

United States Steel Corporation Great Lakes Works

40 CFR 63 Subpart FFFFF National Emission Standards for Hazardous Air Pollutants For Integrated Iron and Steel Manufacturing Facilities □ Operation and Maintenance Plan

Applicable to the following:

- Processes:
 - BOF Primary & Secondary Operations
- Capture Systems:
 - BOF No. 1 Baghouse (Secondary) Emissions Control System
- Control Equipment:
 - BOF Primary Electrostatic Precipitator (ESP)
- Continuous Parametric Monitoring Systems:
 - Electrostatic Precipitator Continuous Opacity Monitor System
 - Process Damper Position
 - Baghouses
 - Fan Amps

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1.0 INTRODUCTION

1.1 Background

1.1.1 NESHAP - 40 CFR 63 Subpart FFFFF

National Emissions Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing were promulgated under 40 CFR 63 Subpart FFFFF on May 20, 2003. The following USS-GLW facilities are subject to the standards specified under 40 CFR 63 Subpart FFFFF:

- blast furnaces
- basic oxygen process furnaces (BOPF)

The following USS-GLW facilities emission sources are subject to the standards specified under 40 CFR 63 Subpart FFFFF:

- Blast furnace casthouse
- Basic oxygen process furnace (BOPF)
- BOPF shop hot metal transfer
- BOPF shop hot metal desulfurization
- BOPF shop hot metal slag skimming
- BOPF shop ladle metallurgy

1.2 Purpose

1.2.1 NESHAP - 40 CFR 63 Subpart FFFFF

These standards require that certain plans be developed and implemented by May 22, 2006. The purpose of this document is to comply with the requirements of 40 CFR 63 Subparts A and FFFFF to develop and implement the following plans:

- Operation and maintenance plan
- Site-specific monitoring plan
- Startup, shutdown and malfunction plan

1.3 Applicability

1.3.1 NESHAP - 40 CFR 63 Subpart FFFFF

1.3.1(a) Operation and Maintenance Plan

40 CFR 63.7800 requires that a written Operation and Maintenance plan be developed and implemented for the following particulate emission capture systems* and particulate emission control devices specified in 40 CFR 63.7790(b):

- Blast furnace casthouse particulate emission capture systems
- BOPF secondary particulate emission capture systems
- BOPF electrostatic precipitator primary particulate emission control systems

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* For purposes of this plan, "emission capture system" includes emission capture hoods, ductwork, dampers and fans important to the efficient collection and transport of particulate emissions to a particulate emission control device. The particulate emission control device is not part of the particulate emission capture system.

1.3.1(b) Site-Specific Monitoring Plan

The Site-Specific Monitoring Plans are not included in this document. They are included in a separate document.

1.3.1(c) Startup, Shutdown and Malfunction Plans

The Startup, Shutdown, and Malfunction Plans are not included in this document. They are included in a separate document.

2.0 OPERATION AND MAINTENANCE PLAN

2.1 SCOPE

The following particulate emission capture systems and particulate emission control devices are subject to the NESHAP 40 CFR 63 Subpart FFFFF requirement and are covered by this plan:

- Particulate emission capture systems
 - BOF No. 1 Baghouse (Secondary) Emissions Control System
- Particulate emission control devices
 - BOF Primary Electrostatic Precipitator (ESP)

2.1.1 The purpose of this plan is to ensure that the above are operated and maintained in a manner consistent with good air pollution control practices. (63.7800(a))

2.1.2 Definitions

2.1.2.1 Capture systems includes the hood, dampers, ductwork, and fans.

2.1.2.2 The ESP control device consists of ESP components (plates, rods, rappers, transformers/rectifiers, hoppers, dust handling, etc.)

2.2 PLAN ELEMENTS

2.2.1 Capture System Inspections

2.2.1.1 For the BOPF Secondary Capture system only, the following program of capture system performance monitoring and inspections will be implemented.

