

Operation and Maintenance (O&M) Plan



Empire Iron Mining Partnership

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Operation and Maintenance (O&M) Plan

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1. Purpose

Cleveland-Cliffs' Empire Iron Mining Partnership facility is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Taconite Iron Ore Processing [40 Code of Federal Regulations (CFR) Part 63 Subpart RRRRR]. This regulation is commonly referred to as the Taconite MACT. The regulation requires the development and implementation of an Operation and Maintenance (O&M) Plan (40 CFR 63.9600(b)) which must be submitted to the Administrator for review and approval by October 30, 2006.

The O&M Plan is applicable to air pollution control equipment that is used to achieve compliance with the Taconite MACT. This includes the indurating furnace(s) and pollution control equipment used to control particulate emissions from the following sources:

- Ore Crushing and Handling Emission Units;
- Indurating Furnace(s); and
- Finished Pellet Handling Emission Units.

The general purpose of the O&M Plan is to document that the pollution control equipment at the facility is operated and maintained in a manner consistent with good air pollution control practice by minimizing emissions by documenting the operation and maintenance activities.

The O&M Plan must contain four general components:

1. Preventative maintenance for each control device;
2. Corrective action procedures for bag leak detection systems;
3. Corrective action procedures for continuous parametric monitoring systems (CPMS) for air pollution control devices except baghouses; and
4. Good combustion practices for each indurating furnace.

In addition to the four general components required for the O&M Plan, this document also addresses roles and responsibilities, recordkeeping, reporting, and revisions.

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2. Responsibilities

The following is a summary of the responsibilities for each position involved in the implementation of the SSM Plans.

2.1 Maintenance Personnel

- 2.1.1 Conducting and documenting maintenance activities, per the O&M Plan.

2.2 Maintenance Coordinators

- 2.2.1 Coordinating preventative maintenance activities, per the O&M Plan;
- 2.2.2 Coordinating maintenance activities, per the O&M Plan;
- 2.2.3 Coordinating critical spare parts specifications and inventories, per the O&M Plan; and
- 2.2.4 Maintaining equipment repair histories through the maintenance tracking system.

2.3 Section Manager Maintenance

- 2.3.1 Ensure that the Maintenance Personnel are completing their responsibilities;
- 2.3.2 Ensure that the Maintenance Coordinators are completing their responsibilities; and
- 2.3.3 Assist Maintenance Personnel and the Maintenance Coordinator as needed.

2.4 Operators

- 2.4.1 Operating the applicable air pollution control equipment and the indurating furnace(s) according to the Standard Operating Procedures (SOPs), the O&M Plan, and the SSM Plan;
- 2.4.2 Assisting in the development and updating of the SSM and O&M procedures, the SSM Plan, and the O&M Plan;
- 2.4.3 Reporting all malfunctions to the shift supervisor; and

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2.4.4 Following the SSM Plan malfunction procedures.

2.5 Shift Supervisor

2.5.1 Ensuring that the operators are completing their responsibilities;

2.5.2 Assisting the operators in responding to malfunction events, as necessary;

2.5.3 Responding to malfunction events and completing the Malfunction form, as required;

2.5.4 Reviewing the completed Malfunction Forms for completeness and accuracy;

2.5.5 Coordinating the root cause analysis and identification of the steps to prevent a recurrence; and

2.5.6 Submitting the completed Malfunction Forms to the Section Manager and Environmental Department.

2.6 Site Operations Manager

2.6.1 Ensuring that the operators and shift supervisors are completing their responsibilities;

2.6.2 Assisting the operators and shift supervisors in responding to malfunction events, as necessary;

2.6.3 Assisting with root cause analysis and steps to prevent a recurrence;

2.6.4 Ensuring that the steps to prevent a recurrence are completed in a timely manner;

2.6.5 Assisting in the development and updating of the SSM and O&M procedures, the SSM Plan, and the O&M Plan; and

2.6.6 Coordinating initial training and refresher training of all affected operators and supervisors.

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2.7 Environmental Engineer

- 2.7.1 Developing and updating the SSM and O&M procedures, the SSM Plan, and the O&M Plan;
- 2.7.2 Maintaining records as required by this plan;
- 2.7.3 Submitting reports as required by the regulation; and
- 2.7.4 Assisting everyone listed above in the completion of their responsibilities, as needed.

