



CLEVELAND-CLIFFS INC.  
Cleveland-Cliffs Steel Corporation  
Dearborn Works  
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August 23, 2022

*Via Electronic Mail*

Ms. Katherine Koster  
Senior Environmental Engineer  
EGLE, AQD – Detroit District  
3058 West Grand Boulevard, Suite 2-200  
Detroit, Michigan 48202

Ms. Jenine Camilleri  
Enforcement Unit Supervisor  
EGLE, AQD  
PO Box 30260  
Lansing, Michigan 48909-7760

Re: Cleveland-Cliffs Dearborn Works  
Response to Violation Notice dated August 2, 2022

Dear Mss. Koster and Camilleri:

I am writing on behalf of Cleveland-Cliffs Dearborn Works in response to the Violation Notice dated August 2, 2022. The Violation Notice alleges noncompliance with the Basic Oxygen Furnace (BOF) Electrostatic Precipitator (ESP) 6-minute average state opacity standard and alleges improper operation of the ESP. For the reasons set forth below, Cleveland-Cliffs respectfully disagrees with the allegations of noncompliance.

*COMS Data Does Not Establish Noncompliance With the State Opacity Standard.*

As with previous Violation Notices issued in relation to BOF ESP opacity, all of the allegations in the current Violation Notice are premised entirely on Continuous Opacity Monitoring System (COMS) data reported pursuant to the 2015 Consent Decree. Cleveland-Cliffs has outlined its position in responses to previous Violation Notices regarding the fact that the allegations in the Violation Notice do not constitute noncompliance. In particular, Cleveland-Cliffs' responses to Violation Notices issued on March 16, 2020, and January 5, 2021, provide the legal, regulatory, and factual information to explain its conclusion that the allegations in this current Violation Notice do not constitute noncompliance with the applicable legal requirements. These prior Violation Notice responses are included as attachments to this response.

In addition, Cleveland-Cliffs Dearborn Works first quarter 2022 report contains a review of COMS data as required by the 2015 Consent Decree. This report details the root cause and corrective action for all instances where the 6-minute block average opacity measured by the COMS is greater than 20%. This report (without the appendices included) is also attached for reference.



*Extensive Method 9 Data Provides Evidence of a Substantial Positive COMS Bias.*

Notwithstanding Cleveland-Cliff's position on its compliance status, there are notable observations specific to the first quarter of 2022. Cleveland-Cliffs' assessment of data conclusively demonstrates that the COMS overstates opacity as compared to Method 9. The basis of this assessment is fully explained in the previously mentioned Violation Notice responses. Observations during the first quarter of 2022 further support this position.

Specifically, Cleveland-Cliffs has been performing a minimum of three 2-heat Method 9 observations per week since the first quarter of 2021. During the period when the opacity alarms were occurring at their highest rate of the quarter (January 25 – February 25 where 46 out of 67 of the alleged exceedances occurred), a diligent effort was made to increase the number of Method 9 opacity observations being performed. While approximately 7 to 9 hours of Method 9 observations were being conducted per week during a typical week, Cleveland-Cliffs increased that to 17 to 26 hours of Method 9 observations per week during this period of time. During this period, 46 COMS alarms ranging between 20% and 40% opacity as a 6-minute averages overlapped with Method 9 readings. All Method 9 observations during this period were below 6% opacity as a 6-minute average. No Method 9 exceedances occurred during the quarter.

Of the 67 exceedances alleged in the Violation Notice, 60 were in the range of 20% to 40% opacity as a 6-minute average. This is the opacity range where the COMS data was shown through direct comparison to have a significant bias when compared to Method 9. Of the remaining seven alleged exceedances, four occurred during startup, shutdown and/or malfunction (SSM) events which are subject to enforcement discretion under Michigan law. Specifically, Mich. R. 336.1915 provides for enforcement discretion when exceedances result from malfunctions, start-up, or shutdown.

While it is impossible to conduct Method 9 observations during all periods of COMS alarms, Cleveland-Cliffs is confident that based on the frequency of readings conducted and the comparison to COMS data during the overlapping periods, the COMS alarms that occur that do not overlap with Method 9 data have a similarly high bias. COMS data on its own is therefore not indicative of overall ESP performance.

*Particulate Matter Stack Test Results.*

In addition to the bias in COMS measurements when compared to concurrent Method 9 observations, Cleveland-Cliffs has also conducted periodic stack testing that demonstrates that the ESP is operating properly. Since the last Violation Notice was issued in January 2021, Cleveland-Cliffs has conducted three separate compliance determinations for particulate matter on the ESP. All three determinations, including one that was conducted on January 25 during the first quarter, substantially complied with the PM emission limits. For these tests, the average PM for the three runs was less than half of the Title V permit limit and less than one-third of the Integrated Iron and Steel MACT limit. The table below provides the results:



<b>Test Date</b>	<b>Iron and Steel NESHAP Limit (gr/dscf)</b>	<b>Cleveland-Cliffs Title V Permit Limit (gr/dscf / lb/hr)</b>	<b>Test Results (gr/dscf / lb/hr)</b>
August 3-4, 2021	0.02	0.0152 / 62.6	0.0069 / 34.7
November 17, 2021	0.02	0.0152 / 62.6	0.0042 / 20.3
January 25, 2022	0.02	0.0152 / 62.6	0.0060 / 24.9
<b>Average</b>			0.0057 / 26.6

In summary, Cleveland-Cliffs disagrees with EGLE’s assertion that that COMS data on its own forms the basis for non-compliance, due to the fact that:

- there is an established COMS positive bias when compared to Method 9;
- there have been zero exceedances of the opacity limit based on Method 9 observations;
- stack test data for particulate matter is less than half of the Title V permit limit and less than one-third of the Integrated Iron and Steel MACT limit.

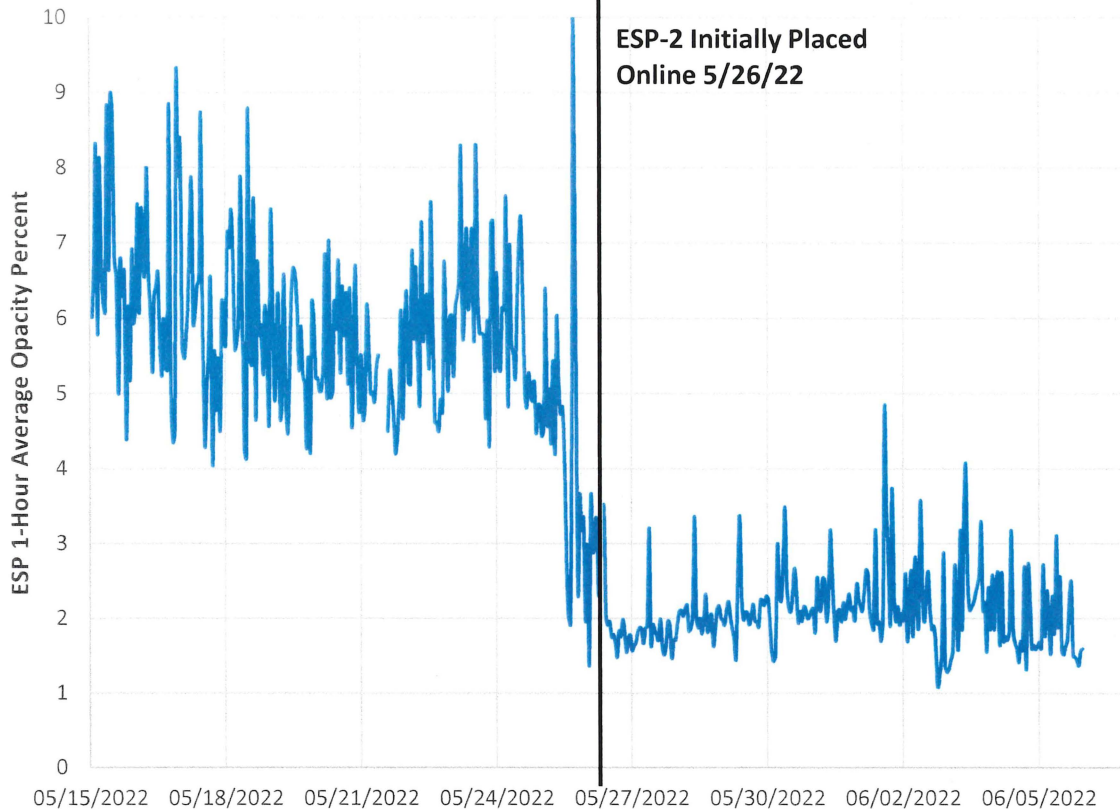
This undisputable factual information fully refutes EGLE’s assertion that the ESP is not being properly operated and maintained.

*Significant Recent COMS Improvements.*

While Cleveland-Cliffs disagrees with EGLE on the allegations in the Violation Notice, the Company does want to note the significant decrease in opacity that has occurred because of the ESP Rebuild Project. The rebuild will improve upon the performance and further reduce emissions below the limits. Since the last Violation Notice was issued in January 2021, Cleveland-Cliffs has added a new casing to the ESP and has completely rebuilt two additional casings which represent half of the pre-rebuild ESP. An additional casing is currently being rebuilt with plans to complete the rebuild project by the end of March 2023. The completion of the rebuild of the second casing in particular has resulted in a noticeable reduction in measured COMS opacity as a whole as is illustrated by the following chart of 1-hour opacity averages around the time that the second casing was placed into service.



### ESP 1-Hour Average Opacity - May 15 to June 5, 2022



This trend has continued through July and August. As of August 23, no non-SSM / non-maintenance alarms have occurred since the second casing was initially placed online on May 26. Therefore, notwithstanding the disagreement on the allegations in the Violation Notice, Cleveland-Cliffs believes that the steps already taken through the rebuild project and the steps planned in the future to complete the rebuild project have resulted and will continue to reduce emissions and result in a significant reduction in “exceedances” identified by the COMS moving forward.

If you have any questions regarding this response, please contact Jim Earl at 313-845-3217.

Sincerely,

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David Pate  
Senior Environmental Engineer  
Cleveland-Cliffs Dearborn Works

Enclosures





**AK Steel Corporation**

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**James E. Earl**

Environmental Affairs Manager  
Dearborn Works

April 6, 2020

***Via Email Only***

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Ms. Jenine Camilleri  
Enforcement Unit Supervisor  
EGLE – AQD  
PO Box 30260  
Lansing Michigan 48909-7760

Re: AK Steel Corporation – Dearborn Works  
Response to Violation Notice dated March 16, 2020

Dear Mss. Koster and Camilleri:

I am writing on behalf of AK Steel Corporation in response to EGLE's Violation Notice dated March 16, 2020, issued to the Dearborn Works. The Violation Notice identified four categories of alleged noncompliance: (1) exceedance of the lead and manganese emission limits for the BOF ESP; (2) exceedance of the BOF ESP opacity standard pursuant to Method 9; (3) exceedance of the BOF ESP opacity standard pursuant to COMS; and (4) improper operation of the ESP. Following is AK Steel's response to each of these allegations in the Violation Notice.

**A. Alleged exceedance of the lead and manganese emission limits for the BOF ESP.**

The Violation Notice alleges that AK Steel exceeded the emission limits for lead and manganese for the Secondary Baghouse stack and the ESP stack from the FGBOFSHOP emissions unit, based on a test conducted on December 17, 2019. The Violation Notice also references lead and manganese tests conducted in August and September 2019 that were included in prior Violation Notices.

AK Steel acknowledges that on the specific dates of the tests, the lead and manganese emission limits were exceeded. AK Steel does not at this time have any reason to question the accuracy of the test results. Note though that EGLE's Violation Notice identifies emission results for "Total Pb" for the December test of 0.123 pounds per hour. The actual results are 0.118 pounds per hour.

While AK Steel does not question the results, the Company believes that the emission limits for lead and manganese were erroneously derived and are both technically infeasible to achieve and need to be adjusted higher to ensure the limits can be reasonably achieved on a continuous basis. Following is a detailed discussion of the technical flaws in the establishment of those emission limits.

**1. Background: The approach used in PTI 182-05 (2006) and 182-05(B) (2007) for establishing the lead and manganese emission limits.**

The current combined ESP stack and BOF Secondary Baghouse stack lead emission limit is 0.067 pounds per hour. The limit was established in PTI 182-05(B) (2007) by correlating the lead concentration in dust with the PM<sub>10</sub> emissions from the ESP and Secondary Baghouse stacks. To estimate the lead content of the emissions, collected ESP dust from the hopper was analyzed for lead. The lead concentration was 1,620 ppm (0.162%). Therefore, the presumption was made that 0.162% of the PM<sub>10</sub> emissions at the ESP stack and BOF Secondary Baghouse stack were lead emissions. This resulted in a limit of 0.0611 pounds of lead per hour for the ESP stack and 0.0054 pounds of lead per hour for the Secondary Baghouse stack, for a combined limit of 0.067 pounds of lead per hour.

The current combined ESP stack and BOF Secondary Baghouse stack manganese emission limit is 0.10 pounds per hour. The manganese emission limit was established in PTI 182-05 (2006) using the same method as the lead emission limit, except the manganese emission limit was reduced by 75% (divided by 4). This 75% reduction was based on baghouse dust analysis for manganese compared to stack test data from an Electric Arc Furnace (EAF) steel mill in Michigan. Even though EAFs and BOFs both produce steel, they are a totally different process and do not have comparable emission profiles. The manganese limit was based on a measured 9,870 ppm in collected ESP dust from the hopper, reduced by 75% or 2,468 ppm (0.25%).

Part of the reason for this contorted approach to establishing the lead and manganese limits was due to the lack of stack test data available at integrated steel plants. The Dearborn Works is the only integrated steel plant in the United States that has a manganese emission limit for the BOF. Likewise, the Dearborn Works is one of only two integrated steel plants in the United States that have a lead emission limit for the BOF. There was therefore a lack of stack test data from other BOFs to benchmark against in establishing the emission limits.

