MK 12/8/21 → Jackson DO

B7061
M

GERDAU

November 29th, 2021

Mr. Scott Miller
Michigan Department of Environment, Great Lakes and Energy
Jackson District, Air Quality Division
301 East Louis Glick Highway
Jackson, MI 49203

Re: B7061-2016 / PTI 75-18 Malfunction Abatement Plan revision

Dear Scott:

Attached is the most recent revision of the Gerdau Monroe Mill malfunction abatement plan required under section one of the ROP and triggered for modification based upon completion of the work defined in PTI 75-18. The MAP scope is defined under the FGMELTSHOP flexible group III.3.

No plan failure had occurred during its most recent revision. The changes referenced in revised plan reflect the modifications that occurred as part of our melt shop CAPEX construction project outlined in PTI 75-18 and subsequent changes in melt shop operations as part of this project in addition to emission unit / flexible group changes that are described in the PTI.

If you have any questions, please contact me at 734-384-6544.

Sincerely,

Christopher Hessler
Regional Environmental Manager
Gerdau Special Steel North America

cc: ~~Karen Kajiya-Mills (EGLE)~~
Mike Kovalchick (EGLE)
File
Enc. (s)

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

REGEIVED
MDEQ - JACKSON
DEC X 2 2021
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environment, Great Lakes, and Energy, Air Quality Division upon request.

Source Name: Gerdau Macsteel Monroe Mill — County: Monroe

Source Address: 3000 E. Front Str. — City: Monroe

AQD Source ID (SRN): B7061 — ROP No.: MI-ROP-B7061-2016 — ROP Section No.: 1

Please check the appropriate box(es):

☐ **Annual Compliance Certification (Pursuant to Rule 213(4)(c))**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

☒ **Other Report Certification**

Reporting period (provide inclusive dates): From _____ To _____

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

PTI 75-18 completion: Malfunction Abatement Plan revision under FGMELTSHOP III.3 requirements

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

Daniel Mussap	VP/GM - Monroe Mill	734-384-6510
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 12/29/21

* Photocopy this form as needed.

EQP 5736 (Rev 04/30/2019)

MALFUNCTION ABATEMENT PLAN

Gerdau Monroe Mill

Electric Arc Furnace
Vacuum Tank Degasser
Ladle Metallurgy Furnace
Continuous Caster

Table of Contents

1.0 ELECTRIC ARC FURNACE (EAF) and VACUUM TANK DEGASSER (VTD)

1.1 EAF/VTD Process and Emission Control System Description

The Electric Arc Furnace (EAF) and Vacuum Tank Degasser (VTD) employs a positive pressure type baghouse for its emission control. This baghouse has a reverse air cleaning system with dust handling by means of hopper screw conveyors to a pneumatic conveying system that loads the dust into a storage silo. The dust is loaded into haul vehicles within a full building enclosure. The building is designed to control fugitive dust emissions during the loading of the truck.

The EAF has two main emission capture points. Most of the emissions are captured directly from the EAF while melting with a Direct Evacuation Control (DEC) ductwork system, emissions not caught by the DEC are captured overhead by a canopy hood system. Emissions from the VTD are routed through a booster fan and ductwork to the canopy hood system.

The EAF exhaust system includes a CO/VOC reaction chamber that allows the exhaust to reside longer in the exhaust system to facilitate combustion of CO and VOCs. The exhaust system also includes a quench system that introduces atomized water into the DEC gas stream to cool the gases prior to entering the baghouse to avoid damaging the filter bags.

The EAF/VTD emission control system consists of a positive pressure baghouse (DVBaghouse-01) with thirteen (13) compartments, three (3) main fans, and one (1) DEC fan. The baghouse exhausts through two stacks positioned above the baghouse. Each baghouse compartment contains 184 bags. Dust captured by the baghouse is screw conveyed across the baghouse and pneumatically loaded into a storage silo. The dust silo (EUDUST-SILO) holds EAF Baghouse dust (KO61) until it is shipped offsite for disposal/recycling.