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3. Definitions

Administrator means the regulatory agency that is responsible for the administration of the Taconite MACT regulation; this could be EPA or State of MI EGLE (MDEQ).

Bypass means to route gas around a control device.

CPMS means continuous parametric monitoring system.

CFR means Code of Federal Regulations.

Dynamic Wet Scrubber means an air emissions control device which utilizes a mechanically powered fan to cause contact between the process exhaust gas stream and the scrubbing liquid which are introduced concurrently into the fan inlet.

EGLE means State of Michigan Department of Environment, Great Lakes, & Energy.

EPA means United States Environmental Protection Agency.

ESP means electrostatic precipitator.

Finished Pellet Handling means the transfer of fired taconite pellets from the indurating furnace to the finished pellet stockpiles at the plant. Finished pellet handling includes, but is not limited to:

- Furnace discharge or grate discharge;
- Finished pellet screening;
- Finished pellet transfer; and
- Finished pellet storage.

The atmospheric pellet cooler vent stack and gravity conveyor gallery vents designed to remove heat and water vapor from the structure are not included as part of the finished pellet handling affected source.

GCP means the Good Combustion Practices.

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HAPS means Hazardous Air Pollutants.

Indurating means the process whereby unfired taconite pellets, called green balls, are hardened at high temperature in an indurating furnace. Types of indurating furnaces include straight-grate indurating furnaces and grate-kiln indurating furnaces.

MACT means Maximum Achievable Control Technology.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. Malfunctions are specifically defined in the SSM Plan.

MDEQ means the Michigan Department of Environmental Quality.

O&M Plan means the Operation and Maintenance Plan.

Ore Crushing and Handling Emission Units means the process whereby dry taconite ore is crushed and screened. Ore crushing and handling includes, but is not limited to:

- Dry crushing operations (e.g. primary, secondary, and tertiary crushing);
- Dry ore conveyance and transfer points;
- Dry ore classification and screening;
- Dry ore storage and stockpiling; and
- Grate feed.

Ore crushing and handling specifically excludes any operations where the dry crushed ore is saturated with water, such as wet milling and wet magnetic separation.

Shutdown means the cessation of operation of an affected source or portion of an affected source for any purpose.

SOP means standard operating procedure.

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SSM Plan means Startup, Shutdown, and Malfunction Plan.

Startup means the setting in operation of an affected source or portion of an affected source for any purpose.

4. Pollution Control Equipment Covered by this Plan

The O&M Plan has been developed for two distinct categories of pollution control equipment.

4.1 Wet Scrubbers

The following is a list of dust collectors that utilize wet scrubbers as particulate matter control equipment that are covered by this plan.

Table 4.1 –Wet Scrubbers

Air Permit ID Number	Control Equipment Description	Process Description
SV-CRUSHER1	EU-CRUSHER1	Ore Crusher #1
SV-CONVEYOR1	EU-CONVEYOR1	Ore Conveyor
SV- CRUSHER1B	EU-CRUSHER1B	1B Ore Crusher
SV-ABTRANSFER	EU-CONVEYOR1B	1B Ore Conveyor
SV-LINES5&6FEED	EU-OREFEED-LN5	Line 5 & 6 Ore Feeders
SV-LINES9&10FEED	EU-OREFEED-LN9	Line 9 & 10 Ore Feeders
SV-LINES17&18FEED	EU-OREFEED-LN17	Line 17 & 18 Ore Feeders
SV-LINES19&20FEED	EU-OREFEED-LN19	Line 19 & 20 Ore Feeders
SV-LINE21FEED	EU-OREFEED-LN21	Line 21 Ore Feeder
SV-LINE22FEED	EU-OREFEED-LN22	Line 22 Ore Feeder
SV-LINE23FEED	EU-OREFEED-LN23	Line 23 Ore Feeder
SV-LINE24FEED	EU-OREFEED-LN24	Line 24 Ore Feeder
SV-UNIT2GRATESTR	EU-UNIT2-GRATE	Pellet stripping of the grate
SV-UNIT2COOLER	EU-UNIT2-DIS#6	Unit1 Conveyor 32 Feed; Unit 2 Pellet Cooler Discharge & Conveyor 31-2 discharge
SV-31-4CONVDISCH	EU-UNIT3-31-4DIS	Conveyor 31-4 discharge end
SV-UNIT3GRATESTR	EU-UNIT3-GRATE	Pellet stripping of the grate
SV-UNIT3COOLER	EU-UNIT3-COOLER	Pellet cooler discharge
SV-31-4CONVFEED	EU-UNIT3-31-4CON	Conveyor 31-4 feed end
SV-UNIT4PANCONV	EU-UNIT4-PAN-CON	Pan conveyor
SV-UNIT4GRATEFD	EU-UNIT4-GRATE-F	Grate feed end
SV-UNIT4GRATESTR	EU-UNIT4-GRATEST	Grate stripping
SV-UNIT4COOLER	EUUNIT4-COOLER	Pellet cooler discharge
SV-31-5CONVFEED	EU-UNIT4-31-5FD	Conveyor 31-5 feed end
SV-31-5CONVDISCH	EU-UNIT4-31-5DIS	Conveyor 31-5 discharge end
SV-32-1CONVDISCH	EU-UNIT4-32-1DIS	Conveyor 32-1 discharge end

