DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

B157758896

FACILITY: GREDE LLC - IRON MOUNTAIN		**SRN / ID:** B1577
LOCATION: 801 S CARPENTER AVE, KINGSFORD		**DISTRICT:** Marquette
CITY: KINGSFORD		**COUNTY:** DICKINSON
CONTACT: Tom White , Environmental Maintenance Lead		**ACTIVITY DATE:** 06/21/2021
STAFF: Michael Conklin	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Targeted inspection for FY 21.		
RESOLVED COMPLAINTS:		

Facility: Grede, LLC – Iron Mountain (B1577)

Location: 801 South Carpenter Avenue, Kingsford, MI 49802

Contact(s): Tom White, Lead Environmental Maintenance, 715-548-1095

Kent Lewis, EHS Supervisor, 419-346-0733

Regulatory Authority

Under the Authority of Section 5526 of Part 55 of NREPA, the Department of Environment, Great Lakes, and Energy may upon the presentation of their card, and stating the authority and purpose of the investigation, enter and inspect any property at reasonable times for the purpose of investigating either an actual or suspected source of air pollution or ascertaining compliance or noncompliance with NREPA, Rules promulgated thereunder, and the federal Clean Air Act.

Facility Description

Grede, LLC – Iron Mountain (Grede) is a gray iron foundry located in Kingsford, MI. The company produces specialty iron castings used for industrial machinery and agricultural equipment. Grede operates a main foundry and a module foundry in the same building. A single WRIB Company cupola provides all the molten iron used by the main and module foundry.

Process Description

Production operations include raw material handling and preparation, mold and core production, metal melting, pouring, cooling, and casting finishing. The metal melting process begins with bulk raw materials received in the charge yard, which are used to make up the charge. Raw materials include scrap steel, pig iron, coke, and limestone. A predetermined amount of metal, coke, and limestone are added into a bucket that is elevated up to the cupola. Iron is melted by the burning of a coke bed and flows down the cupola. The flux combines with nonmetallic impurities in the iron to form slag. Molten iron and slag are removed at the bottom of the cupola. The molten iron is tapped into an electric induction holding furnace. From the holding furnace, the molten iron is poured into ladles that are transported back to pouring stations. The molten iron is poured from

ladles into the molds to create desired castings. The castings are then cooled and transported to the shakeout line, where the mold and core sand are shaken loose from the casting. The castings then proceed to finishing where they undergo chipping, grinding, shot blasting (Wheelabrators), and final quality inspections before being packaged and shipped to customers.

The production and assembly of molds and cores are the other main processes at the facility. For the production of phenolic urethane coldbox (Isocure) cores, sand and resin are mixed in mullers prior to being dispensed to the ten Isocure core machines. For the production of phonolic resin (shell) cores, the sand and resin are pre-mixed and dispensed to 21 natural gas heated core machines. The cores are then transported to one of seven mold lines where they are used to make the molds for casting. Used sand from casting shakeout is recycled and reused to make new molds.

Emissions Reporting

Grede is required to report its annual emissions to the Michigan Air Emissions Reporting System (MAERS). For 2020, the source reported the following total emissions in the table below.

Pollutant	Amount (lbs)
CO	1257
Lead	0
NOx	5077.18
PM10, Filterable	10372.47
PM2.5, Filterable	3782.85
SO2	3207.98
VOC	33667.88

Compliance History

The table below summarizes violations and enforcement actions that have occurred in the last five years at Grede.