The EAF is equipped with Oxy-fuel burners to facilitate melting inside the shell.

For proper air pollution control, the system requires that ten of the thirteen compartments be in operation when the EAF is operating. When fewer than ten compartments are noted to be in operation, the EAF will be shut down

1.2 EAF Emission Control Preventative Maintenance

Generally, one (1) maintenance employee is assigned to the baghouse on the day shift Monday through Friday. Maintenance and repairs are performed on the baghouse equipment on the other shifts as needed.

Maintenance Department supervisory personnel are responsible for overseeing the inspection, maintenance, and repair of the air pollution control systems for both the Electric Arc Furnace (EAF), Vacuum Tank Degasser (VTD) and the Ladle Metallurgy Furnace (LMF) equipment. The Maintenance Department personnel are also responsible for overseeing the inspection, maintenance and repair of the EAF Oxy-fuel burners.

The facility's Maintenance personnel perform the following inspections of the EAF emission control system in accordance with department procedures once per month.

- Visual inspection for hose leaks
- Door seal leaks
- Hopper leaks
- Baffle plate wear
- Cleaning mechanism wear and leaks
- Bag condition
- Fan leaks
- Valve leaks
- Duct leaks
- Slide gate operation
- Overhead door operation
- EUDUST-SILO
- Verify operation of the "Trouble Alert" push button functionality for the dust silo

Each of the thirteen (13) DVBaghouse-01 compartments is equipped with a magnehelic gage. The magnehelic gages are visually inspected by Maintenance each day. If the magnehelic gage readings are too high, Maintenance makes sure that the valves are operating properly for cleaning. If the pressure is too low, Maintenance checks the opacity, fan amperage, and visually inspects the bags for damage. Bags requiring replacement are noted on a log sheet and replaced during the next available maintenance down day.

The baghouse bags are inspected at least once per month, or more frequently, for compartments which have been isolated for downturn repairs due to opacity alarms being triggered. Maintenance employees inspect for dust at the base of the bags, as an indicator of damage. The bag or bags near the dust piles are then thoroughly inspected for damage. Bags that have major damage are replaced or tied off immediately. If the bags are temporarily tied off, then the bag is scheduled to be replaced as soon as practicable.

1.3 EAF Baghouse Spare Parts

The Maintenance Department maintains a minimum of 25 spare bags for the baghouse. In the unlikely event of a "run" on spare bags, the Maintenance Department supervisor will submit a reorder of bags within two (2) working days (Monday through Friday).

A list of major replacement parts that are maintained in inventory for the EAF operation and emission control system is provided in Attachment A.

1.4 Process and Air Cleaning Device Operating Variables

A programmable logic controller (PLC) continually monitors critical baghouse operations. Once a nonconformance is noted, the PLC triggers an alarm to the EAF pulpit, at which time the pulpit personnel notify maintenance. Maintenance arrives, views the PLC screen, which indicates the exact location and malfunction problem. Repair activities are initiated; when the repair is complete, the alarm is cleared.

Operating Variable or Permit Limit	Monitoring Method	Normal Range
Baghouse Differential Pressure	Magnehelic	3 – 14" WG

Baghouse Temperature	Thermocouple to PLC	$< 475^0$F
Baghouse Opacity	Opacity Monitor	Less than 3%
Furnace static pressure	Pressure gage	Per stack test[1]
Fan Motor Amps or Flowrate	Ammeter	Per stack test[2]

Footnote 1: Furnace DEC hood static pressure set during most recent EAF Baghouse compliance stack test and will change after each test.
Footnote 2: +/- 15 % of the EAF Baghouse fan amperage set during most recent EAF Baghouse compliance stack test and will change after each test.

The Oxy-fuel burners are inspected each down day for proper operation by the Maintenance personnel.