4.2 Indurating Furnaces with Dry ESPs

The following table lists the indurating furnace(s) that utilize dry ESPs as particulate matter control equipment that are covered by this plan.

Table 4.2 – Indurating Furnaces with Dry ESPs

Air Permit ID Number	Control Equipment Description	Process Description
SVUNIT2FURNACE	Unit 2 Dry ESP	Grate-Kiln Pelletizing Unit 2
SVUNIT3FURNACE	Unit 3 Dry ESP	Grate-Kiln Pelletizing Unit 3
SVUNIT4FURNACE	Unit 4 Dry ESP	Grate-Kiln Pelletizing Unit 4

4.3 Indurating Furnaces with Good Combustion Practices

The following table lists the indurating furnace(s) for the facility. The indurating furnaces are all required to follow Good Combustion Practices and, therefore, are covered by this plan.

Table 4.3 – Indurating Furnaces with Good Combustion Practices

Air Permit ID Number	Control Equipment Description	Process Description
SVUNIT2FURNACE	Unit 2 Dry ESP	Grate-Kiln Pelletizing Unit 2
SVUNIT3FURNACE	Unit 3 Dry ESP	Grate-Kiln Pelletizing Unit 3
SVUNIT4FURNACE	Unit 4 Dry ESP	Grate-Kiln Pelletizing Unit 4

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5. Preventative Maintenance for Control Devices

The requirements presented in this section of the O&M Plan apply to all of the pollution control equipment which is presented in section 4 of this plan.

Per 40 CFR 63.9600(b)(1), the O&M Plan must address the following:

Preventative maintenance for each control device, including a schedule that is consistent with the manufacturer's instructions for routine and long-term maintenance.

In order to comply with this requirement, this facility periodically evaluates the routine inspection and preventative maintenance programs for the affected equipment. The evaluations are conducted to ensure that the routine inspection and preventative maintenance programs are consistent with the manufacturer's instructions and operating experiences. The established routine inspection and preventative maintenance programs ensure that the control equipment is maintained in a manner consistent with good air pollution control practices for minimizing emissions.

The routine inspection and preventative maintenance schedules for the equipment affected by this plan are presented in Appendix A of this document.

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6. Corrective Action Procedures for Continuous Parameter Monitoring Systems

The requirements presented in this section of the O&M Plan apply to the MACT regulated systems at this facility that utilize continuous parametric monitoring systems (CPMS), which consists of the following:

- Wet scrubbers, as presented in section 4.1 and table 4.1;
- Indurating furnaces with dry ESPs as presented in section 4.2 and table 4.2; and

Monitoring requirements as required by 40 CFR 63.9631 include:

- Wet Scrubbers:
 - Daily average pressure drop; and
 - Daily average scrubber water flow rate.
- Dry ESPs:
 - 6-minute average opacity.

If the daily average operating parameter value for an emission unit or group of similar emission units does not meet the corresponding established operating limit, that does not necessarily mean that the substantive emission limitation was exceeded.

- When possible, operating conditions outside the ranges established by performance tests shall be evaluated to determine whether there were resulting emission exceedances.
- Engineering calculations and information from other process parameters may be used to evaluate whether emission exceedances occurred.
- If credible evidence indicate that the aberrant operating condition did not result in excess emissions and does not represent operation outside the expected or normal range, then the appropriate corrective action may include no action.