**2. Technical flaws in the approach to establishing the manganese (2006) and lead (2007) emission limits.**

The first technical flaw in establishing the lead and manganese emission limits relates to the assumptions involving the concentration of the metal in the measured hopper dust versus from the stack. The concentration of lead in the ESP hopper dust was assumed to be the same as the concentration of lead in the filterable PM<sub>10</sub> stack emissions. Likewise, the concentration of manganese in the ESP hopper dust was assumed to be four times the concentration of manganese in the filterable PM<sub>10</sub> stack emissions.

However, AK Steel has proven this assumption incorrect based on numerous stack testing samples between 2012 and 2020. For lead, the peak concentration in the outlet particulate matter stack testing samples was 12,960 ppm. This is approximately 8.0 times higher than the lead concentration from the ESP dust hopper sample used to derive the lead emission limit. For manganese, the peak concentration was 20,625 ppm, which is 8.4 times higher than the manganese concentration from the ESP dust hopper sample used to derive the manganese emission limit. This actual data collected from a significant data set has proven that the assumptions to derive both lead and manganese concentrations in the outlet stack based on ESP hopper dust samples was technically flawed.

The second technical flaw in establishing the lead and manganese emission limits is that both lead and manganese concentrations in the ESP hopper dust samples that were used in deriving the emission limits were based on a single ESP hopper dust analysis. However, several ESP hopper dust samples taken between 2008 and 2020 have revealed extensive variability in the lead and manganese concentrations in the ESP hopper dust. Measured lead concentrations in ESP hopper dust in particular have been as high as 2,700 ppm, which is 1.7 times higher than the initial single sample used to establish the emission limit. Likewise, manganese concentrations in ESP hopper dust have been as high as 9,900 ppm, which is 4.0 times the value used to establish the emission limit based on the initial single sample.

A third technical flaw is that lead and manganese emission limits were calculated based on a  $PM_{10}$  basis. All reference test methods to measure lead and manganese emissions can only measure TSP lead and manganese emissions from the stack. Therefore, when stack testing is conducted for manganese, results are approximately 20 percent higher than what is regulated by the manganese ITSL. It may have been more appropriate to derive the lead and manganese emission limits on a TSP basis instead of a  $PM_{10}$  basis which would have been more accurate on an apple-to-apple basis.

**3. The manganese (2006) and lead (2007) emission limits are infeasible to achieve on a continuous basis.**

The ESP emission limits for lead and manganese were both developed to correspond to the emission limit for  $PM_{10}$ . In other words, achieving compliance with the lead and manganese emission limits for the ESP was directly tied to achieving compliance with the emission limit for  $PM_{10}$ . However, that has not been the case. The ESP has always achieved compliance with the  $PM_{10}$  emission limit while at the same time exceeding the lead and manganese emission limits.

In that same regard, the ESP is operating well above its design specifications for controlling particulate matter. Specifically, over the course of numerous test runs for particulate matter in 2019 to 2020, the outlet grain loading of the ESP has averaged 0.0049 grains per dry standard cubic foot, compared to a design specification of 0.024 grains per dry standard cubic foot. Likewise, based on inlet testing conducted in 2019, the ESP collection efficiency has ranged between 99.6% and 99.9%, compared to a design specification of 99.2%. Thus, the ESP has greatly exceeded the design specification in both regards. Since lead and manganese both tested over the limit during the majority of the testing in this time period, it is apparent that achieving the current lead and manganese emission limits requires the ESP to greatly exceed its design specifications.

Furthermore, when factoring normal process variability with respect to manganese and lead concentration in the ESP off gas, the required ESP performance (existing or new ESP) to achieve continuous compliance with the flawed manganese and lead emission limits is technically infeasible because the required performance would require the ESP to operate at a performance rate that exceeds best available control technology (BACT) standards as well as the equipment manufacturer performance guarantee for the existing or new ESP. It is unreasonable to expect the ESP to comply with erroneously derived emission limits that are technically unachievable on a continuous basis, and when the underlying regulations support an increase where ambient air will continue to be protected by an ample margin of safety.

#### **4. Technical justifications for higher lead and manganese emission limits.**

In light of the technical deficiencies in the permitted lead and manganese emission limits, AK Steel has submitted to EGLE two Permit to Install applications to adjust the lead and manganese emission limits. Specifically, AK Steel has applied to increase the combined Secondary Baghouse stack and ESP stack lead emission limit from 0.067 pounds per hour to 0.20 pounds per hour. In addition, AK Steel has applied to increase the combined Secondary Baghouse stack and ESP stack manganese emission limit from 0.10 pounds per hour to 0.38 pounds per hour. These higher emission limits are technically justified and are protective of human health and the environment for multiple reasons.

First, Michigan significantly raised the manganese Initial Threshold Screening Level (ITSL) in 2014 from  $0.05 \mu\text{g}/\text{m}^3$  to  $0.3 \mu\text{g}/\text{m}^3$  and determined the screening threshold applies to the  $\text{PM}_{10}$  fraction on an annual average basis. This revision occurred after the manganese emission limit was established for the BOF ESP. The ITSL was adjusted after a detailed technical review, in consultation with EPA and consistent with ATSDR's recommendations in 2012. The ITSL is designed to be a conservative, state-wide screening threshold below which no adverse impacts could be shown.

Second, note that the ITSL only applies to the  $\text{PM}_{10}$  fraction of total manganese. However, the reference test method for measuring manganese emissions can only measure total manganese, which is greater than just the  $\text{PM}_{10}$  fraction. Therefore, the manganese emissions data is overstated when it is compared to the ITSL. In addition, the ITSL is an annual average. Any short-term "exceedance" is therefore not in fact an exceedance.

Third, AK Steel has conducted air quality modeling for the requested revised lead and manganese emission limits. The results of the modeling were included with the permit applications and are summarized below:

- For lead, the total modeled impact of the lead emission rate increased from  $0.0265 \mu\text{g}/\text{m}^3$  to  $0.0411 \mu\text{g}/\text{m}^3$ . This equates to an increase from 17.68% to 27.37% of the lead NAAQS of  $0.15 \mu\text{g}/\text{m}^3$ . Thus, the modeled lead concentration for the proposed emission limit increase remains well below the NAAQS standard.
- For manganese, the total modeled impact of the manganese emission rate increased from  $0.0370 \mu\text{g}/\text{m}^3$  to  $0.0380 \mu\text{g}/\text{m}^3$ . This equates to an increase from 12.33% to 12.65% of the manganese ITSL. Thus, the modeled manganese concentration for the proposed emission limit increase remains well below the ITSL.

Fourth, actual ambient data from the Dearborn Salina Ambient Monitoring Station (which is approximately one-third mile from the AK Steel property line) does not show increasing lead and manganese concentrations from 2016-2019. Both lead and manganese measured concentrations are well below the NAAQS for lead and the ITSL for manganese. In addition, actual measured concentrations are well below the modeled values:

<b>Year</b>	<b>Highest 3-month Average Lead TSP Concentration (µg/m<sup>3</sup>)</b>	<b>Annual Average Manganese PM<sub>10</sub> Concentration (µg/m<sup>3</sup>)</b>
2012	0.0154	0.0425
2013	0.0143	0.0311
2014	0.0165	0.0286
2015	0.0192	0.0313
2016	0.0125	0.0346
2017	0.0169	0.0327
2018	0.0104	0.0318
2019	0.0101	0.0305

Note that EGLE has not posted the 2019 Michigan Annual Ambient Air Quality Report on its website as of April 3, 2020. The manganese data above for 2019 is based on an incomplete data set from EPA's website. Graphical representations of modeled lead and manganese compared to the NAAQS and ITSL are enclosed.

**5. Conclusions regarding lead and manganese emission limits.**

Based on the above, the information we have provided clearly demonstrate the original PTI manganese (2006) and lead (2007) emission limits were erroneously derived and are technically infeasible to achieve. There is ample justification for addressing the technical deficiencies that were inherent in the initial approach to setting the lead and manganese emission limits. In addition, the revised emission limits requested by AK Steel are fully protective of human health and the environment. The fact that the existing lead and manganese emission limits are technically deficient, and that the existing or new ESP is required to operate well beyond the design specifications, are substantial mitigating factors as it relates to the exceedances of the existing lead and manganese emission limits.

**B. Alleged exceedance of the BOF ESP opacity standard pursuant to Method 9.**

The Violation Notice alleges that based on the certified Method 9 visible emission readings on the ESP taken during the August 14, 2019 stack test, from 3:25:15 PM to 3:31:15 PM, the 6-minute opacity was 30% and therefore constituted a violation of R. 336.1301(1)(a) and Section 1, General Condition 11 of the ROP. Those provisions restrict visible emissions to a 6-minute average of 20% opacity, except for one 6-minute average per hour of not more than 27% opacity. AK Steel disagrees that it exceeded this standard.

AK Steel reviewed the Visible Emission field data sheets from the August 13-14 stack test report and calculated a 6-minute opacity of 26.5% during the above-referenced time frame. The 6-minute average opacity for the ESP was over 20% for only 6 minutes. The next highest 6-minute average opacity recorded during the reading was 19.8%. This meets the requirements of the ROP and the regulation that allows for one six-minute average of not more than 27% opacity. Therefore, a violation did not occur. The Visible Emission field data sheet and AK Steel's calculations are enclosed.

**C. Alleged exceedances of the BOF ESP opacity standard pursuant to the COMS.**

The Violation Notice alleges that AK Steel also violated General Condition 11 of its ROP based on 6-minute average results from the Continuous Opacity Monitor System (COMS) on the BOF ESP stack. However, AK Steel disagrees that a 6-minute average as measured by the COMS that exceeds 20% is considered a violation of that state standard.

AK Steel previously provided EGLE with its position on this issue in a letter dated November 17, 2014. AK Steel's position remains the same as it did at that time. A copy of that response is enclosed. Following is a summary of that position:

- General Condition 11 in AK Steel's ROP is derived from the opacity standard in R. 336.1301(1). That regulation provides that "the opacity of a visible emission shall be determined by a qualified observer and shall be certified in accordance with, and using the procedures specified in, reference method 9 or an alternative method approved by the department." R. 336.1303. AK Steel has not sought approval from EGLE for an alternative method, therefore the regulation dictates that compliance with the opacity standard in GC 11 and R. 336.1301(1) is based on Method 9, not any other means such as a COMS.
- Given the difference in stringency between a standard based on periodic Method 9 observations, and a standard based on continuous COMS readings, any such COMS data is not "credible" evidence as it relates to the state Method 9 standard.
- A court has assessed this exact issue and held that use of COMS data in place of Method 9 data for assessing an opacity standard is improper and beyond the scope of the credible evidence rule. *United States v. Mountain State Carbon, LLC*, No. 5:12-CV-19, (N.D. W.Va. Jan. 14, 2014). The court held that use of COMS was more stringent than use of Method 9 due to the continuous nature of the COMS, which is in conflict with U.S. EPA's preamble statements that the credible evidence rule was not intended to make limits more stringent. Specifically, the court concluded that "using COMS as 'credible evidence,' therefore, would affect the stringency of underlying emission standards by amending the nature of the compliance obligation."

The Violation Notice also references the Consent Decree requirement to submit a quarterly report that includes each instance in which the 6-minute block average reading of the COM data for the ESP exceeds 20% opacity. However, such instances are not considered noncompliance under the Consent Decree. They are only identified for purposes of identifying root causes, corrective actions and preventative actions. AK Steel continues to make such assessments. In that regard, it is important to note that for the 3rd Quarter 2019 through the end of the 1st Quarter 2020, the instances in which the 6-minute block average reading of the COM data for the ESP exceeded 20% opacity is only 0.6% of all 6-minute periods. So even if the COMS was used for compliance, the recent compliance rate would be 99.4%.

Finally, note that while AK Steel's position is that none of the instances of alleged COMS opacity exceedances included in the table in the Violation Notice represent noncompliance, AK Steel does disagree with the identified numbers. For every quarter, AK

Steel has counted fewer 6-minute averages that EGLE identified in the table. It is also important to note that any events that were the result of start-ups, shutdowns or malfunctions could otherwise be subject to R. 336.1915 and R. 336.1916, if in fact they constituted exceedances.

**D. Alleged improper maintenance and operation of the ESP.**

The Violation Notice alleges that the ESP is not “installed and operating properly” and is not “installed, maintained and operated in a satisfactory manner” in accordance with EUBOF Standard Condition IV.1 and R. 336.1910. EGLE’s basis for such allegation is the alleged opacity exceedances, failed stack tests, and the ESP Annual Inspection Report findings. AK Steel disagrees with EGLE’s assertions regarding the maintenance and operation of the ESP.

First, as discussed in detail above, the noncompliant lead and manganese stack tests are not an indication of a deficiency in the ESP, but instead are due to the technically incorrect and unachievable emission limits. Likewise, as detailed above, AK Steel disagrees with EGLE’s assertion that there has been any noncompliance with the opacity emission limit.

Second, the most recent ESP annual inspection report does not support EGLE’s assertion that the ESP is not maintained or operated properly. Specifically, the *Inspection Report – BOF Electrostatic Precipitator Chambers 1-8* (ESP Inspection Report), dated August 9, 2019, and submitted to the government on October 4, 2019, is a very detailed report that includes numerous technical maintenance recommendations. The report does however include some general conclusions. Most importantly, the report concludes that “[o]verall, the BOF precipitator was found in reasonably good operating condition during this inspection. This mostly reflects the chamber maintenance that was recently completed.” Such a conclusion is not consistent with EGLE’s allegation of improper operation and maintenance of the ESP.

Third, AK Steel believes there is substantial data that properly evidences that the ESP is maintained and operating properly. In particular:

- The Dearborn Works has not had any deviations of the state 6-minute opacity limit based on Method 9 observations (the approved method for reading opacity) from the BOF ESP stack.
- The Dearborn Works has not had any deviations of the NESHAP hourly opacity limit for the BOF ESP stack.
- The Dearborn Works has identified a disconnect between 6-minute COMS readings and Method 9 observations from the BOF ESP stack, such that the COMS readings are often higher than official Method 9 observations.
- The Dearborn Works has passed all particulate matter tests at the BOF ESP by a wide margin (where opacity is merely a surrogate for mass particulate matter emissions).

For all of these reasons, AK Steel disagrees with EGLE’s assertion that the Company is not properly operating and maintaining the ESP.