1.5 Variables Monitored to Detect Malfunctions

The EAF operating pulpit is equipped with a baghouse opacity alarm system. In the event of an opacity alarm, the operating personnel contact the Maintenance Department, who in turn corrects the problem or isolates the baghouse chamber that triggered the alarm. All non-conformances are noted in the quarterly Melt Shop Opacity Reports provided to the Michigan Department of Environment, Great Lakes, and Energy (EGLE). The opacity monitoring equipment is auto-calibrated daily. The opacity monitor is audited on an annual basis.

Also, within the EAF operating pulpit, is an alarm panel which will sound instantaneously when equipment malfunctions occur. This alarm panel is triggered by the baghouse PLC, and other field signals around the EAF. When the alarm sounds, the furnace operator contacts Maintenance; it is then the responsibility of the shift's Maintenance employees to respond and initiate repairs.

The EAF Baghouse PLC monitors incoming baghouse temperatures. At 450°F, an alarm is triggered. At 475°F, the PLC shuts down the baghouse. This is to protect the baghouse bags, which have a maximum temperature rating of 500°F. The Baghouse PLC also monitors a wide variety of other baghouse field conditions.

1.6 Corrective Procedures

In the event of a major malfunction of DVBaghouse-01 (i.e., more than one of the baghouse fans malfunction), the Melt Shop will cease operations until repairs have been made. If only one of the three main baghouse fans fails, daily visible emissions (VE) readings of the Melt Shop roofline will be conducted to determine if the Melt Shop can continue to run, or if it should be shut down to facilitate the necessary repairs. If opacity from the Melt Shop roofline exceeds 6%, the Melt Shop will cease operation until necessary repairs can be made. Minor malfunctions in the baghouse (i.e., a dropped bag causing 3% opacity or more to be emitted from the baghouse stacks) will require immediate attention for repairs or require a baghouse chamber to be isolated, and/or baghouse and EAF shutdown until repairs can be safely made. Proper notification will be made to the EGLE via the quarterly Melt Shop Opacity Report.

2.0 LADLE METALLURGY FURNACE (LMF)

2.1 LMF Emission Control System Description

A ladle metallurgy furnace has the ability to reheat and add "trim" alloys into the liquid steel that was melted in the EAF. The LMF affords the ability to provide temperature and alloy control to the steel making process.

The LMF employs a pulse jet baghouse (DVLMFBaghouse) to control off gases from the ladle. The steel processing off gases are captured in the LMF ladle hood and travel through the LMF Baghouse ductwork to DVLMFBaghouse. DVLMFBaghouse captures emissions from the LMF and the East Melt Shop Roof Monitor. Particulate from the off gas is removed as it passes through the filter bags in the baghouse compartments. After passing through the baghouse bags, the exhaust gas is emitted through an exhaust stack. The dust collected in the baghouse is transported off site for recycling.

The LMF emissions control system consists of a ten-module pulse jet dust collector, two operating 150,000 cfm fans (North & South ID Fans), one 70,000 cfm Booster Fan, ductwork, and process controls. Draft control is accomplished with variable position dampers.

The ten-module pulse jet dust collector is divided into two groups of five. Each group of five modules discharges dust into its own screw conveyor. Every dust collector module can be isolated from the inlet plenum via a manually operated inlet butterfly damper. Every module may be isolated from the outlet plenum via a pneumatically operated outlet butterfly valve. Each hopper has a rotary valve and vibrator. The modules are cleaned on an automatically sequenced basis, which can be triggered by time or by differential pressure. The cleaning can also be manually activated.

For proper air pollution control, the system requires that eight of the ten modules be in operation when the LMF is operating. When fewer than eight modules are noted to be in operation, the LMF will be shut down.

2.2 Preventative Maintenance Program for the LMF Baghouse

Generally, one (1) maintenance employee is assigned to the LMF operation on the day shift Monday through Friday. Maintenance is performed on the LMF equipment on other shifts as needed.

Maintenance Department supervisory personnel are responsible for overseeing the inspection, maintenance, and repair of the air pollution control systems for both the DVBaghouse-01 and DVLMFBaghouse.

The facility's Maintenance personnel perform the following maintenance activities on DVLMFBaghouse in accordance with department procedures and specified frequencies.