Date	Violation Notice/Enforcement Action
June 22, 2016	Consent Order No. 23-2016 signed on June 22, 2016. EGLE alleged the company failed to comply with the ROP conditions for fugitive opacity testing within the required 6-month time period as required by 40 CFR 63.7731(b) and ROP FGMACT-EEEEE SC V.1; failed to comply with recordkeeping and monitoring requirements of the ROP for EU-P012 Main Plant Sand System, EU-P014 Main Plant Finishing, EU-P018 Main Plant Shakeout, EU-P021 Isocure, EU-P032 Module Sand System, EU-P034 Module Finishing, EU-P038 Module Shakeout, EU-P040 Sand Conditioning System, and EU-P043 Module Isocure; and failed to properly operate the control equipment associated with EU-P009 Cupola, EU-P012 Main Plant Finishing, EU-P018 Main Plant Shakeout, EU-P032 Module Sand System, EU-P034 Module Finishing, and EU-P038 Module Shakeout, as cited in the Violation Notice dated September 23, 2015.
August 6, 2018	Violation Notice issued for failure to provide AQD notification of a change in responsible official and for ROP certifications to be signed by responsible official; failure to adequately collect and dispose of air contaminants; failure to adequately maintain and operate an air cleaning device; emission of an air contaminant that has caused injurious effects to property and/or has caused unreasonable interference with the comfortable enjoyment of life and property; failure to notify of change of ownership or operational control of stationary source; failure to conduct performance testing as required; failure to provide consent of purchaser to assume all obligations of Consent Order.
September 19, 2018	Violation Notice issued for failure to submit semi-annual monitoring and deviation report for January 1 – June 30, 2018, in a timely manner.
November 30, 2018	Violation Notice issued for failure to properly maintain/operate Module Torit Collector and failure to properly handle collected air contaminants.
September 9, 2019	Violation Notice issued for failure of stack test from EU-P009 Cupola for carbon monoxide (CO) emission limits, PM10 emission limit, and SO2 because analyzer did not pass calibrations; failure of stack test for EU-P016 Main Plant Pouring and Cooling and EU-P036 Module Pouring and Cooling for PM since the minimum straight run distances and/or cyclonic

	flow requirements of EPA Method 1 were invalid. Testing was performed April 16-18, 2019 and April 23-25, 2019.
September 11, 2019	Violation Notice issued for failure to control emissions from the cupola furnace by exceedance of PM and PM10 emission limits; failure to operate pollution control equipment in a manner consistent with good air pollution control practices and according to the operation and maintenance plan. On July 31, 2019, AQD staff observed the cupola wet cap open while there was molten/ignited material in the cupola, during an off-blast period. Additionally, based upon information requested and provided by AAM-IMMF, during the previous 6 months, the cupola was operated with the wet cap open 160 times over 68 days for a total of 4,505 minutes. Opening the wet cap of the cupola, while it is operating, results in emissions by-passing the fabric filter collector and exceeding the particulate matter emission limit. The cited violations are also enforceable under Exhibit A and B of Consent Order, AQD number 23-2016.
February 19, 2021	Violation Notice issued for failure of stack test from EU-P009 Cupola for PM10. The average test result indicates PM10 emissions from the Cupola to be 2.50 pounds per hour. This is a violation of Special Condition I.5 of ROP #MI-ROP-B1577-2020 and Consent Order, AQD #2021-01.

Regulatory Analysis

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70, because the potential to emit of volatile organic compounds exceeds 100 tons per year and the potential to emit of any single HAP regulated by Section 112 of the federal Clean Air Act, is equal to or more than 10 tons per year and/or the potential to emit of all HAPs combined is equal to or more than 25 tons per year. EU-P009 CUPOLA, EU-P016 MAIN PLANT POURING AND COOLING and EU-P036 MODULE POURING AND COOLING at the stationary source are subject to the Maximum Achievable Control Technology Standards for Iron and Steel Foundries promulgated in 40 CFR Part 63, Subparts A and EEEEE.

Inspection

An on-site inspection was performed at Grede on 6/21/2021 to determine compliance with ROP No. MI-ROP-B577-2020, Consent Order No. AQD 2021-01, and all other applicable Michigan Air Pollution Control Rules and federal regulations. The facility representatives included Tom White, Kent Lewis, and Tyler Hill. The inspection began with having a meeting to discuss the inspection plan, updates on the proposed PTI application, and any changes/updates to the facility. After the discussion, a tour of the plant proceeded to inspect the emission units outlined in the ROP.

EU-P009 Cupola

This emission unit includes a WRIB Company 72-inch refractory lined, water wall, high efficiency cupola. The cupola has a maximum melt rate of 20 tph. Natural gas is used for lighting coke and the coke is used to maintain melting temperature in the cupola. Pollution control equipment includes four natural gas-fired afterburners for VOC, CO, and HAPs, a low efficiency scrubber (quench tank) for SO2, and a Hartzell Engineering Corporation baghouse for PM. This emission unit is subject to 40 CFR Part 63 Subpart EEEEE.

