

April 6, 2020

Via Email Only

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Ms. Jenine Camilleri
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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 PM₁₀ 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 PM₁₀ 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 PM₁₀ 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 PM₁₀ 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 PM₁₀ 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 PM₁₀ 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 PM₁₀. 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 PM₁₀. However, that has not been the case. The ESP has always achieved compliance with the PM₁₀ 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 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 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 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:

Year	Highest 3-month Average Lead TSP Concentration ($\mu\text{g}/\text{m}^3$)	Annual Average Manganese PM_{10} Concentration ($\mu\text{g}/\text{m}^3$)
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.