Equipment	Inspection Frequency	Inspection Responsibility	Recording Method	Regulatory Citation
Hoods	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Ductwork (External)	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Expansion Joints	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Process Dampers	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Fan Exterior	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Fan Housing & Seals	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Fan Bearings & Couplings	Monthly	Maintenance	CMMS	§63.7800(b)(1)
Fan Motor Bearings	Monthly	Maintenance	CMMS	§63.7800(b)(1)

2.2.1.2 For each site-specific capture system, an inspection program will be implemented based on the capture system components.

2.2.1.3 Any identified deficiencies (such as holes, corrosion, deformation, broken drive shafts), damaged areas, or other conditions affecting performance will be reported to the Environmental Department for capture system impact evaluation and to the Facility Area Maintenance Coordinator for corrective measures prior to the next inspection.

2.2 PLAN ELEMENTS

2.2.2 Control Device Preventive Maintenance §63.7800(b)(2)

2.2.2.1 For the BOPF Primary control device (ESP), a program of specific system preventive maintenance will be implemented in accordance with accepted maintenance practices, equipment maintenance history and experience, or the manufacturer's recommendation.

2.2.2.2 For each site-specific control device, a preventive maintenance program will be implemented based on the system components.

2.2.2.3 USS-GLW uses a computer based preventive maintenance system to generate work orders for regularly scheduled inspection and maintenance activities. The initial inspection and repair schedules are based on the accepted maintenance practices or the equipment manufacturer's recommended frequency. Inspection results and repair activities are tracked by the system and schedule frequency is modified as deemed appropriate.

2.2.2.3.1 BOPF Primary (ESP) Emissions Control System

<u>Operating Limit Parameter</u>	<u>Why Chosen</u>	<u>Recording Method</u>	<u>Averaging Frequency</u>	<u>Regulatory Citation</u>
COMS	Current equipment	Continuous	Hourly average	63.7800(b)(3)

2.2.1.4 Corrective action (CA) procedures for ESP COM's (63.7833(g))

2.2.1.4.1 A COM is installed on the BOF ESP exhaust stack to measure opacity.

<u>Opacity Alarm Response</u>	<u>Response Action</u>	<u>Corrective Action (CA) Responsibilities</u>	<u>Recording Method</u>	<u>Regulatory Citation</u>
Within 1 hour	Initiate CA to determine the cause of the alarm.	Operations	Paper	63.7833(g)(1)
Within 24 hours	Measure and record hourly average to determine if CA successful.	Maintenance	Paper	63.7833(g)(1)
Within 48 hours (if first CA not successful)	Measure and record hourly average to determine if CA successful.	Maintenance	Paper	63.7833(g)(1)

2.2 PLAN ELEMENTS

2.2.3 Capture System Operating Limits §63.7800(b)(3)

2.2.3.1 General §63.7800(b)(3)(i) & §63.7800(b)(3)(iii)

For the BOPF Secondary Emissions (No. 1 Baghouse)), the following operating limits parameters have been identified as the representative indicators of the capture system performance.

2.2.3.1.1 Process Damper Position §63.7800(b)(3)(i) & (iii)

All process dampers, except those that are physically fixed in one position, associated with emissions collection from different branches or local collection hoods are equipped with position monitoring instrumentation (limit switches) that records the applicable process damper(s) position(s) during a process operation to a data storage server.

BOP No. 1 Baghouse (Secondary) Emission Control System
Damper Position when operation is occurring on vessel

FURNACE OPERATION	CHARGE DAMPER	TAP DAMPER	COMMENTS
Scrap Charging	Open	Closed	None
Hot Metal Charging	Open	Closed	None
Turn Down / Slag-Off	Open	Closed	❖ This operation can be done by the primary (ESP) or combination of both.
Tapping	Closed	Open	❖ This operation can be done by the primary (ESP) or combination of both.
Slag Conditioning	Closed	Open	❖ This operation can be done by the primary (ESP) or combination of both.
Slag Blasting	Closed Open	Open Closed	❖ Does not matter which damper is open due to slag blasting is done while the furnace is straight up. ❖ This operation can be done by the primary (ESP) or combination of both.

