%	30.19 in	10.0 mi	NNW	3.5 mph		N/A	1	Mostly Cloudy
5:15 AM	48.7 °F	47,3 °F	95%	30.19 in	10,0 mi	NW	4.6 mph		N/A		Scattered Clouds
5:35 AM	48.4 °F	46.8 °F	94%	30,19 in	10.0 mi	WNW	3.5 mph	1.	N/A		Clear
5:55 AM	47.8 °F	46.6 °F	95%	30.19 in	10.0 mi	Calm	Calm		N/A		Clear
6:15 AM	46.8 °F	45,3 °F	95%	30.20 in	10.0 mi	Calm	Calm		N/A	1	Clear
6:35 AM	45,9 °F	45.1 °F	97%	30.19 in	7.0 mi	Calm	Calm		N/A		Clear
6:55 AM	46.6 °F	45.9 °F	97%	30,20 in	10.0 mi	WNW	3,5 mph		N/A		Clear
7:15 AM	47.3 °F	46.4 °F	97%	30.21 in	10,0 mi	Calm	Calm		N/A		Clear
7:35 AM	48.9 °F	47.3 °F	94%	30,21 in	10.0 mi	Calm	Calm		N/A		Clear
7:55 AM	50.2 °F	47.8 °F	92%	30.21 in	10.0 mi	WNW	3.5 mph	2	N/A		Clear
8:15 AM	51.4 °F	48.2 °F	89%	30.21 in	10.0 mi	NNW	3,5 mph		N/A_		Clear
8:35 AM	52,9 °F	48.7 °F	86%	30.21 in	10.0 mi	NW	3.5 mph	2	N/A		Clear
8:55 AM	54.5 °F	49.8 °F	84%	30.21 in	10.0 mi	NW	4.6 mph	×	N/A		Clear
9:15 AM	56.1 °F	49.8 °F	79%	30.21 in	10.0 mi	Calm	Calm		N/A		Clear
9:35 AM	57.0 °F	49.6 °F	76%	30.22 in	10.0 mi	Calm	Calm		N/A		Clear
9:55 AM	58.1 °F	47.7 °F	68%	30.22 in	10.0 mi	Calm	Calm		N/A		Clear
10:15 AM 10:35 AM	60.3 °F	48.2 °F	64%	30,21 in	10.0 mi	Calm	Calm	-	N/A		Clear
10:55 AM	60.3 °F 61.3 °F	46,8 °F	61%	30,21 in	10.0 mi	Calm	Calm		N/A		Clear
11:15 AM	60.8 °F	46.6 °F 43.5 °F	58% 53%	30.21 in	10.0 mi	Calm	Calm		N/A		Scattered Clouds
11.35 AM	61.7 F	45.7 °F	55%	30.20 in	10,0 mi	Calm	Calm		N/A	-	Mostly Cloudy
11:55 AM	62.2 °F	44.1 °F	51%	30.19 in 30.19 in	10.0 mi	North	3.5 mph		N/A	_	Mostly Cloudy
12:15 PM	62.8 °F	43,3 °F	49%	30.19 in	10.0 mi	Calm	Calm	*	N/A		Mostly Cloudy
12:35 PM	64.4 °F	46.2 °F	52%	30,19 in	10.0 mi	Calm NW	Calm	-	N/A		Mostly Cloudy
12:55 PM	64.4 °F	46.0 °F	51%	30.18 in	10.0 mi	WSW	6.9 mph 3.5 mph	1:	N/A N/A		Scattered Clouds
1:15 PM	64.6 °F	44,6 °F	48%	30.17 in	10.0 mi	Calm	Calm	1:	N/A	_	Clear
1:35 PM	64.8 °F	45,0 °F	49%	30.17 in	10.0 mi	NW	3.5 mph		N/A	_	Scattered Clouds Mostly Cloudy
1:55 PM	64.0 °F	43.7 °F	48%	30.16 in	10,0 mi	Calm	Calm		N/A		Scattered Clouds
2:15 PM	64.6 °F	43.9 °F	47%	30.15 in	10.0 mi	ENE	4.6 mph	2	N/A		Clear
2:35 PM	63.3 °F	43.2 °F	48%	30.14 in	10.0 mi	WNW	4.6 mph	2	N/A		Clear
2:55 PM	66.2 °F	44.6 °F	46%	30.13 in	10.0 mi	West	5.8 mph	-	N/A		Clear
3:15 PM	65.7 °F	45.1 °F	47%	30.13 in	10.0 mi	West	5.8 mph		N/A		Scattered Clouds
3:35 PM	65.7 °F	44.1 °F	46%	30 ₋ 13 in	10.0 mi	West	4.6 mph		N/A		Clear
3:55 PM	65.8 °F	43.7 °F	45%	30-12 in	10.0 mi	Calm	Calm		N/A		Clear
4:15 PM	65.8 °F	44.2 °F	46%	30-12 in	10,0 mi	SW	4.6 mph	45	N/A		Scattered Clouds
4:35 PM	65.7 °F	44.1 °F	46%	30:11 in	10.0 mi	WNW	4.6 mph	+5	N/A		Clear
4:55 PM	64,9 °F	43,7 °F	46%	30:11 in	10.0 mi	Calm	Calm	*	N/A		Clear
5:15 PM	65.3 °F	44.6 °F	47%	30.11 in	10,0 mi	West	4.6 mph	•	N/A		Clear
5:35 PM	64.8 °F	44,1 °F	47%	30,11 in	10.0 mi	West	3.5 mph	*.	N/A		Clear
5:55 PM	63.9 °F	43.9 °F	48%	30.11 in	10.0 mi	WNW	4.6 mph	*	N/A		Clear
6:15 PM	63.0 °F	44.2 °F	50%	30-10 in	10,0 mi	West	3.5 mph		N/A		Clear
6:35 PM	62.6 °F	44.6 °F	52%	30.10 in	10.0 mi	West	3.5 mph	-	N/A		Clear
6:55 PM	61.5 °F	44,6 °F	54%	30-10 in	10.0 mi	WSW	3,5 mph		N/A		Clear
7:15 PM	57.4 °F	47.7 °F	70%	30,09 in	10,0 mi	SW	3.5 mph		N/A		Clear
7:35 PM	53.8 °F	46.9 °F	78%	30-10 in	10.0 mi	Calm	Calm		N/A		Clear
7:55 PM	54.0 °F	47.3 °F	78%	30,10 in	10.0 mi	Calm	Calm		N/A		Clear
8:15 PM	51.4 °F	46.8 °F	84%	30 10 in	10.0 mi	Calm	Calm		N/A		Clear
8:35 PM 8:55 PM	51.6 °F 54.5 °F	47.5 °F	86%	30.11 in	10-0 mi	Calm	Calm	-	N/A		Clear
9:15 PM	54.5 °F	48.0 °F	79%	30.11 in	10.0 mi	Calm	Calm		N/A		Clear
9:15 PM 9:35 PM	51,4 °F	48.0 °F	81%	30.10 in	10.0 mi	Calm	Calm		N/A		Clear
9:35 PM 9:55 PM	51,4 °F	48.0 °F	88%	30.11 in	10.0 mi	Calm	Calm		N/A		Clear
10:15 PM	50.0 °F	47.1 °F 47.7 °F	90% 92%	30.11 in	10.0 mi	Calm	Calm		N/A		Clear
	48.9 °F	47.7 °F	96%	30.10 in 30.11 in	10.0 mi	Calm	Calm	-	N/A		Clear
10-35 DM	40.9				10.0 mi	Calm	Calm		N/A		Clear
	50 / °F	1 40 4 0 -									
10:35 PM 10:55 PM	50.4 °F	48.4 °F	93%	30.10 in	10.0 mi	Calm	Calm		N/A		Clear
	50.4 °F 48.4 °F 46.6 °F	48.4 °F 46.9 °F 45.5 °F	93% 95% 96%	30.10 in 30.10 in	10.0 mi 10.0 mi	Calm	Calm Calm	Ė	N/A N/A		Clear Clear

^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

September 15, 2014 Meteorological Data from Chicago Midway Airport - KMDW

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions	
12:51 AM	55.0 °F	46.9 °F	74%	30,18 in	10,0 mi	SSW	4.6 mph	12	N/A		Scattered Clouds	
1:51 AM	55.0 °F	48.0 °F	77%	30,18 in	10.0 mi	Calm	Calm		N/A		Mostly Cloudy	
2:51 AM	55_0 °F	48.0 °F	77%	30.17 in	10.0 mi	Calm	Calm	*	N/A		Mostly Cloudy	
3:51 AM	55.4 °F	46.4 °F	72%	30.15 in	10.0 mi	South	3.5 mph	3	N/A		Mostly Cloudy	
4:51 AM	55.9 °F	46.9 °F	72%	30,14 in	10.0 mi	SSW	3.5 mph		N/A		Mostly Cloudy	
5:51 AM	55.9 °F	48.9 °F	77%	30.14 in	10.0 mi	Calm	Calm		0,00 in		Mostly Cloudy	
6:51 AM	57.2 °F	48.2 °F	72%	30,14 in	10.0 mi	South	4.6 mph	×	N/A		Overcast	
7:51 AM	57_0 °F	48.9 °F	74%	30.14 in	10_0 mi	Variable	5.8 mph		0.00 in	Rain	Light Rain	
8:51 AM	57.0 °F	50.0 °F	77%	30.16 in	10.0 mi	SW	9.2 mph		0,00 in		Overcast	
9:51 AM	60.1 °F	50.0 °F	69%	30,12 in	10.0 mi	West	3.5 mph		N/A		Overcast	
10:51 AM	60.1 °F	51.1 °F	72%	30,13 in	10.0 mi	South	6.9 mph	3.	N/A		Overcast	
11:51 AM	60,1 °F	51.1 °F	72%	30.13 in	10.0 mi	SSW	8.1 mph		N/A		Overcast	
12:51 PM	60.8 °F	51.8 °F	72%	30,10 in	10.0 mi	SW	11.5 mph		N/A		Overcast	
1:51 PM	60.1 °F	51.1 °F	72%	30.08 in	10.0 mi	SSW	8.1 mph		N/A		Overcast	
2:51 PM	59.0 °F	52.0 °F	78%	30.09 in	10.0 mi	WSW	6.9 mph		N/A		Overcast	
3:39 PM	59.0 °F	52.0 °F	78%	30,09 in	10.0 mi	WNW	5.8 mph		N/A		Overcast	
3:51 PM	59.0 °F	53.1 °F	81%	30,09 in	10.0 mi	West	5,8 mph	12	N/A		Overcast	
4:45 PM	57.2 °F	53.6 °F	88%	30,09 in	9.0 mi	WNW	5.8 mph		0.00 in		Light Drizzle	
4:51 PM	57.9 °F	53.1 °F	84%	30.09 in	9.0 mi	NW	5.8 mph	1	0.00 in		Light Drizzle	
5:37 PM	60.1 °F	54.0 °F	80%	30.10 in	9.0 mi	NNW	5.8 mph	(G	0,00 in		Overcast	
5:51 PM	59.0 °F	54.0 °F	83%	30,10 in	9.0 mi	NW	4.6 mph		0,00 in		Overcast	
6:17 PM	60.1 °F	54.0 °F	80%	30.11 in	9.0 mi	NW	5-8 mph		N/A		Overcast	
6:51 PM	60.1 °F	54.0 °F	80%	30.11 in	9.0 mi	NW	6.9 mph	13.	N/A		Overcast	
7:04 PM	60.1 °F	53.1 °F	78%	30,11 in	9.0 mi	NNW	9.2 mph		0.00 in		Light Drizzle	
7:51 PM	60-1 °F	54.0 °F	80%	30.11 in	9.0 mi	North	6.9 mph		0.00 in		Overcast	
8:13 PM	60.1 °F	54.0 °F	80%	30.12 in	9.0 mi	North	9.2 mph	(4)	N/A		Overcast	
8:51 PM	57.9 °F	52.0 °F	81%	30.14 in	10-0 mi	North	12-7 mph	(4)	N/A		Overcast	
9:29 PM	57.9 °F	52-0 °F	81%	30.14 in	10.0 mi	North	10.4 mph	29.1	N/A		Overcast	
9:51 PM	57.0 °F	51-1 °F	81%	30.15 in	10.0 mi	NNW	9.2 mph	* 1	N/A		Mostly Cloudy	
10:51 PM	55.9 °F	48.9 °F	77%	30.16 in	10.0 mi	NNW	11.5 mph	9.	N/A		Mostly Cloudy	
11:43 PM	54.0 °F	48.9 °F	83%	30.17 in	10.0 mi	NNW	9.2 mph	-7	N/A		Mostly Cloudy	
11:51 PM	54.0 °F	50.0 °F	86%	30-17 in	10.0 mi	NNW	9.2 mph		N/A		Scattered Cloud	