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Per 40 CFR 63.9600(b)(3), the O&M Plan must address the following:

Corrective action procedures for continuous parametric monitoring systems (CPMS) for all air pollution control devices except for baghouses.

The regulation states:

In the event you exceed an established operating limit for an air pollution control device except for a baghouse, you must initiate corrective action to determine the cause of the operating limit exceedence and complete the corrective action within 10 calendar days. The corrective action procedures you take must be consistent with the installation, operation, and maintenance procedure listed in your site-specific CPMS monitoring plan in accordance with 63.6932(b).

Compliance with this requirement is achieved as follows:

- The monitoring requirements of 63.9632(b) are addressed in the *Site-Specific Monitoring Plan for Continuous Parametric Monitoring Systems* for this facility.
- The corrective action procedures as required by 63.9600(b)(3) were addressed in “malfunction” section of the *Startup, Shutdown, and Malfunction (SSM) Plan* for this facility. The malfunction forms address the corrective action procedures and corresponding documentation. The malfunction forms, as presented in the SSM Plan, are presented in Appendix B of this document.

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7. Good Combustion Practices for Indurating Furnaces

The requirements presented in this section of the O&M Plan apply to the Indurating Furnaces, as presented in section 4.6 and table 4.6 of this plan.

Per 40 CFR 63.9600(b)(4), the O&M Plan must address the following:

Good combustion practices (GCP) for Indurating Furnaces.

The regulation states that the following:

You must identify and implement a set of site specific GCP for each type of indurating furnace at your plant. These GCP should correspond to your standard operating procedures for maintaining the proper and efficient combustion within each indurating furnace.

The required elements of the GCP, including the facility's strategy for compliance, justification the strategy, and the documentation plan, are provided below.

- (i) *Required Element:* Proper operating conditions for each indurating furnace (e.g. minimum combustion temperature, maximum carbon monoxide concentration in the furnace exhaust gases, burner alignment, or proper fuel-air distribution/mixing).

Facility Compliance Strategy:

- Operate according to established startup, shutdown, and malfunction procedures;
- Maintain adequate primary air by monitoring primary air fan flow or damper setting;
- Monitor and maintain kiln off gas temperature above 1500 °F;
- Operate coal mill exhauster with adequate air discharge by monitoring pressure or damper setting;
- Operate the coal mill outlet within the proper temperature range;
- Maintain negative pressure in preheat windbox; and
- Monitor flame.

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Justification for the Strategy: The induration process operates in excess of 1500 °F which is well beyond the autoignition temperature of natural gas or coal. The large quantities of fuel consumed in the induration process represents a significant portion of the product cost, it is in our best interest to ensure complete combustion of all fuel.

Facility Documentation Plan: The monitored parameters associated with GCP are documented in a computer historian. The environmental and IT departments ensure that the documented records are kept in the computer historian for a minimum of 5 years.

- (ii) *Required Element:* Routine inspection and preventative maintenance and corresponding schedules of each indurating furnace.

Facility Compliance Strategy: The routine inspection and preventative maintenance program was addressed in section 5 of this document.

Justification for the Strategy: The routine inspection and preventative maintenance schedules have been arrived at through manufacturer instructions, operational experience and process analysis.

Facility Documentation Plan: The facility documentation program for routine inspections and preventative maintenance was presented in section 5 of this document.

- (iii) *Required Element:* Performance analysis of each indurating furnace.

Facility Compliance Strategy: All aspects of the induration process are continually monitored and controlled by a Distributed Control System (DCS) which ensures the proper operating parameters are maintained. The parameter ranges have been arrived at through manufacturer instructions, operational experience and process analysis.

Justification for the Strategy: DCS is the state of the art technology for process control and monitoring.

Facility Documentation Plan: The monitored parameters associated with GCP are documented in a computer historian. The environmental and IT departments ensure that the documented records are kept in the computer historian for a minimum of 5 years.

- (iv) *Required Element:* Keeping applicable operator logs.

Facility Compliance Strategy: The parameters associated with GCP are continuously monitored by the DCS.

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Justification for the Strategy: DCS is the state of the art technology for process control and monitoring.

Facility Documentation Plan: The monitored parameters associated with GCP are documented in a computer historian. The environmental and IT departments ensure that the documented records are kept in the computer historian for a minimum of 5 years.

- (v) *Required Element:* Keeping applicable records to document compliance with each element.