**E. Requested information for the Violation Notice.**

The Violation Notice requests that AK Steel include specific information in its response. The following provides the requested information as it relates to the alleged violations of the lead and manganese emission limits. As AK Steel does not agree with the allegations involving opacity and the operation and maintenance of the ESP, no response is required for those items.

1. *The dates the violations occurred.*

The violations occurred on the dates of the three stack tests: August 13-14, September 17, and December 17.

2. *An explanation of the causes and duration of the violation.*

The cause of the violation of the manganese and lead emission limits is the improperly established emission limits for the ESP in PTI 182-05 (2006) and 182-05(B) (2007) for those metals emitted from the ESP which are technically infeasible to achieve with the existing or new ESP. The duration of the violation is as noted in response to Question 1, above.

3. *Whether the violations are ongoing.*

As noted above, the violations occurred on the dates of the three stack tests: August 13-14, September 17, and December 17, 2019.

4. *A summary of the actions that have been taken and are proposed to be taken to correct the violations and the dates by which these actions will take place.*

As noted above, AK Steel submitted PTI applications to EGLE to revise the lead and manganese emission limits for the ESP, which were received by EGLE on January 23, 2020. Pursuant to EGLE's letter dated February 10, 2020, a final action on the PTI applications will occur by July 21, 2020, if public participation is not required, or by September 19, 2020, if public participation is required.

5. *What steps are being taken to prevent a reoccurrence.*

As noted above, AK Steel submitted PTI applications to EGLE to revise the lead and manganese emission limits. Emission limits for lead and manganese that are technically correct will prevent a recurrence.



Ms. Katherine Koster  
April 6, 2020  
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If you have any questions regarding this response, please contact me at 313-845-3217.

Sincerely,

/s/ James E. Earl

James E. Earl  
Environmental Affairs Manager  
AK Steel Dearborn Works

enclosures

Cc: Michael Long – Cleveland-Cliffs Inc.





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January 26, 2021

**VIA ELECTRONIC MAIL**

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Environment, Nat. Res. and Agriculture Division  
P.O. Box 30755  
Lansing, MI 48909

RE: AK Steel Corporation – Dearborn Works  
Response to Violation Notice dated January 5, 2021

Dear Neil:

I am writing on behalf of AK Steel Corporation in response to EGLE's Violation Notice dated January 5, 2021, issued to the Dearborn Works. Concurrent with the submission of this letter to you, AK Steel is providing a copy to Mss. Camilleri and Koster as instructed by the Violation Notice.

The Violation Notice alleges noncompliance with the Basic Oxygen Furnace (BOF) Electrostatic Precipitator (ESP) 6-minute average state opacity standard and alleges improper operation of the ESP. These allegations are premised entirely on Continuous Opacity Monitoring System (COMS) data reported pursuant to the 2015 Consent Decree. The Violation Notice also alleges noncompliance with the Renewable Operating Permit (ROP) reporting requirements for the failure to properly report, again based on the COMS data.

This is now the third successive Violation Notice issued by EGLE premised entirely on AK Steel's quarterly Consent Decree COMS data report. As with each prior Violation Notice, AK Steel continues to assert that these facts do not form the basis for noncompliance. In that regard, in order to avoid an infinite loop of EGLE Violation Notices every quarter alleging noncompliance followed by AK Steel responses disputing noncompliance, it seems that a meeting to resolve this disagreement is advisable.

AK Steel believes that such a meeting should include non-legal representatives. The goal of the technical meeting would be to determine if there are additional Method 9 opacity monitoring terms that can be included in the upcoming renewal of the Dearborn Works ROP to address EGLE's concerns on opacity compliance at the BOF ESP. If so, then that ideally will negate EGLE's current approach of pursuing allegations of noncompliance of the state opacity standard based on the COMS. AK Steel is agreeable to using the COMS as a diagnostic, trouble-shooting

tool (as it currently does under its Operation and Maintenance Plan and pursuant to the Integrated Iron and Steel NESHAP). It is just not appropriate to use the COMS for legal *compliance* with the state opacity standard.

In addition, any concerns regarding the sufficiency of the ESP are already being addressed with AK Steel's construction of a complete rebuild of the ESP. AK Steel intends to commence installation of structural steel for the new compartment likely yet this week. The project continues to move forward. Therefore, it seems as though this issue can be fully resolved through an agreement on some additional permit terms.

In advance of such a meeting, however, AK Steel believes it is warranted to provide a comprehensive response to EGLE's Violation Notice. Some of this information has been provided to EGLE in prior Violation Notice responses. However, it is being compiled here so that EGLE can fully understand the breadth of AK Steel's legal, regulatory and technical argument against the Violation Notice.

#### **A. Alleged Opacity Noncompliance.**

The primary allegation of noncompliance in the Violation Notice involves the regulatory and ROP opacity requirement for the BOF ESP stack. Background on the standards at issue and a chronology of how and why opacity has been measured at the BOF ESP is pertinent to establish the basis of AK Steel's objections to this Violation Notice.

##### **1. Regulatory and Renewable Operating Permit Requirements for Opacity from the BOF ESP Stack.**

The BOF ESP stack is subject to two independent, separate opacity standards. The first standard is the state opacity limit, which subjects a source to a "6-minute average of 20% opacity, except for 1 6-minute average per hour of not more than 27% opacity." R 336.1301(1); ROP Section 1, General Condition 11. AK Steel is required to conduct Method 9 visible emissions readings of the BOF ESP stack once per week. ROP EUBOF, Section VI.3. It is this state 6-minute average opacity standard that is the subject of the Violation Notice.

The second opacity standard is from the NESHAP for Integrated Iron and Steel Manufacturing Facilities, which requires a source to maintain "hourly average of opacity of emissions exiting the control device at or below 10 percent." 40 C.F.R. § 7790(b)(3). If this standard is exceeded, it is not an immediate violation, but instead a trigger to corrective action. 40 CFR § 63.7833(e). The regulations provide that the source must install, operate and maintain a COMS to monitor the hourly average opacity of emissions. 40 C.F.R. § 63.7830(d). The COMS is required to complete one cycle of data recording for every 15-second period and for each 6-minute period, and the data must be reduced to 6-minute averages, however this is simply to create the "building blocks" of data for the hourly average. This federal NESHAP standard is not a subject of the Violation Notice.

The Violation Notice also references the Consent Decree requirement to submit a quarterly report that includes each instance in which the 6-minute block average reading of the COM data for the ESP exceeds 20% opacity. Consent Decree, Paragraph 20. However, such instances are not considered noncompliance under the Consent Decree. They are only required for purposes of identifying root causes, corrective actions and preventative actions.

In that regard, note that EGLE has mischaracterized this third-quarter 2020 COMS data in the Violation Notice. EGLE states that the COMS quarterly report identified 29 exceedances. The correct number from that report, however, is 24 exceedances, taking into account the Michigan exemption for startup, shutdown and malfunction events pursuant to Mich. R. 336.1315 and Mich. R. 336.1316.

## **2. History of Reporting COMS 6-Minute Opacity Data for the BOF ESP.**

This disagreement over the correct manner in which to demonstrate compliance with the BOF ESP stack state 6-minute average opacity limit has a long-running history. The BOF ESP has maintained a COMS since the 1980s. However, the purposes for the COMS was for operational assessment of the BOF ESP. It was not for purposes of assessing compliance with the state 6-minute average opacity standard, and neither the state nor the county air agency ever issued a Violation Notice based on opacity measured by the COMS (until EGLE's recent actions).

In the early 2000s, U.S. EPA issued and then revised the NESHAP for Integrated Iron and Steel Manufacturing Facilities. The NESHAP required the use of a COMS for the BOF ESP. The regulation as revised required compliance with an hourly opacity average. At that point, Severstal (AK Steel's predecessor) did not assess 6-minute data generated by the COMS for purposes of comparison to the state 6-minute average opacity standard. Instead, Severstal determined compliance with the NESHAP opacity standard by assessing COMS data and determined compliance with the state opacity standard by assessing Method 9 data.

At some point after U.S. EPA promulgated the NESHAP standard, EGLE identified to Severstal that the U.S. Steel Great Lakes facility was assessing COMS data for purposes of compliance with the state 6-minute average opacity standard for its BOF ESP. EGLE stated that Severstal needed to do the same. Severstal acquiesced and began to assess COMS data for the state 6-minute average opacity standard and reported any deviations of the state standard pursuant to its ROP.

However, pursuant to a letter dated November 17, 2014, AK Steel informed EGLE that the BOF ESP COMS cannot be used to assess compliance with the state 6-minute average opacity standard. AK Steel provided a detailed legal analysis for its position. EGLE did not respond in writing to that letter.

Since that time, pursuant to the Consent Decree, AK Steel has reported numerous instances every quarter in which the 6-minute block average reading of the COMS data has exceeded 20% opacity. However, EGLE did not issue any Violation Notices for any of those previous instances

over the past nearly five years, until the Violation Notice issued in March 2020. AK Steel therefore assumed that EGLE was not using COMS data to assess compliance with the state 6-minute average opacity standard.

**3. Method 9, Not COMS, Is the Only Appropriate Methodology to Assess Compliance with the State 6-Minute Average Opacity Standard.**

In the Violation Notice, EGLE states that: “COMS measurements are a direct compliance method for opacity as allowed by R. 336.1303” and that “as such, the opacity exceedances as measured by the COMS represent violations ...” This is an incorrect statement as it relates to the state 6-minute average opacity standard at the Dearborn Works.

The requirement that is the subject of the Violation Notice is the state 6-minute average opacity standard. The standard is set forth in Rule 301. R. 336.1301(1)(a). Rule 301 identifies the numeric aspects of the opacity standard, and several exemptions.

Rule 303, titled “grading visible emissions,” then provides the methodology for determining compliance with the Rule 301 opacity standard. R. 336.1303. Rule 303 states, in its entirety, that: “the opacity of a visible emission shall be determined by a qualified observer and shall be certified in accordance with, and using the procedures specified in, reference method 9 or an alternative method approved by the department.” R. 336.1303.

Therefore, Rule 303 requires Method 9, or “an alternative method approved by the department.” While COMS may be considered an “alternate method” for measuring opacity for some facilities, it is not for the Dearborn Works. AK Steel has not sought approval from EGLE for an alternative method to measure opacity. And even if EGLE had the unilateral right to “approve” an alternate method on its own, AK Steel is unaware of any action taken by EGLE to approve such a method as COMS. Certainly, if EGLE had unilateral authority here, it would need to be pursuant to an appealable final action.

Likewise, Rule 303 is approved in the Michigan SIP. 57 Fed. Reg. 24752 (June 11, 1992). Thus, U.S. EPA has concurred that Method 9 is the appropriate means to identify compliance with the stack opacity standard. Furthermore, U.S. EPA has stated that when a state allows a source to measure its emissions by a test method other than what is identified in the SIP, “this substitution constitutes a revision to the SIP and must be submitted to U.S. EPA for review and approval.” 47 Fed. Reg. 41587 (September 21, 1982). There has been no such revision to the SIP to allow for the use of COMS as a reference method for opacity from a BOF ESP stack.

But to the extent there is any ambiguity here based on the regulation, the ROP provides the definitive answer. The ROP unequivocally states that compliance with the state 6-minute average opacity standard is pursuant to Method 9 monitoring.

Specifically, the Dearborn Works ROP is consistent with Rule 301 and Rule 303. The opacity standard is included in the ROP at Section 1, General Condition 11. It recites the numeric

opacity requirements from Rule 301 and then notes that “the grading of visible emissions shall be determined in accordance with Rule 303.”

The General Conditions do not contain specific monitoring requirements for the state 6-minute opacity standard. Emission Unit EUBOF, however, does contain opacity monitoring requirements based on Rule 301. Specifically, EUBOF, Section VI.3 requires that AK Steel perform a Method 9 visible emissions observation of the BOF ESP stack at least once every week for a minimum of one complete heat. This permit condition specifically cites Rule 301 as the underlying applicable requirement.

Based on this monitoring requirement, AK Steel conducts weekly Method 9 observations of the BOF ESP stack. AK Steel has demonstrated 100% compliance with the state 6-minute opacity requirement.

In the Violation Notice, EGLE also states that: “COMS measurements are a direct compliance method for opacity as allowed . . . in the Integrated Iron and Steel MACT” and that “as such, the opacity exceedances as measured by the COMS represent violations . . .” The use of the COMS for purposes of compliance with the Integrated Iron and Steel NESHAP opacity standard has no bearing on the methodology for compliance with the state 6-minute opacity standard. The sole regulatory purpose of the COMS is to demonstrate compliance with the NESHAP opacity standard. The NESHAP does not require maintaining or assessing 6-minute averages for compliance with a state standard or for any other purposes. And to the extent there was any question, the ROP again provides the definitive answer. Everywhere there is a permit condition associated with the COMS, the sole underlying applicable requirement is appropriately the NESHAP standard, not the state standard.

The fact that the ROP identifies Method 9 as the compliance methodology for the state 6-minute average opacity standard provides a legal bar from the use of another methodology based on the permit shield. The Michigan ROP permit shield regulation states the following:

each renewable operating permit shall include a permit shield provision stating that compliance with the conditions of the permit shall be considered compliance with any applicable requirements as of the date of permit issuance, if either of the following provisions is satisfied: (i) The applicable requirements are included and are specifically identified in the permit. . . .

R 336.1213(6)(a). This permit shield provision is restated in the ROP at Section 1, General Condition 26. U.S. EPA has stated that the purpose of the permit shield is to “give greater certainty to the regulated community” and provide that “unclear provisions or changes in interpretations will not affect a shielded source after a permit has been issued.” 56 Fed. Reg. 21744 (1991).

Since AK Steel’s ROP includes and specifically identifies the state opacity applicable requirements, compliance with the permit based on Method 9 is considered compliance with the

applicable requirement. Therefore, it is undeniable that the sole appropriate methodology for determining compliance with the state 6-minute opacity standard is Method 9. The COMS is not used for compliance with this state standard.