^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

September 16, 2014 Meteorological Data from Chicago Midway Airport - KMDW

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions	
12:51 AM	53.6 °F	48.2 °F	82%	30.17 in	10.0 mi	NNW	9.2 mph	Pag	N/A		Partly Cloudy	
1:51 AM	53.1 °F	48.9 °F	86%	30.17 in	10.0 mi	North	8.1 mph		N/A		Partly Cloudy	
2:51 AM	51.1 °F	46.9 °F	86%	30.19 in	10.0 mi	WNW	5.8 mph	4	N/A		Partly Cloudy	
3:51 AM	50.0 °F	46.4 °F	87%	30.19 in	10.0 mi	WNW	5.8 mph	-	N/A		Partly Cloudy	
4:51 AM	48.9 °F	46,0 °F	90%	30.19 in	10,0 mi	WNW	4.6 mph		N/A		Clear	
5:51 AM	48.0 °F	46.0 °F	93%	30.19 in	10.0 mi	NNW	3.5 mph		N/A		Partly Cloudy	
6:51 AM	46.9 °F	45.0 °F	93%	30,21 in	10.0 mi	Calm	Calm	0.0	N/A		Partly Cloudy	
7:51 AM	51,1 °F	46,0 °F	83%	30,21 in	10.0 mi	NW	4.6 mph	(9.)	N/A		Partly Cloudy	
8:51 AM	55.9 °F	48,0 °F	75%	30.21 in	10.0 mi	NNW	4.6 mph		N/A		Partly Cloudy	
9:51 AM	60.1 °F	50.0 °F	69%	30.21 in	10.0 mi	Calm	Calm		N/A		Partly Cloudy	
10:51 AM	61.0 °F	48.0 °F	62%	30.20 in	10.0 mi	South	3.5 mph	(4)	N/A		Scattered Clouds	
11:51 AM	62.1 °F	43.0 °F	50%	30.19 in	10.0 mi	NW	3.5 mph		N/A		Scattered Clouds	
12:51 PM	64.9 °F	43.0 °F	45%	30,17 in	10.0 mi	Variable	3.5 mph	-	N/A		Scattered Clouds	
1:51 PM	66.2 °F	42.8 °F	43%	30,15 in	10.0 mi	Calm	Calm		N/A		Scattered Clouds	
2:51 PM	68.0 °F	43,0 °F	40%	30.12 in	10.0 mi	Variable	4.6 mph		N/A		Partly Cloudy	
3:51 PM	68.0 °F	42.1 °F	39%	30.11 in	10 ₋ 0 mi	NW	6.9 mph		N/A		Partly Cloudy	
4:51 PM	68.0 °F	42,1 °F	39%	30.10 in	10.0 mi	West	9.2 mph		N/A		Partly Cloudy	
5:51 PM	66.9 °F	39,9 °F	37%	30.09 in	10.0 mi	NW	10,4 mph	3.	N/A		Partly Cloudy	
6:51 PM	63.0 °F	48,0 °F	58%	30.09 in	10.0 mi	East	6.9 mph	(2)	N/A		Partly Cloudy	
7:51 PM	62-1 °F	50.0 °F	65%	30.09 in	10.0 mi	East	5.8 mph	(2)	N/A		Člear	
8:51 PM	61.0 °F	51.1 °F	70%	30 ₋ 09 in	10.0 mi	East	6.9 mph	8/	N/A		Clear	
9:51 PM	60.8 °F	51.8 °F	72%	30.10 in	10.0 mi	East	3.5 mph	54:	N/A		Clear	
10:51 PM	57.9 °F	50.0 °F	75%	30.09 in	10.0 mi	East	3.5 mph	· ·	N/A		Clear	
11:51 PM	57.0 °F	48.9 °F	74%	30-08 in	10-0 mi	SĒ	4.6 mph	(a)	N/A		Clear	

^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

Sentember 15, 2014 Meteorological Data from Gary Chicago International Airport - KGYY

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions	
12:15 AM	57.2 °F	52.7 °F	85%	30_16 in	10_0 mi	NNW	11.5 mph		N/A		Overcast	
12:35 AM	56.3 °F	52.2 °F	86%	30.16 in	10,0 mi	NNW	9.2 mph	16.1 mph	N/A		Mostly Cloudy	
12:55 AM	55.8 °F	51.4 °F	85%	30,17 in	10.0 mi	NNW	8.1 mph	() 6 .	N/A		Scattered Clouds	
1:15 AM	55.0 °F	51,1 °F	86%	30.17 in	10.0 mi	NNW	9.2 mph	(m:	N/A		Clear	
1:35 AM	55,4 °F	50.4 °F	83%	-30.17 in	10.0 mi	NNW	11.5 mph	1.5	N/A		Clear	
1:55 AM	55.0 °F	50,5 °F	85%	30.17 in	10.0 mi	NNW	9,2 mph	-	N/A		Clear	
2:15 AM	55.6 °F	50.9 °F	84%	30.18 in	10.0 mi	NW	8.1 mph		N/A		Scattered Clouds	
2:35 AM	56.3 °F	51,3 °F	83%	30,18 in	10.0 mi	NNW	6.9 mph		N/A		Overcast	
2:55 AM	56.5 °F	51.1 °F	82%	30.18 in	10.0 mi	NW	8.1 mph		N/A		Overcast	
3:15 AM	54.5 °F	49.3 °F	83%	30.18 in	10.0 mi	West	5.8 mph		N/A		Overcast	
3:35 AM	54.1 °F	49.3 °F	84%	30.18 in	10.0 mi	West	6.9 mph		N/A		Overcast	
3:55 AM	53.8 °F	49.5 °F	85%	30 ₋ 18 in	10_0 mi	West	6.9 mph		N/A		Overcast	
4:15 AM	53.4 °F	49.1 °F	85%	30,18 in	10_0 mi	West	5.8 mph	73	N/A		Mostly Cloudy	
4:45 AM	51,8 °F	48.2 °F	88%	30,18 in	10.0 mi	West	8.1 mph	122	N/A		Mostly Cloudy	
5:45 AM	50.0 °F	46.4 °F	87%	30.19 in	10.0 mi	West	4.6 mph	E-1	N/A		Scattered Clouds	
6:45 AM	50.0 °F	46.4 °F	87%	30.20 in	10.0 mi	WNW	4.6 mph		N/A		Partly Cloudy	
7:45 AM	51.8 °F	50.0 °F	94%	30.21 in	10.0 mi	West	6.9 mph	\$3	N/A		Partly Cloudy	
8:45 AM	57,2 °F	50.0 °F	77%	30.21 in	10.0 mi	WNW	5.8 mph	25	N/A		Partly Cloudy	
9:45 AM	60.8 °F	50.0 °F	68%	30.22 in	15.0 mi	WNW	6.9 mph	•	N/A		Scattered Clouds	
10:45 AM	62,6 °F	46.4 °F	55%	30.21 in	10.0 mi	WNW	6.9 mph	+9	N/A		Scattered Clouds	
11:45 AM	64.4 °F	42.8 °F	45%	30.20 in	15.0 mi	Variable	4_6 mph	¥5	N/A		Scattered Clouds	
12:45 PM	64.4 °F	46.4 °F	52%	30.18 in	15.0 mi	NNE	11.5 mph	€	N/A		Scattered Clouds	
1.45 PM	66.2 °F	44.6 °F	46%	30.17 in	15.0 mi	NNE	9.2 mph		N/A		Scattered Clouds	
3:45 PM	66.2 °F	46.4 °F	49%	30.12 in	15.0 mi	ENE	9.2 mph	*	N/A		Partly Cloudy	
4:45 PM	64.4 °F	46.4 °F	52%	30.11 in	15.0 mi	NE	5.8 mph		N/A		Partly Cloudy	
6:45 PM	60.8 °F	51,8 °F	72%	30,10 in	15.0 mi	East	3.5 mph	*:	N/A		Partly Cloudy	
7:45 PM	53,6 °F	50.0 °F	88%	30-10 in	10.0 mi	ESE	4.6 mph		N/A		Clear	
8:45 PM	51.8 °F	50.0 °F	94%	30,11 in	10,0 mi	Calm	Calm		N/A		Clear	
9:15 PM	50.2 °F	48.4 °F	94%	30.10 in	10.0 mi	Calm	Calm		N/A		Clear	
9:35 PM	49.8 °F	48,2 °F	94%	30,11 in	7.0 mi	Calm	Calm		N/A		Clear	
9:45 PM	50.0 °F	48.2 °F	94%	30.11 in	10.0 mi	SE	4.6 mph	-	N/A		Clear	
9:55 PM	50,4 °F	49.1 °F	95%	30.11 in	10.0 mi	Calm	Calm	-	N/A		Clear	
10:15 PM	48.6 °F	47.1 °F	95%	30-11 in	7.0 mi	Calm	Calm		N/A		Clear	
10:35 PM	48.2 °F	46.8 °F	95%	30.11 in	7.0 mi	Calm	Calm	F	N/A		Clear	
10:55 PM	48.6 °F	47.3 °F	95%	30,10 in	7_0 mi	Calm	Calm	2	N/A		Clear	
11:15 PM	50.2 °F	49.1 °F	96%	30.10 in	10.0 mi	Calm	Calm	2	N/A		Clear	
11:35 PM	50-2 °F	48.6 °F	94%	30-10 in	10.0 mi	Calm	Calm		N/A		Clear	
11:55 PM	48.0 °F	46.4 °F	94%	30.10 in	10.0 mi	Calm	Calm	12	N/A		Clear	

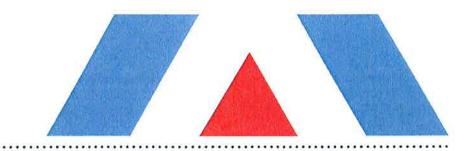
^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