Emission/Material Limits

The cupola contains emission limits for CO, PM, PM10, SO2, and visible emissions (VE). Compliance with the emission limits is demonstrated through control equipment monitoring and performance testing.

The cupola contains a charge limit of 450 tons per day and 164,250 tons per year. Compliance with these limits is demonstrated through melt logs.

Process/Operational Restriction(s)

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the cupola and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of the afterburners, quench tank, and baghouse for the cupola. Performance monitoring parameters with ranges of proper operation and observed data from control room, during the inspection, are outlined in the table below.

Parameter	Range	Observed (12:14 PM CST)
Baghouse fan	115 – 281 Amps	140 Amps
Baghouse d.p.	1.0 in WC minimum	5.38 in WC
Afterburner temperature	1300 degrees F minimum	1525 degrees F

Data was collected from the cupola control room while the cupola was in "on-blast" status. After collecting performance parameters, we proceeded to the roof of the facility to inspect the cupola

housing, cupola stack, and baghouse for visible emissions. No visible emissions were observed from the cupola housing or the baghouse, however, visible emissions were observed around the cap and the 90-degree elbow of the main exhaust duct. There appeared to be a leak around the cap or in the duct that was allowing uncontrolled fugitive emissions. Mr. White and Mr. Lewis also observed the fugitive emission leak around the cap/duct elbow. This leak will need to be addressed so all exhaust gasses are captured and pass through the air pollution control equipment.

Testing/Sampling

Performance testing on the cupola last occurred in December 2020. Test protocol and results were submitted in a timely manner. Testing was conducted for compliance with the CO, PM, PM10, SO2, VOHAP, and VE emission limits. The cupola passed for all emission limits except PM10. The average result for PM10 was 2.50 lb/hr, which is an exceedance of the 1.30 lb/hr limit. Grede has been able to pass the PM10 limit in the past by not applying the Method 5D 12.4 dilution air flow rate. The facility was instructed during the 2008 testing event to not apply the 12.4 formula and it was not applied during the 2013 and 2019 tests as well. Following Method 5D, this formula is to be applied in calculating the total volumetric flow rate. In doing so, the cupola is exceeding the 1.30 lb/hr PM10 limit.

A Violation Notice was issued on 2/19/21 for the failed PM10 test result. To-date, testing has not been rescheduled due to the facility believing the cupola exhaust will not be able to meet the 1.30 lb/hr PM10 limit based on current operations and control equipment. Grede is currently preparing to submit a PTI application to increase the pound per hour PM10 emission limit. The company is currently under Consent Order AQD No. 2021-01 and is subject to stipulated fines per violation per day. The monetary amount imposed is within the discretion of EGLE.

The facility has made improvements in cupola operations and maintenance that have resulted in lower emission rates during performance testing compared to past performance tests. According to Mr. Hill, Grede has changed coke suppliers and is using a higher quality product that is believed to help in lowering CO emissions. In addition, the water temperature and cooling of the cupola is closely monitored to improve the efficiency. Grede has also stated significance maintenance has been performed on the baghouse that has improved the overall control efficiency and reduced visible emission events.

Monitoring/Recordkeeping

Grede is required to track the number and weight of charges added to the cupola during production. The facility maintains a melt log that notes the date, minutes the cupola was operating, number of charges added to the cupola, total tons of charges, average ton/hour of charge, and cupola downtime minutes. Grede uses an average 1.25 ton/charge multiplier to

factor the weight of each charge. The overall average ton/hr melt rate for 2020 was 14.7 ton/hr and the total amount of charges melted was 20,568 charges (25,710 tons). Grede also maintains a 12-month rolling sum of the amount of charges melted in the cupola. For the period 01/01/2020 through 5/31/2021, the 12-month rolling sum was below 40,000 tons. The facility is staying well below its melt limit of 164,250 tpy based on the records reviewed. Grede has only been operating on one shift per day, where historically they would run up to three shifts per day. This has caused a decrease in the amount charged compared to in the past.

