

December 21, 2018

Attn: Mr. Hassan Bouchareb
Statewide Mercury Total Maximum Daily Load Coordinator
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Subject: Northshore Mining Company Mercury Reduction Plan

Dear Mr. Bouchareb:

Attached with this electronic submittal is Northshore Mining Company's *Mercury Reduction Plan Submittal (Ferrous Mining/Processing) Form* (Form aq-ei2-04a) and associated mercury emissions calculations. A hard copy with original signatures is also being mailed to your attention today.

Please contact me at 218-226-6032 with any questions or comments you may have on this submittal.

Sincerely,



Andrea Hayden
Environmental Manager

cc: Paul Carlson - Northshore Mining Company
Jennifer Ramsdell - Northshore Mining Company
Jason Aagenes - Cleveland-Cliffs Inc.
Scott Gischia - Cleveland-Cliffs Inc.

Enclosure

Mercury Reduction Plan submittal (Ferrous mining/processing)

Air Quality Permit Program

Minn. R. 7007.0502, subp. 3

Doc Type: Regulated Party Response

Instructions:

- Complete this form to meet the Mercury Reduction Plan requirements for owners and operators of ferrous mining or processing facilities subject to Minn. R. 7007.0502, subp. 3.
- Attach any additional explanatory information, for example, editable spreadsheets with calculations, stack test reports, engineering or design reports, and any other information supporting your reduction plan. Data that is considered to be confidential information must follow the procedures described in item 9 of this form.
- This reduction plan must be approved by the Minnesota Pollution Control Agency (MPCA) prior to submittal of a permit amendment application or development of an enforceable document. It is not a substitution for a permit amendment application.
- **Please submit form to:** Statewide Mercury Total Maximum Daily Load (TMDL) Coordinator, Hassan Bouchareb, Minnesota Pollution Control Agency, 520 Lafayette Road North, St. Paul, Minnesota 55155.

Mercury Reduction Plan

The goal of the Mercury TMDL is to reduce statewide mercury air emissions to 789 pounds per year. To achieve this goal, the MPCA undertook rulemaking and adopted rules regarding mercury reduction plans in Minn. R. 7007.0502. These rules established a mercury emission reduction, for ferrous mining or processing, of 72% from the amount of mercury emitted in 2008 or 2010. As stated in the [Mercury TMDL Implementation Plan](#) and reiterated in the MPCA's [Response to Comments](#) for the rulemaking, "The technology developed to achieve the target must be technically and economically feasible, it must not impair pellet quality, and it must not cause excessive corrosion to pellet furnaces and associated ducting and emission-control equipment. Criteria for determining economic feasibility will be developed through a collaborative effort by the taconite industry and the MPCA."

Minn. R. 7007.0502 requires the owners or operators of a ferrous mining or processing facility to prepare a mercury reduction plan that addresses reductions for each indurating furnace or kiln of a taconite processing facility or the rotary hearth furnace of a direct-reduced iron facility. The reduction plan may accomplish reductions at each furnace, across all furnaces at a single stationary source, or across furnaces at multiple stationary sources. The mercury reduction plan submittal and compliance deadlines are shown in the table below.

Mercury Reduction Plan submittal and compliance deadlines

Type of source	Mercury Reduction Plan submittal deadline	Compliance deadline
Ferrous mining or processing	December 30, 2018	January 1, 2025

1. Facility information

- 1.a. Facility name: Northshore Mining Company 1.b. AQ facility ID number: 07500003
- 1.c. Facility contact for this reduction plan: Andrea Hayden 1.d. Agency Interest ID number: 1875
- 1.e. Facility contact email address: andrea.hayden@clevelandcliffs.com 1.f. Facility contact phone number: 218-226-6032

2. Determination of technically achievable

Has the facility determined that the reductions listed in Minn. R. 7007.0502, subp. 6, are technically achievable by the January 1, 2025, compliance date?

- Yes Skip item 3. Go to item 4.
 No Proceed to item 3.

3. Proposal of alternative reduction

If the owner or operator determines that the mercury reductions listed in Minn. R. 7007.0502, subp. 6 are not technically achievable by the identified compliance date; an alternative plan may be submitted under Minn. R. 7007.0502, subp. 5(A)(2). If you are proposing an alternative plan to reduce mercury emissions, please complete the following:

a) Complete Steps 1 through 6 below:

Step 1. Identify all available technologies and rank in descending order of control effectiveness.