- General inspections and repairs:
    - Hopper Vibrators
    - Screw Conveyors
    - Rotary Valves

- Compressed Air for Pulse Jet
- Hopper and Compartment Doors sealed
- Damper Operation

A list of major replacement parts that are maintained in inventory for the LMF operation and emission control system is also provided in Attachment A.

2.3 Source and Air Cleaning Device Operating Variables

A PLC continually monitors critical baghouse operations. Once a nonconformance is noted, the PLC triggers an alarm to the LMF pulpit, at which time the LMF operator notifies Maintenance. Maintenance arrives, views the PLC screen, which indicates the location and malfunction problem. Repair activities are initiated; when the repair is complete, the alarm is cleared.

Operating Variable	Monitoring Method	Normal Range
Baghouse Differential Pressure	Magnehelic	3 – 12" WG
Baghouse Temperature	Thermocouple to PLC	$< 300^0$F
Baghouse Particle Detection	Triboelectric to PLC	Below alarm level

2.4 Corrective Procedures

In the event of a major malfunction of the LMF (i.e., the baghouse ceasing operations), the entire LMF system is not operational until the malfunction has been corrected. Other minor malfunctions are picked up either by a preventative maintenance inspection or through the LMF PLC alarm system. Once a malfunction is noted, the root cause of the malfunction is determined, and the appropriate corrective actions implemented.

3.0 CONTINUOUS CASTER (Caster)

3.1 Caster Equipment and Process Description

The Caster is designed to tap the Ladle from the bottom to transfer the molten steel into a covered tundish. This design minimizes particulate emissions which would occur from tip and pour casting. The caster consists of four strands and can process steel in all four strands simultaneously. Each strand is equipped with an oxy-fuel cutting torch to cut the steel into billets for ease of storage and further handling. Oxy-fuel cutting is a process that uses fuel gases and oxygen to cut the hot cast strands into billets. Pure oxygen, rather than air (20% oxygen/80% nitrogen), is used to increase the flame temperature to allow localized melting of the metal in a room environment. The oxy-fuel cutting torches provide cleaner cuts and make quality testing easier. Neither the tapping of the Ladle nor the oxy-fuel cutting torch operations are equipped with localized hooding or emission control equipment.

3.2 Process Operating Variables

Emissions from the caster operation are minimized by implementing the following operating parameters.

- Ladles are covered during delivery to and processing at the Caster.
- Steel is tapped from the bottom of the Ladle.
- The tundish will remain enclosed while processing steel.
- Fuel use by the oxy-fuel cutting torches is limited to pipeline quality natural gas.

3.3 Variables Monitored to Detect Malfunctions

The Maintenance Department periodically inspects the cutting torches and the oxy-fuel delivery system to determine whether the torches and/or delivery system are operating as designed. The Roll Mill monitors and records the amount of natural gas used by the oxy-fuel cutting torches on a monthly basis.

3.4 Corrective Procedures

In the event the oxy-fuel cutting torches and/or the oxy-fuel delivery system are found to be operating out of conformance with the design parameters, the applicable equipment will be repaired or replaced consistent with the manufacturer's recommendations. If the equipment is operating out of conformance it will not function properly which will alert those in the area.

4.0 CASTER COOLING TOWER

4.1 Caster Cooling Tower Equipment and Process Description

EUCASTERCOOLTWR employs Mist Eliminators to minimize water mist generated during the process water cooling process. Noncontact process water is used to condense the steam produced from the Continuous Caster.

4.2 Process Operating Variables

Emissions from the caster cooling tower operation are minimized by implementing the following operating parameters.

- Mist eliminators are in place

4.3 Variables Monitored to Detect Malfunctions

The Maintenance Department periodically inspects the cooling tower mist eliminators to determine whether the eliminators are in place and operating as designed.

4.4 Corrective Procedures

In the event the mist eliminators are found to be operating out of conformance with the design parameters, the applicable equipment will be repaired or replaced consistent with the manufacturer's recommendations. The equipment is found to be out of conformance through regular inspections.