2.2.3.1.2 Fan Motor Amperage §63.7800(b)(3)(i) & (iii)

For each capture system, each of the collection fan motor starters is equipped with current sensors and transmitters that continuously record fan motor amperages.

2.2.3.1.4 BOPF Secondary (No. 1 Baghouse) Emissions Capture System

<u>Operating Limit Parameter</u>	<u>Why Chosen</u>	<u>Recording Method</u>	<u>Averaging Frequency</u>	<u>Regulatory Citation</u>
Fan amps	Current equipment	Continuous	Operational period average	63.7800(b)(3)
Process Damper Position	Current equipment	Continuous	N/A	63.7830(a)(1)

2.2 PLAN ELEMENTS

2.2.3 Capture System Operating Limits §63.7800(b)(3)

2.2.3.2 Description of capture system design will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

2.2.3.2.1 BOPF Shop Secondary Emissions (No. 1 Baghouse)

At the No.2 BOPF Shop, the capture system consists of one (1) Hot Metal Charging emissions collection hood and one (1) BOPF Vessel Tapping emissions collection hood each with process isolation dampers for each BOPF Vessel (Nos. 25 & 26) connected by branch and main header ductwork to a positive pressure shaker type dust collector unit.

2.2.3.3 Description of the capture system operating during production will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

2.2.3.3.1 BOPF Shop Secondary Emissions (No. 1 Baghouse)

- a) The capture system will be in operation during the BOPF vessel charging, tapping, and ancillary operations.
- b) Simultaneous BOPF Shop secondary emissions control system operation at both BOPF Vessels is prohibited.
- c) For BOPF Vessel tapping operations, either the BOPF Vessel Primary Emissions Collection System, Secondary Emissions Control System Tapping Hood, or both will be in operation.

2.2.3.4 Rationale for why the parameter was chosen will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

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- See Appendix D for rationale.

2.2.3.5 Description of each selected operating limit parameter will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

- See Appendix D for description

2.2 PLAN ELEMENTS

2.2.3 Capture System Operating Limits §63.7800(b)(3)

2.2.3.6 Description of method used to monitor parameter will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

- See Appendix D for description

2.2.3.7 Data used to set the value or settings for the parameter for each process configuration will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

- The fan amp lower limit for No. 1 Baghouse Fan 1 and Fan 2 is: 115 amps

These limits were determined by tracking for each hour the maximum fan amps recorded for each fan. Then taking the lowest of these amp values across all the operating baghouse fans. The result is that for each hour, the minimum amp value for all fans is known. The specific threshold is based on the lower 0.135 percentile of the observed data. This value corresponds to the one-tail three-sigma probability for a normal distribution. It was determined that the 0.135 percentile from the empirical cumulative distribution of the 2006 data. The use of a nonparametric approach is used to avoid reliance on any assumed distributional form, which inspection of the histograms indicates would be inappropriate. See Appendix D for the back up data used to establish the limits.

2.2.4 Bag Leak Detection §63.7800(b)(4)

2.2.4.1 General §63.7800(b)(4)

For each capture system with a negative pressure type dust collector, bag leak detection instrumentation is installed.

2.2.4.1.1 The No. 1 Baghouse system is a positive pressure type baghouse and does not require the installation of bag leak detection instrumentation.

2.2 PLAN ELEMENTS

2.2.5 Dust Collector Inspections §63.7830(b)(1)-(8)

2.2.5.1 For the BOPF Secondary No. 1 Baghouse dust collector control device subject to the MACT regulation requirements, the following program of system performance monitoring and inspections will be implemented.