#### **4. Use of “Credible Evidence” Is Not Available in Michigan.**

In the Violation Notice, EGLE states that “at a minimum, COMS opacity exceedances represent credible evidence.” This is incorrect. Credible evidence is not a Clean Air Act catch-all that applies everywhere. It is a specific (disputed) regulatory provision that has no applicability unless it is formally adopted. And EGLE has not adopted it.

In 1997, U.S. EPA promulgated the credible evidence rule. 62 Fed. Reg. 8314 (February 24, 1997). The purpose of the rule was to clarify what types of evidence agencies and citizens could rely upon in bringing enforcement actions. However, U.S. EPA stated that the rule merely addresses an evidentiary issue and that the rule would not affect the stringency of underlying emission standards by amending the nature of the compliance obligation.

The credible evidence rule was incorporated into several Clean Air Act regulations. Primarily, the concept of credible evidence was added to the federal regulation that identifies how the federal government will enforce standards that are part of a state’s State Implementation Plan (SIP). 40 C.F.R. § 52.12(c). In addition to this regulation on federal enforcement, and of importance here, U.S. EPA included a separate provision in its credible evidence rulemaking requiring each state to adopt through the SIP process its own credible evidence rule. 40 C.F.R. § 51.212(c). This regulation states that each SIP “must provide” for credible evidence.

Courts have held that credible evidence cannot be used in a state until that state promulgates the credible evidence regulation in 40 C.F.R. § 51.212. *See, Sierra Club v. TVA*, 430 F.3d 1337 (11<sup>th</sup> Cir. 2005) (holding that only Method 9, and not COMS, could be used to determine compliance before Alabama adopted its own credible evidence rule through the SIP process) and *BP Amoco Chemical Co. v. Flint Hills Resources, LLC*, 615 F. Supp. 2d 765 (E.D. Ill. 2009) (following *Sierra Club v. TVA* and holding that the credible evidence rule applies only for purposes of federal enforcement and that it was unavailable to enforce provisions in a SIP until the state adopted its own credible evidence rule).

However, it does not appear that EGLE has adopted into its SIP the credible evidence requirements of 40 C.F.R. 51.212. In addition, nowhere in the ROP is there a term requiring the assessment of credible evidence. Therefore, EGLE does not have a credible evidence provision it can rely on in this circumstance.

Note that AK Steel is aware of MCL § 324.5532 that sets forth factors to be considered in determining the amount of a penalty. One such factor is “[t]he duration of the violation as established by any credible evidence, including evidence other than the applicable test method.” This provision replicates the penalty criteria in the Clean Air Act at Section 113(e)(1). This provision, however, allows for the use of credible evidence only to establish the *duration* of a



violation. This is an entirely separate issue than the use of credible evidence to establish the violation itself, as EGLE purports to do in the Violation Notice.

**5. Even If the Use of Credible Evidence Was Available to EGLE, Use of COMS Is Not Credible Evidence of a Method 9 Standard.**

Even if AK Steel's compliance with the state 6-minute average opacity standard was subject to credible evidence, use of COMS data in place of Method 9 is not, in fact, credible evidence. This is because the opacity standard at issue was not promulgated as a continuous standard.

It is important to understand that an emission standard consists of three interconnected elements: (1) the numerical limit; (2) the averaging time; and (3) the compliance demonstration method or measurement. An adjustment to any of these elements will affect the stringency of the limit. A test method is an integral part of the standard itself and the test method should not be changed without a full evaluation of the impact such a change might have on the standard.

Changing the compliance demonstration method from a periodic measurement to a continuous measurement significantly increases the stringency of the limit beyond what was contemplated when the limit was established. Quite simply, a 6-minute average standard based on the use of COMS is significantly more stringent than a 6-minute average standard based on Method 9 observations.

Per the D.C. Circuit, changing the method of measuring compliance with an emission limitation can affect the stringency of the limitation itself. *See, Appalachian Power Company v. EPA*, 208 F.3d 1015, 1027 (D.C. Cir. 2000); *Portland Cement Association v. Ruckelshaus*, 486 F.2d 375, 396-97 (D.C. Cir.1973). In *National Parks Conservation Assoc. v. TVA*, a federal court concurred with the above D.C. Circuit decisions, and held that "obviously, monitoring the smokestack emissions continuously with equipment capable of reliably measuring the opacity will identify many more exceedances than will be identified by an operator 'eyeballing' the smokestack emissions once a day or less." 175 F.Supp.2d 1071 (E.D. Tn. 2002).

In addition to the above courts weighing in on the conceptual nature of credible evidence, this exact issue on COMS versus Method 9 has been litigated and decided by a federal District Court. In a decision dated January 14, 2014, the District Court for the Northern District of West Virginia held that use of COMS data in place of Method 9 data for assessing an opacity standard is improper and beyond the scope of the credible evidence rule. *United States v. Mountain State Carbon, LLC*, 2014 WL 131065, (N.D. W.Va. Jan. 14, 2014).

In that case, U.S. EPA alleged that emissions from Mountain State Carbon's (MSC) coke battery combustion stack were in noncompliance with the state-based opacity standard based on COMS data, even though the state-based opacity limit required the use of Method 9 to determine compliance. U.S. EPA referenced the credible evidence provision included in West Virginia's

regulation and in MSC's Title V permit. U.S. EPA concluded that these provisions allowed the use of COMS data to assess noncompliance with the opacity standard.

The Court, however, disagreed. The court concluded that use of COMS was more stringent than use of Method 9 due to the continuous nature of the COMS, which is in conflict with U.S. EPA's preamble statements that the credible evidence rule was not intended to make limits more stringent. Specifically, the court concluded that "using COMS as 'credible evidence,' therefore, would affect the stringency of underlying emission standards by amending the nature of the compliance obligation."

As noted above, EGLE has not incorporated the credible evidence rule into its SIP or its permits. That forecloses any use of the concept. However, even if EGLE did have a credible evidence rule, the MSC court decision is entirely on point and excludes the use of COMS in place of Method 9 for the purposes of demonstrating compliance with the state 6-minute average opacity standard.

**6. U.S. EPA Has Concluded that it is Technically Unreasonable to Require Compliance with a 6-Minute Average Opacity as Measured by COMS for a BOF ESP.**

Rulemaking for the Integrated Iron and Steel NESHAP provides further reasons why it is technically inappropriate to rely upon the COMS for purposes of assessing compliance with the state 6-minute average opacity standard. Specifically, U.S. EPA has concurred that it is inappropriate to assess proper operation and maintenance of a BOF ESP based on compliance with a 6-minute average opacity standard measured by a COMS.

In the initial Integrated Iron and Steel NESHAP rulemaking, U.S. EPA included a provision for establishing an opacity limit for BOF ESPs based upon the 99% confidence limit of 6-minute average COMS measurements during a performance test. 68 Fed. Reg. 27646 (May 20, 2003). Industry petitioned U.S. EPA on this standard, noting that such short-term opacity limit was unattainable. Industry provided two primary arguments to support its position.

First, industry noted that moisture in the BOF ESP gas stream interferes with the COMS ability to accurately provide short term readings. As a result, COMS often provide false high opacities when corresponding visible emissions reading using Method 9 demonstrate much lower opacity levels. Industry provided data sets from COMS monitoring that demonstrated frequent opacity readings well above actual opacities measured by Method 9. (*See*, American Iron and Steel Institute's comments dated October 11, 2001 to the proposed rule). Similar interference from water vapor had been identified in wet scrubber installations, which do not utilize COMS because of the inaccurate and erroneously high readings. COMS are just simply not suitable in certain circumstances.

Second, industry noted that COMS have a known level of error that can impact compliance with a short-term, low opacity limitation. This is due to COMS inherent error bands at low

opacities. As a result, COMs often express baseline opacities readings at several percent even when processes are not operating, and opacities should be zero. For these reasons, industry concluded that COMs were inappropriate to determine compliance with an opacity limitation where little margin of error is permitted due to a low opacity limit averaged over a short period of time, coupled with the presence of water vapor in the gas stream.

U.S. EPA recognized these challenges and limitations of COMs, and instead of requiring an opacity limitation from these sources based on a short-term period, developed an hourly average opacity requirement. 71 Fed. Reg. 39579 (July 13, 2006). As such, U.S. EPA has expressly concluded that 6-minute averages as measured by a COMs is technically inappropriate for determining compliance with BOF ESP stack emissions. It is unreasonable for EGLE to now try and enforce use of the COMs on a 6-minute average when U.S. EPA has made this technical finding.

**7. There Is a Substantial Positive Bias in the BOF ESP COMs Data When Compared to Method 9 Data.**

AK Steel has undertaken a comparison of the past two years of Method 9 data and compared it to COMs data from the same time range. Consistent with U.S. EPA's findings above in conjunction with the Integrated Iron and Steel NESHAP rulemaking, it is apparent that a substantial positive bias in COMs data compared to Method 9 data at the Dearborn Works BOF ESP exists.

Specifically, AK Steel conducted a comparative analysis of ninety Method 9 observations conducted between January 2, 2019 and December 27, 2020 with the concurrent COMs data. The analysis revealed that the COMs overstated average opacity by an average factor of 4 and the highest 6-minute average opacity by an average factor of 2.2 when compared with the Method 9 observations. In addition, in three cases where the COMs identified an opacity exceedance, the corresponding Method 9 observation identified compliance.

Note also that the Method 9 observations used in this data comparison were obtained from four separate certified observers. That fact therefore negates any potential that a particular observer was biased in their observations.

This bias that AK Steel has identified between the COMs and Method 9 observations is not surprising. A 1996 study prepared for the Steel Manufacturer's Association identified a COMs measurement error of 7.5 percent opacity, based on the measurement deviations permitted by U.S. EPA's Performance Specification 1 (PS-1). And U.S. EPA's own studies have identified a 4% opacity error in COMs data. *See*, 65 Fed. Reg. 48914, 48917 (August 10, 2000).

This site-specific and broadly applicable technical assessment results in several conclusions:

- The COMs greatly overstates the average opacity when compared with Method 9.

- The COMS greatly overstates the highest 6-minute average opacity when compared with Method 9.
- The positive COMS bias is confirmed by multiple Method 9 observers.

For these reasons, use of the BOF ESP COMS data on a 6-minute basis cannot be used to establish noncompliance with the state 6-minute average opacity standard due to the substantial bias.

#### **8. Enforcement for Excess Opacity Is Improper When the Source is in Compliance with an Underlying Mass Emission Limit.**

As EGLE is aware, “opacity” is not a pollutant or an emission, but instead is the degree to which particulate emissions reduce the transmission of light and obscure the view of an object in the background. *See, e.g.*, 40 C.F.R. § 60.2. The primary purpose of opacity limits, therefore, is not to measure emissions, but to ensure that a plant is properly operating and maintaining the source. *See, e.g.* 42 Fed. Reg. 61,537 (December 5, 1977) (stating “the intended effect is to limit opacity of emissions in order to insure proper operation and maintenance of facilities subject to standards of performance.”).

EGLE concurs in this primary purpose of opacity limits. In guidance on the use of opacity limits, EGLE states that “in many cases, the opacity limit is included as a surrogate for, or as an indicator of compliance with, a particulate emission limit.” *Use of Visible Emission Limits Less than 20% Opacity in Permits to Install*, DEQ Air Quality Division Policy and Procedure, March 4, 2013.

As discussed in more detail below, the ESP is operating well below the BOF ESP particulate matter limits in the ROP (less than 50% of the particulate matter limit), and above its design specifications for controlling particulate matter. Thus, AK Steel has demonstrated compliance with the mass particulate matter limits by a wide margin of compliance. Therefore, continued pursuit of enforcement for opacity violations alone is not consistent with long-standing principles that opacity is only a surrogate for particulate matter compliance.

#### **9. Summary of AK Steel’s Position on Use of COMS in Place of Method 9 for the BOF ESP.**

Based on the above, AK Steel has provided substantial legal, regulatory and technical reasons why use of COMS data is inappropriate for determining compliance with the BOF ESP state 6-minute average opacity standard. In sum:

- Based on Michigan regulations and the Dearborn Works ROP including the permit shield, Method 9 is the only appropriate method for assessing compliance with the state 6-minute average opacity term, not COMS.
- Credible evidence is not available in Michigan as it has not been incorporated into the Michigan SIP. But even if it was available, based on applicable court decisions, COMS is

not credible evidence of a Method 9 opacity standard as use of COMS increases the stringency of the limit.

- U.S. EPA has concluded that short-term opacity limits such as 6-minute averages as measured by COMS are technically inappropriate for BOF ESPs due to steam interference from the ESP and due to inherent errors in COMS at low opacities. AK Steel has substantiated these problems and has identified a positive bias in COMS readings compared to Method 9 at the Dearborn Works.
- Opacity is merely a surrogate for particulate matter, and since AK Steel is in substantial compliance with the particulate matter limit at the BOF ESP, EGLE should not bring enforcement for alleged opacity noncompliance.

For all of these reasons, AK Steel objects to EGLE's opacity violation allegations in the Violation Notice.

#### **B. Alleged ESP Operation Noncompliance.**

The Violation Notice alleges that the ESP is not "installed and operating properly" and is not "installed, maintained and operated in a satisfactory manner" in accordance with EUBOF Standard Condition IV.1 and R. 336.1910. EGLE's basis for such allegation is solely the alleged COMS opacity exceedances. AK Steel disagrees with EGLE's assertions regarding the operation of the ESP.

As discussed in detail above, AK Steel disagrees with EGLE's allegation that there has been any noncompliance with the BOF ESP opacity emissions limit. Therefore, such alleged noncompliance cannot form the basis for alleged noncompliance with the operational requirements cited in the Violation Notice.

Importantly, however, as explained in detail in a letter to EGLE dated May 15, 2020, AK Steel has fully assessed the ESP, including: (1) reviewing ESP inspection reports and operation and maintenance records; (2) assessing the ESP design efficiency and power levels; (3) evaluating ESP tested performance; and (4) evaluating ESP compliance data. Based on this rigorous assessment, AK Steel has concluded that the ESP is operating properly and is in compliance with Rule 910. A summary of that information included in the prior correspondence follows.