5.0 ROLLING MILL

5.1 Rolling Mill Equipment and Process Description

The Rolling Mill Billet Reheat Furnace (BRF) is a natural gas-fired furnace designed to reheat billets from ambient temperatures to temperatures suitable for rolling. The furnace is heated by 38 burners, each powered by a combination of natural gas and combustion air. It emits through a stack that has daily emission readings performed on it. Temperatures in the furnace can reach up to 2250 °F. Burners come equipped with the capability to run on a flameless heating mode to reduce NO_x emissions.

5.2 Process Operating Variables

Emissions from the reheat furnace operation are minimized by implementing the following operating parameters:

- Level I and II automation continually monitor critical systems operations in the reheat furnace.
- Operating non-conformances trigger alarms in the operating pulpit.
- All alarms and alerts are logged and stored in an electronic archive.

5.3 Variables Monitored to Detect Malfunctions

The Rolling Mill continually monitors natural gas consumption. Any unexplained fluctuation in gas usage may signify a malfunction and will be investigated. The performance of the natural gas burners will also be monitored. Visible emissions readings of the stack will be performed upon lighting of the furnace.

5.4 Corrective Procedures

Preventative maintenance will be performed on applicable equipment. In the event the natural gas delivery system and/or the burners are found to be operating out of conformance with the design parameters, the applicable equipment will be repaired or replaced consistent with the manufacturer's recommendations. The equipment is found to be out of conformance through automated alarms that alert the BRF operators.

6.0 CORRECTIVE ACTIONS

In the event a malfunction occurs, and this plan must be followed, a failure analysis must be conducted using the PRG system. The Environmental Manager will be made aware of the situation though the PRG, and determine if an official notification needs to be made to any environmental regulation agencies. All qualifying non-conformances will be logged and reported as a deviation in the semi-annual deviation report submitted to EGLE.

7.0 REPORTING OF MALFUNCTIONS

If the facility exceeds any applicable emissions limit as a direct result of a **breakdown of control equipment continuing for more than two (2) hours**, the facility shall do both of the following:

1. Notify the Air Quality Division of the EGLE (Jackson office) at telephone number (517) 780-7844 as soon as is reasonably possible, but not later than 9:00 a.m. of the next working day.
2. Submit to the EGLE (EGLE, Jackson District Office, 301 E. Louis Glick Highway, Jackson, Michigan, 49201) in writing, within 10 days, a detailed report, including identification of the emission source that experienced the malfunction, the time and date, probable causes, duration of violation or abnormal condition, remedial action taken, and what steps are being undertaken to prevent a recurrence. These preventative steps shall become part of the Malfunction Abatement Plan.

ATTACHMENT A

Spare Parts

- EAF Emission Control System
  - Valve Controller for the EAF Sonic Spray System
  - D1 Retractable Duct
  - EAF Elbow
  - Baghouse Bags
  - Main Exhaust Fan
  - Main Exhaust Impeller
  - Rotary Blower Solenoid
  - Vibration Sensor

- Billet Reheat Furnace
  - Fan Motor
  - Combustion Air Fan
  - Gas Valves

- LMF Emission Control System
  - Baghouse Bags
  - Broken Bag Detector - TRIBO U3400-H-11-I-15-42"Q
  - Main Fan Impeller
  - Main Fan Motor
  - Booster Fan Motor
  - Booster Fan Soft Starter
  - Main Fan Soft Starter
  - Screw Conveyor & Rotary Valve zero speed switches
  - Vibration Transmitter - Metrix ST5484E-121-101-00
  - Bearings
  - Pillow Blocks
  - Gearbox – Rotolock
  - AMETEK NCC Pulse cleaning board

ATTACHMENT B

Revision Log

Revision	Date	Nature of Change
1	05/20/1994	
2	05/1/1997	
3	02/21/2001	
4	07/02/2013	
5	12/16/2013	
6	02/14/2014	
7	01/16/2015	
8	06/15/2018	
9	11/12/2021	Updates to include PTI75-18 CAPEX completion