CLIFFS
CLEVELAND-CLIFFS INC.
Cleveland-Cliffs Steel Corporation
Dearborn Works
4001 Miller Road, Dearborn, MI 48120
P 313.317.8900 clevelandcliffs.com

February 8, 2023

Ms. Katherine Koster
Senior Environmental Engineer
EQLE, AQD, Detroit District
3058 West Grand Boulevard, Suite 2-300
Detroit, Michigan 48202

Ms. Jenine Camilleri
Enforcement Unit Supervisor
EQLE, AQD
P.O. Box 30260
Lansing, Michigan 48909-7760

Re: Cleveland-Cliffs Dearborn Works
Response to Violation Notice dated January 19, 2023

Dear Mss. Koster and Camilleri:

I am writing on behalf of Cleveland-Cliffs Dearborn Works in response to the Violation Notice dated January 19, 2023. The Violation Notice alleges that Cleveland-Cliffs failed to perform an acceptable stack test for total mercury (Hg) on the ESP and SEC Baghouse within 3 years from the prior test.

Cleveland-Cliffs disagrees that a violation occurred for two reasons. First, Cleveland-Cliffs asserts that the mercury data from the first test, conducted in July 2022, was valid notwithstanding the methodology issues identified by EGLE. None of the methodology issues affected the quality of the collected data. It should be noted that the testing demonstrated compliance with all applicable permit limits. Second, there is ambiguity in the permit testing terms, and the permit can be interpreted such that testing was timely since the re-test was completed prior to the end of the calendar year. Both of these are discussed in detail below.

EGLE's Rejection of Mercury Test Results

EGLE's reasons for not accepting the mercury test results were provided in an email dated December 8, 2022 (79 days after the report was mailed out), which is included as Attachment 1 to this response. EGLE provided the following reasons:

1. For metals Runs 1, 2, and 3 on the ESP, the probe was maintained lower than the acceptable temperature of 248 ±25 °F during sampling for 8 out of 41 points (Run 1), 25 out of 41 points (Run 3), and 34 out of 36 points (Run 4). Additionally, the Run 1 filter exit temperature was maintained lower than the acceptable temperature of 248 ±25 °F during sampling for 5 out of 41 points.

2. For metals Run 4 on the SEC baghouse, the manganese emissions were higher than expected, resulting in the run combined SEC baghouse and ESP emissions exceeding the permitted limit. Cliffs suspected possible contamination from the potassium permanganate reagent present in the back half of the train for Hg measurement. This possible contamination would indicate issue with the sampling train preparation, sampling, and/or sample recovery.

3. The SEC Baghouse oxygen exceeded the calibrated range of the instrument for all runs. Per EPA method 7e, referenced in EPA method 3A, no valid run average concentration may exceed the calibration span.

Cleveland-Cliffs acknowledges that the firm hired to perform the stack testing experienced technical deviations of the test methods. However, there are strong technical arguments that the deviations did not affect the quality of the Mercury testing data.

Effects of Probe Temperature on Mercury Results

Montrose Air Quality Services, the vendor who performed the stack testing, analyzed the effects of probe temperature on data quality. This analysis is included as Attachment 2 to this response. The analysis demonstrates that solid state metals would be collected on the filter and in the pre-filter wash regardless of probe temperature. Vapor phase particles (which comprise the majority of the mercury collected) are primarily collected at chilled temperatures through the use of powerful oxidizers and are completely independent of sampling train temperature. Even if one were to assume that sample train temperature is critical for accurate mercury results, the probe temperature is not the appropriate temperature to use in making the evaluation. Probe temperature is measured at a point on the exterior of the probe and is not representative of the actual gas temperature passing through the train. The temperature of the filter is measured directly within the gas stream and would be the more appropriate temperature to use in evaluating the results. While EGLE indicated that Run 1 filter exit temperature for the ESP had 5 out of 41 points that were out of range, the data sheet is not consistent with EGLE's assessment. Cleveland-Cliffs believes that it is more likely that the indicated temperatures were between 260 and 269°F and that EGLE read "0" for the middle number when it was actually a "6." A copy of the data sheet is included as Attachment 3. If these numbers are a "6", then all filter temperatures measured and recorded during the test program were in accordance with method specifications.