Time (CDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions	
12:15 AM	57.2 °F	52.7 °F	85%	30.16 in	10_0 mi	NNW	11.5 mph		N/A		Overcast	
12:35 AM	56,3 °F	52.2 °F	86%	30.16 in	10.0 mi	NNW	9.2 mph	16_1 mph	N/A		Mostly Cloudy	
12:55 AM	55.8 °F	51.4 °F	85%	30,17 in	10 ₋ 0 mi	NNW	8.1 mph	100	N/A		Scattered Clouds	
1:15 AM	55.0 °F	51,1 °F	86%	30_17 in	10.0 mi	NNW	9.2 mph	(*)	N/A		Clear	
1:35 AM	55.4 °F	50.4 °F	83%	30_17 in	10.0 mi	NNW	11.5 mph		N/A		Clear	
1:55 AM	55.0 °F	50,5 °F	85%	30,17 in	10.0 mi	NNW	9.2 mph	(E)	N/A		Clear	
2:15 AM	55.6 °F	50,9 °F	84%	30,18 in	10,0 mi	NW	8.1 mph	(e)	N/A		Scattered Clouds	
2:35 AM	56.3 °F	51,3 °F	83%	30,18 in	10.0 mi	NNW	6.9 mph		N/A		Overcast	
2:55 AM	56.5 °F	51.1 °F	82%	30.18 in	10.0 mi	NW	8.1 mph		N/A		Overcast	
3:15 AM	54.5 °F	49.3 °F	83%	30.18 in	10.0 mi	West	5.8 mph		N/A		Overcast	
3:35 AM	54.1 °F	49,3 °F	84%	30.18 in	10.0 mi	West	6.9 mph		N/A		Overcast	
3:55 AM	53.8 °F	49.5 °F	85%	30,18 in	10.0 mi	West	6.9 mph		N/A		Overcast	
4:15 AM	53.4 °F	49,1 °F	85%	30.18 in	10.0 mi	West	5.8 mph	-	N/A		Mostly Cloudy	
4:45 AM	51.8 °F	48.2 °F	88%	30.18 in	10.0 mi	West	8.1 mph		N/A		Mostly Cloudy	
5:45 AM	50.0 °F	46.4 °F	87%	30.19 in	10.0 mi	West	4.6 mph		N/A		Scattered Clouds	
6:45 AM	50,0 °F	46.4 °F	87%	30.20 in	10.0 mi	WNW	4.6 mph		N/A		Partly Cloudy	
7:45 AM	51.8 °F	50.0 °F	94%	30.21 in	10.0 mi	West	6.9 mph	V23	N/A		Partly Cloudy Partly Cloudy	
8:45 AM	57.2 °F	50.0 °F	77%	30,21 in	10.0 mi	WNW	5.8 mph	72	N/A		Partly Cloudy	
9:45 AM	60.8 °F	50.0 °F	68%	30.22 in	15.0 mi	WNW	6.9 mph	16	N/A		Scattered Clouds	
10:45 AM	62.6 °F	46.4 °F	55%	30.21 in	10.0 mi	WNW	6.9 mph	15	N/A		Scattered Clouds	
11:45 AM	64.4 °F	42.8 °F	45%	30.20 in	15,0 mi	Variable	4.6 mph	(P)	N/A		Scattered Cloud:	
12:45 PM	64.4 °F	46.4 °F	52%	30.18 în	15.0 mi	NNE	11.5 mph	(e	N/A		Scattered Cloud:	
1:45 PM	66,2 °F	44.6 °F	46%	30.17 in	15.0 mi	NNE	9.2 mph		N/A		Scattered Cloud	
3:45 PM	66.2 °F	46.4 °F	49%	30.12 in	15.0 mi	ENE	9.2 mph	16	N/A		Partly Cloudy	
4:45 PM	64.4 °F	46.4 °F	52%	30.11 in	15.0 mi	NE	5.8 mph	1960	N/A		Partly Cloudy	
6:45 PM	60.8 °F	51.8 °F	72%	30-10 in	15.0 mi	East	3.5 mph		N/A		Partly Cloudy	
7:45 PM	53.6 °F	50.0 °F	88%	30.10 in	10.0 mi	ESE	4.6 mph		N/A		Clear	
8:45 PM	51.8 °F	50.0 °F	94%	30.11 in	10.0 mi	Calm	Calm		N/A		Clear	
9:15 PM	50.2 °F	48.4 °F	94%	30.10 in	10.0 mi	Calm	Calm		N/A	-	Clear	
9:35 PM	49.8 °F	48.2 °F	94%	30-11 in	7.0 mi	Calm	Calm		N/A		Clear	
9:45 PM	50.0 °F	48.2 °F	94%	30.11 in	10.0 mi	SE	4.6 mph		N/A		Clear	
9:55 PM	50.4 °F	49-1 °F	95%	30.11 in	10,0 mi	Calm	Calm		N/A		Clear	
10:15 PM	48.6 °F	47.1 °F	95%	30-11 in	7.0 mi	Calm	Calm	I .	N/A		Clear	
10:35 PM	48.2 °F	46.8 °F	95%	30-11 in	7.0 mi	Calm	Calm		N/A		Clear	
10:55 PM	48.6 °F	47.3 °F	95%	30.10 in	7.0 mi	Calm	Calm	1.	N/A		Clear	
11:15 PM	50.2 °F	49.1 °F	96%	30-10 in	10.0 mi	Calm	Calm		N/A		Clear	
11:35 PM	50.2 °F	48.6 °F	94%	30-10 in	10.0 mi	Čalm	Calm	1	N/A		Clear	
11:55 PM	48.0 °F	46-4 °F	94%	30-10 in	10.0 mi	Calm	Calm	-	N/A		Clear	

^{*}Meteorological data was obtained from the National Weather Service via the weatherunderground.com website

EXHIBIT B

Quarterly Visible Emissions and Opacity Report Horsehead Corporation - Chicago Plant 4th Quarter 2014 Report



QUARTERLY VISIBLE EMISSIONS AND OPACITY REPORT

Horsehead Corporation > Chicago Plant

4th Quarter 2014 Report

Prepared By:

TRINITY CONSULTANTS

1S660 Midwest Road Suite 250 Oakbrook Terrace, IL 60181 630-495-1470

December 2014

Project 141401.0179



Environmental solutions delivered uncommonly well

On December 15 and 19, 2014, Trinity Consultants (Trinity) performed visible emissions observations at the Horsehead Corporation (Horsehead) Chicago Plant. These observations were conducted to comply with the City of Chicago Department of Public Health (CDPH) Rules and Regulations for Bulk Materials Storage (CDPH Bulk Storage Rules)¹, Sections 3.0(2)(d) and 3.0(3)(f)(ii) which require the facility to conduct quarterly testing to demonstrate compliance with the prohibition on fugitive dust set forth in 3.0(2)(b). The quarterly testing followed the protocol established in section 3.1.7.1 – Quarterly Visible Emissions and Opacity Testing of the Consolidated Fugitive Dust Control Plan and Operating program for Fugitive Particulate Matter for Horsehead Corporation (Chicago Plant), June 11, 2014.² The opacity observations were conducted in accordance with the requirements of 40 Code of Federal Regulations (CFR) 60, Appendix A, Method 9 (USEPA Method 9) and the visible emissions observations were conducted in accordance with the requirements of 40 CFR 60, Appendix A, Method 22 (USEPA Method 22).³

Supporting information for the report is included in the appendices. The visible emissions and opacity observations for the fourth quarter report were conducted by Mr. Jacob Beckerman and Mr. Erich Yaeger, both of Trinity. A copy of each observer's current Method 9 certification is included in Appendix A.⁴ A site plan of the Chicago Plant, denoting the locations of fugitive dust emissions sources, is included in Appendix B. The visible emissions and opacity observations data sheets are included in Appendix C. Meteorological data from December 15 and 19, 2014 for the Horsehead Chicago Plant is included in Appendix D which indicates that the observations were included over a range of weather conditions occurring over this period.⁵ Data from a weather monitoring station located inside the Horsehead Facility has been included and summarizes the weather conditions on the dates of observation.⁶

The results of the December 15 and 19, 2014 tests demonstrated that there were no instances of visible dust beyond the property line of the facility and that all affected sources were below the opacity limit of 10% pursuant to CDPH Bulk Storage Rules Section 3.0(2)(a) and (b), respectively. A summary of the results is included in Section 2 of this report.

¹ Article II. Air Pollution Control Rules and Regulations, Part B: Bulk Solid Material Facilities.

² While Horsehead submitted the Consolidated Fugitive Dust Control Plan and Operating Program for Fugitive Particulate Matter for Horsehead Corporation (Chicago Plant) to the City of Chicago on June 11, 2014, there has been no formal approval of such plan from the City of Chicago to Horsehead.

 $^{^3}$ Visible emissions and opacity observation methods used as specified in CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a).

⁴ Per CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a) a professional trained and certified to read opacity in accordance with 40 CFR 60, Appendix A, Method 9 shall conduct the opacity observations.

⁵ Per CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(b), observations were included over a range of weather conditions.

⁶ Horsehead installed the weather monitoring station to comply with the wind monitoring requirements per CDPH Bulk Storage Rules Section 3.0(5) in accordance with the variance request submitted to the City of Chicago dated June 13, 2014.

2. VISIBLE EMISSIONS AND OPACITY OBSERVATIONS RESULTS SUMMARY

The following table summarizes the results of all of the visible emissions and opacity observations conducted for the fourth quarter of 2014. As previously discussed, all observations of opacity for fugitive dust emissions sources were conducted in accordance with USEPA Method 9, and all of the property line visible emissions observations were conducted in accordance with USEPA Method 22.7 Observation points were selected to comply with the requirement of CDPH Bulk Storage Rules Section 3.0(2)(a) to verify that there was no fugitive dust that is visible beyond the property line and with CDPH Bulk Storage Rules Section 3.0(2)(b) to verify that any bulk solid material storage pile, transfer point, roadway, or parking area does not exceed the 10% opacity limit.⁸

Table 2. Horsehead Corporation (Chicago Plant) 4th Quarter 2014 Visible Emissions and Opacity Summary

Location	Type of Fugitive Emissions Source	Duration of Observation (Minutes)	Average Opacity (%)
IRM Truck Loading ¹	Transfer Point	7	0
Coke Hopper ²	Transfer Point	3	0
Off Spec Coke Pile	Material Storage Pile	20	0
Temp. IRM Storage Pile (East of Coke Pile)	Material Storage Pile	20	0
Temporary IRM Storage Pile	Material Storage Pile	20	0
Main IRM Storage Pile	Material Storage Pile	20	0
Coke Loading Pile	Material Storage Pile	20	0
West Coke Pile	Material Storage Pile	20	0
East Coke Pile	Material Storage Pile	20	0
Main IRM Storage Bunkers	Material Storage Pile	20	0
Paved Road - Main Truck Road	Roadway	4 Vehicle Passes	0
Parking Lot	Roadway	4 Vehicle Passes	0
Paved Road - To IRM Truck Loading	Roadway	4 Vehicle Passes	0
Unpaved Road – Section of 114th Street	Roadway	4 Vehicle Passes	0
Property Line Locations (Method 22) ³	Property Line	8 x 10 minutes	No visible emissions
IRM Barge Loading Hopper and Loading Conveyor/Chute ⁴	Transfer Point	N/A	N/A

- 1. Observations were taken while IRM was being loaded into trucks. A total of 3 trucks were loaded, lasting a total of 7 minutes
- 2. Observations were taken while coke was being loaded into the hopper. The process of loading the coke took a total of 3 minutes.
- 3. There were 8 property line observations conducted using EPA Method 22: North property line looking east and west, east property line looking north and south, south property line looking east and west, southwest property line looking northeast, and the west property line looking north.
- 4. Per a conversation with John Marta on 12/15/14, no IRM barge loading activities were scheduled for the days of observations or for the remainder of 2014. Therefore, no readings during IRM barge loading were taken for the fourth quarter.

⁷ Visible emissions and opacity observation methods used as specified in CDPH Bulk Storage Rules Section 3.0(3)(f)(ii)(a).

⁶ CDPH Bulk Storage Rules Section 2.0 an Internal Road is defined as, any route within a facility that is not located in an area normally used for staging or storage of material and that has evidence of repeated prior travel by, or is otherwise regularly used by vehicles for transporting materials to, from or, or within the facility. A Transfer Point is the location at or within a facility where material being moved, carried, or conveyed is dropped or deposited.