Grede is required to continuously monitor and record the baghouse differential pressure, afterburner temperature, and baghouse fan amperage as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from the cupola control system in the melt room of the plant. In addition, the facility is required to monitor and record visible emissions observations from the baghouse on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate the baghouse fan amperage was between 115-280 amps, the differential pressure across the baghouse was greater than 1 in WC, stack temperature was greater than 1300 degrees F, and no visible emissions were detected from the cupola.

Grede is required to calculate and maintain records of CO, PM10 and SO2 emission rates on a 12-month rolling time period. The facility is required to use emission factors derived from the most recent stack test. Spreadsheets were provided that show the monthly amount of material melted, 12-month rolling total of material melted, and 12-month rolling total of CO, SO2, and PM10 emissions from the cupola. Taking the lb/hr stack test result and ton/hr melt rate during the test, the facility calculates a lb/ton emission factor for these pollutants. A review of these records shows the 12-month rolling emission rates of SO2, CO, and PM10 to be below the emission limits. For the period June 2020 through May 2021, the CO emissions were 0.751 tons, PM10 was 2.315 tons, and SO2 was 1.528 tons. The facility is using the most recent stack test (December 2020) emission factors in calculating these emissions rates. Grede was alerted they are only required to use stack test emission factors from the month the test was performed and going forward, until a new test is performed.

Reporting

A review of the 2020 annual compliance and deviation reports show 4 deviations reported for EU-P009 Cupola. Three of the four deviations reported were of opening the cupola cap because the VFD tripped to the baghouse fan motor. The duration of these incidents reported were five minutes. The other deviation was the cupola control system went offline for 11 minutes due to the server needing to be reset.

A follow-up email regarding the open cap deviations was sent to the company to inquire the reasons for occurrence and how the system can be improved going forward. The questions and responses are outlined below. Responses were submitted from Matt Deyarmond (Grede).

1. What is causing the VFD to trip?

   "High temperature detected by the VFD thyristor."

2. Is the VFD still in "good" condition or does it need to be replaced?

   "The VFD was replaced after the second time because we believed it was a failure with the unit."

3. Upon detection, was the cupola shutdown before the cap was opened?

   "The cupola shut down automatically when a fault like that is detected."

4. Were the afterburners still operating when the cap was opened?

   "The ignition burners remain on."

5. During each instance, how long exactly was the cap open?

   "Roughly 5 minutes. As long as it takes to check the VFD and restarting it."

6. Please provide more details on "programming updated" and corrective actions/repairs made.

   "After the second time we replaced the drive and uploaded the parameters from the drive that was in the unit. On the third, I went through the drive parameters one by one. I was able to find a change to the harmonics of the drive that was changed prior to the blower being replaced due to a bearing squeal. This change was causing the drive to overheat. Once the parameter was changed back to the default the drive stopped heating up and the issues went away."

A review of past reports indicates the facility had multiple open cap events on an annual basis. Based on a review of the 2020 compliance report and communications with Grede, the company has greatly decreased the number of open cap events and has been making improvements to minimize future occurrences.

The afterburners and baghouse are CAM subject control devices. The afterburners control CO emissions while the baghouse controls particulates. A review of the 2020 CAM Excursion/Exceedance and Monitor Downtime reports indicate the cupola had three, five-minute excursions for the baghouse due to the cap having to be opened and bypassing the baghouse. These CAM exceedances are the same deviations reported on the 2020 compliance report.

Stack/Vent Restriction(s)

The baghouse was inspected for visible emissions, proper operation, overall condition, and stack height. During the inspection of the baghouse, it was observed panels on the south facing side were not intact and were blowing outwards. Since the baghouse is a positive pressure unit, the exhaust appeared to also be exiting some at the point where the housing is not intact. The panels are being blown outward indicating emissions are being vented at this point. A range finder was used to measure the height at which the panels were shown not intact. A height of 42.6 feet was measured.

The overall stack height was also measured to check compliance against the minimum stack height requirement of 58 feet. Two points on the baghouse were measured. The first point was at the yellow guard rail on the north facing side of the baghouse. This point is the minimum height where exhaust begins to exit. A Nikon Forestry Pro II RangeFinder was used to measure stack heights throughout the inspection. Accounting for the height of the observer, the height measured at the yellow guard rail on the baghouse was 53.33 feet. The other point measured was the highest corner of the baghouse on the north facing side. Accounting for the height of the observer, the height measured was 60.83 feet.