N/A

Step 2. Eliminate technically infeasible technologies.

Include references and citations supporting the basis for the determination that the reductions are not technically achievable by the compliance date. If the mercury reductions are not technically achievable based solely or partly on economic factors, include references and citations supporting the basis for the determination that the reductions are not economically feasible.

N/A

Step 3. Rank remaining technologies in descending order of control effectiveness.

N/A

Step 4. Complete an environmental impacts analysis.

Provide an analysis of environmental impacts. Focus on impacts other than direct impacts due to emissions of mercury, such as solid or hazardous waste generation, discharges of polluted water from a control device, demand on local water resources, and emissions of other regulated air pollutants.

N/A

Step 5. Complete a cost effectiveness evaluation.

Calculate the cost effectiveness of each control technology (in dollars per pound of mercury emissions reduced). This cost effectiveness must address both an average basis for each measure and combination of measures. If multi-pollutant control strategies were considered that have implications on cost, such as the control technology also reducing emissions of other regulated air pollutants, please provide that information as well. The costs associated with direct energy impacts should be calculated and included in the cost analysis. Direct energy consumption impacts include the consumption of fuel and the consumption of electrical or thermal energy. The emphasis of this analysis is on the cost of control relative to the amount of pollutant removed, rather than economic parameters that provide an indication of the general affordability of the control alternative relative to the source.

N/A

Step 6. Of the remaining technologies, propose the best-performing control strategy. Describe the selection of the control strategy.

N/A

b) Provide an estimate of the annual mass of mercury emitted under the requirements of Minn. R. 7007.0502, subp. 6.

See supporting spreadsheet. Northshore Mining's baseline is 54.8 lbs Hg/year and is comprised of 50.4 pounds from Silver Bay Power (based on stack testing emission rates and 2013 operating hours) and 4.4 pounds from Northshore Mining's indurating furnaces (based on MPCA emission rates and 2008 production levels).

c) Provide an estimate of the annual mass of mercury emitted and percent reduction achieved under the proposed alternative plan.

See supporting spreadsheet. Northshore Mining is proposing a stationary source-wide mercury emission cap of 15.3 lb Hg/yr which represents a 72% total reduction from baseline emissions.

d) Complete the information in items 4 through 9 for your alternative proposal.

4. Description of mercury reduction action

Complete the following table for each emission unit that emits mercury. Use a separate row for each specific control, process, material or work practice that will be employed to achieve the applicable control efficiencies, reductions or allowable emissions. Provide a written summary below as needed for context or background. Minn. R. 7007.0502, subp. 5(A)(1)(a), 5(A)(1)(b), or 5(A)(2)(a).

This table has an example of information that the MPCA is seeking for industrial boilers. The table is designed to help address each element needed when composing enforceable emission limits, control efficiencies or other conditions to meet mercury reductions. In the below example, the facility is applying control technology and fuel limits between two boilers to meet the total mercury reduction requirement of 70% with no changes proposed for the lime kiln other than tracking suppliers and fuel sampling [examples can be deleted]. To create a new row, place your cursor in the last column of the last row, hit tab.

Emission unit	Element to reduce mercury (control device, work practice, etc.)	Reduction, control efficiency, emission limit, operating limit, or work practice* (indicate units, i.e., lb. hg/ton material, % control)	Describe element in detail (include manufacturer's data** as applicable)
EU001 Power Boiler 1	Work Practice	Over-controlling SBP with a 78.3% reduction – Via enforceable Hg emissions cap of 15.3 lb/year for the stationary source. (Satisfies the 72% reduction target.)	N/A
EU002 Power Boiler 2	Work Practice		N/A
EU100 F11 Hood Exhaust	N/A	No direct reduction –Achieve equivalent 72% reduction by over-controlling SBP via enforceable Hg emissions cap of 15.3 lb/year for the stationary source.	N/A
EU104 F11 Waste Gas	N/A		
EU110 F12 Hood Exhaust	N/A		
EU114 F12 Waste Gas	N/A		
EU262 F6 HE/WG	N/A		
EU634 F5 HE/WG	N/A		

*The permit or enforceable document will include the proposed control efficiency, emission limits, or other requirements that achieve the reduction.