Facility Compliance Strategy: The compliance strategy for recordkeeping is presented with each of the required elements.

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8. Recordkeeping Requirements

The purpose of the recordkeeping program is to maintain records that demonstrate conformance with the O&M Plan. The following general recordkeeping requirements apply as required by 40 CFR 63.9642 and 636.9643:

- All records will be maintained for a minimum of 5 years.
- Records will be maintained in a manner that can be readily accessed.
- Records can be maintained as a hard copy or a computer-readable form.
- The most recent 2 years of records will be maintained on-site. The remaining 3 years of records may be retained off-site.
- Copies of reports that have been submitted to the applicable EPA Regional office are not required to be maintained.

The following records will be maintained:

- Routine inspection and preventative maintenance records, as described in section 5;
- Completed Malfunction Forms as described in section 6; and
- GCP records, as described in section 7.

In addition, the Environmental Department will maintain a current copy of the O&M Plan. The plan will be maintained for the life of the affected source or until the affect source is no longer subject to the requirements of this regulation.

9. Reporting Requirements

The following is a summary of the reports required for the SSM Plan. All reporting is the responsibility of the Environmental Department.

9.1 Semiannual Reports

The MACT regulations require submittal of semiannual reports. The reporting requirements are detailed in 40 CFR 63.9641. It is important to note that one semiannual report is submitted for compliance with all of the Taconite MACT requirements.

The reporting due dates are:

Reporting Period	Dates	Report Due Date
1 st Semiannual Period	January 1 – June 30	September 15
2 nd Semiannual Period	June 30 – December 31	March 15

The report must include:

1. Company name and address;
2. Statement by responsible official, with the official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.
3. Dates of report and beginning and ending dates of the reporting period.
4. If there was a Startup, Shutdown, or Malfunction during the reporting period and actions were consistent with the SSM Plan, the compliance report will include the information presented in 40 CFR 63(10)(d)(5)(i), which is detailed in the SSM report.
5. If there were no deviations from the continuous compliance requirements in 40 CFR 63.9634 through 63.6936, then a statement will be provided that states that there were no deviations from the emission limitations, work practice standards, or operation and maintenance requirements during the operating period.

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6. If there were no periods during which a continuous monitoring system (CPMS or COMS) was out-of-control as specified in 40 CFR 63.8(c)(7), then a statement will be provided that states that there were no periods during which a continuous monitoring system was out-of-control during the reporting period.
7. For each deviation from a MACT emission limitation where you are not using a continuous monitoring system (including CPMS or COMS) to comply with an emission limitation for the Taconite MACT, the compliance report must contain the following information (including for periods of startup, shutdown, and malfunction):
 - (i) The total operating time of each affected source during the reporting period; and
 - (ii) Information on the number, duration, and cause of deviations (including unknown causes) as applicable, and the corrective action taken.
8. For each deviation from a MACT emission limitation where you are using a continuous monitoring system (including CPMS or COMS) to comply with an emission limitation for the Taconite MACT, the compliance report must contain the following information (including for periods of startup, shutdown, and malfunction):
 - (i) The date and time that each malfunction started and stopped;
 - (ii) The date and time that each CPMS and/or COMS was inoperative, except for zero (low-level) and high-level checks;
 - (iii) The date, time and duration that each CPMS and/or COMS was out-of-control, including the information in 40 CFR 63(c)(8);
 - (iv) The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period;
 - (v) A summary of the total duration of the deviations during the reporting period and the total duration as a percent of the total source operating time during the reporting period;

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- (vi) A breakdown of the total duration of the deviations during the reporting period, including those due to startup, shutdown, control equipment problems, process problems, other known causes, and unknown causes;
- (vii) A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of continuous monitoring system downtime as a percent of the total source operating time during the reporting period;
- (viii) A brief description of the process units;
- (ix) A brief description of the continuous monitoring system;
- (x) The date of the latest continuous monitoring system certification or audit; and
- (xi) A description of any changes in continuous monitoring systems, processes, or controls since the last reporting system.

Reports required by other regulations, can be submitted in place of or as part of the semiannual report.