Based on observations of the baghouse, the integrity of the structure did not appear to be well maintained and was causing exhaust leaks at a point where it should not be emitting.

EU-P011 Shell Core

This process represents the production of phenolic resin (shell) cores. The cores are produced on 10 natural gas heated core machines. Emissions from the core machines are vented into the plant, and subsequently the core area is vented by fans located on the roof. The sand used is pre-coated with a resin prior to purchase; therefore, no mixing of sand and resin is required.

Emission/Material Limits

The shell core process contains an emission limit for PM that is practically enforceable through proper operation and maintenance of equipment and emissions testing if requested.

Testing/Sampling

Testing has not been required for this emission unit.

Reporting

For 2020, no deviations were reported from the shell core process.

Stack/Vent Restrictions

The shell core process is vented through three ceiling vents that act as general ventilation for the process. During the inspection, the vent fans were on and appeared to be ventilating properly.

EU-P012 Main Plant Sand System

Process includes activities associated with collection and distribution of mold sand used in the Main Plant. The Main Plant Sand System is controlled by the Large Wet Dust Collector.

Emission/Material Limits

The Main Plant Sand System contains PM and PM10 emission limits that are made practically enforceable through proper operation and maintenance of the Large Wet Dust Collector, monitoring of pressure drop, fan amperage, visible emissions, and emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Main Plant Sand System and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of the Large Wet Dust Collector. Performance monitoring parameters with ranges of proper operation and observed data from control panel, during the inspection, are outlined in the table below.

Parameter	Range	Observed (12:02 PM CST)
Fan motor	122 – 137 Amps	130 Amps
Differential Pressure	2.0 – 4.0 in. WC	3 in WC

Design/Equipment Parameters

The Large Wet Dust Collector is equipped with a differential pressure gauge. This was observed on-site.

Testing/Sampling

Verification of PM and PM10 emission rates from the Main Plant Sand System has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the Large Wet Dust Collector differential pressure and fan amperage as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from a control panel. In addition, the facility is required to monitor and record visible emissions observations from the Large Wet Dust Collector on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate the fan amperage was between 122-137 amps, the differential pressure across the baghouse was between 2.0 – 4.0 in WC, and no visible emissions were detected from the stack of the Large Wet Dust Collector.

Grede is required to maintain records of PM10 emissions from the Main Plant Sand System on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Main Plant Sand System beginning in October 2020. For PM10 calculations, the facility is using a PM10 stack test emission factor from a 2005 stack test on the Main Plant Sand System. For the period June 2020 through May 2021, PM10 emissions were 0.4045 tons.

Reporting

A review of the 2020 compliance and deviation reports indicate there were no deviations reported, along with no CAM monitor downtimes or exceedances for the Main Plant Sand System.

Stack/Vent Restrictions

After collecting the monitoring parameters data, we proceeded to the roof of the facility to inspect the wet collector and stack. At the time of the inspection, the wet collector was operating and no visible emissions were observed.

EU-P014 Main Plant Finishing

This emission unit include all activities associated with casting finishing conducted in the Main Plant. These processes include grinding, chipping, and tumble blasting (Wheelabrators). The process exhaust is collected by three pulse-jet baghouses: East Fuller, West Fuller, and Steelcraft.

Emission/Material Limits

The Main Plant Finishing contains PM and PM10 emission limits that are made practically enforceable through proper operation and maintenance of the three baghouses, monitoring of pressure drop across each baghouse, monitoring fan amperage for each baghouse, monitoring of visible emissions from each baghouse, and emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Main Plant Finishing and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of each baghouse for Main Plant Finishing. Performance monitoring parameters with ranges of proper operation and observed data from control panels during the inspection are outlined in the table below.