**Attach manufacturer's information and other resources used to document the reduction

Written description:

Please see supporting spreadsheet for proposed enforceable mercury emission cap rationale.

5. Schedule

For each reduction element (specific control, process, material or work practice) described in Item 4 that will be employed as part of the mercury reduction plan, complete the following table. To create a new row, place your cursor in the last column of the last row, hit tab.

Emission unit	Reduction element	Anticipated element construction/installation date (mm/dd/yyyy)	Anticipated startup date (mm/dd/yyyy)	Anticipated date for demonstrating reduction target (mm/dd/yyyy)	Date reduction needs to be met (mm/dd/yyyy)	Anticipated date of permit application submittal (if necessary) (mm/dd/yyyy)
EU001 Power Boiler 1	Work Practice	N/A	N/A	01/01/2020	01/01/2025	06/30/2019
EU002 Power Boiler 2	Work Practice	N/A	N/A	01/01/2020	01/01/2025	06/30/2019
EU100 F11 HE	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019
EU104 F11 WG	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019

EU110 F12 HE	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019
EU114 F12 WG	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019
EU262 F6 HE/WG	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019
EU234 F5 HE/WG	Reduction @ PB 1&2	N/A	N/A	01/01/2025	01/01/2025	06/30/2019

6. Calculation data

Include all mercury emission calculations for each emissions unit listed in item 4 in an editable electronic spreadsheet. Provide calculations showing the mercury reduction, control efficiency, or emission rate that each emissions unit will achieve once the plan for that emissions unit is fully implemented.

6a. Emission factors

Identify the emission factors and sources of the emission factors used to determine mercury emissions in item 3 in the following table. Please include the rationale behind your decision. Minn. R. 7007.0502, subp. 5(A)(1)(b) or Minn. R. 7007.0502, subp. 5(A)(2)(d). *To create a new row, place your cursor in the last column of the last row, hit tab.*

Emission unit	Emission factors for current mercury emissions rate, if applicable	Source of emission factor	Target emission rate	Source of emission factors for target emission rate
EU001 Power Boiler 1	0.0029 lb/hr	M29 Stack Test 3/16/2010	Stationary Source-Wide Hg Emission Cap ≤ 15.3 lb/yr	N/A
EU002 Power Boiler 2	0.0034 lb/hr	M29 Stack Test 7/19/2018		
EU100 F11 Hood Exhaust	0.83 lb/mmmt pellets (total facility production)	MPCA 2014 Response to Rulemaking Comments		
EU104 F11 Waste Gas				
EU110 F12 Hood Exhaust				
EU114 F12 Waste Gas				
EU262 F6 HE/WG				
EU634 F5 HE/WG				

7. Operation, monitoring, and recordkeeping plan

7a. Operation and optimization plan

For each control device used to achieve the overall mercury reduction of the plan, describe how you will operate the control system such that mercury reductions are maintained. Explain how an operator might adjust the control system at the facility. Describe system alarms or safeguards to ensure optimal operation of the mercury control system. Optimization also includes training of individuals responsible for operating the control system, and the development and upkeep of operation and maintenance manuals. The MPCA is not requesting that such programs or manuals be included here, rather that they are summarized. Discuss potential variability of mercury emissions and how operations will be monitored to address variability. Minn. R. 7007.0502, subp. 5(A)(1)(c) or Minn. R. 7007.0502, subp. 5(A)(2)(c).

Northshore Mining Company and Silver Bay Power make up the stationary source under air permit 07500003-010. A stationary source-wide mercury emissions cap of 15.3 lb/year would satisfy the Minnesota Rule requirements for a 72% mercury emission reduction. Northshore Mining's approach to reducing mercury aligns with MPCA's guidance on Mercury Reduction Plans as described in the 7/14/2014 *Revised MPCA Response to Comments Received during the Public Comment Period on the Dual Notice of Intent to Adopt Rules Governing Mercury Air Emissions Reporting and Reduction*. MPCA's comment reads as follows:

Lastly, Cliffs Natural Resources raises concerns about the requirement to prepare reduction plans when the result of the sum of multiple and different mercury emission sources (in their case, taconite indurating furnaces and coal-fired power boilers) results in a requirement to prepare a reduction plan for the taconite furnaces and a reduction of 72% from those furnaces. The proposed rule does not specify what types of controls any source should implement, but allows sources to identify reduction strategies, including alternative plans that best suit their needs. The flexibility built into the rule addresses Cliffs Natural Resources concerns.