#### **1. Inspection Reports and Operation and Maintenance Records Support the Proper Operation of the ESP.**

A thorough inspection of the ESP is conducted annually in accordance with the 2015 Consent Decree. The inspection requires a "detailed and thorough evaluation of the ESP Chambers 1-8, the rapper system and off-gas conditioning system" with recommendations for repair or improvement of operation. The types of repairs identified in the inspection report are routine, not unique to the ESP at AK Steel, and are common for all ESPs across this process application and other ESP applications.

In addition, AK Steel employs an Operation and Maintenance plan which monitors transformer power (KV, ma), and requires routine inspections of components on a daily, weekly, quarterly and annual frequency. Most of the O&M inspection findings are routine and are addressed promptly. This includes, among other items, structural repairs where defects have developed, replacement of defective rappers, trimming and realignment of collecting plates, repair of straightening vanes, and cleanup of material build-up. These types of repairs are common for all ESPs installed across this process application.

AK Steel's annual third-party ESP inspection reports indicate that the ESP is properly maintained and operated. Specifically, the most recent annual Inspection Report – BOF Electrostatic Precipitator Chambers 1-8 (ESP Inspection Report), dated October 21, 2020, and submitted to the government on December 2, 2020, is a very detailed report that includes numerous technical maintenance recommendations. The report does include some general conclusions. Most importantly, the report concludes that “[o]verall, the inspection found the BOF precipitator to be in reasonably good operating condition.” *Inspection Report*, page 2.

## **2. Particulate Matter Design Efficiency and Corona Power Indicates Proper Operation and Maintenance of the ESP.**

ESP efficiency is controlled by the ability to charge and move particles to the collection plate by the processes of particle migration in an electric field. The theory and practice of ESP operation was well developed at the time of the installation of this ESP and the design reflects state of the art design parameters for a high particulate removal efficiency (*i.e.* 99.2%). As designed, the collection plate area per treated gas volume (*i.e.* specific collection area) was 295 ft<sup>2</sup>/1000 acfm and the velocity through the unit was 3.57 ft/sec at the design gas flow of 1,030,000 acfm. These parameters are used to size an ESP and determine the potential particle removal efficiency. A recent measurement of the gas volume during a typical BOF blow cycle was calculated to be 723,600 acfm. Based on this measurement, the specific collection area was calculated as 417 ft<sup>2</sup>/1000 acfm with a velocity of 2.53 ft/sec. At these conditions the capture efficiency, when compared to design, results in a higher removal efficiency and lower mass emission rate.

Removal efficiency is also determined by electrical energy consumed by the ESP. This is defined as corona power (*i.e.* secondary power) expressed as watts per 1000 acfm of gas volume. This is another key predictive indicator of overall particulate removal efficiency and the removal efficiency is asymptotic to 100% as the value increases. An examination of ESP corona power during a test run showed power levels during the oxygen blowing portion that were sufficiently high to provide the required capture efficiency to achieve compliance with the particulate permit limit. Specific corona power for the run averaged 438 watts/1000 acfm and was 999 watts/1000 acfm during oxygen blowing where the vast majority of particulate loading for a heat occurs. In fact, when corona power reaches 200 watts/1000 acfm (or higher), the ESP is approaching optimal efficiency and performance. Corona power is expected to be high during blow periods when gas temperature and gas moisture are optimal to achieve high particulate removal efficiency.

This assessment of design efficiency data and corona power levels results in the conclusion that optimal ESP particulate matter removal efficiency is fully demonstrated. Simply stated, the ESP is operating as designed.

### **3. Stack Testing Performance Data and Proper-Methodology Opacity Data Indicates Proper Operation and Maintenance of the ESP.**

In order to perform a thorough statistical analysis on ESP particulate emissions, AK Steel compiled a summary of 50 stack testing sample runs from both performance testing and in-house engineering testing between 2012 and 2020. The performance of the existing ESP can be seen from an examination of the particulate matter stack testing results which averaged 17.86 lb/hr and 0.0041 gr/dscf over 50 test runs. The ESP has thus demonstrated continuous compliance with the permitted particulate matter limit of 62.6 lb/hr (less than 50% of the particulate matter limit), and 0.0152 gr/dscf.

In addition, the ESP design specifications called for a particulate removal efficiency of 99.2%. AK Steel calculated particulate removal efficiencies of 99.86% for 2012 to 2016 and 99.79% for 2019 to 2020. In both data sets, the ESP greatly exceeded its design specifications.

Likewise, it is important to note that the Dearborn Works has not had any deviations of the state 6-minute opacity limit based on Method 9 observations (the approved method for reading opacity) from the BOF ESP stack. And, the Dearborn Works has not had any deviations of the NESHAP hourly opacity standard for the BOF ESP stack.

Finally, use of the COMS as a diagnostic tool continues to demonstrate high performance for the ESP. For the fourth quarter of 2020, AK Steel measured only four opacity events, considering the Rule 301 exemption and the Rules 315 and 316 startup, shutdown and malfunction provisions. This equates to 99.98% of the time without an opacity event.

### **4. Summary of AK Steel's Position on the Proper Operation of the BOF ESP.**

Since AK Steel is in compliance with the state 6-minute average opacity standard based on the proper methodology, EGLE's Violation Notice claiming noncompliance with the requirements to properly operate the ESP is not substantiated. However, even if the opacity events were in fact considered noncompliance, AK Steel has provided substantial technical evidence that the BOF ESP is operating properly based on O&M records, design efficiency assessments, corona power analyses, and evaluation of stack test data.

Notwithstanding the fact that the ESP is operating properly, the practical, useful life of the ESP is often determined by evaluating ongoing costs to maintain the unit as compared to costs to replace or rebuild the unit. At this point in time the repair cost is high enough that AK Steel is rebuilding the ESP. The decision to rebuild the ESP therefore has no bearing on EGLE's allegation that the ESP is not operating properly.

For all of these reasons, AK Steel disagrees with EGLE's assertion that the Company is not properly operating and maintaining the ESP.

**C. Alleged ROP Reporting Noncompliance.**

The Violation Notice alleges that AK Steel failed to properly report the alleged opacity exceedances in the ROP semi-annual deviation reports and the annual compliance certifications. AK Steel disagrees with EGLE's assertions regarding the company's ROP reporting obligations.

As discussed in detail above, AK Steel disagrees with EGLE's assertion that there has been any noncompliance with the BOF ESP opacity emissions limit. Therefore, such alleged noncompliance cannot form the basis for alleged noncompliance with the ROP reporting requirements cited in the Violation Notice.

However, in the Violation Notice, EGLE states that AK Steel is required to assess "other material information" in certifying compliance with its semiannual and annual reporting obligations. And EGLE has asserted that the COMS data constitutes "other material information."

Initially, it is important to note that it is questionable whether the "other material information" terms apply in Michigan. As referenced by EGLE, the federal Title V permit regulations include the following "other material information" requirement as it relates to the contents of the annual certification: "[i]f necessary, the owner or operator also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the Act, which prohibits knowingly making a false certification or omitting material information." 40 C.F.R. § 70.6(c)(5)(iii)(B). This provision, however, does not appear in Michigan's ROP regulations, thus it would seem to not apply to sources in Michigan due to EGLE having an approved Title V program. 66 Fed. Reg. 62949 (December 4, 2001).

This lack of an "other material information" requirement in Michigan's ROP regulations is consistent with EGLE's annual compliance certification reporting form. The annual compliance certification from specifies demonstrating compliance based on "the methods specified in the ROP." As noted above, the method specified in the ROP for the state 6-minute average opacity standard is Method 9, not COMS.

Legal applicability arguments aside, even if the "other material information" regulation applies to the Dearborn Works, it nonetheless has a limited scope. The "other material information" regulatory term was added to the Title V regulations in 2014. 79 Fed. Reg. 43661 (July 28, 2014). The final regulation preamble includes commentary by U.S. EPA identifying what the agency believes must be considered in the Title V compliance certification. In the preamble, U.S. EPA typically equates the scope of "other material information" to the scope of "credible evidence," at times duplicating numerous statements from prior credible evidence rulemaking.



Therefore, it is most appropriate to equate “other material information” with “credible evidence.” As discussed extensively above, AK Steel asserts that COMS data is not credible evidence for compliance with the state 6-minute average opacity standard. Therefore, it likewise does not serve as “other material information” for purposes of ROP reporting, if there even is such a requirement.

Furthermore, even setting aside all of these legal and regulatory arguments, AK Steel has conclusively demonstrated that at the Dearborn Works there is a substantial positive bias with COMS data compared to Method 9 observations. This conclusion alone demonstrates that COMS data is not appropriate “other material information” for Method 9 opacity standards for the Dearborn Works BOF ESP.

**D. Requested Response to Violation Notice.**

Regarding the request in the Violation Notice to provide written responses to certain categories of information (*e.g.*, the dates of violation, explanation of the causes, etc.), AK Steel believes the statements in the Violation Notice do not constitute violations. Therefore, as offered by the Violation Notice, this response instead provides the legal, regulatory, and factual information to explain AK Steel’s position that the statements in the Violation Notice do not constitute violations of the applicable legal requirements.

**E. Next Steps.**

Due to the apparent likelihood of continuing Violation Notices from EGLE for alleged violations of the state 6-minute average opacity standard based on COMS data, and AK Steel’s disagreement, it seems that a meeting between the parties would be beneficial. This is especially pertinent due to the need to resolve these Violation Notices in the Consent Decree Modification that the parties are currently negotiating.

This issue is also pertinent due to the Dearborn Works’ pending ROP renewal application. While AK Steel will agree in the ROP renewal to additional Method 9 observations of the BOF ESP stack beyond what it currently completes, the company will not agree to an imposition of the COMS as a methodology for the state 6-minute average opacity standard. It therefore seems sensible to determine if the parties can resolve their differences at this time.

Neil D. Gordon, Esq.  
January 26, 2021  
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In that regard, AK Steel will follow-up in the near term to schedule a date for a conference call with EGLE. In the meantime, if you have any questions regarding this response, please contact me.

Sincerely,

FROST BROWN TODD LLC



Steven M. Wesloh

cc: David Cartella, Cleveland-Cliffs, Inc.  
Michael Long, Cleveland-Cliffs, Inc.  
James Earl, AK Steel Corporation

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CLEVELAND-CLIFFS INC.  
Cleveland-Cliffs Steel Corporation  
Dearborn Works  
4001 Miller Road, Dearborn, MI 48120  
P 313 317 8900 clevelandcliffs.com

April 29, 2022

Via E-Mail

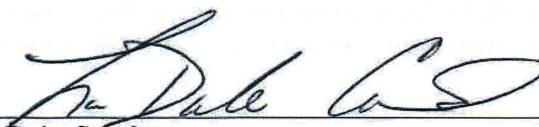
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Neil Gordon, EGLE (Gordonn1@michigan.gov)  
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April Wendling, EGLE (wendlinga@michigan.gov)

Subject: Cleveland-Cliffs Steel Corporation Dearborn Works – Civil Action No. 15-cv-11804  
DJ # 90-5-2-1-10702

In accordance with the Consent Decree in the above-referenced action, attached is the Paragraph 20 report regarding review of Continuous Opacity Monitoring (COM) data for the first quarter of 2022.

If you have any questions regarding this report, please contact Jim Earl at 313-845-3217.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
\_\_\_\_\_  
LaDale Combs  
General Manager, Dearborn Works

### 1st Quarter 2022 Data Overview

During the first quarter of 2022, Cleveland-Cliffs Steel Corporation experienced 260 events (excluding steam events and calibration/maintenance) on which the 6-minute opacity block average exceeded 20%. This represents 1.12% of the number of 6-minute periods in the quarter. The breakdown of opacity events per month showed that January, February, and March experienced 157, 63, and 40 opacity events greater than 20%, respectively. Of these 260 events, 57 occurred in which overlapping method 9 observations were less than 20% for the 6-minute block average. After removing these 57 events and incorporating all of the Michigan regulatory exemptions identified below, the BOF ESP was achieving conformance to the opacity benchmark 99.73% of the time (with 59 non-exempt, non-SSM events). A general breakdown of these alarms is provided below and in Table 1. A more detailed breakdown is provided in the attached report.

**Table 1: Cleveland Cliffs Steel Corporation Dearborn Works – 1<sup>st</sup> Quarter 2022 Summary**

Total 6-Minute Events excluding steam events and calibration / maintenance	260
Total 6-Minute Events in which concurrent Method 9 observations were less than 20%	57
Total 6-Minute Events excluding steam events, calibration / maintenance, and concurrent Method 9 observations less than 20%	203
6-Minute Events Exempt pursuant to 336.1301(1)(a)	136
Percentage of Events Exempt pursuant to 336.1301(1)(a)	67%
6-Minute Events Not Exempt pursuant to 336.1301(1)(a) Attributed to Startup/Shutdown or Delays	8
Number of Events Exempted, attributed to Startup/Shutdown or Delays, or concurrent Method 9 observations were less than 20%	59
Percentage of Events Exempted, attributed to Startup/Shutdown or Delays, or concurrent Method 9 observations were less than 20%	77%
Percentage of Reporting Period with no 20% 6-minute periods	99.06%
Percentage of Reporting Period less Startup/Shutdown or Delays and exemptions pursuant to 336.1301(1)(a)	99.73%

Due to EGLE’s recent characterization of these reported COMS events as alleged opacity exceedances, Cleveland-Cliffs believes it is important to identify exemptions that otherwise would be applicable if the SIP or ROP defined COM as the method to determine compliance. This involves excluding SSM and other exemptions allowed under 336.1301(1)(a). We also believe that presenting the data in this manner better characterizes the performance of the ESP.

As mentioned in previous correspondence, Cleveland-Cliffs believes that the COMS overstates opacity as compared to method 9 and that this bias is particularly high during cold weather periods. It is also believed that some of the older portions of the ESP are allowing an increased amount of air infiltration on the clean side of the ESP which further contributes to false high readings at the COMS monitor location. As stated in previous reports, Cleveland-Cliffs has been performing a minimum of three 2-heat method 9 observations per week for over a year now. During the period when the opacity alarms were occurring at their highest rate of the quarter (January 25 – February 25), a conscientious effort was made to increase the amount of readings being performed. Whereas approximately 7-9 hours of method 9 observations was being conducted during a typical week, 17-26 hours per week of method 9 observations were conducted during this time frame. 46 of the 57 6-minute opacity alarms that overlapped with method 9 observations during the quarter occurred during this period. No method 9 exceedances occurred during the quarter. While it is impossible to conduct method 9 observations during all periods of COMS alarms, Cleveland-Cliffs believes that based on the frequency of readings conducted and the comparison to COMS data during the overlapping periods, it is reasonable to conclude that the COMS alarms that occur that do not overlap with Method 9

data have a similarly high bias and that overall ESP performance is better than one might conclude when just looking at the COMS data on its own.