This facility will comply with the reporting requirements as follows:

- The Taconite MACT Report will be submitted in combination with the Renewable Operation Permit Certification Report

9.2 Immediate Corrective Action Reports

As discussed in section 7, appendix B, and the SSM Plan, after three unsuccessful attempts at applying corrective actions to an emission unit or emission groups, an immediate corrective action report must be submitted as required by 40 CFR 63.6934(j):

- The report must be submitted to the Administrator within 5 calendar days of the third unsuccessful attempt at corrective action;
- This written report must state that a deviation has occurred and must documents the types of corrective measures that have been taken to address the problem.

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9.3 Reports for Actions Not Consistent with SSM Plan

As discussed in the SSM Plan, if an SSM event occurred that was not consistent with the SSM plan, you must submit a immediate notification and a written report, as required by 40 CFR 63.6(e)(3)(iv) and 63.10(d)(5)(ii):

- An immediate notification, which consists of a phone call or a fax, to the Administrator within 2 working days after commencing action that is inconsistent with the SSM Plan.
- A written report to the Administrator within 7 working days after the end of the event. The report shall include:
 - Certification of truth, accuracy, and completeness of report by a responsible official;
 - Explanation of circumstances of the event;
 - Reasons for not following the SSM Plan; and
 - Description of all excess emissions and/or CPMS monitoring exceedences which are believed to have occurred.

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10. Revisions of the O&M Plan

10.1 Revisions Required by the Administrator

As stated in 40 CFR 63.9600(b), the facility must submit the O&M Plan to the Administrator for review and approval by October 30, 2006. As stated in the regulation:

- The Administrator will review the adequacy of the site-specific practices, the objectives, and the records the facility will keep to demonstrate compliance with the O&M Plan.
- If the Administrator determines that any portion of the O&M Plan is not adequate, the Administrator can reject those portions of the plan, and request that the facility provide additional information addressing the relevant issues.
- In the interim of the approval of the revised portions of the plan, the facility will continue to follow the current O&M Plan as submitted, until the revisions are accepted as adequate by the Administrator.

10.2 Revisions Initiated by Cleveland-Cliffs

Cleveland-Cliffs may periodically revise the O&M Plan, as necessary, to satisfy the requirements of the regulation or to reflect changes in equipment or procedures at the affected source. In order to make these change, the facility will use the following procedure:

- The facility will submit the proposed revisions to the Administrator for approval;
- In the interim of the approval of the revised portions of the plan, the facility will continue to follow the current O&M Plan as submitted, until the revisions are accepted as adequate by the Administrator.

Original Plan October 2006
Minor Revisions March 2016
Minor Revisions July 2019

Appendix A

Routine Inspection and Preventative Maintenance Schedules

Wet Scrubbers

Routine Inspection and Preventative Maintenance Schedules

Control Equipment Description	Process Description	Equipment Description	PM Description	PM Frequency	PM Responsibility
Wet Scrubber	Ore Crushing and handling, finished pellet handling	Motor and Fan	General Check (Check for vibrations or unusual noise, check belts, check sheaves, check bearings)	Monthly	Maintenance & Operating
		Scrubber Housing	Visual Inspection (Check housing, holes and ductwork)	Monthly	Maintenance & Operating
			Check drain for plugging	Monthly	Maintenance & Operating

Indurating Furnaces with Dry ESPs Routine Inspection and Preventative Maintenance Schedules

Control Equipment Description	Process Description	Equipment Description	PM Description	PM Frequency	PM Responsibility
Dry ESP	Indurating Furnace	ESP air purge heater	<p>Check intake filters & replace as needed.</p> <p>Check current draw with AMP Probe & record readings.</p> <p>Check operation of thermostat & record temperature reading & set points.</p>	Monthly	Electrical
Dry ESP	Indurating Furnace	ESP Rapper/Vibrator	Inspect rapper and vibration control circuits for proper operation	Quarterly	Electrical
Dry ESP	Indurating Furnace	ESP	Check all units operating. Reset tripped units.	Daily	Electrical
Dry ESP	Indurating Furnace	ESP	ESP Internal Inspection	Scheduled with Major repairs (appx. 12-18 months)	PP Operations

Indurating Furnaces – Equipment for Good Combustion Practices Routine Inspection and Preventative Maintenance Schedules

Process Description	Equipment Description	PM Description	PM Frequency	PM Responsibility
Indurating Furnace	GCP Instrumentation	Instrumentation Inspection	Scheduled with major repairs (appx. 12-18 months)	Electrical