In addition to the reasons stated above, Cleveland-Cliffs believes that it is appropriate to put the magnitude of the measured probe temperature differences in context. While several points were outside of the 248 +/ 25°F range, all measured probe temperatures were in excess of 200°F. Based on the highest measured stack gas moisture content of 18.37%, the dew point for the ESP stack gas falls between 130 and 140°F. Therefore, probe temperature was always a minimum of 60°F above the dew point. While the analysis by Montrose indicated that Mercury data quality is independent of train temperature and the actual temperature measured within the gas stream was within the method specifications, the fact that the probe was always far hotter than the gas dew point should be sufficient to show that the gas stream remained in a completely gaseous state while passing through the probe and that moisture droplets did not interfere with the test.

Measured Manganese Emissions for Run 4 on the SEC Baghouse

EGLE noted higher than expected Manganese results that were obtained on Run 4 for the SEC Baghouse and acknowledged Cleveland-Cliffs' suspicions of possible potassium permanganate contamination of the sampling train back half. EGLE then concluded that "this possible contamination would indicate issues with the sampling train preparation, sampling, and/or sample recovery." Cleveland-Cliffs believes that this is erroneous. First, EGLE's conclusion is speculative. Nothing in the test report supports this conclusion. Cleveland-Cliffs is unaware of any observations made by EGLE that would support this conclusion. In addition, cross contamination of this kind would have no effect on mercury data quality since mercury is not a component within any of the reagents. Cleveland-Cliffs proposed a possible explanation as to what might have contributed to an abnormally high manganese concentration within the back half of the sampling train. However, EGLE's conclusion that this possible explanation is indicative of sampling train problems is not supported by evidence.

SEC Baghouse Oxygen Exceeding Calibration Range of Instrument

EGLE noted that all SEC Baghouse oxygen readings exceeded the calibrated range of the instrument. However, there would be no effect on the data quality for any of the parameters tested. The SEC Baghouse is known to be an ambient source based on numerous previous tests and a knowledge of how the process works. Oxygen is used solely in the calculation of molecular weight. It is not used to correct any emissions or to calculate emission rate based on heat input. A single point grab sample for oxygen measurement on this source has been approved in the past and it is difficult to see how that method provides better data quality than a continuous measurement method where the technical range of the instrument was around 0.5% to 1% lower than the method requires.

In conclusion, it is Cleveland-Cliffs opinion that test deviations, to the extent they occurred, did not affect data quality. The reasons cited by EGLE for not accepting the mercury testing results are not supported by technical evidence.

Requirement to Test Every Three Years

The Violation Notice alleges that a violation occurred because an acceptable stack test was not conducted within three years of completion of the previous stack test. It should be noted that the Violation Notice states the "Facility failed to perform an acceptable stack test for total mercury (Hg) in accordance with the department requirements **within three years of the date** of the prior test." This is paraphrasing the requirement. The actual requirement is "Subsequent testing will be required once **every 3 years** from the completion of the previous stack test."

The previous stack test for mercury was conducted in August 2019. As noted above, the Dearborn Works ROP requires testing "once every three years" from the prior test. There is inherent ambiguity in the word "years." Based on a standard dictionary definition, "year" can mean either 365 days, or a calendar year. *See, e.g.*, Merriam-Webster (www.merriam-webster.com/dictionary/year). EGLE's position could be correct if the interpretation of "year" is 365 days. But if the interpretation is a calendar year, then Cleveland-Cliffs had until the end of the calendar year, December 31, 2022, to complete the test. Re-testing for mercury was completed on December 21, 2022.

The ROP does not define "year." Nor has Cleveland-Cliffs found any relevant provisions in EGLE's performance test regulations or guidance. However, Michigan's law on statutory construction does define "year," and it defines it to mean "calendar year." M.C.L.A. § 8.3j. Therefore, while there is ambiguity in the word, the only source that addresses the term defines it as "calendar year." In the absence of any other source to resolve the ambiguity, the Michigan law on statutory construction carries significant weight.