The Method 9 opacity observation results for the coke storage areas, coke pile material handling, IRM storage piles, IRM pile handling, IRM truck loading, paved roadways, and unpaved roadways were all below the 10% opacity standard promulgated in the CDPH's Bulk Storage Rules. Additionally, the Method 22 observations of visible emissions at the property boundaries showed no visible emissions crossing the plant property lines.

As discussed in the executive summary, supporting information for the report is included in the appendices. Copies of Mr. Beckerman and Mr. Yaeger's current Method 9 certifications are included in Appendix A. A site plan of the Chicago Plant, denoting the locations of fugitive dust emissions sources, is included in Appendix B. The visible emissions and opacity observations data sheets are included in Appendix C. Meteorological data from December 15 and 19, 2014 for the Horsehead Chicago Plant is included in Appendix D.

APPENDIX A: METHOD 9 VISIBLE EMISSIONS OBSERVER CERTIFICATION



AeroMet

Engineering, Inc.

Solutions for a Changing Environment

Certification of Visible Opacity Reading

Jacob Beckerman

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: September 25, 2014

Expiration Date: March 25, 2015

AeroMet Instructor:

Josh Haslag



Certification of Visible Opacity Reading

Erich Yaeger

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

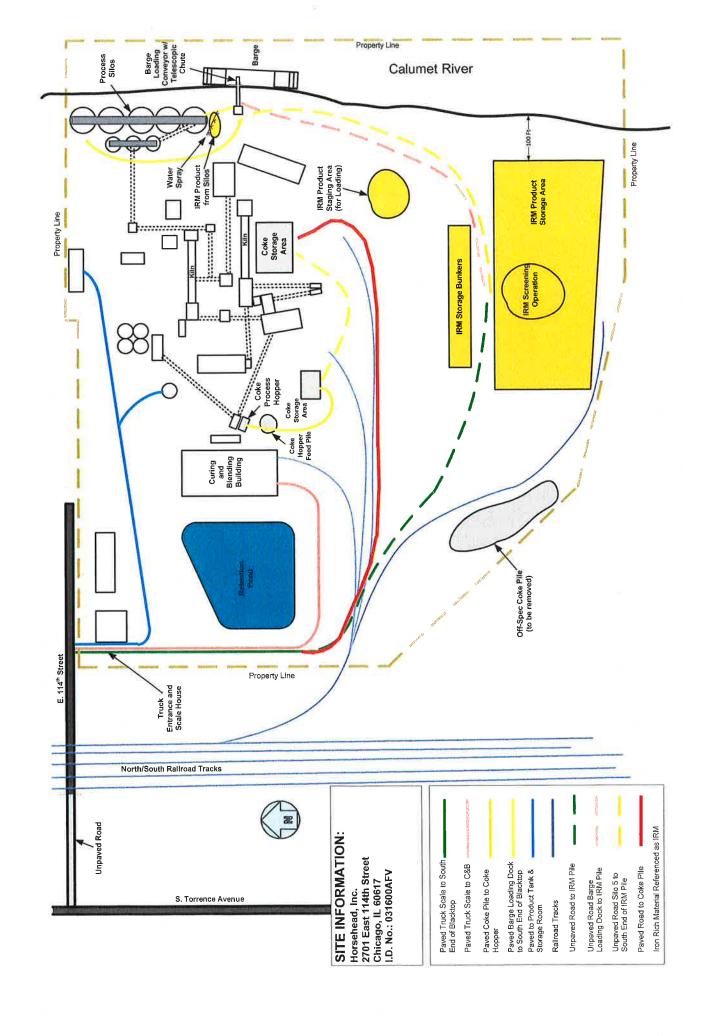
Certification Date: September 25, 2014

Expiration Date: March 25, 2015

AeroMet Instructor:

Josh Haslag

APPENDIX B: FACILITY SITE DIAGRAM



APPENDIX C: VISIBLE EMISSIONS AND OPACITY OBSERVATIONS DATA SHEETS

SOURCE NAME		OBSERV					TIME		STOP	TIME 58 as	n		
Horsehead Corporation	(Chicago	Plant)	SEC	/19/	14		l -	SEC	1		0 0 - 0	-
ADDRESS 2701 East 114th Street				MIN	0	15	30	45	MIN	0	15	30	45
				11	0	0	0	0	31				
CITY	STATE		ZIP	2	0	0	0	0	32				
Chicago	IL		60617	3	0	0	0	0	33				
	SOURCE I	D NUMBE	ER	4	0	0	0	0	34				
773-433-4263	03160	OAFV	TUIS NODE	5	0	Ŏ	0	0	35				
PROCESS EQUIPMENT		Leadin	TING MODE g "Truck S	6	Ö	Ö	0	0	36				
PHONE 773-933-9263 PROCESS EQUIPMENT IRM Truck Landy CONTROL EQUIPMENT	19	OPERA	TING MODE			0	0	0	37	-	†		
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15 FF DISTANCE FROM OBSERVER	DIRECTIO	N FROM	OBSERVER	11					41				
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source NAME Horsehead Corporation	(Chicag	o Plant)	1	/ATION	DATE /14		START	TIME 45	am	STOP	TIME 25	am
ADDRESS 2701 East 114th Street	M=====================================	9997-1 III (WENNING LOOK)	SEC	0	15	30		SEC	0	15	30	45
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Horsehead Corporation (Chicago Plant)	SOURCE NAME		OBSER				START	TIME		STOP	TIME			
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Horsehead Corporation (Chicago Plant) 12 / 15 / 14 11 7 am 11 37 am 37 am 30 30 45 30 30 45 30 30 45 30 30 45 30 30 45 30 30 45 30 30 45 30 30 30 45 30 30 30 45 30 30 30 45 30 30 45 30 30 30 45 30 30 30 45 30 30 30 45 30 30 30 45 30 30 30 45 30 30 30 30 30 30 30 3	SOURCE NAME Horsehead Corneration	(Chicago	Dlant)	OBSER					TIME		STOP		
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Sun - Wind Observers Position Stack Stack Stack Sun Location Line COMMENTS 30 AVERAGE OPACITY FOR NUMBER OF READINGS ABOVE HIGHEST PERIOD O O MINIMUM OBSERVER'S NAME (PRINT) Jacob Beckerman OBSERVER'S SIGNATURE ORGANIZATION TWILL CONSULTANTS CERTIFIED BY: ARYOMRET Engline wing Inc. DATE ARYOMRET Engline wing Inc. 12/15/14	1 mind						 	 	+		 	-	-
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SIGNATURE CERTIFIED BY: DATE			((Carlesia escapa a trip				942	m	n		100		
SIGNATURE ARROWET Engineering In: 9/25/14	THAVE DECEIVED A CODY OF THE	E ODACITY	ORGEDVATIONS				0451	nlta	nts	DA-	TC		
TITLE DATE VERIFIED BY: DATE	1.	E OPACITY	OBSERVATIONS			_	00.00	40				14	
	TITLE	VERIFI	ED BY:	- Asc	CEPTI	19	-						

SOURCE NAME					OBSERVATION DATE				START TIME			STOP TIME		
Horsehead Corporation (Chicago Plant)					12/15/14			8:11 am			8: 34am			
ADDRESS									SEC				É	
2701 East 114th Street					0	15	30	45	MIM	0	15	30	45	
				MIN 1	-	0	0	0	31					
					2		~	\prec						
CITY	STATE		ZIP	2	O	0	O	0	32					
Chicago			60617	3	0	0	0	0	33					
PHONE	SOURCE ID NUMBER		4	A	0	7	O	34						
773-933-9263 031600AFV					\leq	$\stackrel{\checkmark}{\sim}$	1	-						
PROCESS EQUIPMENT OPERATING MODE				5	0	0		0	35					
West-Coke Pile N/A			6	0	0	0	0	- 36						
CONTROL EQUIPMENT OPERATING M			TING MODE	7	0	0	0	0	37					
N/A N/A				8		6	X	V	-					
START COLE STORAGE PILE					0	0	0	0	38					
					0	0	0	0	39					
HEIGHT ABOVE GROUND LEVEL	START 20 FF STOP 20 FF		10	0	0	0	0	40						
DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER			11	0	X	O'	5	41					
START 60 F+STOP	START NW STOP NW			12				×		-				
DESCRIBE EMISSIONS NO					D	0	0	O	42					
DESCRIBE EMISSIONS NO START NONE - EMISSIONS STOP NONE - EMISSIONS					0	0	0	0	43					
EMISSION COLOR	R PLUME TYPE:_ CONTINUOUS []				0	1	0	0	44					
STARTNONE STOPNONE	FUGITIVE INTERMITTENT			14		X	×	8			 			
WATER DROPLETS PRESENT:	IF WATER DROPLET PLUME: NA			15	U	0	Q		45		<u> </u>			
NO YES			ETACHED 🔲 🍐	16	0	0	0	10	46					
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START 9 FT CODOLE PILE STOP 4 Above 10 10					O	0	0	0	47					
START 4 FT above prie STOP4 ft above pile					Ö	Ö	~	O	48		1			
DESCRIBE BACKGROUND START Grey Sky/Tan Building STOP Sky/Tan Building BACKGROUND COLOR GREY/SKY CONDITIONS							12	X						
START GREY SKY Tan Dwilding STOP SKY Taniding BACKGROUND COLOR A LISKY CONDITIONS				19	0	D	U	V	49					
ISTART VEY/ INTO TO TO TAKE DE TOTO ME CET				20	0	O	0	0	50					
				21					51					
START 5-10 STOP ()-5 mgh	START 7	row	eton tran			 	 				+	-		
AMBIENT TEMP	WET BULE	RIEMP	RH.percent	22					52					
AMBIENT EMP START 5 F STOP 45°F	N/A		NIA	23					53					
Civili Cy Color Cy	10//		1 10 1/1	24					54					
Source Layout Sketch	Draw North Arrow			25	-		†	 	55	100	1	-	1	
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X Emission Point				28		İ			58					
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310				29	ļ	<u> </u>			59		-	-		
	Prile	/		30			İ		60					
Sun - Wind	`~	AVERA	GE OPA	CITYF	OR,				READIN		OVE			
Plume and Observers Position Stack					HIGHEST PERIOD O % WERE									
					RANGE OF OPACITY READINGS									
<					OBSERVER'S NAME (PRINT)									
Sun Location Line														
Overcast, no sun					cob	TONAT	TIDE	ma	<u>n</u>	IDA:	TE .			
CONNENTS					DATE DATE 12/15/14									
					ORGANIZATION 12/15/14									
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I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS				CERTIF	IED BY	YV	DN20	ALTEN	VI D	I DA	ΪΈ			
SIGNATURE				Trinity Consultants CERTIFIED BY: Aeronet Engineering Inc 9/25/14										
TITLE DATE					ED BY	- 71	TO IV	7	,,,	DA				