Appendix B

Corrective Action Procedures for Continuous Parametric Monitoring Systems

Malfunction Forms from SSM Plan

Malfunction Form

Wet Scrubbers

1	Identification of Wet Scrubber	Wet Scrubber Name		
1.1	On which Wet Scrubber did the Malfunction Occur:			
2	Beginning and End of Malfunction	Date and Time		
2.1	Beginning of Malfunction:			
2.2	End of Malfunction:			
3	Operations Personnel During Malfunction Event	Name		
3.1	Operator:			
3.2	Shift Supervisor:			
4	Type of Malfunction (select all that apply)			
4.1	<input type="checkbox"/> Low Pressure Drop Malfunction occurs when the daily average scrubber pressure drop is below the minimum operating requirement (see page 3 of malfunction form).			
	<input type="checkbox"/> Low Scrubber Water Flow Malfunction occurs when the daily average scrubber water flow rate is below the minimum operating requirement, (see page 3 of malfunction form).			
5	Description of Malfunction (select all that apply)			
5.1	<input type="checkbox"/> Fan failure <input type="checkbox"/> Pump failure <input type="checkbox"/> Power outage		<input type="checkbox"/> Instrument failure <input type="checkbox"/> Plugged screen or strainer <input type="checkbox"/> Plugged nozzles	
	5.2	Detailed description of malfunction:		
6	Malfunction Immediate Response	Yes	No	NA
6.1	Immediately take steps to safely secure the operation of the system			
6.2	Initiate steps to identify the cause of the malfunction			
6.3	Take actions to resolve the malfunction			
6.4	Were steps 6.1-6.3 completed as fast as reasonably possible?			
6.5	Describe the Immediate Response (attach additional information if necessary):			
6.6	Were all actions consistent with "steps for minimizing emissions"? NOTE: In order to minimize emissions during malfunction procedures, all of the answers to 6.1-6.4 should be either "Yes" or "NA."			
6.7	If the answer to 6.6 is "No," notify the Environmental Department	Who was notified: Date/Time of Notification:		
6.8	If the answer to 6.6 is "No," Explain (continue on back, if necessary):			
6.9	Did the immediate response resolve the malfunction?			

Malfunction Form – Page 2

Wet Scrubbers

7		Corrective Actions		
7.1	First Attempt Corrective Actions	Yes	No	NA
	7.1.1 Describe the first corrective action (following malfunction):			
	7.1.2 Was first corrective action initiated and completed within 10 days after the malfunction (daily limits meet operating limits after 10 days)?			
	7.1.3 Did first corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES" place the completed form in the SSM binder • If "NO", then corrective action was unsuccessful and you should notify Environmental Department and proceed to "Second Attempt" 			
7.2	Second Attempt Corrective Actions	Yes	No	NA
	7.2.1 Describe the second corrective action (following first corrective action):			
	7.2.2 Was second corrective action initiated and completed within 10 days after the first corrective action attempt (daily limits meet operating limits after 10 days)?			
	7.2.3 Did second corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES" place the completed form in the SSM binder • If "NO", then corrective action was unsuccessful and you should notify Environmental Department and proceed to "Third Attempt" 			
7.3	Third Attempt Corrective Actions	Yes	No	NA
	7.3.1 Describe the third corrective action (following second corrective action):			
	7.3.2 Was third corrective action initiated and completed within 10 days after the second corrective action attempt (daily limits meet operating limits after 10 days)?			
	7.3.3 Did third corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES", then corrective action was successful • If "NO", then corrective action was unsuccessful and you should notify Environmental Department 			
	7.3.4 NOTE: If the third corrective action attempt, the procedure from section 7 of the SSM Plan must be followed. In summary, the Environmental Department will insure that the following requirements are followed: <ul style="list-style-type: none"> ○ If the third attempt is not successful, the facility must conduct another performance test and report the third unsuccessful attempt at corrective action to the Administrator as a deviation. ○ The report must notify the Administrator that a deviation has occurred and document the types of corrective measures that have been taken to address the problem. 			
8	Steps to prevent a Reoccurrence (to be completed by Shift Supervisor)	Who	Target Completion Date	Actual Completion Date
8.1				
8.2				
8.3				