An interpretation of the word "year" to mean "calendar year" is also consistent with how EGLE otherwise defines timing considerations. For example, EGLE's performance test regulation allows the agency to require tests "if more than 36 months have expired since the date of the last performance test." R. 336.2001(1)(e). Use of "36 months" resolves any ambiguity inherent in the word "year." But EGLE chose to use the phrase "3 years" in the ROP and not "36 months." The choice by EGLE to use one phrase over another in the ROP can be presumed to be intentional.

Finally, Cleveland-Cliffs believes it is worthwhile to note the practical significance of EGLE's decision to issue a Violation Notice for this situation. In order to avoid the risk of this happening again, Cleveland-Cliffs would need to schedule a stack test sufficiently far in advance to ensure that if a test is rejected by EGLE for minor method issues, notwithstanding valid test data, the company has enough time to retest before the expiration of the time period. And that would mean scheduling a test *substantially* in advance, due to the time it takes to coordinate with testing companies, perform the test, get results, submit the test report to EGLE, and wait for a response from EGLE. EGLE's decision to issue a Violation Notice for this situation is a disincentive to the orderly administration of the stack testing program. Cleveland-Cliffs had no objection to conducting another performance test. Cleveland-Cliffs' issue is with EGLE's decision that this situation warranted a Violation Notice.

Specific Information requested by Violation Notice

Notwithstanding Cleveland-Cliffs disagreement with the Violation Notice, the company has already taken the necessary steps to resolve the issues alleged in the Violation Notice. The following is the specific information requested by the Violation Notice.

The dates the alleged violation occurred

The stack test was conducted July 26-27, 2022. The report was submitted to EGLE on September 20, 2022 and EGLE's rejection of the test results was received on December 8, 2022.

An explanation of the causes and duration of the violation

The reasons for EGLE rejecting the mercury stack test results are explained in detail above.

Whether the violation is ongoing

The alleged violation is not ongoing.

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

A re-test was completed for Mercury on December 21, 2022, within two weeks of receiving notification of EGLE's rejection of the test results. .

Steps being taken to prevent a reoccurrence

While Cleveland-Cliffs believes that the testing data is valid, pre-test meetings will be conducted with the stack testing vendors to emphasize the importance of strictly following the test methods outside of what has previously been approved in the test plan.

If you have any questions regarding the provided information or require additional information, please contact David Pate at 313-323-1261.

Sincerely,

James E. Earl
Area Manager Environmental
Cleveland-Cliffs Dearborn Works

Attachment 1: EGLE Email dated 12/8/22

Attachment 2: Montrose Air Quality Services Analysis of Probe Temperature Effect on Mercury Data Quality

Attachment 3: ESP Run 1 Field Data Sheet

Attachment 1

EGLE Email dated 12/8/22

Pate, David J

From: Koster, Katherine (EGLE) <KOSTERK1@michigan.gov>
Sent: Thursday, December 08, 2022 9:38 AM
To: Pate, David J
Cc: Angellotti, Regina (EGLE); Earl, James E
Subject: [EXTERNAL] July 2022 BOF SEC BH and ESP stack test

Dave,

AQD Detroit office and TPU staff have reviewed the July 2022 BOF SEC baghouse and ESP stack test. TPU contacted Cliffs to inquire about certain conditions during the testing that were not compliant with the test methods; namely, the temperature requirement for the probe. We reviewed the November 30, 2022, response provided by Montrose via email. However, given the number of issues identified during the testing that did not comply with the methods, we are unable to accept the results of the July 2022 metals testing as valid. Below is a summary of the issues identified:

- For metals Runs 1, 2, and 3 on the ESP, the probe was maintained lower than the acceptable temperature of 248 ±25 °F during sampling for 8 out of 41 points (Run 1), 25 out of 41 points (Run 3), and 34 out of 36 points (Run 4). Additionally, the Run 1 filter exit temperature was maintained lower than the acceptable temperature of 248 ±25 °F during sampling for 5 out of 41 points.
- For metals Run 4 on the SEC baghouse, the Mn emissions were higher than expected, resulting in the run combined SEC baghouse and ESP emissions exceeding the permitted limit. Cliffs suspected possible contamination from the potassium permanganate reagent present in the back half of the train for Hg measurement. This possible contamination would indicate issue with the sampling train preparation, sampling, and/or sample recovery.
- The SEC Baghouse oxygen exceeded the calibrated range of the instrument for all runs. Per EPA method 7e, referenced in EPA method 3A, no valid run average concentration may exceed the calibration span.
- For PM Run 1 on the ESP, the probe was maintained lower than the acceptable temperature of 248 ±25 °F during sampling for 16 out of 41 points sampled. Note, as the issue was resolved for subsequent runs, we accepted the PM results in this instance.

As there is an upcoming test for Mn and Pb in the next couple of weeks, we are requesting the addition of Hg. Also, unfortunately, to my knowledge, the last time Hg was tested was in August 2019 so Cliffs will be outside of the three years from the completion of an acceptable test deadline as required in the ROP. AQD will be issuing a violation notice for non compliance with the testing deadline for Hg.

Please let us know if you would like to discuss further.

Thanks
Katie Koster
Environmental Engineer
Air Quality Division
Detroit District Office
Michigan Department of Environment, Great Lakes, and Energy
C: 313-418-0715 (New Number) |T: 313-456-4678 |kosterk1@michigan.gov

Attachment 2

Montrose Air Quality Services Analysis of Probe Temperature Effect on Mercury Data Quality

November 22, 2022

Prepared by Montrose Air Quality Services

Regarding Testing Conducted on the basic oxygen furnace electrostatic precipitator stack – Cleveland Cliffs

Air Compliance Testing –July 2022

Discussion of Results

Montrose Air Quality Services completed a compliance test program on the basic oxygen furnace (BOF) electrostatic precipitator stack for metals and total particulate matter utilizing United States Environmental Protection Agency (USEPA) methods 29 and method 5/202 respectively. During the sampling program, probe temperatures were recorded outside of the nominal range of 248+/-25 degrees F as required by the method.

Concerning the Method 29 sampling train, metals are captured from the stack effluent in two primary phases, particulate and vapor phase. There would not be molten metal present at these locations and the heat necessary to facilitate the presence of molten globules suspended in the stack effluent would make sampling impossible. Solid state metals are captured in the front half of the sample train by a particulate filter. These metals exist in a variety of particulate sizes and are all accounted for in the front half laboratory analysis. Vapor phase metals must be captured and solubilized in the impinger solutions. These vapor phase metals exist independent of temperature in the stack effluent and the change in vapor pressure for these metals is negligible across hundreds of degrees at these temperature ranges. The mechanism of capture requires the use of powerful oxidizers, specifically acidic peroxide for manganese and lead. The sulfuric/permanganate is an even more powerful oxidizer and must be utilized to capture the vapor phase mercury. This reaction mechanism is evident in the Hg lab analysis, as the Hg passes through the chilled acidic peroxide impingers and it is not captured until it reacts with the sulfuric/permanganate impingers. These reactions occur independent of the sampling train temperature. Assuming the worst-case scenario that the effluent gas sampled was too low, emissions would remain consistent with what was sampled. This was discussed with Dr. William C. Anderson in association with Eurofins Laboratories.

After interviewing the test crew and reviewing the data, the sample trains were operated with a thermocouple in the filter exhaust as required by USEPA method 5. This provides a true temperature measurement for the effluent gas being sampled. This thermocouple is free floating in the effluent gas and provides a temperature reading via direct contact with the gas stream without any bias of external factors. This data shows that the gas within the train was collected within temperature range for the methodology. Since the effluent gas was directly measured utilizing a filter exhaust thermocouple and since the capture of metals is not temperature dependent, it is of the opinion of Montrose personnel that data accurately determines the emissions from the ESP. Please feel free to reach with any additional questions.