Silver Bay Power (Power Boiler 1 – EU001; Power Boiler 2 – EU002) is owned and operated by Northshore Mining to provide power and steam for its taconite processing facility. Silver Bay Power uses coal as its primary fuel source and natural gas as its secondary fuel source. Northshore Mining intends to economically idle Silver Bay Power on January 1, 2020, thereby providing early mercury emission reductions. To facilitate economic idling of Silver Bay Power, Northshore Mining will purchase electric power from Minnesota Power and is installing a natural gas fired package boiler plant to provide steam to the taconite processing facility. Northshore Mining has recently invested significant resources and capital to allow for its taconite facility to receive all of its electrical power from the grid and to install the new gas fired package steam plant. Silver Bay Power will be maintained in a ready state/standby mode. If Silver Bay Power does return to service any time after January 1, 2025, its mercury emissions will be limited by managing its fuel consumption (increased natural gas and reduction/elimination of solid fuel) or by installing additional control technologies if solid fuel is utilized in the future. Note, installation of additional control technologies would trigger future Title V permit amendments and approval by MPCA.

Northshore Mining is proposing to develop a mercury emission tracking system that will calculate and reconcile combined annual mercury emissions from its indurating furnaces and Silver Bay Power. The emission tracking system would allow for banking of excess mercury emission reduction credits, including the early mercury emission reductions attributed to the economic idling of Silver Bay Power prior to January 1, 2025. The source-wide emission cap of 15.3 pounds would become effective for the year beginning January 1, 2025 and continue in future years. Northshore Mining is also proposing that excess emission reduction credits be available for transfer to other taconite production facilities to partially offset their mercury reduction requirements in the event that those facilities are not able to meet the 72% mercury emission reduction target.

7b. Proposed monitoring and recordkeeping

For each reduction element (specific control equipment, emission limit, operating limit, material or work practice), describe monitoring to provide a reasonable assurance of continuous control of mercury emissions. If the plan includes control equipment, attach MPCA Air Quality Permit Forms GI-05A and CD-05. Minn. R. 7007.0502, subp. 5(A)(1)(d).

This table and following description has example material for a facility with two coal fired boilers [examples can be deleted]. To create a new row, place your cursor in the last column of the last row, hit tab.

Emission Unit	Reduction Element	Reduction, Control Efficiency or Emission Rate (include units)	Operating Parameters	Monitoring Method	Parameter Range (include units, if applicable)	Monitoring Frequency	Proposed Recordkeeping	Discussion of Why Monitoring is Adequate
EUs 001, 002	Economic idling; additional controls; fuel management	N/A	Hourly operation by fuel type.	Record hourly operation by fuel type.	N/A	N/A	Calculate actual annual emissions by multiplying fuel type operating hours by appropriate emission factor for each fuel.	Silver Bay Power can utilize natural gas if emissions cap is approached while utilizing solid fuel. Northshore Mining will maintain a mercury emission tracking system to maintain compliance with the 15.3 lb Hg/year emission cap.
EUs 100, 104, 110, 114, 262, 643	Overcontrol of EUs 001, 002; source-wide emission cap	N/A	Annual pellet production	Record annual pellet production	N/A	N/A	Calculate actual annual emissions by multiplying pellet tonnage by 0.83 lb Hg/mmlt pellet.	

Additional Discussion:

7c. Evaluation of the use of Continuous Emissions Monitoring Systems (CEMS).

Evaluate the use of CEMS for mercury, both the sorbent tube method (U.S. Environmental Protection Agency [EPA] Method 30B) and an extractive “continuous” system. Describe if either method has been used at the mercury emissions source for parametric monitoring or for compliance determination. If CEMS is selected for monitoring of mercury emissions, please include in item 6a above. If it is not selected for monitoring of mercury emissions, please discuss the evaluation of the use of CEMS below:

Mercury CEMS are not appropriate for this application with Silver Bay Power planning to be idled prior to the January 1, 2025 compliance date and the extremely low mercury concentrations from the indurating furnaces.