Dust Collector Equipment	Inspection Frequency	Inspection Task	Recording Method	Regulatory Citation
Monitor the pressure drop across each baghouse cell each day to ensure pressure drop is within the normal operating range identified in the manual.	Daily	Operations	Manual	§63.7830(b)(1)
Confirm that dust is being removed from hoppers through weekly visual inspections or other means of ensuring the proper functioning of removal mechanisms.	Weekly	Maintenance	CMMS	§63.7830(b)(2)
Check the compressed air supply for pulse-jet baghouses.	Daily	Operations	Manual	§63.7830(b)(3)
Monitor cleaning cycles to ensure proper operation using an appropriate methodology.	Daily	Operations	Manual	§63.7830(b)(4)
Check bag cleaning mechanisms for proper functioning using an appropriate methodology.	Monthly	Maintenance	CMMS	§63.7830(b)(5)
Monthly visual checks of bag tension for shaker-type units to ensure bags are not kinked or laying on their side	Monthly	Maintenance	CMMS	§63.7830(b)(6)
Confirm the physical integrity of the baghouse through visual inspections of the baghouse interior for air leaks.	Quarterly	Maintenance	CMMS	§63.7830(b)(7)
Inspect fans for wear, material buildup, and corrosion through quarterly visual inspections, vibration detectors or equivalent means.	Quarterly	Maintenance	CMMS	§63.7830(b)(8)

2.2.5.2 For each site-specific control device, an inspection program will be implemented based on the above requirements. The inspection program matrix is included in the Appendix section.

2.2.5.3 Any identified damaged areas will be reported to the Facility Area Maintenance Coordinator for incorporation into the maintenance repair schedule for completion prior to the next inspection.

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3.0 PLAN MAINTENANCE, RECORDKEEPING AND REPORTING

3.1 INITIAL PLAN REQUIREMENTS

- The Operation and Maintenance Plan, Site-Specific Monitoring Plan and Startup, Shutdown and Malfunction Plan must be developed and implemented by May 22, 2006
- The plans are not required to be submitted to or approved by U.S. EPA or MDEQ unless required the Title V operating permit.
- Failure to meet any condition in a plan is a deviation and must be reported as such in the semi-annual and annual deviation report.

3.2 PLAN REVISIONS

- Plans may be revised at any time provided that notification is given to the permitting agency in the next periodic Title V compliance certification.

3.3 RECORDKEEPING

- All current plans and superceded plans must be maintained for the life of the affected source. All other information necessary to demonstrate compliance with each plan requirement must be kept on-site for a period of at least 5 years.

3.4 SPECIAL STARTUP, SHUTDOWN AND MALFUNCTION REPORTING REQUIREMENT

- If, at any time, the Startup, Shutdown and Malfunction Plan is not followed during a startup, shutdown or malfunction event, the failure must be reported by telephone, FAX or E-Mail within 2 days following the failure to the permitting agency.
- Within 7 days following the end of the startup, shutdown or malfunction event, a letter must be submitted including the following information:
 1. Name and title of Reporting Official
 2. Certifying signature of the plant Responsible Official
 3. How the startup, shutdown or malfunction event happened
 4. What the response to the event was
 5. Reasons the Startup, Shutdown and Malfunction Plan was not followed
 6. Whether any regulated HAP emissions or monitored parameters were higher or different from their allowable values during the startup, shutdown or malfunction event.
- Within 45 day of the end of the event, the Startup, Shutdown and Malfunction Plan must be revised to describe the additional or corrected response in the event that cause happens again.

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Appendix A - Capture System Inspections §63.7800(b)(1)
Reference: BOPF O & M Plan Section 2.2.1

BOF SECONDARY #1 BAGHOUSE	PROC / DOC	MODEL W/O #
INSPECTIONS		
Ext hoods / duct / exp joints	Procedure	3042552 3043522
Ext dampers / actuators	Procedure	3042822 3042823
Ext fans / bearings / vibration	Procedure	3042822 3042823
Exterior baghouse hoppers & dust handling equipment	Procedure	3192779
Exterior clean sys components	Procedure	3192779
Shaker unit - bag tension	Procedure	3192779
Interior baghouse modules / filterbags	Procedure	3042446
		3042450
		3042452
		3042453
		3042454
		3042455
		3042456
		3042457
		3042447
		3042449
Interior fans / rotor / shaft	Procedure	3042458
		3042549