Malfunction Form

Indurating Furnaces with Dry ESPs

1	Identification of Indurating Furnace	Indurating Furnace Name		
1.1	On which Indurating Furnace did the Malfunction Occur:			
2	Beginning and End of Malfunction	Date and Time		
2.1	Beginning of Malfunction:			
2.2	End of Malfunction:			
3	Operations Personnel During Malfunction Event	Name		
3.1	Operator:			
3.2	Shift Supervisor:			
4	Type of Malfunction (select all that apply)			
4.1	<input type="checkbox"/> High Opacity Malfunction occurs when the 6-minute average opacity of emissions exiting the control device stack is above the maximum allowable, as established during the stack test. <input type="checkbox"/> Operation Malfunctions occur when other operating conditions, not detailed above, cause an increase in particulate emissions higher than the Taconite MACT standard. <input type="checkbox"/> Dry ESP Bypass Malfunctions occur when the dry ESP is bypassed, including for emergency purposes, while the indurating furnace continues to operate or is shutting down.			
5	Description of Malfunction			
5.1	<input type="checkbox"/> Fan failure <input type="checkbox"/> Instrument failure – process or monitoring <input type="checkbox"/> Power outage <input type="checkbox"/> Mechanical failure	<input type="checkbox"/> Precipitator failure <input type="checkbox"/> Plugged hopper <input type="checkbox"/> Balling problems <input type="checkbox"/> Electrical failure		
5.2	Detailed Description of malfunction:			
6	Malfunction Immediate Response	Yes	No	NA
6.1	Immediately take steps to safely secure the operation of the system			
6.2	Initiate steps to identify the cause of the malfunction			
6.3	Take actions to resolve the malfunction			
6.4	Were steps 6.1-6.3 completed as fast as reasonably possible?			
6.5	Describe the Immediate Response (attach additional information if necessary):			
6.6	Were all actions consistent with “steps for minimizing emissions”? NOTE: In order to minimize emissions during malfunction procedures, all of the answers to 6.1-6.4 should be either “Yes” or “NA.”			
6.7	If the answer to 6.6 is “No,” notify the Environmental Department	Who was notified: Date/Time of Notification:		
6.8	If the answer to 6.6 is “No,” Explain (continue on back, if necessary):			
6.9	Did the immediate response resolve the malfunction?			
	<ul style="list-style-type: none"> • If “YES” return completed form to place the completed form in the SSM binder • If “NO” proceed with corrective action (section 7 of this form) 			

Malfunction Form – Page 2

Indurating Furnaces with Dry ESPs

7		Corrective Actions (only required if immediate response was not successful and the fan continues to operate)		
7.1	First Attempt Corrective Actions	Yes	No	NA
	7.1.1	Describe the first corrective action (following immediate response):		
	7.1.2	Was first corrective action initiated and completed within 10 days after the malfunction?		
	7.1.3	Did first corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES" place the completed form in the SSM binder • If "NO", then corrective action was unsuccessful and you should notify Environmental Department and proceed to "Second Attempt" 		
7.2	Second Attempt Corrective Actions	Yes	No	NA
	7.2.1	Describe the second corrective action (following first corrective action):		
	7.2.2	Was second corrective action initiated and completed within 10 days after the first corrective action attempt?		
	7.2.3	Did second corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES" place the completed form in the SSM binder • If "NO", then corrective action was unsuccessful and you should notify Environmental Department and proceed to "Third Attempt" 		
7.3	Third Attempt Corrective Actions	Yes	No	NA
	7.3.1	Describe the third corrective action (following second corrective action):		
	7.3.2	Was third corrective action initiated and completed within 10 days after the second corrective action attempt?		
	7.3.3	Did third corrective action attempt resolve the problem? <ul style="list-style-type: none"> • If "YES", then corrective action was successful • If "NO", then corrective action was unsuccessful and you should notify Environmental Department and continue to follow the corrective action procedure until the problem is resolved. 		
	7.3.4	NOTE: If the third corrective action attempt, the procedure from section 7 of the SSM Plan must be followed. In summary, the Environmental Department will insure that the following requirements are followed: <ul style="list-style-type: none"> ○ If the third attempt is not successful, the facility must conduct another performance test and report the third unsuccessful attempt at corrective action to the Administrator as a deviation. ○ The report must notify the Administrator that a deviation has occurred and document the types of corrective measures that have been taken to address the problem. 		
8	Steps to prevent a Reoccurrence (to be completed by Shift Supervisor)	Who	Target Completion Date	Actual Completion Date
8.1				
8.2				
8.3				