Some of the reportable opacity events for this reporting period are exempt or occurred during startup, shutdown or malfunction (“SSM”) circumstances. Approximately 67% of the reported opacity alarms (or 136 events out of 203 total events) would be exempted under Mich. R. 336.1301(1) but are required to be reported under the Consent Decree’s more conservative language. Opacity events that occur during SSM events are subject to enforcement discretion under Michigan law. Specifically, Mich. R. 336.1915 provides for enforcement discretion when exceedances result from malfunctions, start-up, or shutdown. During this reporting period we have included 8 alarms, or 12% of the otherwise non-exempt total that were attributed to either startups, shutdowns, or abnormal downtime in BOF operation. Alarms of this type have been documented in previous reports and are primarily due to the inherent nature of the ESP design whereby the ESP is less efficient when the off gas conditions (temperature and moisture) are below optimal design parameters due to process SSM/delays. After incorporating the Mich. R. 336.1301(1) exemption and accounting for SSM events, the BOF ESP was achieving conformance to the opacity benchmark 99.73% of the time (with 59 non-exempt, non-SSM events).

As Cleveland-Cliffs has identified in prior reports, the Company is implementing a project to rebuild and expand the capacity of the ESP. A new casing was completed in the second quarter of 2021. An additional casing that housed compartments 1 and 2 has been rebuilt and was commissioned on November 30. Currently, work is progressing on the replacement of the ESP casing that housed compartments 3 and 4. It is anticipated that this casing will be completed and commissioned by May 31, 2022.

ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

Cleveland-Cliffs initiated a program of more frequent method 9 readings on the ESP starting February 10, 2021. Whereas the ROP requires weekly method 9 readings for 1 heat, Cleveland-Cliffs has been performing a minimum of three 2-heat method 9 observations per week since the program was initiated. In addition, attempts have been made to conduct method 9 observations during periods when the ESP was experiencing higher than normal alarm activity. The cases below are all cases where the COMS was greater than 20% opacity but the concurrent Method 9 observation was less than 20% opacity.

Date / Time	6-Min Avg Opacity (Measured by COMS)	6-Min Avg Opacity (Measured by Method 9)	Attachments
1/6/22 12:42 PM	26.9	0.0	Refer to attachments 1 through 3 for Method 9 6-minute average calculations, observer method 9 certificates, and the method 9 field data sheets.
1/19/22 1:24 PM	20.9	11.5	
1/19/22 3:30 PM	22.5	0.0	
1/19/22 3:36 PM	20.9	0.0	
1/26/22 1:24 PM	21.5	0.0	
1/26/22 3:12 PM	26.9	0.0	
1/27/22 11:06 AM	24.6	0.0	
1/27/22 11:42 AM	21.0	0.0	
1/27/22 11:48 AM	22.1	0.0	
1/27/22 11:54 AM	21.0	0.0	
1/27/22 1:30 PM	22.4	0.0	
1/27/22 1:36 PM	20.6	0.0	
1/27/22 1:42 PM	21.9	0.0	
1/27/22 2:30 PM	21.3	0.0	
1/27/22 4:00 PM	22.5	0.0	
1/27/22 4:06 PM	21.3	0.0	
1/27/22 4:30 PM	20.6	0.0	
1/28/22 8:48 AM	22.3	0.0	
1/28/22 9:24 AM	21.0	0.0	
1/28/22 9:30 AM	22.0	0.0	
1/28/22 1:42 PM	20.9	0.0	
1/31/22 9:18 AM	22.4	0.0	
1/31/22 9:24 AM	22.4	1.3	
1/31/22 10:06 AM	21.1	0.0	
1/31/22 10:12 AM	26.4	0.0	
1/31/22 10:18 AM	23.7	1.7	
1/31/22 2:30 PM	27.4	0.0	
1/31/22 3:18 PM	22.7	0.0	
1/31/22 4:18 PM	21.8	0.0	
2/2/22 11:18 AM	28.4	0.0	
2/2/22 12:12 PM	21.1	0.0	
2/4/22 11:54 AM	20.9	0.0	
2/4/22 2:48 PM	20.6	0.0	
2/7/22 8:48 AM	20.8	0.0	
2/7/22 4:24 PM	22.3	0.0	
2/11/22 9:12 AM	23.0	0.0	
2/11/22 12:18 PM	20.7	0.0	
2/15/22 10:48 AM	20.8	3.54	
2/15/22 3:00 PM	21.7	5.63	
2/16/22 11:48 AM	23.6	0.0	



**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

The following instances were due either to low power levels on certain fields during the heat or to a field tripping out either during or just prior to a heat. When low power levels on certain fields persist towards the end of a heat, power-off rapping is performed on those fields once the heat is completed. If a C, D, or E field trips out, the field can usually be sectionalized and one of the C, D, or E fields can usually be returned to service. Adjustments to compartment outlet dampers can be made if needed to direct flow away from areas of the ESP that have fields offline.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/19/22 5:48 AM	25.4	Fields 5A, 7A, 8A, 7-8C, 501, and 502 all experienced low power levels towards the end of the heat.	N/A	Power off rapping was performed on fields 5A-8A and 7-8C after the completion of the heat.
2/12/22 5:24 PM	20.9	Field 7-8E and compartment 6 were out of service. Field 7A experienced low power levels during the 2nd half of the heat.	N/A	Power off rapping was performed on field 7A after the completion of the heat.
2/13/22 5:54 AM	40.8	Field 7-8E and compartment 6 were out of service. Manual rapping was performed on Field 7A during the previous heat. The operator failed to turn 7A back on prior to the heat. Field 7-8C experienced low power levels for the majority of the heat due to the excess loading from Field 7A being off.	N/A	Power off rapping was performed on fields 5A, 7A, 8A, and 7-8C after the completion of the heat. BOF maintenance supervision talked to the operator after his shift concluded to stress the importance of having power off rapping completed and having all possible fields back in service before oxygen blowing begins.
2/13/22 6:00 AM	59.0			
2/14/22 7:00 PM	25.2	Field 7-8E and compartment 6 were out of service. Field 7A experienced low power levels during the second half of the heat.	N/A	Power off rapping was performed on fields 5A and 7A after the completion of the heat.
2/14/22 7:54 PM	25.2	Field 7-8E and compartment 6 were out of service. Field 7A experienced low power levels during the last two thirds of the heat.	N/A	Power off rapping was performed on field 7A after the completion of the heat.
2/15/22 9:00 AM	22.2	Field 7-8E and compartment 6 were out of service. Field 7A experienced low power levels during the second half of the heat.	N/A	Power off rapping was performed on field 7A and 7-8C after the completion of the heat.
2/18/22 11:42 PM	31.5	Field 7-8E and compartment 6 were out of service. Manual rapping was performed on Field 7A during the previous heat. The operator failed to turn 7A back on prior to the heat. Field 7-8C experienced low power levels for the majority of the heat due to the excess loading from Field 7A being off.	N/A	The operator in question was the same operator that made a similar error on 2/13 for the 5:54 and 6:00 alarms. The operator was suspended from work for a period of time.
2/18/22 11:48 PM	31.1			



ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

The following instances occurred either during a startup or a shutdown of the BOF and ESP or during the startup or shutdown on an ESP ID Fan. Procedures for startup and shutdown are in place to minimize instances of elevated opacity. If a pattern of events leading to an elevated opacity is identified, a startup or shutdown procedure can be revised to minimize emissions.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
2/11/22 12:36 AM	22.3	An initial test was being conducted on the Primary louvers to verify functionality after the completion of an outage. The wye section was cleaned during the outage and it is believed that opening the primary louvers stirred up some loose dust.	N/A	No corrective action was taken. Opacity returned to normal levels after the one alarm.
2/25/22 12:48 PM	54.1	Alarms occurred when compartment 6 was returned to service after the completion of annual maintenance.	N/A	A review of the procedure for returning compartments to service was conducted and no procedural violations were identified. The decision was made to slow down the process for subsequent compartments during the annual review cycle by opening the compartment outlet louver less when placed into service and not being fully open until a heat had been observed.
2/25/22 12:54 AM	30.1		N/A	
2/26/22 4:12 PM	21.5	Alarms occurred when compartment 7 was taken out of service to start annual maintenance.	N/A	The compartment 7 outlet louver no longer has the ability to close. The compartment was isolated by inserting a slide gate just above the outlet louvers. This method lacks the control that is inherent with adjusting the louvers but it is the only way to isolate this compartment until it is rebuilt.
2/26/22 4:24 AM	29.1		N/A	
3/8/22 11:12 AM	25.4	The ESP was shutdown in preparation for a 72-hour outage. The shutdown procedure was not followed. The procedures required that all ID Fans be placed in manual mode prior to shutting any of the fan down. The fans were left in AUTO mode.	N/A	The shutdown procedure was revised to add further clarification on when the fans need to be placed in manual mode prior to shutting any of them down.
3/8/22 11:18 AM	85.6			
3/8/22 11:24 AM	54.5			
3/25/22 11:06 AM	41.2	The alarms occurred during the first heat following a 72-hour outage. The outlet louvers for ESP-5 were not opened which resulted in the rest of the ESP being overloaded.	N/A	The ESP startup procedure was modified to require verification that the new ESP outlet louvers are open prior to startup after an extended outage
3/25/22 11:12 AM	55.5			

**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022**

The following instances occurred following longer than normal periods of BOF downtime. When the BOF melting operations are resumed after an extended downtime period, opacity spikes are likely until steady state conditions are reached. Water sprays to condition the gas sample are triggered by temperature. The ESP is cold after a period of BOF downtime which results in additional condensation within the ESP when the sprays are activated. The ESP is typically reconditioned after one heat.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/4/22 3:00 AM	23.4	Approximately 1 hour 14 minutes of downtime occurred between heats. The ESP cooled which has an effect on gas conditioning. In addition, fields 106 and 107 were out of service and fields 7A and 5-6C experienced low power levels during the 2nd half of the heat.	N/A	Power off rapping was performed on fields 6A, 7A, and 5-6C after the completion of the heat.
1/4/22 8:18 AM	21.0	Approximately 56 minutes 58 seconds of downtime occurred between heats. The ESP cooled which has an effect on gas conditioning. In addition, fields 106 and 107 were out of service and field 5-6C experienced low power levels during the majority of the heat.	N/A	Power off rapping was performed on field 5-6C after the completion of the heat.
1/5/22 10:30 AM	21.5	Approximately 1 hour 36 minutes of downtime occurred between heats. The ESP cooled which has an effect on gas conditioning. In addition, fields 106 and 107 were out of service.	N/A	Power off rapping was performed on fields 5C-8C after the completion of the heat.
1/8/22 9:24 AM	20.9	Approximately 2 hours 49 minutes of downtime occurred between heats. The ESP cooled which has an effect on gas conditioning. In addition, fields 106 and 107 were out of service and field 7A experienced low power levels during the second half of the heat.	N/A	Power off rapping was performed on fields 5A-8A, 7-8C, and 7-8D after the completion of the heat.
2/25/22 12:12 AM	22.0	Approximately 1 hour 4 minutes of downtime occurred between heats. The ESP cooled which has an effect on gas conditioning. In addition, compartment 6 and field 7-8C were out of service.	N/A	No corrective action was taken.
3/29/22 4:48 PM	21.5	Approximately 1 hour 30 minutes of downtime occurred between heats. Compartment 8 was out of service and the outlet louvers were closed on compartment 7. The ESP cooled which has an effect on gas conditioning.	N/A	Power off rapping was performed on fields 6A and 5-6C after the completion of the heat.
3/29/22 4:54 PM	27.9			

**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022**

For the following instances, either a root cause could not be identified or the root cause is different than what is discussed elsewhere.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/4/22 4:24 PM	20.9	One of the ESP ID Fans was taken out of service to perform patching. This effected the balancing through the compartments.	N/A	Outlet louver adjustments were made after the completion of the heat to balance the flow. The fan maintenance was completed later in the shift and the fan was returned to service.
1/5/22 7:36 AM	23.3	Fields 106,107, and 7-8C were out of service due to grounds.	N/A	ESP draft was reduced on 1/6 to lessen the load on the ESP and adjustments were made to several outlet louvers to redistribute flow.
1/5/22 11:24 AM	22.4			
1/6/22 4:48 PM	22.0			
1/12/22 11:30 AM	34.3	A motor drive for one of the new ESP compartment conveyers was being upgraded. This required a reset to the PLC which cycled the power to the ESP compartment off. The outlet louvers were closed but the opacity still spiked. A heat was not being blown at the time.	N/A	Relevant procedures were updated to require that the guillotine be closed and the compartment be completely isolated when power is shut off.
1/14/22 8:12 AM	20.8	Opacity spiked outside of a heat due to maintenance on one of the ESP hoppers.	N/A	The maintenance was completed without any additional alarms. No further corrective action was taken.
1/16/22 11:54 PM	21.8	Fields 106, 107 (inlet fields in new compartment 2), 501, and 502 (inlet fields in new ESP-5) were grounded out of service due to material buildup within the compartments.	N/A	The BOF Shop was taken down for approximately 17 hours on 1/18 to clear the material buildup so that the fields could be returned to service. All four fields were returned to service after the outage though 501 and 502 were maintained at reduced power level as the material buildup could not be completely cleared.
1/17/22 8:00 PM	22.3			
1/17/22 8:06 PM	23.7			
1/17/22 11:00 PM	31.0			
1/17/22 11:06 PM	25.3			
1/18/22 2:06 AM	22.8			
1/18/22 8:48 AM	22.4			
1/18/22 9:30 AM	24.8	The draft was lowered from 2.4" W.C. to 1.0" W.C. to allow for maintenance within portions of the ESP without completely shutting the system down. All operations were down at this point.	N/A	No corrective action was taken.
1/19/22 7:54 AM	20.6	The water conditioning sprays did not turn on at the start of the heat resulting in no gas conditioning at ignition.	N/A	The logic in place worked as designed by pulling the lance to terminate the blow. No issues were observed when the heat was restarted.