SOURCE NAME Horsehead Corporation	(Chicago	o Plant)	OBSER		DATE 201	4		START TIME			STOPTIME 8232 AM	
ADDRESS	(Cineug)	0 1 10110)	SEC		-	ľ	<u> </u>	SEC				70.
2701 East 114th Street			MIN	0	15	30	45	MIN	0	15	30	45
			1	0	0	0	0	31				
CITY	STATE	IZIP	2	0	0	0	0	32				
Chicago	IL	60617	3	0	0	0	0	33				
PHONE		D NUMBER		~	0	0	8	34				
773-933-9263 p	03160		4	8	_		The second second					
PROCESS EQUIPMENT		OPERATING MODE	5	0	0	0	0	35				
EAST COKE PIL	6.	N A OPERATING MODE	6		0	0	0	36				
WATERING		NA WODE	7	0	0	0	0	37				
DESCRIBE EMISSION POINT			8	0	0	0	0	38				
START PILED COKE			9	1	G	0	0	39				
HEIGHT ABOVE GROUND LEVEL	HEIGHT RI	ELATIVE TO OBSERVER	10	<u> </u>	0	5	X	40	-			
ZO (+ DISTANCE FROM OBSERVER	START 1	Off IS STOP 20 FT IS	11	0		10	0			-		
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START 60 (ASTOP 54MG			12	0	0	B	0	42				
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			14	0	0	3	0	44				50,000
START NA STOPNA	FUGITIVE	INTERMITTENT [15	Õ	0	0	0	45		-		
WATER DROPLETS PRESENT:	IF WATER	DROPLET PLUME:	16	0	0	1	0	46		-		
START NA STOP NA FUGITIVE INTERMITTENT DESCRIPTION OF THE PLUME AT WHICH OPACITY WAS DETERMINED				-		10	-	-		-		
START 2-3 ET ABOVE PILE STOP (SAME) DESCRIBE BACKGROUND,			17	0	0	0	0	47				
DESCRIBE BACKGROUND,		(3.) 	18	0	0	0	0	48				
START TAN BUDG/	STOP	Sane is	19	0	0	0	0	49				
BACKGROUND COLOR			20	0	0	0	0	50				
	WIND DIR	JERLASTSTOP SOME	21				1	51				
START 0-5 MPH STOP 0-5 MPH	START	SW STOP SAME	22		 	-		52	-			
I AMRIENT TEMP	WET BULL	B TEMP RH.percent	1			┼	-	-		-	-	
START USF STOPSIME	N	AUA	23				<u> </u>	53		-		
		,	24					54				
Source Layout Sketch	Dra	w North Arrow	25					55				
		R	26					56				
		\mathcal{L}	27					57				
	X Emission	n Point	28	 	-	+	_	58		 	-	
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			29			 		59		-	-	-
		>	30		Olevi E		1	60		DEADU	00.40	1
Sun O Wind Plume and	Observer	rs Position	AVERA HIGHES			OR /	_			READIN % WERI		IVE
Stack	~		RANGE			READIN	GS	1 170	<u> </u>	70 VVL	_	
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7Sun Loc	ation Line	t)	OBSER		15.00							
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I HAVE RECEIVED A COPY OF THES	E OPACITY	OBSERVATIONS	CERTIF	IED BY	:				DA	TE /		
SIGNATURE			L A	GRO	net	En	GIN	ECRIV	5	9/-	25/	2014
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							START TIME			STOP TIME	
Horsehead Corporation	(Chicago Plant)		15	201	4	9:	31		9	57	
ADDRESS		SEC					SEC				
2701 East 114th Street		MIN	0	15	30		MIN	0	15	30	45
	3.	1	0	0	0	0	31				
CITY	STATE ZIP	2	0	0	0	03	32				
Chicago	IL 60617	3	Ō	0	8	15	33				
PHONE	SOURCE ID NUMBER			_		10			-		
773-423-47/3	031600AFV	4	0	0	0	0	34				
773-433 - 1263 PROCESS EQUIPMENT	OPERATING MODE	5	0	0	O	0	35				
IRM STORAGE BU	OPERATING MODE	6	0	4	0	Ò	36				
CONTROL EQUIPMENT	OPERATING MODE	7	(5)	~	(%)	100	37				
WATERING	WATER IN G DESCRIBE EMISSION POINT			1	1	3	38			-	-
START PILES STORING (RM HEIGHT ABOVE GROUND LEVEL HEIGHT RELATIVE TO OBSERVER			0	10	12	(2			-	-	
HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVE	9	0	0	0	0	39				
15 84	START 15 A STOP 15 A		0	0	0	0	40				
DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER	11	0	O	ਹ	0	41		T		
DISTANCE FROM OBSERVER START SO PESTOP SAME	START NE STOP SAME	12	12	ŏ	0	0	42	-	1		
			8	0	-	1	-		-		
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EMISSION COLOR	PLUME LIPE: CONTINUOUS [14	0	9	0	0	44				
START NA STOPNA 18 WATER DROPLETS PRESENT:	IF WATER DROPLET PLUME:	15	0	0	0	0	45				
	ATTACHED DETACHED	NA 16	0	1	5	0	46				
POINT IN THE PLUME AT WHICH OP	ACITY WAS DETERMINED	17	1	0	1	1	47		+		
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DESCRIBE BACKGROUND		18	0	10	0	10	48		-	-	
START TAN PROCESS EG) (SIOP	19	0	0	10	0	49		1		
BACKGROUND COLOR	SKY CONDITIONS	20	0	0	0	0	50				
START AN STOP Same JA	START (UEC STOP SAM	21					51				
START O-S STOP STARE	START NALL STOP SAM	£ 22	_	 	1	†	52		 	 	1
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START THE STOP CAME	N/A N/A	1 111	-		-		53				
		24					54				
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7 1		29					59				
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Sun - Wind	D W		GE OP		OR	,			READI		OVE
Plume and	Observers Position		ST PER	-	3	<u></u>	ALL	- 0	% WEF	ίΕ ————	
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- Cuploo	ation Line	OBSE	RVER'S				(1)	IVIANI	INIOIN		
A SUIT EOU	auon Line	OBSE		CM		-Ger					
COMMENTS		OBSE	RVER'S	SIGNA	TUBE	100	-	DA	TE		
NO EMISSIO	NS OBSERVED		1	111	/	In	_		12/1	5/14	
2.5.0010		Control of the Contro	NIZATIO		-/						
			TRIN	TY	1 C	S.LLC	ELTA	NT	5		
THAVE RECEIVED A COPY OF THES	SE OPACITY OBSERVATIONS	CERT	FIED BY	62				DA	TE /-	G h	Alla
SIGNATURE	Toxee	AE	ED BY:	4	ENG	INFE	n w6	- 04	TE Z	5/20	אינ
TITLE	DATE	(000.000.000.000	ob Be	. 1	Maria I			0.000	2/23/	ıu	
I .	No.	Unc	~D 06	core	man				7 27	• 1	

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

Company: Horsehead Corporation			Provide sketch of obse	rver's position rel	ative to the source:	
Address: 2701 East 114th		10, IL 60617				
Facility ID: 031600AFV			-	`		
Date: 12/15/14					<u> </u>	
Location Description: Pavec	Road - Main	trnck road	direc	ic both Frons	15 ft	
Control Device: Welling!	Sweeping					
, ·	hair			φ.	1	
Observer's Name: Jacob	Beckerman		Wind North	Observer	Note: Not to Scale,	
Certification Date of Observer: 9/25/14			Observer's Affiliation:			
Point of Emissions: Roadway/Tire Interface		Height of Dis	charge Poin	t: 0 ft		
CLOCK TIME	4	Initial	10:46 am	Final	11:08am	
OBSERVER LOCATION						
Distance to discharge		1:	5 ft	1.	5 ft	
Direction from discharg	je	90 d	legrees	90 d	legrees	
Height of observation p	ooint	4 ft		4 ft		
BACKGROUND DESCRIPTION		Road/Gravel		Road (Grave)		
WEATHER CONDITIONS						
Wind Direction		From the South		Fro	om the South	
Wind Speed		0-5 mph		0-5	mph	
Ambient Temperature		45° F		45° F		
SKY CONDITIONS (e.g., clea	ar,	0		Overcast		
overcast, % clouds, etc.) PLUME DESCRIPTION		Overcast		- Wercasi		
Color		RETO-BREEN.	n second			
Distance Visible			one.	, , , , , , , , , , , , , , , , , , ,).⊅6	
OTHER INFORMATION		/ / m	iles	2 m	iles	
OTHER INFORMATION	SUMMARY	OF AVERAGE	OPACITY			
		Time		Opac	ity (%)	
Set Number		Start - End		Sum	Average	
1	10:46;	30 - In:	46:45	0	0	
2			54:30	0	Ö	
3	10:59:		59:30	O	0	
4	11:08:		09:00	0	0	
Readings ranged from	O to	0	% opacity.			
			-			
Average of 12 readings:						

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways (Cont.)

Page <u>2</u> of <u>2</u>

		y/Tire In			ryalidada masa
	Vehicle Pass #	0	Seconds 5	10	Vehicle Type
	1	0	0	0	Heavy Truck
	2	0	0	0	Heavy Truck Heavy Truck
	3	0	0	0	Heavy Truck Heavy Truck
	4	0	0	0	Heavy Truck
escript	ion of Road (Paved/	Unpaved, I	Dry/Wet):_	Paved,	W

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

Company: HORSEHEAD CORP			Provide sketch of obs	erver's position rel	ative to the source:	
Address: 2701 Fast 114	TH ST. CMIC	AGO, 1 L 60617				
Facility ID: 031660	•	₹		BOTH DIRE	ctions	
Date: (2/15/2014	***************************************		Ţ:	TRUCK	1	
Location Description: PA	RICING LOT				15 ft	
Control Device: N/A						
Hours of Observation:	12:12-12:16	PM] 1	Α.		
Observer's Name: FRU			Wind North	Observer	Note: Not to Scale.	
Certification Date of Obse	erver: 9/26	12014	Observer's At	Efiliation:	TRIVITY CONSULTAVI	
Point of Emissions: Re	oadway/Tire In	terface	Height of Dia	scharge Poin	t: 0 ft	
CLOCK TIME	CLOCK TIME Initia		12:12 PM	Final	12:16 PM	
OBSERVER LOCATION				型并为		
Distance to discharge		15	ft	1	5 ft	
Direction from discharge	ge	90 d	egrees	90 d	legrees	
Height of observation	point	4	ft	4 ft		
BACKGROUND DESCRIPTION		DARK ST	BRAGE PILE	Same 18		
WEATHER CONDITIONS						
Wind Direction		Fro	m the S	From the 5,10		
Wind Speed		5-10 r	ubp	SANG	mph	
Ambient Temperature		45 F		Same 18 F		
SKY CONDITIONS (e.g., cle	ar,	A 54: 47		SAME		
overcast, % clouds, etc.) PLUME DESCRIPTION		OVERCHST		34W6		
Color	10.54		Fig.		T. S. HIEROSA	
		No €W	1851005	No emissions us		
Distance Visible		₩/A m	iles	N/A. miles		
OTHER INFORMATION	CITAMAN DIS	OF AVERAGE	ODA GERNA	-		
	SUMMARY	OF AVERAGE Time	OPACITY	Onac	ity (%)	
Set Number	\	Start - End	Military A. T. Indiana.	Sum	Average	
1	17:13		:13			
2	12:15		***************************************	200	0	
3	2:15		: 15		6	
4		1.00	. 15			
Readings ranged from	12:16	17	% opacity.			
Readings ranged from	to	-	• Opacity.			
Average of 12 readings:	0/2					

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways (Cont.)