Attachment 3

ESP Run 1 Field Data Sheet

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EPA Method 2 Field Datasheet (Isokinetic) Page ___ of 2

Project Information		Sampling Conditions		ALT 011	TC ID:	Ambient °F	Ref. °F
Date	7/26/22	Static Pressure, in. H_2O	-0.6	Stack			
Project #	18563	Ambient Temp, °F	82	Probe			
Customer/Facility	Dearborn, MI	Barometric Pressure, in. Hg	29.99	Filter Box			
Unit ID/Sample Location	ESP	Ref. Barometer ID	NWS	Filter Exit			
Run #	1	Wind Speed / Direction	WNW 5	Meter outlet			
Operator	KR	Precipitation, Y / N, type		Impinger Exit			
		Probe / Filter Temp Range, °F		Other			

Sampling Equipment IDs		Calibration		Equipment Checks	Pre	Mid	Post
Meterbox ID	MB2	Meterbox Y	1.017	Pitot (+), pass @ in. H_2O	☑ @ 3.5	☐ @	☑ @ 3.7
Umbilical ID	Umb 9	Meterbox ΔH@, in. H_2O	1.75	Pitot (-), pass @ in. H_2O	☑ @ 3.5	☐ @	☑ @ 3.2
Nozzle ID	Glass ~~7FT-A~~	Nozzle diameter, Dn, in.	0.234	Pitot visual inspection	☑ pass	☐ pass	☑ pass
Pitot / Probe ID	7FT-A	Pitot coefficient, Cp	.84	Nozzle visual inspection	☐ pass	☐ pass	☐ pass
Manometer ID	MB2	Manometer zero and level	☑ yes	Meter, cfm @ in. Hg	0.000 @ 15	@	0.000 @ 11
Sensitivity		K-Factor	2.1	Intermediate leak check volume, ft^3		/	/

Ref. Thermometer ID

Continuity Check ☐ Continuity w/ Proper Polarity

Notes:

Traverse Point #	Elapsed Time	Clock Time 24hr	DGM Reading, Vm, ft^3	Velocity Head, ΔP in H_2O	Orifice Pressure Differential, ΔH Target	ΔH Actual	Stack Temp, °F	Probe Temp, °F	Filter Temp, °F Box	Filter Temp, °F Exit	Impinger Exit Temp, °F	Dry Gas Meter Inlet	Dry Gas Meter Outlet		Pump Vacuum, in. Hg
P1-1	2.5	14:18	426.171	.55	1.2	1.2	258	217		200	50		88		2
-2	5		428.53	.66	1.6	1.6	258	210		207	51		88		2
-3	7.5		430.82	.53	1.1	1.1	224	214		202	51		88		3
-4	10		432.40	.55	1.2	1.2	258	220		205	52		88		3
-5	12.5		434.6	.81	1.7	1.7	295	221		204	53		88		3
-6	15		435.72	.75	1.6	1.6	285	220		261	54		88		3
-1	17.5		436.53	.70	1.5	1.5	284	221		264	55		88		3
-2	20		437.73	.70	1.5	1.5	284	218		265	55		88		3
-3	22.5		439.26	.71	1.5	1.5	284	231		258	56		88		3
-4	25		440.82	.70	1.5	1.5	285	238		249	57		88		3
-5	27.5		442.92	.68	1.5	1.5	282	239		258	58		89		3
-6	30	Pause	445.43	.66	1.3	1.3	282	229		255	60		89		3
P2-1	32.5	1452	448.82	.62	1.3	1.3	282	252		262	61		89		3
-2	35	Resume	451.02	.44	.9	0.9	300	246		261	62		90		4
-3	37.5		453.31	.44	.9	.9	300	241		262	58		89		4
-4	40		454.94	.45	.9	.9	300	244		260	54		90		3
-5	42.5		456.77	.42	.9	.9	289	238		259	52		90		3
-6	45		458.91	.42	.9	.9	288	236		258	51		90		4
-1	47.5		460.51	.25	.5	.5	252	237		258	50		90		4
-2	50		462.82	.28	.5	.5	251	238		251	51		89		4
-3	52.5		464.10	.50	1.0	1.0	252	236		252	50		89		4
-4	55		465.87	.50	1.0	1.0	252	230		253	50		90		3
-5	57.5		466.78	~~1.0~~ .50	1.0	1.0	254	226		254	49		90		3
-6	60	Pause	468.29	~~1.2~~ .57	1.2	1.2	255	236		261	50		90		3
P3-1	62.5	1522	464.50	~~1.1~~ .54	1.1	1.1	258	235		260	49		90		3
Averages			66.97												