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Appendix B - Control Device Preventive Maintenance §63.7800(b)(2)
 Reference: BOPF O & M Plan Section 2.2.2

BOF PRIMARY ESP	PROC / DOC	MODEL W/O #
Preventive Maintenance		
Dust handling system components (drag feeders, bucket elevator, silo gate)	Procedure	3043014 - df
		3043015 - df
		3043016 - df
		3043017 - df
		3043018 - df
		3042495 - be
		3042496 - sg
ESP module components	Procedure	3043677
Fans	Procedure	3437632
		3042494 - #1
		3042551 - #2
		3042550 - #3

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Appendix C - Dust Collector Control Device Inspections §63.7830(b)(1)-(8)
 Reference: BOPF O & M Plan Section 2.2.5.1

BOF SECONDARY #1 BAGHOUSE	PROC / DOC	MODEL W/O #
PREVENTIVE MAINT		
Baghouse module components	Procedure	3042446
		3042447
		3042449
		3042450
		3042452
		3042453
		3042454
		3042455
		3042456
		3042457
Shaker clean sys components	Procedure	3192779
Dust handling sys components	Procedure	3192779
Fans	Procedure	3042458
		3042549

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Appendix D - Operating Limit Parameter Documentation §63.7800(b)(3)(iii) Reference: BOPF O & M Plan Section 2.2.3

D-1 - Rationale for why the parameter was chosen will be maintained in the Environmental Department files. (63.7800(b)(3)(iii)) Reference: BOPF O & M Plan Section 2.2.3.4

The fan motor amperage parameter was identified as the most consistent indicator of the capture system performance for the following reasons:

- i) The fan motor amperage monitoring instrumentation is typically installed in weather protected locations or electrical boxes, requires no maintenance after initial installation and commissioning, and requires minimal re-calibration.
- ii) The fan motor amperage parameter monitoring instrumentation will provide a consistent signal and operating range, except for seasonal fluctuations due to changes in the ambient temperature condition.
- iii) The fan motor amperage operating range can be directly correlated to the fan operational performance based on the capture system fan curve and fan law relationships.
- iv) Changes in fan performance operation due to significant capture system malfunctions (significant changes in pressure drop across the control device, fan inefficiency, capture system inefficiency) will quickly correlate to a change in the fan motor amperage parameter readings.

D-2 - Description of each selected operating limit parameter will be maintained in the Environmental Department files. (63.7800(b)(3)(iii)) Reference: BOPF O & M Plan Section 2.2.3.5

No. 1 Baghouse (Secondary) Emissions System

The fan current sensor and transmitters are located in the fan motor starter MCC panels located in the No. 1 Baghouse Control Room.

D-3 - Description of method used to monitor parameter will be maintained in the Environmental Department files. (63.7800(b)(3)(iii)) Reference: BOPF O & M Plan Section 2.2.3.6

For each capture system, each of the collection fan motor starters is equipped with current sensors and transmitters that continuously record fan motor amperages. The monitoring parameter data is collected and transferred to a Level II data server for recordkeeping.

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Appendix D - Operating Limit Parameter Documentation §63.7800(b)(3)(iii)

Reference: BOPF O & M Plan Section 2.2.3

D-4 - Data used to set the value or settings for the parameter for each process configuration will be maintained in the Environmental Department files. (63.7800(b)(3)(iii))

Reference: BOPF O & M Plan Section 2.2.3.7

- i) The site specific operating limit parameter ranges will be established by monitoring and recording the parameters during typical capture system operations and during performance of stack testing.
- ii) Site-specific operating limit parameters ranges will be established based on all facility process operation modes and for changes in seasonal conditions.
- iii) For each emissions control capture system subject to the MACT regulation requirements (BOPF Secondary Emissions), the identified site-specific operating limit parameters and ranges matrix is included in the Appendix section.

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Appendix E - MACT Alarm Corrective Action Procedure 63.7800(b)(4)
Reference: BOPF O & M Plan Sections 2.2.3 & 2.3.4