Page <u>2</u> of 2

					ERICH YARGER
	missions Roadwa			-	INDUSTREATE
	Vehicle Pass #	0	Seconds 5	10	Vehicle Type
	1	Q	Ö	0	LIGHT TRUCK
	2	0	0	0	CAR
	3	0	O	0	CAR.
	4	0	0	0	LIGHT TRUCK
riptio	n of Road (Paved/	Unpaved,	Dry/Wet):	PAVE	4
*****	Obset	rver Signa	ature		Date

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

Company: HORSEMEAD	CORP.		Provide wketch of obse	erver's position rela	ative to the source:	
Address: 2701 E457 11		er LAGO, 12 606	7 B	BOTH DIRECTIO	WS	
Facility ID: 631600A		N	mmo IN <			
Date: 12/19/2014			1 9 P L	TRUCK	1	
Location Description: Roy	0 10 TPM	MUCK LOMI	06		15 ft	
Control Device: N/A				0.00		
Hours of Observation: 9	97 Am 10	0:04 AM		Α.	↓	
Observer's Name: ERICE			Wind North	Observer	Note: Not to Scale.	
Certification Date of Obse		5/2014	Observer's Af	filiation:	TRINITY CONSULTANT	
Point of Emissions: Ro	adway/Tire In	terface	Height of Dis	charge Poin	c: 0 ft	
CLOCK TIME 9.57		Initial	9:57 AM	Final	10:04 AM	
OBSERVER LOCATION					7 5x1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Distance to discharge		1.	5 ft	1:	5 ft	
Direction from discharg	re	90 d	legrees	90 đ	egrees	
Height of observation p	ooint	4	ft	4 ft		
BACKGROUND DESCRIPTION	1117	TAN PR	ocess eat	Samera		
WEATHER CONDITIONS						
Wind Direction		Fro	om the ζ	Fro	om the 5 m	
Wind Speed	7	0-5	mph	5 hmc mph		
Ambient Temperature		45	F	SAME F		
SKY CONDITIONS (e.g., clea	ar,	0.10	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	SAME		
overcast, % clouds, etc.) PLUME DESCRIPTION		000	RCA81	egyg sysynessysyes en		
Color		. la 7		37.3		
Distance Visible			iles	No emission	iles	
OTHER INFORMATION		7/17 "		N/A JP,		
	SUMMARY	OF AVERAGE	OPACITY			
		Time		Opac	ity (%)	
Set Number		Start - End	L	Sum	Average	
1	· · · · · · · · · · · · · · · · · · ·	9:58-9:5	18	0	0	
2		9:59 - 9:5		0		
3	10	3:02-10	:01	0	0	
4	10	:04 - 10	† 2 4	0		
Readings ranged from	O to	0	% opacity.			
Average of 12 readings:	0%	- Davidores			*	

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways (Cont.)

					Page _2
Company	HORSENGA	D CORP	· (Observer _	ERICLE YAEGOR
Location	CHICAGO,	14	Faci	lity Type	INDUSTRIAL
Point of e	emissions Roadwa	ay/Tire In	terface	380	es .
	Vehicle Pass #	0	Seconds 5	10	Vehicle Type
	1	0	0	0	LIGHT TRUCK
	2	0	0	0	HEALY TRUCK
	3	0	6	0	LIGHT TRUCK
	4	05	0	0	HEAUY TRUCK
Descripti	on of Road (Paved/	Unpaved, I	Dry/Wet):_	DAM	IP, PAVED
		2	1/2		12/19/2019
V-	Obse	rver Signa	kure		Date

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways

Company: HORSENEAD CORP.			Provide sketch of obs	erver's position rola	tive to the source:	
Address: 2701 East ()4 M		160617				
Facility ID: 63 1600			€ TK	wck(>	
Date: 12/15/2014			1	SOTM OFIZECTIONS	T	
Location Description: FAC	ILITY ENTR	ANCE (SECTION	(r)	SKIZECITON	15 ft	
Control Device: ٢/٩	1],			
Hours of Observation: ((:32 am -1	1:45 Au	1 5	4	<u>_</u>	
Observer's Name: ERICE	Y YAEGER	N	Wind North	Observer	Note: Not to Scale.	
Certification Date of Obse	erver: 9/2	12014	Observer's At	filiation: T	SINITY CONSUCTANT	
Point of Emissions: Ro	oadway/Tire In	terface	Height of Dis	scharge Point	: 0 ft	
CLOCK TIME		Initial	11:32 AM	Final	11: 45 44	
OBSERVER LOCATION			According to			
Distance to discharge		15	5 ft	15	ft	
Direction from discharg	je	90 d	egrees	90 de	egrees	
Height of observation p	point	4 ft		4 ft		
BACKGROUND DESCRIPTION		DENSE BRUSH (TAN)		SAME		
WEATHER CONDITIONS						
Wind Direction		Fro	m the 5	From the S		
Wind Speed		5-10 r	nph	5-10 m	mph	
Ambient Temperature		45 F		45 F		
SKY CONDITIONS (e.g., clea	ar,	O VERCAST		OVERCAST		
overcast, % clouds, etc.) PLUME DESCRIPTION		() vere	CASI	OVER 15.		
Color		Ex 134121	C 11 1 C 2 1 1 S S	No. 8 (2011) 11 11 11 11 11 11 11 11 11 11 11 11		
Distance Visible			EMISSIONS iles N/A	No emissioning Ma miles		
OTHER INFORMATION		200	1160 11/14	N/A _{JB} mi	165	
	SUMMARY	OF AVERAGE	OPACITY			
		Time		Opaci	ty (%)	
Set Number		Start - End		Sum	Average	
1	16:33	- 11:3	7	0		
2	11:36	11:36 - 11:36		0	0	
3	11:30		39	0	0	
4	11:44	- []:	14	O	0	
Readings ranged from	O to	<u> </u>	% opacity.			
Average of 12 readings:		Succ				

Method 9 Visual Emissions Observation Record Form Paved and Unpaved Roadways (Cont.)

Page 2 of 2

	MICAGO, LL			lity Type	(NOUSTRIAL
		277 2220 22	OTTAGE		
	Vehicle Pass #		Seconds		Vehicle Type
	1	0	5	10	MEAN TRUCK
	2	0	0		MEANY TRUCK
	3	0	Ö	0	HEAVY TRUCK
	4	0	ಲ	0	HEAVY TRUCK
scriptic		Unpaved,		UNP	(2/15/2014 Date

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION – METHOD 22 ERICH YAGGER Company Horsehead Corporation (Chicago Plant) Observer Chicago Plant, 2701 E. 114th St. Chicago, IL TRINITY CONSULTANB Location Affiliation 60617 12/19/2014 JOHN MARTA Company Rep. Date OVERCAST **Sky Conditions** Wind Direction Wind Speed Precipitation **Process Unit** Industry Secondary Refining of Non Ferrous Metals Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points. (ANAL **OBSERVATIONS** Clock Time **Observation Period Actual Emission Time** Duration (min:sec) (min:sec) **Begin Observation** 8: 42 Am -00:00 00:00 50: 00

End Observation

Total Sample Time: 0:00

Total Emission Time: 00:00

Emission Frequency: 0/.
(Total Emission Time/Total Sample Time) x 100%

00:

00:00

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION – METHOD 22 Company Horsehead Corporation (Chicago Plant) Observer Chicago Plant, 2701 E. 114th St. Chicago, IL Location 60617 Affiliation RINTTY CONSULTANTS 12014 Company Rep. Date **Sky Conditions** Wind Direction MPH Precipitation Wind Speed Industry Secondary Refining of Non Ferrous Metals **Process Unit**

Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)
Begin Observation	8:54 AM		erina Anili
			00°00
	_		GG:50
	_		190 141
			00:00
	_		00:00
And the property	"		
End Observation	9:04		80:00

Total Sample Time:	10:00
Total Emission Time:	00:00
Emission Frequency: (Total Emission Time/Total Sample	Time) x 100%

FUGIT		EMISSION INSPECTION – METHOD 22	CTION			
Company Horsehead Corpo	ration (Chicago Plant)		1 YACGER			
	01 E. 114th St, Chicago, IL		TY CONSULTANTS			
	1 A A D D A	Date 12/15/2014 Wind Direction N/NW				
	N MARRA					
	130T					
Precipitation	S 110 - 10 - 100 - 2000	Wind Speed O-S M				
Industry Secondary Refining	of Non Ferrous Metals	Process Unit Prop	ERTY LINE			
Sketch Process Unit: In points and/or actual emi		on relative to source; inc	licate potential emission			
	OBSER Clock Time	VATIONS Observation Period	Actual Emission Time			
		Duration (min:sec)	(min:sec)			
Begin Observation	9:15 AM	1 111				
	-		00:00			
	-					
	-		00:00			
	_					
he a bale i			00:00			
	-					
			00:00			
	_					
End Observation	9:25 AM		00:00			
		Total Sample Tin				
		Total Emission T Emission Frequen				
		(Total Emission Time/Total	ity.			

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION – METHOD 22 ERICH YAEGER Company Horsehead Corporation (Chicago Plant) Observer Chicago Plant, 2701 E. 114th St, Chicago, IL. TRINITY CONSULTANTS Location 60617 Affiliation JOHN 2014 MARTA Date Company Rep. /NW VERCAS T **Sky Conditions** Wind Direction MPH Wind Speed Precipitation PROPERTY Process Unit LINE Industry Secondary Refining of Non Ferrous Metals Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points. PROPERT RAIL TRACK

OBSERVATIONS

	100					
	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)			
Begin Observation	10:10 AM	45 45 46	43			
			00:00			
	1	4				
)		00:00			
7 7 m	1					
0.	1		00:00			
	1					
	1		00 100			
(A) (B) (B) (B) (B) (B) (B) (B) (B) (B) (B	T.					
End Observation	10:20 AM		00:00			

Total Sample Time:	10:00
Total Emission Time:	00:00
Emission Frequency: (Total Emission Time/Total Sampl	e Time) x 100%

FUGI		EMISSION INSPECTION – METHOD 22	CTION
Chicago Plant, 270	oration (Chicago Plant) 01 E. 114th St, Chicago, IL	Observer ERICH	
Company Rep.	N AZZIA	Date 12/19/20	CONSULTANTS
Sky Conditions West	AST	Wind Direction N	
Precipitation) 	Wind Speed 0 - 5	MPH
Industry Secondary Refining	of Non Ferrous Metals	Process Unit	PROPERTY LINE
Sketch Process Unit: In points and/or actual emi		on relative to source; ind	licate potential emission
	NO MOUND		
	OBSER	VATIONS	
	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)
Begin Observation	10:26	A i alt	. 98ca - a i i
	=	4	00:00
	-		
	_		00:00

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)		
Begin Observation	10:26	de la la la la la la la la la la la la la			
	=		00:00		
	-				
	-		00:00		
			06:00		
	_		00:00		
X V	-	VALUE OF THE			
End Observation	10:36		00:00		

Total Sample Time: 10:00

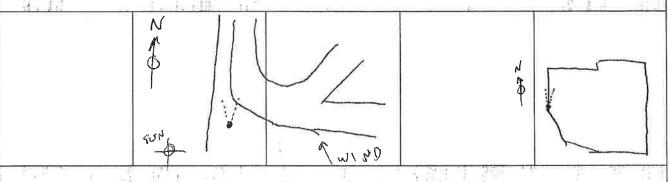
Total Emission Time: 00:00

Emission Frequency: 07

(Total Emission Time/Total Sample Time) x 100%

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION – METHOD 22 Observer ERICH YNEGER Company Horsehead Corporation (Chicago Plant) Chicago Plant, 2701 E. 114th St, Chicago, IL CONSULTANTS RINTITY Location Affiliation 60617 2014 JOHN MARTA Date Company Rep. Overc AST N/NW **Sky Conditions** Wind Direction MPH Wind Speed Precipitation PROPERTY **Process Unit** LINE Industry Secondary Refining of Non Ferrous Metals Sketch Process Unit: Indicate observer position relative to source; indicate potential emission

points and/or actual emission points.