8. Mechanism to make reduction plan enforceable.

The elements of the reduction plan will be included in your air emissions permit. If a permit amendment is needed in order to install or implement the control plan, please explain:

Once the mercury reduction plan is approved by MPCA, Northshore Mining will submit a permit amendment application within 90 days to add an enforceable mercury emissions cap of 15.3 lb Hg/year for the stationary source under permit 07500003-010. The permit amendment will include a description and example of the source-wide mercury emission tracking system, including a description of excess mercury emission reduction banking; accounting of early reduction attributable to the economic idling of Silver Bay Power; and mechanism for potential transfer of excess mercury emission reductions to other taconite facilities.

9. Additional information

Please provide additional information that will assist in reviewing your Mercury Reduction Plan.

N/A

10. Confidentiality

If your mercury reduction plan submittal includes confidential information, submit two versions of the mercury reduction plan. One version with the confidential information and one public version with the confidential information redacted.

10a. Confidentiality statement

- This submittal does not contain material claimed to be confidential under Minn. Stat. §§ 13.37 subd. 1(b) and 116.075. Skip item 10b, go to item 11.
- This submittal contains material which is claimed to be confidential under Minn. Stat. §§ 13.37 subd. 1(b) and 116.075. Complete Item 10b.
Your submittal must include both Confidential and Public versions of your submittal.
 - Confidential copy of submittal attached
 - Public copy of submittal attached

10b. Confidentiality certification

To certify data for the confidential use of the MPCA, a responsible official must read the following, certify to its truth by filling in the signature block in this item, and provide the stated attachments.

- I certify that the enclosed submittal(s) and all attachments have been reviewed by me and do contain confidential material. I understand that only specific data can be considered confidential and not the entire submittal. I certify that I have enclosed the following to comply with the proper procedure for confidential material:
 - I have enclosed a statement identifying which data contained in my submittal I consider confidential, and I have explained why I believe the information qualifies for confidential (or non-public) treatment under Minnesota Statutes.
 - I have explained why the data for which I am seeking confidential treatment should not be considered "emissions data" which the MPCA is required to make available to the public under federal law.
 - I have enclosed a submittal containing all pertinent information to allow for review and approval of my submittal. This document has been clearly marked "confidential."
 - I have enclosed a second copy of my submittal with the confidential data blacked out (not omitted or deleted entirely). It is evident from this copy that information was there, but that it is not for public review. This document has been clearly marked "public copy."

Permittee responsible official

Co-permittee responsible official (if applicable)

Print name: _____

Print name: _____

Title: _____ Date _____

Title: _____ Date: _____

Signature: _____

Signature: _____

Phone: _____ Fax: _____

Phone: _____ Fax: _____

11. Submittal certification

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.

Permittee responsible official

Co-permittee responsible official (if applicable)

Print name: Paul Carlson

Print name: _____

Title: General Manager Date 12-21-18

Title: _____ Date: _____

Signature: 

Signature: _____

Phone: 218-226-6057 Fax: N/A

Phone: _____ Fax: _____

Northshore Mining Company Mercury Emission Baseline and Proposed Limit

Northshore/Silver Bay Power - Hg Baseline Summary and Future Limit	2013 Operating Hours (hr/year)		Emission Factors (lb/hr)		Baseline Hg Emissions (lb/year)			Limit Beginning 2025 (28% of Baseline)
	Unit 1	Unit 2	Unit 1 ¹	Unit 2 ²	Unit 1	Unit 2	SBP Total	
Silver Bay Power								
2013 Calculated Emissions (Based on 2013 operating hours and max emission factor from stack testing)	8239	7797	0.0029	0.0034	23.9	26.5	50.4	14.1
NSM Indurating Furnaces	2008 Production (mmlt)		Emission Factor (lb/mmlt pellet) ³		Hg Emissions (lb/year)		Furnaces Total	Limit Beginning 2025 (28% of Baseline)
Indurating Furnaces (Based on 2008 operating hours and emission factor from 2014 MPCA's Mercury Rule Response to Comments)	5.299		0.83		4.4		4.4	1.2
Total							54.8	15.3

Emission Factor Sources:

1. Unit 1 Performance Stack Test - Method 29, March 16, 2010
2. Unit 2 Performance Stack Test - Method 29, July 19, 2018
3. MPCA - Revised MPCA Response to Comments Received during the Public Comment Period on the Dual Notice of Intent to Adopt Rules Governing Mercury Air Emissions Reporting and Reduction, Minnesota Rules, Chapters 7005, 7007, 7011, and 7019. Table 3. Pg. 24.