**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

For the following instances, either a root cause could not be identified or the root cause is different than what is discussed elsewhere.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/19/22 9:00 AM	27.4	High levels of silica in the iron contributed coating of the plates early in heats. This led to elevated opacity at the end of heats as water conditioning cut back.	N/A	Extensive power off rapping was performed between heats to try to clean the plates. An adjustment was made to the steam program to add additional steam at the end of the heat and to leave steam on for a set time after the completion of the heat to provide additional gas conditioning near the end of heats and on reblows.
1/19/22 10:06 AM	22.3			
1/19/22 11:06 AM	22.4			
1/19/22 11:12 AM	26.1			
1/19/22 7:36 PM	21.5	Initially, it was believed that a hole in the compartment 6 E-field was causing that compartment to contribute to elevated opacity. While this was likely a contributor, an additional factor was that fields 501 and 502 were cut back on power to try to minimize material buildup in the compartment that could cause a ground.	N/A	The outlet louver for compartment 6 was completely closed. Plans were initiated to start the annual ESP maintenance on compartment 6 with a priority being to fix the hole in the E-field. This maintenance was initiated on 2/7.
1/19/22 8:24 PM	20.9			
1/20/22 4:18 PM	24.8	Fields 501 and 502 were cut back on power to try to minimize material buildup in the compartment that could cause a ground. There was already material present that had accumulated for unknown reasons. In addition, fields 8C and 7E both grounded out over the time period. Fields 502 grounded out due to material buildup on 1/24 and field 501 grounded out on 1/25.	N/A	Attempts were made to slowly increase power on fields 501 and 502 over the timeframe. In addition, several attempts were made to balance the flow with limited success. Eventually however, field 502 grounded out on 1/24 and field 501 grounded out on 1/25. A 16-hour outage was taken on 2/1 to attempt to clean the fields and repair all grounds. Fields 7E and 8C were returned to service but the extent of the material buildup in the new ESP-5 was such that the buildup could not be removed and fields 501 and 502 could not be returned to service. Cleveland-Cliffs also believes that the opacity meter readings were biased high due to possible air infiltration causing steam interference at the monitor location and initiated a program of increased method 9 readings on 1/27.
1/20/22 7:36 PM	28.6			
1/20/22 9:24 PM	24.0			
1/21/22 6:12 PM	21.1			
1/21/22 7:00 PM	21.9			
1/21/22 7:30 PM	21.1			
1/21/22 7:42 PM	26.2			
1/21/22 8:30 PM	21.5			
1/21/22 9:12 PM	20.5			
1/21/22 9:36 PM	29.9			
1/22/22 12:06 AM	26.0			
1/22/22 6:36 AM	23.5			
1/23/22 2:36 PM	28.0			
1/23/22 9:54 AM	21.0			
1/23/22 10:42 AM	21.2			
1/23/22 2:06 PM	21.4			
1/23/22 2:12 PM	22.1			
1/24/22 12:30 PM	21.3			
1/24/22 1:24 PM	20.6			
1/24/22 3:00 PM	21.9			
1/25/22 12:54 AM	24.1			
1/25/22 6:36 PM	21.7			

ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

For the following instances, either a root cause could not be identified or the root cause is different than what is discussed elsewhere.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/26/22 5:18 PM	27.5	Fields 501 and 502 were out of service due to grounds caused by material buildup. Fields 8C and 7E were also out of service due to grounds. Compartment 6 was out of service due to a large hole in the E-field.	N/A	Continued efforts to better distribute the flow and extensive power off rapping was performed. A 16-hour outage was taken on 2/1 to attempt to clean the fields and repair all grounds. Fields 7E and 8C were returned to service but the extent of the material buildup in the new ESP-5 was such that the buildup could not be removed and fields 501 and 502 could not be returned to service. Cleveland-Cliffs also believes that the opacity meter readings were biased high due to possible air infiltration causing steam interference at the monitor location and initiated a program of increased method 9 readings on 1/27.
1/26/22 8:30 PM	20.9			
1/26/22 9:42 PM	24.8			
1/27/22 12:18 AM	21.3			
1/27/22 1:42 AM	22.9			
1/27/22 10:12 PM	22.0			
1/27/22 11:12 PM	22.1			
1/28/22 6:54 AM	22.1			
1/28/22 5:06 PM	21.5			
1/28/22 6:00 PM	24.5			
1/28/22 7:30 PM	20.5			
1/28/22 8:12 PM	22.3			
1/28/22 9:00 PM	22.8			
1/28/22 11:42 PM	21.5			
1/29/22 2:48 AM	22.7			
1/29/22 3:30 AM	21.6			
1/29/22 5:06 AM	21.5			
1/29/22 8:18 AM	21.0			
1/29/22 8:24 AM	23.8			
1/29/22 11:24 AM	23.1			
1/29/22 1:00 PM	21.0			
1/29/22 2:12 PM	20.8			
1/29/22 2:18 PM	21.0			
1/29/22 4:48 PM	21.7			
1/29/22 4:54 PM	22.8			
1/29/22 5:30 PM	22.4			
1/29/22 5:36 PM	22.5			
1/29/22 6:54 PM	24.8			
1/29/22 7:00 PM	27.7			
1/29/22 7:30 PM	21.6			
1/29/22 9:00 PM	22.8			
1/29/22 9:30 PM	22.1			
1/29/22 11:30 PM	22.9			
1/30/22 12:54 AM	23.2			
1/30/22 1:42 AM	21.5			
1/30/22 2:48 AM	21.3			
1/30/22 5:12 AM	31.0			
1/30/22 5:18 AM	31.0			
1/30/22 5:54 AM	31.0			
1/30/22 6:00 AM	33.2			

ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

For the following instances, either a root cause could not be identified or the root cause is different than what is discussed elsewhere.

Date / Time	6-Min Avg Opacity	Section B.20.a  Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b  When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c  Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/30/22 7:48 AM	26.3	Fields 501 and 502 were out of service due to grounds caused by material buildup. Fields 8C and 7E were also out of service due to grounds. Compartment 6 was out of service due to a large hole in the E-field.	N/A	Continued efforts to better distribute the flow and extensive power off rapping was performed. A 16-hour outage was taken on 2/1 to attempt to clean the fields and repair all grounds. Fields 7E and 8C were returned to service but the extent of the material buildup in the new ESP-5 was such that the buildup could not be removed and fields 501 and 502 could not be returned to service. Cleveland-Cliffs also believes that the opacity meter readings were biased high due to possible air infiltration causing steam interference at the monitor location and initiated a program of increased method 9 readings on 1/27.
1/30/22 7:54 AM	32.2			
1/30/22 8:36 AM	26.0			
1/30/22 8:42 AM	38.9			
1/30/22 9:18 AM	24.5			
1/30/22 9:24 AM	22.1			
1/30/22 10:12 AM	23.7			
1/30/22 11:06 AM	26.9			
1/30/22 11:42 AM	30.0			
1/30/22 11:48 AM	32.5			
1/30/22 11:54 AM	23.2			
1/30/22 3:12 PM	38.1			
1/30/22 3:18 PM	28.1			
1/30/22 4:00 PM	25.5			
1/30/22 4:06 PM	23.3			
1/30/22 5:00 PM	24.9			
1/30/22 6:12 PM	20.8			
1/30/22 6:48 PM	22.6			
1/30/22 7:36 PM	23.2			
1/30/22 8:06 PM	24.7			
1/30/22 8:12 PM	30.2			
1/30/22 10:12 PM	26.3			
1/30/22 10:18 PM	29.0			
1/30/22 11:30 PM	30.2			
1/31/22 12:00 AM	23.3			
1/31/22 12:06 AM	36.3			
1/31/22 12:12 AM	31.9			
1/31/22 1:24 AM	24.0			
1/31/22 2:00 AM	24.2			
1/31/22 2:06 AM	33.3			
1/31/22 2:54 AM	22.2			
1/31/22 3:24 AM	22.2			
1/31/22 3:30 AM	28.6			
1/31/22 6:18 AM	21.4			
1/31/22 6:24 AM	24.8			
1/31/22 7:18 PM	21.8			
1/31/22 7:24 PM	25.2			
1/31/22 8:18 PM	20.8			



**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

For the following instances, either a root cause could not be identified or the root cause is different than what is discussed elsewhere.

Date / Time	6-Min Avg Opacity	Section B.20.a	Section B.20.b	Section B.20.c
		<b>Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;</b>	<b>When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;</b>	<b>Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;</b>
1/27/22 10:36 AM	20.9	One of the ESP ID Fans was shutdown to perform cladding on the fan housing. No alarms occurred during the shutdown. When the system was placed into charge mode for the following heat, the opacity spiked. This was likely due to changes in flow balancing. A contributing factor was that steam did not come on during the charge due to the steam valve freezing up.	N/A	The operators were notified to delay the blow until the steam valve could be fixed. The valve was toggled several times and then returned to service with normal function.
1/27/22 10:42 AM	21.8			
2/12/22 6:54 PM	26.0	Compartment 6 and field 7-8E was out of service. Under this configuration, there were occasions where both of the new ESP Casings exhibited signs of overloading for no known reasons as the outlet fields dipped in power levels when opacity spiked.	N/A	In every case, all fields in both casings ran through an automated power off rapping cycle prior to the following heat.
2/16/22 8:18 PM	25.1			
2/19/22 10:00 AM	22.6			
2/22/22 6:18 AM	21.1			
2/22/22 8:30 AM	21.6			
2/23/22 1:06 AM	22.5			
2/23/22 1:12 AM	21.0			
2/23/22 5:54 PM	22.0			
2/23/22 6:48 PM	22.8	Compartment 7 was out of service for maintenance. Both of the new ESP Casings exhibited signs of overloading for no known reasons as the outlet fields dipped in power levels when opacity spiked.	N/A	All fields in both casings ran through an automated power off rapping cycle prior to the following heat.
2/23/22 7:30 PM	22.7			
3/3/22 6:36 AM	21.1	Compartment 5 and field 6D were out of service. Under this configuration, there were occasions where both of the new ESP Casings exhibited signs of overloading for no known reasons as the outlet fields dipped in power levels when opacity spiked. In addition, a review of long term trends indicated that having both compartment 7 and 8 online was creating either an imbalance or allowing cold air infiltration that was negatively affecting performance. A reason for this is unknown but when compartment 8 was taken out of service on 3/26, performance did improve.	N/A	Cleveland-Cliffs ran for a short period of time with compartments and 7 and 8 out of service after the completion of the annual maintenance on compartment 8 on 4/2. Compartment 8 was returned to service on 4/5 but compartment 7 has remained out of service as the facility has determined that compartment 7 being online was negatively affecting performance. Compartments 7 and 8 are the next compartments to be rebuilt after the completion of phase 3 which is due for May 31, 2022.
3/14/22 4:00 PM	23.4			
3/14/22 7:30 PM	24.1			
3/14/22 7:36 PM	30.8			
3/14/22 8:12 AM	21.6			
3/14/22 11:30 PM	21.2			
3/14/22 11:36 PM	21.0			
3/15/22 12:18 AM	20.9			
3/15/22 11:36 PM	21.1			
3/16/22 1:24 AM	27.8			
3/16/22 9:06 AM	23.3			
3/17/22 5:18 AM	22.2			
3/17/22 3:48 PM	23.9			
3/18/22 12:12 AM	21.6			
3/18/22 12:42 PM	26.4			





**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

The following instances occurred due to steam interference.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/1/22 10:54 PM	20.5	Steam Interference	N/A	N/A
1/2/22 9:42 PM	23.2	Steam Interference	N/A	N/A
1/3/22 1:42 PM	26.5	Steam Interference	N/A	N/A
1/3/22 1:48 PM	21.0	Steam Interference	N/A	N/A
1/3/22 7:18 PM	22.7	Steam Interference	N/A	N/A
1/4/22 2:54 AM	25.5	Steam Interference	N/A	N/A
1/4/22 5:12 AM	23.8	Steam Interference	N/A	N/A
1/4/22 8:06 AM	20.7	Steam Interference	N/A	N/A
1/5/22 10:18 AM	21.8	Steam Interference	N/A	N/A
1/7/22 5:36 PM	25.8	Steam Interference	N/A	N/A
1/8/22 9:18 AM	22.2	Steam Interference	N/A	N/A
1/8/22 10:30 AM	21.0	Steam Interference	N/A	N/A
1/9/22 6:54 PM	21.4	Steam Interference	N/A	N/A
1/9/22 9:00 PM	23.1	Steam Interference	N/A	N/A
1/10/22 8:36 AM	23.2	Steam Interference	N/A	N/A
1/15/22 10:12 AM	22.4	Steam Interference	N/A	N/A
1/15/22 10:18 AM	24.4	Steam Interference	N/A	N/A
1/15/22 3:30 PM	24.1	Steam Interference	N/A	N/A
1/15/22 8:36 PM	23.6	Steam Interference	N/A	N/A
1/16/22 7:54 AM	21.2	Steam Interference	N/A	N/A
1/17/22 4:42 PM	22.4	Steam Interference	N/A	N/A
1/19/22 4:30 AM	21.0	Steam Interference	N/A	N/A
1/20/22 11:00 AM	22.6	Steam Interference	N/A	N/A
1/20/22 4:12 PM	23.8	Steam Interference	N/A	N/A
1/21/22 8:12 AM	22.0	Steam Interference	N/A	N/A
1/24/22 12:00 AM	20.8	Steam Interference	N/A	N/A
1/24/22 11:48 AM	21.7	Steam Interference	N/A	N/A
1/26/22 6:12 AM	21.8	Steam Interference	N/A	N/A
1/26/22 9:00 AM	22.3	Steam Interference	N/A	N/A
1/26/22 5:12 PM	20.5	Steam Interference	N/A	N/A
1/26/22 9:36 PM	24.0	Steam Interference	N/A	N/A
1/27/22 1:36 AM	21.2	Steam Interference	N/A	N/A
1/27/22 11:00 AM	34.2	Steam Interference	N/A	N/A
1/27/22 5:30 AM	21.8	Steam Interference	N/A	N/A
1/27/22 7:48 PM	20.9	Steam Interference	N/A	N/A
1/27/22 10:06 PM	26.2	Steam Interference	N/A	N/A
1/27/22 11:06 PM	21.2	Steam Interference	N/A	N/A
1/28/22 3:42 PM	23.0	Steam Interference	N/A	N/A
1/28/22 5:00 PM	29.6	Steam Interference	N/A	N/A
1/28/22 11:06 PM	26.9	Steam Interference	N/A	N/A

ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

The following instances occurred due to steam interference.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/28/22 11:12 PM	27.6	Steam Interference	N/A	N/A
1/29/22 12:24 PM	21.2	Steam Interference	N/A	N/A
1/29/22 2:36 AM	37.0	Steam Interference	N/A	N/A
1/29/22 2:42 AM	25.5	Steam Interference	N/A	N/A
1/29/22 11:18 AM	24.1	Steam Interference	N/A	N/A
1/29/22 12:48 PM	22.0	Steam Interference	N/A	N/A
1/29/22 1:42 PM	20.8	Steam Interference	N/A	N/A
1/29/22 3:24 PM	20.6	Steam Interference	N/A	N/A
1/29/22 6:48 PM	28.7	Steam Interference	N/A	N/A
1/29/22 8:48 PM	25.0	Steam Interference	N/A	N/A
1/29/22 8:54 PM	27.0	Steam Interference	N/A	N/A
1/29/22 10:42 PM	26.8	Steam Interference	N/A	N/A
1/29/22 10:48 PM	27.1	Steam Interference	N/A	N/A
1/30/22 12:42 PM	22.2	Steam Interference	N/A	N/A
1/30/22 12:48 PM	21.2	Steam Interference	N/A	N/A
1/30/22 2:42 AM	22.2	Steam Interference	N/A	N/A
1/30/22 5:00 AM	21.1	Steam Interference	N/A	N/A
1/30/22 5:06 AM	29.8	Steam Interference	N/A	N/A
1/30/22 5:48 AM	27.1	Steam Interference	N/A	N/A
1/30/22 7:36 AM	28.5	Steam Interference	N/A	N/A
1/30/22 7:42 AM	26.1	Steam Interference	N/A	N/A
1/30/22 8:30 AM	22.8	Steam Interference	N/A	N/A
1/30/22 10:06 AM	21.9	Steam Interference	N/A	N/A
1/30/22 3:06 PM	21.0	Steam Interference	N/A	N/A
1/30/22 6:06 PM	22.0	Steam Interference	N/A	N/A
1/30/22 9:30 PM	21.8	Steam Interference	N/A	N/A
1/30/22 9:36 PM	21.2	Steam Interference	N/A	N/A
1/30/22 9:42 PM	21.9	Steam Interference	N/A	N/A
1/30/22 11:18 PM	20.9	Steam Interference	N/A	N/A
1/30/22 11:24 PM	23.2	Steam Interference	N/A	N/A
1/31/22 1:12 AM	25.8	Steam Interference	N/A	N/A
1/31/22 1:18 AM	27.4	Steam Interference	N/A	N/A
1/31/22 4:54 AM	25.6	Steam Interference	N/A	N/A
1/31/22 5:00 AM	27.6	Steam Interference	N/A	N/A
1/31/22 5:06 AM	29.6	Steam Interference	N/A	N/A
1/31/22 6:48 PM	24.8	Steam Interference	N/A	N/A
1/31/22 6:54 PM	20.5	Steam Interference	N/A	N/A
1/31/22 8:12 PM	23.3	Steam Interference	N/A	N/A
1/31/22 10:36 PM	21.1	Steam Interference	N/A	N/A
1/31/22 10:42 PM	25.7	Steam Interference	N/A	N/A

**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

The following instances occurred due to steam interference.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
1/31/22 10:48 PM	22.1	Steam Interference	N/A	N/A
1/31/22 11:36 PM	20.8	Steam Interference	N/A	N/A
2/1/22 1:30 AM	28.1	Steam Interference	N/A	N/A
2/1/22 1:36 AM	22.5	Steam Interference	N/A	N/A
2/1/22 5:00 AM	30.3	Steam Interference	N/A	N/A
2/1/22 5:06 AM	23.0	Steam Interference	N/A	N/A
2/1/22 5:12 AM	20.9	Steam Interference	N/A	N/A
2/1/22 7:18 AM	22.8	Steam Interference	N/A	N/A
2/1/22 7:24 AM	26.7	Steam Interference	N/A	N/A
2/2/22 12:54 AM	24.6	Steam Interference	N/A	N/A
2/2/22 1:00 AM	28.2	Steam Interference	N/A	N/A
2/2/22 1:54 AM	25.3	Steam Interference	N/A	N/A
2/2/22 2:00 AM	25.0	Steam Interference	N/A	N/A
2/2/22 8:24 AM	26.0	Steam Interference	N/A	N/A
2/2/22 5:42 PM	23.4	Steam Interference	N/A	N/A
2/2/22 10:54 PM	29.2	Steam Interference	N/A	N/A
2/3/22 1:42 AM	22.8	Steam Interference	N/A	N/A
2/3/22 2:54 AM	21.0	Steam Interference	N/A	N/A
2/3/22 4:00 AM	25.5	Steam Interference	N/A	N/A
2/3/22 4:06 AM	22.8	Steam Interference	N/A	N/A
2/3/22 5:36 AM	21.2	Steam Interference	N/A	N/A
2/3/22 5:42 AM	28.8	Steam Interference	N/A	N/A
2/3/22 6:42 AM	23.6	Steam Interference	N/A	N/A
2/3/22 7:24 AM	21.1	Steam Interference	N/A	N/A
2/3/22 11:48 AM	24.6	Steam Interference	N/A	N/A
2/3/22 11:54 AM	27.3	Steam Interference	N/A	N/A
2/3/22 1:30 PM	25.6	Steam Interference	N/A	N/A
2/3/22 1:36 PM	21.4	Steam Interference	N/A	N/A
2/3/22 5:18 PM	22.0	Steam Interference	N/A	N/A
2/3/22 6:24 PM	21.1	Steam Interference	N/A	N/A
2/3/22 6:30 PM	20.8	Steam Interference	N/A	N/A
2/3/22 7:48 PM	22.7	Steam Interference	N/A	N/A
2/4/22 4:36 AM	21.4	Steam Interference	N/A	N/A
2/4/22 5:36 AM	21.0	Steam Interference	N/A	N/A
2/4/22 6:24 AM	21.2	Steam Interference	N/A	N/A
2/4/22 7:42 AM	25.1	Steam Interference	N/A	N/A
2/5/22 3:06 AM	24.4	Steam Interference	N/A	N/A
2/5/22 3:12 AM	27.5	Steam Interference	N/A	N/A
2/5/22 6:06 PM	20.6	Steam Interference	N/A	N/A
2/5/22 10:54 PM	21.1	Steam Interference	N/A	N/A

ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)  
1st Quarter 2022

The following instances occurred due to steam interference.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
2/6/22 2:00 AM	23.1	Steam Interference	N/A	N/A
2/6/22 3:06 AM	23.9	Steam Interference	N/A	N/A
2/6/22 4:12 AM	26.1	Steam Interference	N/A	N/A
2/6/22 5:30 AM	27.5	Steam Interference	N/A	N/A
2/6/22 5:36 AM	25.4	Steam Interference	N/A	N/A
2/6/22 6:24 AM	25.3	Steam Interference	N/A	N/A
2/6/22 6:30 AM	25.6	Steam Interference	N/A	N/A
2/6/22 7:42 AM	29.0	Steam Interference	N/A	N/A
2/6/22 7:48 AM	27.3	Steam Interference	N/A	N/A
2/6/22 9:30 AM	31.1	Steam Interference	N/A	N/A
2/6/22 9:36 PM	29.9	Steam Interference	N/A	N/A
2/6/22 10:12 AM	20.5	Steam Interference	N/A	N/A
2/6/22 11:18 AM	20.7	Steam Interference	N/A	N/A
2/6/22 11:24 AM	21.1	Steam Interference	N/A	N/A
2/6/22 7:48 AM	21.2	Steam Interference	N/A	N/A
2/8/22 3:30 AM	21.8	Steam Interference	N/A	N/A
2/8/22 5:54 AM	23.9	Steam Interference	N/A	N/A
2/8/22 6:00 AM	26.4	Steam Interference	N/A	N/A
2/8/22 9:00 PM	23.5	Steam Interference	N/A	N/A
2/8/22 9:06 PM	21.5	Steam Interference	N/A	N/A
2/9/22 12:12 AM	23.7	Steam Interference	N/A	N/A
2/11/22 7:42 AM	22.3	Steam Interference	N/A	N/A
2/12/22 12:48 PM	21.8	Steam Interference	N/A	N/A
2/13/22 3:24 PM	22.8	Steam Interference	N/A	N/A
2/14/22 12:24 AM	24.9	Steam Interference	N/A	N/A
2/14/22 12:30 AM	20.7	Steam Interference	N/A	N/A
2/14/22 6:06 PM	21.3	Steam Interference	N/A	N/A
2/14/22 7:48 PM	22.1	Steam Interference	N/A	N/A
2/14/22 9:36 PM	20.5	Steam Interference	N/A	N/A
2/15/22 3:00 AM	20.8	Steam Interference	N/A	N/A
2/15/22 7:18 AM	22.4	Steam Interference	N/A	N/A
2/16/22 1:54 AM	23.9	Steam Interference	N/A	N/A
2/16/22 7:36 AM	22.5	Steam Interference	N/A	N/A
2/17/22 8:06 AM	21.5	Steam Interference	N/A	N/A
2/17/22 8:00 PM	21.1	Steam Interference	N/A	N/A
2/17/22 10:18 PM	26.0	Steam Interference	N/A	N/A
2/18/22 12:00 AM	22.2	Steam Interference	N/A	N/A
2/18/22 3:36 AM	23.9	Steam Interference	N/A	N/A
2/18/22 5:30 AM	22.9	Steam Interference	N/A	N/A
2/18/22 5:42 PM	21.9	Steam Interference	N/A	N/A

**ESP 20% Opacity Report (Required by Consent Decree for Civil Action No. 15-cv-11804; section B.20.)**  
**1st Quarter 2022**

The following instances occurred due to steam interference.

Date / Time	6-Min Avg Opacity	Section B.20.a Identify the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity;	Section B.20.b When the root cause is unknown, provide a description of efforts taken by Defendant to investigate the root cause of each 6-minute block average reading that exceeds 20% opacity, including a copy of any related ESP operating records;	Section B.20.c Describe corrective actions taken in response to the root cause of each instance in which the 6-minute block average reading exceeds 20% opacity, including but not limited to a copy of related work orders or other documents submitted to address the cause of the high reading, if any;
2/18/22 10:06 PM	20.8	Steam Interference	N/A	N/A
2/19/22 1:00 AM	22.9	Steam Interference	N/A	N/A
2/19/22 4:24 AM	26.0	Steam Interference	N/A	N/A
2/19/22 6:54 AM	21.5	Steam Interference	N/A	N/A
2/19/22 8:00 AM	21.5	Steam Interference	N/A	N/A
2/19/22 10:48 AM	23.5	Steam Interference	N/A	N/A
2/19/22 1:36 PM	22.1	Steam Interference	N/A	N/A
2/19/22 2:24 PM	20.6	Steam Interference	N/A	N/A
2/20/22 1:24 AM	21.0	Steam Interference	N/A	N/A
2/20/22 8:54 AM	20.9	Steam Interference	N/A	N/A
2/20/22 12:36 PM	20.6	Steam Interference	N/A	N/A
2/20/22 2:00 PM	20.9	Steam Interference	N/A	N/A
2/20/22 2:48 PM	21.8	Steam Interference	N/A	N/A
2/20/22 7:00 PM	20.8	Steam Interference	N/A	N/A
2/22/22 3:54 PM	22.4	Steam Interference	N/A	N/A
2/23/22 7:00 AM	22.8	Steam Interference	N/A	N/A
2/23/22 7:06 AM	23.5	Steam Interference	N/A	N/A
2/23/22 11:18 PM	20.5	Steam Interference	N/A	N/A
2/24/22 5:06 AM	20.6	Steam Interference	N/A	N/A
2/24/22 5:12 AM	24.9	Steam Interference	N/A	N/A
2/24/22 7:12 AM	27.5	Steam Interference	N/A	N/A
2/24/22 7:18 AM	24.9	Steam Interference	N/A	N/A
2/24/22 5:30 PM	23.5	Steam Interference	N/A	N/A
2/24/22 7:54 PM	22.8	Steam Interference	N/A	N/A
2/25/22 12:06 AM	24.1	Steam Interference	N/A	N/A
2/25/22 2:24 AM	21.6	Steam Interference	N/A	N/A
2/25/22 6:54 AM	21.3	Steam Interference	N/A	N/A
3/7/22 5:24 PM	20.6	Steam Interference	N/A	N/A
3/11/22 4:00 PM	23.0	Steam Interference	N/A	N/A
3/12/22 2:12 AM	20.7	Steam Interference	N/A	N/A
3/12/22 4:00 AM	23.1	Steam Interference	N/A	N/A
3/12/22 7:18 PM	22.4	Steam Interference	N/A	N/A
3/13/22 1:06 AM	24.3	Steam Interference	N/A	N/A
3/13/22 3:54 AM	21.6	Steam Interference	N/A	N/A
3/13/22 6:00 AM	22.7	Steam Interference	N/A	N/A
3/13/22 9:18 AM	20.8	Steam Interference	N/A	N/A
3/13/22 12:36 PM	21.7	Steam Interference	N/A	N/A
3/15/22 6:42 AM	20.8	Steam Interference	N/A	N/A
3/18/22 8:42 AM	23.0	Steam Interference	N/A	N/A
3/18/22 8:30 PM	20.6	Steam Interference	N/A	N/A