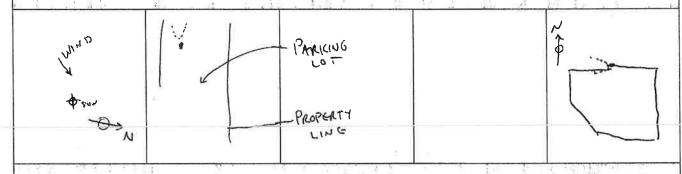
OBSERVATIONS

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)
Begin Observation	10:45 AM		
			00:00
	-		
			00:66
	~		
	9 17 .		00:00
	=		
	-		00: Os
	-		
End Observation	10:55		00:00

Total Sample Time:	10:00
Total Emission Time:	00,00
Emission Frequency:	60%
Emission Frequency: (Total Emission Time/Total Sample	e Time) x 100% /0

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION - METHOD 22 Company Horsehead Corporation (Chicago Plant) ERICH YAEGER Observer Chicago Plant, 2701 E. 114th St. Chicago, IL TRINITY CONSULTAUTS Location Affiliation 60617 John MARTA 12/15/2014 Date Company Rep. N/NE OVERCAST **Sky Conditions** Wind Direction 0-5 MPH Precipitation Wind Speed PROPERTY LING Industry Secondary Refining of Non Ferrous Metals **Process Unit**

Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)		
Begin Observation	11:04 AM				
	_		00:00		
	~	767			
		· ·	00:00		
	₩	1	00:00		
		.,	00:00		
	_				
End Observation	11:14 AM		00:00		

Total Sample Time: (O:OO

Total Emission Time: OO:OO

Emission Frequency: (Total Emission Time/Total Sample Time) x 100%

FUGITIVE OR SMOKE EMISSION INSPECTION OUTSIDE LOCATION - METHOD 22 ERILH YACGOR Horsehead Corporation (Chicago Plant) Company Observer Chicago Plant, 2701 E. 114th St, Chicago, IL RINITY CONSULTANTS Location 60617 Affiliation JOHN MARTA 12014 Company Rep. Date N/NW **Sky Conditions** Wind Direction 0-5 MP4 Precipitation Wind Speed Industry Secondary Refining of Non Ferrous Metals **Process Unit** Sketch Process Unit: Indicate observer position relative to source; indicate potential emission points and/or actual emission points. LINE PARNUMB LOT **OBSERVATIONS**

	Clock Time	Observation Period Duration (min:sec)	Actual Emission Time (min:sec)		
Begin Observation	11:18 AM				
yah V	~ ', ',		00:00		
(82%	*		·		
	H-1		30:00		
	-				
			<i>∞</i> 0:00		
	<u> </u>		00:00		
End Observation	N: 28 AN		ට ළ ; ල0		

Total Sample Time: 10:06 **Total Emission Time:** 00:00

Emission Frequency:

(Total Emission Time/Total Sample Time) x 100%

APPENDIX D: METEOROLOGICAL DATA

Date/Time	Record #	Average Wind Speed (mph)	Average Wind Direction	Gust (mph)	Temperature (°F)	Rain (inches)	Total Rain (inches)
12/15/2014 6:29	11278	6.307	195.1	11.95	45.85	0	0
12/15/2014 6:34	11279	4.267	184	7.778	45.88	0	0
12/15/2014 6:39	11280	5.727	182	9.56	45.85	0	0
12/15/2014 6:44	11281	5.985	179	10.16	45.72	0	0
12/15/2014 6:49	11282	5.419	181.1	11.35	45.67	0	0
12/15/2014 6:54	11283	7.992	180.4	13.14	45.66	0	0
12/15/2014 6:59	11284	5.991	180.1	9.56	45.66	0	0
12/15/2014 7:04	11285	5.836	177.3	10.76	45.65	0	0
12/15/2014 7:09	11286	7.849	175.8	13.14	45.48	0	0
12/15/2014 7:14	11287	7.635	172.9	11,35	45,45	0	0
12/15/2014 7:19	11288	7.254	180.7	13.14	45.45	0	0
12/15/2014 7:24	11289	9.08	180.9	16.12	45.44	0	0
12/15/2014 7:29	11290	7.397	182,7	11,35	45.44	0	0
12/15/2014 7:34	11291	6.628	184.5	11.95	45.42	0	0
12/15/2014 7:39	11292	7.284	176	11.35	45.44	0	0
12/15/2014 7:44	11293	8,52	180.9	12.54	45,43	0	0
12/15/2014 7:49	11294	7.623	190.8	13.73	45.44	0	0
12/15/2014 7:54	11295	5.896	181.4	10.16	45.44	0	0
12/15/2014 7:59	11296	7.313	178.8	12.54	45.44	0	0
12/15/2014 8:04	11297	8.18	179.3	11.95	45.44	0	0
12/15/2014 8:09	11298	9,64	191.4	14.93	45.44	0	0
12/15/2014 8:14	11299	6.348	186.9	10.76	45.45	0	0
12/15/2014 8:19	11300	5.483	188.3	8,97	45.47	0	0
12/15/2014 8:24	11301	6.146	186.1	11.35	45.48	0	0
12/15/2014 8:29	11302	7.212	194.7	12.54	45.49	0	0
12/15/2014 8:34	11302	5.788	188.1	9.56	45.47	0	0
12/15/2014 8:39	11303	7,117	197	14.33	45.48	0	0
12/15/2014 8:44	11305	7.045	195.2	13.14	45.45	0	0
12/15/2014 8:49	11306	7.748	191.4	15.52	45.55	0	0
12/15/2014 8:54	11307	7.921	185.5	13.14	45.59	0	0
12/15/2014 8:59	11307	7.742	177.3	13.73	45.54	0	0
12/15/2014 9:04	11300	6.176	166,9	8.37	45.45	0	0
12/15/2014 9:09	11310	7.2	175.8	11.95	45.45	0	0
12/15/2014 9:09	11310	8.94	174.3	13.73	45.38	0	0
12/15/2014 9:19	0	10.33	177.8	14.93	45.41	0	0
12/15/2014 9:19	1	7.29	176.3	13.14	45.45	0	0
12/15/2014 9:29	2	7,486	179.9	11.95	45.47	0	0
12/15/2014 9:34	3	9,65	178.9	16.12	45.54	0	0
12/15/2014 9:39	4	9.49	176.2	15.52	45.53	0	0
12/15/2014 9:39	5	7,957	181,4	12.54	45.57	0	0
12/15/2014 9:44	6	8,75	176.3	14.33	45.63	0	0
	7	8,46	178.8	13.14	45.67	0	0
12/15/2014 9:54 12/15/2014 9:59	8	9.23	170.0	14.93	45.69	0	0
12/15/2014 9:59	9	9.84	179.4	16,12	45.87	0	0
12/15/2014 10:04	10	8.17	171.3	11.95	45.82	0	0
12/15/2014 10:09	11	7.778	168.6	11.35	45.74	0	0
12/15/2014 10:14	12	10,49	168.3	14.93	45.82	0	0
12/15/2014 10:19	13	9.58	173.9	16.71	46.05	0	0
12/15/2014 10:24	14	7.528	173.6	12.54	46.12	0	0
12/15/2014 10:29	15	9.87	175.6	13.73	46	0	0
	16	10.11	179.4	14.33	45.85	0	0
12/15/2014 10:39	17	11.37	174.3	15.52	45.6	0	0
12/15/2014 10:44		11.37	174.3	17.31	45.5	0	0
12/15/2014 10:49	18		174.6		45.48	0	0
12/15/2014 10:54	19	12.02		17.9 17.9	45.48	0	0
12/15/2014 10:59	20	11.63	174		45.52	0	0
12/15/2014 11:04	21	11.78	180.2	18.5	45.52	0	0
12/15/2014 11:09	22	12.17	173.7	18.5			
12/15/2014 11:14	23	9.83	176.9	15.52	45.32	0	0
12/15/2014 11:19	24	8.99	172.4	14.33	45.42	0	0
12/15/2014 11:24	25	9,02	172	15.52	45.46	0	0
12/15/2014 11:29	26	10.18	173	15.52	45.36	0	0

Horsehead Corporation - Chicago Plant Weather and Windspeed Data - December 15, 2014

		Average Wind Speed	Average Wind	Gust	Temperature	Rain	Total Rain
Date/Time	Record #	(mph)	Direction	(mph)	(°F)	(inches)	(inches)
12/15/2014 11:34	27	9.99	175.5	13.73	45.35	0	0
12/15/2014 11:39	28	8.53	152.1	13.14	45.22	0	0
12/15/2014 11:44	29	7.921	145	13.73	44.84	0	0
12/15/2014 11:49	30	7.528	178	11.95	44.83	0	0
12/15/2014 11:54	31	6.509	164.7	10.16	44.81	0	0
12/15/2014 11:59	32	9.48	142.1	14.33	44.43	0	0
12/15/2014 12:04	33	6.968	162.3	14.93	44.11	0	0
12/15/2014 12:09	34	6.503	171.2	10.76	43.96	0	0
12/15/2014 12:14	35	8.02	144.5	14.33	43.79	0	0
12/15/2014 12:19	36	7.373	162.1	15,52	43.49	0	0
12/15/2014 12:24	37	8.08	177.9	12.54	43.48	0	0
12/15/2014 12:29	38	7.409	174.7	11.35	43.47	0.01	0.01
12/15/2014 12:34	39	4.728	163,2	8.97	43.49	0	0.01
12/15/2014 12:39	40	7.546	156.5	12.54	43.51	0	0.01
12/15/2014 12:44	41	9.7	175.7	14.33	43.65	0	0.01
12/15/2014 12:49	42	8.32	185.7	11.35	43.78	0	0.01
12/15/2014 12:54	43	9.32	177.6	14.33	43.89	0	0.01
12/15/2014 12:59	44	8.92	180	14.33	43.97	0	0.01
12/15/2014 13:04	45	7.98	184.2	12.54	44.14	0	0.01
12/15/2014 13:09	46	9.83	177	14.33	44.28	0	0.01
12/15/2014 13:14	47	9.13	171.1	12.54	44.49	0	0.01
12/15/2014 13:19	48	7.921	172.2	14.33	44.62	0	0.01
12/15/2014 13:24	49	6,837	171.8	11.35	44.81	0	0.01
12/15/2014 13:29	50	8.46	179.2	14.93	44.93	0	0.01
12/15/2014 13:34	51	7,272	177.3	10.76	45.06	0	0.01
12/15/2014 13:39	52	7.635	181.2	13.14	45.29	0	0.01
12/15/2014 13:44	53	8.87	178.2	14.33	45.53	0	0.01
12/15/2014 13:49	54	8.76	177.7	12,54	45.74	0	0.01
12/15/2014 13:54	55	8.95	177.3	14.33	45.9	0	0.01
12/15/2014 13:59	56	7.689	182.6	14.93	46.1	0	0.01
12/15/2014 14:04	57	8.65	181.6	14.93	46.2	0	0.01
12/15/2014 14:09	58	7.76	178.7	12.54	46.33	0	0.01
12/15/2014 14:14	59	7.325	178	12.54	46.31	0	0.01
12/15/2014 14:19	60	11.36	172,3	16,71	46.12	0	0.01
12/15/2014 14:24	61	10.89	174.1	17.31	46.11	0	0.01
12/15/2014 14:29	62	7.349	174.6	13.73	46.12	0	0.01