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MW049AS-018563-RT-1074

MONTROSE AIR QUALITY SERVICES

EPA Method ___ Field Datasheet (Isokinetic)

Project Information		Sampling Conditions		ALT 011	TC ID:	Ambient °F	Ref. °F
Date	7/26/22 Project # 18563	Static Pressure, in. H_2O	Ambient Temp, °F	Stack			
Customer/Facility	Cleveland Cliffs Dearborn, MI	Barometric Pressure, in. Hg	Ref. Barometer ID	Probe			
Unit ID/Sample Location	ESP	Wind Speed / Direction	Precipitation, Y / N, type	Filter Box			
Run #	1 Operator LR	Filter Temp Range, °F 248 +/- 25		Filter Exit			

Sampling Equipment IDs	Calibration	Equipment Checks	Pre	Mid	Post		
Meterbox ID	Meterbox Y	Pitot (+), pass @ in. H_2O	☐ @	☐ @	☐ @	Meter outlet	
Umbilical ID	Meterbox ΔH@, in. H_2O	Pitot (-), pass @ in. H_2O	☐ @	☐ @	☐ @	Impinger Exit	
Nozzle ID	Nozzle diameter, Dn, in.	Pitot visual inspection	☐ pass	☐ pass	☐ pass	Other	
Pitot / Probe ID	Pitot coefficient, Cp 0.84	Nozzle visual inspection	☐ pass	☐ pass	☐ pass	Ref. Thermometer ID	
Manometer ID	Manometer zero and level ☐ yes	Meter, cfm @ in. Hg	@	@	@	Continuity Check ☑ Continuity w/ Proper Polarity	
Sensitivity	K-Factor	Intermediate leak check volume, ft^3		/	/	Notes: Filter No.	

Traverse Point #	Elapsed Time	Clock Time 24hr	DGM Reading, Vm, ft^3	Velocity Head, ΔP in H_2O	Orifice Pressure Differential, ΔH		Stack Temp, °F	Probe Temp, °F	Filter Temp, °F		Impinger Exit Temp, °F	Dry Gas Meter Temperature, °F		NA	Pump Vacuum, in. Hg
					Target	Actual			Box	Exit		Inlet	Outlet		
-2	65	Resume	470.92	.68	1.4	1.4	250	248	------	257	49	↓	90	↓	3
-3	67.5	1527	471.96	.70	1.5	1.5	249	246	------	251	90		90		4
-1	70		473.26	.71	1.5	1.5	248	246	------	255	54		90		4
-5	72.5		474.55	.72	1.5	1.5	247	242	------	256	53		90		5
-6	75		477.54	.73	1.5	1.5	246	240	------	260	55		89		4
P4-1	77.5		479.81	.76	1.6	1.6	285	239	------	262	56		90		4
P4-2	80	Pause	480.26	.72	1.5	1.5	280	241	------	261	56		90		4
-3	82.5	1549	481.03	.65	1.5	1.5	279	242	------	265	56		90		5
-4	85	Resume	482.32	.45	.88	.88	254	246	------	258	57		91		5
-5	87.5	1558	483.28	.40	.84	.84	254	246	------	259	58		91		4
-6	90		484.95	.54	.82	.82	248	244	------	200	57		91		3
~~5~~-1	92.5		486.01	.40	.84	.84	238	243	------	257	58		92		3
-2	95		487.46	.55	.80	.80	240	244	------	256	60		92		3
-3	97.5		488.94	.40	.84	.84	241	239	------	255	60		91		3
-4	100		490.14	.59	.82	.82	241	239	------	257	61		91		3
-5	102.5	end	491.74	.42	.86	.86	243	240	------	255	61		92		3
-6	105	1616	493.140	~~.39~~	~~.82~~	~~.80~~	~~244~~	~~241~~	------	~~251~~	~~61~~		~~92~~		~~3~~
	107.5			LR 7/26				[illegible]	------	[illegible]					
	110								------						
	112.5								------						

Averages															

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