		Average Wind Speed	Average Wind	Gust	Temperature	Rain	Total Rain
Date/Time	Record #	(mph)	Direction	(mph)	(°F)	(inches)	(inches)
12/19/2014 6:29	1118	4.508	302.5	6.587	29.49	0	0
12/19/2014 6:34	1119	4.013	300.6	6.587	29.63	0	0
12/19/2014 6:39	1120	3.579	291.1	4.8	29.63	0	0
12/19/2014 6:44	1121	3.328	297.7	4.8	29.63	0	0
12/19/2014 6:49	1122	3.43	292.1	4.8	29.63	0	0
12/19/2014 6:54	1123	3.68	292.4	5.395	29.63	0	0
12/19/2014 6:59	1124	3.352	278.8	5.395	29.7	0	0
12/19/2014 7:04	1125	3.799	281	4.8	29.66	0	0
12/19/2014 7:09	1126	3.942	305.8	5,991	29.83	0	0
12/19/2014 7:14	1127	4.728	286.3	7.182	29.95	0	0
12/19/2014 7:19	1128	4.079	289	5.395	29.96	0	0
12/19/2014 7:24	1129	5.02	303.8	6.587	30,03	0	0
12/19/2014 7:29	1130	5,884	310.5	7.778	30.13	0	0
12/19/2014 7:34	1131	4.746	304.9	6.587	30.26	0	0
12/19/2014 7:39	1132	3.751	301.6	5.991	30.28	0	0
12/19/2014 7:44	1133	3,683	284.7	4.8	30.22	0	0
12/19/2014 7:49	1134	3.489	292.6	5.991	30.19	0	0
12/19/2014 7:54	1135	5.217	309.3	6,587	30.28	0	0
12/19/2014 7:59	1136	4,299	299.7	5.991	30.3	0	0
12/19/2014 7:39	1137	3.531	291.6	4.8	30.29	0	0
12/19/2014 8:09	1138	3.99	295.7	5.395	30.28	0	0
12/19/2014 8:09	1139	4.067	301,5	7.182	30.41	0	0
12/19/2014 8:14	1139	5.086	308.9	6.587	30.46	0	0
12/19/2014 8:19	1141	4,651	306.6	5.991	30.5	0	0
12/19/2014 8:29	1142	4.74	305.1	6.587	30.5	0	0
	1142	4,74	307.7	5.991	30,5	0	0
12/19/2014 8:34				6.587	30.5	0	0
12/19/2014 8:39	1144	4,812 5.199	308.3 309.9	7.182	30.51	0	0
12/19/2014 8:44	1145				30.5	0	0
12/19/2014 8:49	1146	5.199	308.4	6.587		0	0
12/19/2014 8:54	1147	5.014	309.8	6.587	30.53	0	0
12/19/2014 8:59	1148	4.806	307.3	5.991	30.54		
12/19/2014 9:04	1149	4.573	302.1	5.991	30.66	0	0
12/19/2014 9:09	1150	4.097	294	5.991	30.76	0	0
12/19/2014 9:14	1151	4.156	305.5	5.991	30.92	0	0
12/19/2014 9:19	1152	4.043	289.5	5.395	30.93	0	0
12/19/2014 9:24	1153	3.686	288.8	4.8	30.94	0	0
12/19/2014 9:29	1154	4.377	277	5.395	30.94	0	0
12/19/2014 9:34	1155	4.448	278.7	5.991	30.94	0	0
12/19/2014 9:39	1156	4.216	267.7	4.8	30.94	0	0
12/19/2014 9:44	1157	2.927	232.6	4.204	31.02	0	0
12/19/2014 9:49	1158	3.688	252.3	5.395	31.1	0	0
12/19/2014 9:54	1159	3.275	266.4	4.204	31,17	0	0
12/19/2014 9:59	1160	3.757	277.2	5.395	31.29	. 0	0
12/19/2014 10:04	1161	3.185	272.5	5.395	31.37	0	0
12/19/2014 10:09	1162	3.077	261.6	5.395	31.29	0	0
12/19/2014 10:14	1163	3,298	262	4.8	31.33	0	0
12/19/2014 10:19	1164	3.077	294.3	4.8	31.37	0	0
12/19/2014 10:24	1165	3.406	287.6	4.204	31.37	0	0
12/19/2014 10:29	1166	3.858	281.6	4.8	31.32	0	0
12/19/2014 10:34	1167	3.888	279.5	4.8	31.24	0	0
12/19/2014 10:39	1168	3.435	280.5	4.8	31.3	0	0
12/19/2014 10:44	1169	3.626	295.9	4.8	31,37	0	0
12/19/2014 10:49	1170	3.344	296,6	4.8	31.37	0	0
12/19/2014 10:54	1171	4.335	305.4	6,587	31.37	0	0
12/19/2014 10:59	1172	4.079	300	6.587	31.37	0	0
12/19/2014 11:04	1173	4.001	298.7	5.395	31.38	0	0
12/19/2014 11:09	1174	4.246	291.7	5.991	31.4	0	0
12/19/2014 11:14	1175	4.133	299.3	5.395	31.39	0	0
12/19/2014 11:19	1176	3.71	296.5	5,395	31,47	0	0
12/19/2014 11:24	1177	4.675	301.4	5.991	31.39	0	0
12/19/2014 11:29	1178	4.996	307.9	6.587	31.38	0	0
14/11/4014 11.47	11/0	4.585	301.9	5.991	31,45	0	0

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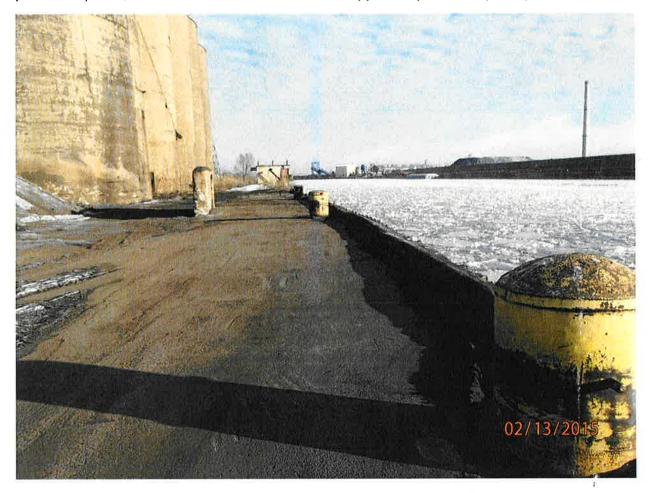
EXHIBIT C

Stormwater Berm Photographs Horsehead Corporation - Chicago Plant

Photo looking north – showing earthen berm south of silo storage area (Calumet River is in center of the photo, Horsehead silos in upper left portion of photo)



Photo looking north – showing paved berm alongside silos (Calumet River is in right portion of photo, ice covered, Horsehead silos in upper left portion of photo)



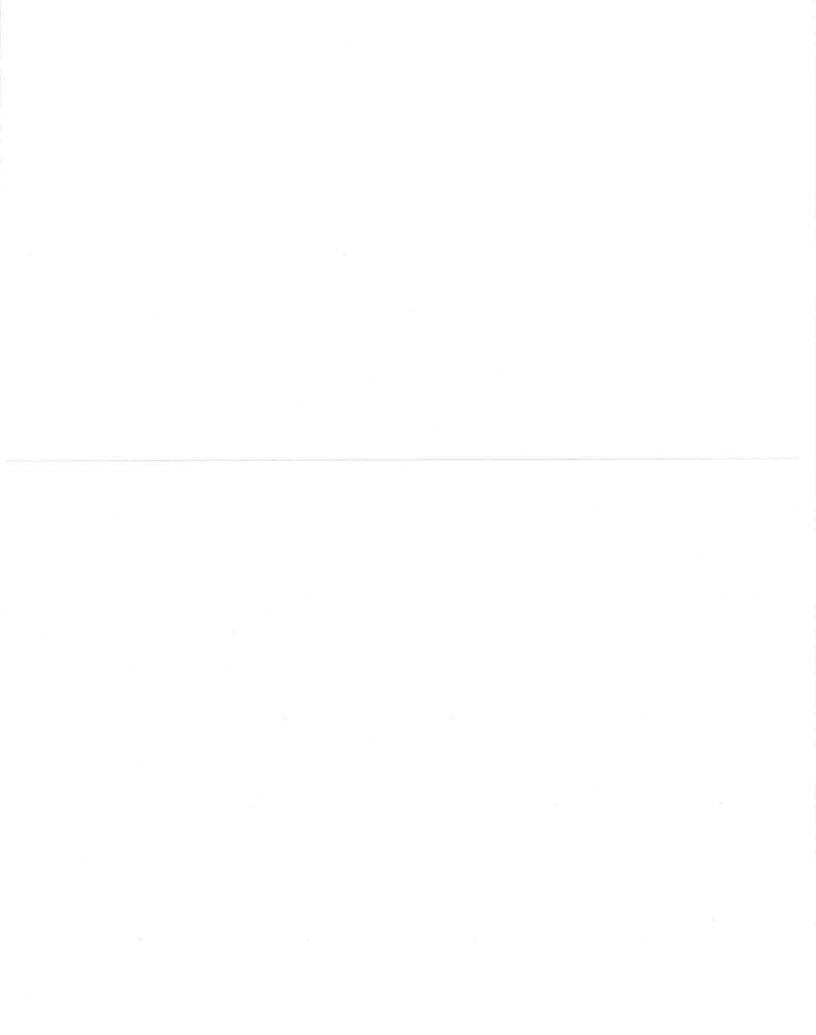


EXHIBIT D

Master Site Diagram with Berms and Stormwater Drainage Horsehead Corporation - Chicago Plant

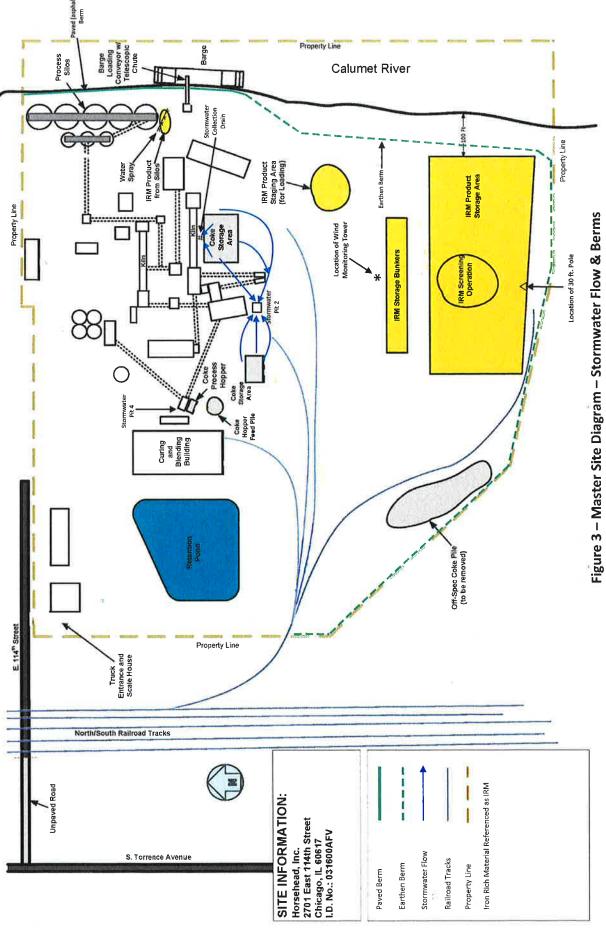


EXHIBIT E

IRM Study Abstract - Passive Removal of Containments Using Iron Rich Material (IRM) Horsehead Corporation - Chicago Plant

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U.S. EPA Contaminated Site Cleanup Information (CLU-IN)

CLU-IN | In The News | Technology Innovation News Survey | Search Result

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LOW-COST, LONG-TERM PASSIVE TREATMENT OF METAL-BEARING AND ARD WATER USING IRON RICH MATERIAL Brown, A. International Mine Water Association, 2013 Annual Conference, Golden, CO: Reliable Mine Water Technology, Vol I: 525-532, 2013

An iron-rich material (IRM) can be used for inexpensive and passive removal of divalent metal contaminants from acid- and metal-bearing mine drainage. IRM, the cinder residue resulting from zinc recovery from electric arc furnace dust in a horizontal Waelz furnace, occurs as a solid solution of iron oxides and akermanite that is high in alkalinity, cation exchange capacity, adsorptive capacity, porosity, surface area, strength, and permeability. IRM is marketed in the United

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States as HiSorb and Ecotite™. This paper describes the chemistry, action, capabilities, performance, and design of IRM water treatment systems. The author briefly describes the use of IRM for the OU2 Cinder Bank water treatment at the Palmerton Zinc Superfund site. http://www.imwa.info/docs/imwa.2013/IMWA2013 Brown 568.pdf

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