Parameter	Range	Observed (12:29 PM CST)
Steelcraft baghouse fan	145 – 165 Amps	148 Amps
Steelcraft baghouse d.p.	3.5 – 5.5 in WC minimum	5.1 in WC

Parameter	Range	Observed (12:39 PM CST)
East Fuller baghouse fan	100 – 120 Amps	105 Amps
East Fuller baghouse d.p.	5.0 – 7.0 in WC minimum	6.8 in WC

Parameter	Range	Observed (12:39 PM CST)

West Fuller baghouse fan	120 – 140 Amps	132 Amps
West Fuller baghouse d.p.	5.0 – 7.0 in WC minimum	5.5 in WC

A fallout complaint was received by the EPA on 6/14/2021 and forwarded to the AQD Marquette District Office on 6/16/2021. The complainant reported noticing brown fallout depositing on vehicle and siding of house. The complaint was not from a specific incident but more of a general concern. The complainant's property is located directly south of the facility. The observed fallout is likely from an incident that occurred with the Steelcraft baghouse in March. According to Mr. Hill, the Steelcraft baghouse had a malfunction where material was being discharged out of the Steelcraft stack for a period of ten minutes. Corrective actions entailed the baghouse being shut down and replacement of 50 bags inside the unit. Mr. Hill believes the material that was discharged remained on the roof and was then blown off with a strong north wind into areas south of the facility. Mr. Hill stated the fugitive dust did not appear to be from the cupola and appeared to be from casting finishing. Since the complaint was of general concern and not of a known event, a violation notice to the facility was not issued due to the actual time of the incident being unknown. Grede was alerted of the fallout complaint received and followed-up with complainant as well. It was communicated with the complainant to alert the AQD immediately of any noticeable future events or when any fallout is detected.

Testing/Sampling

Verification of PM and PM10 emission rates from the Main Plant Finishing has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the differential pressure and fan amperage from the East Fuller, West Fuller, and Steelcraft baghouses as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from control panels that display the current fan amperage and differential pressure. In addition, the facility is required to monitor and record visible emissions observations from each of the three baghouses on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate all operating parameters were within the respected ranges for proper operation.

Grede is required to maintain records of PM10 emissions from the Main Plant Finishing on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Main Plant Finishing beginning in October 2020. For PM10 calculations, the facility is using a

PM10 MAERS emission factor and control efficiency of 99% for the baghouses. For the period June 2020 through May 2021, PM10 emissions were 0.1415 tons.

Reporting

A review of the 2020 compliance and deviation reports indicate there were five 5 deviations reported for EU-P014. Three of the deviations involved the Steelcraft baghouse having differential pressure ranges outside of the normal operating ranges. The reason for the deviations were thought to be ice forming in the air supply lines and not allowing the pulse jet system to clean the filter bags. Antifreeze was ran through the system and fixed the issues when they occurred.

The other two deviations involved the West Fuller baghouse having a differential pressure and fan amperage outside of the normal operating range. The reason for high differential pressure occurrence was the baghouse was not pulsing due to settings needed to be reset. The reason for the high fan amperage occurrence was the fan amperage gauge needed replacing. The three baghouses are all CAM subject control devices and these exceedances were also reported on the CAM Excursion/Exceedance and Monitor Downtime reports.

Based on a review of these reports, Grede is monitoring the operating parameters of these control devices and follows-up with corrective actions when exceedances occur.

Stack/Vent Restrictions

After collecting the monitoring parameters data, we proceeded outside of the facility to inspect the Steelcraft, West Fuller, and East Fuller for visible emissions and verify stack heights with the rangefinder. At the time of the inspection, all three baghouses were in operation and no visible emissions were observed. The Steelcraft baghouse measured 45.5 feet, which meets the minimum height requirement of 44 feet. The East and West Fuller baghouse stacks are cut on a 45-degree slant. Measuring at the bottom point of the stack results in a measured height of 25 feet for both West and East Fuller. Measuring at the higher point, results in a measured height of 29 feet. Since exhaust emissions can be emitted at the lowest point in the stack, the minimum height must be compared to the permitted limit. In doing so, the West and East Fuller baghouses are not meeting the minimum height requirement of 27 feet. If the stacks were raised to the high point in the slant, then the stacks would meet the minimum height requirement.

EU-P016 Main Plant Pouring and Cooling

Process includes all activities associated with the pouring and cooling of molten iron on six mold lines in the Main Plant. Molten iron is supplied by a 20-ton Brown Boveri holding furnace that

receives molten iron from the cupola. There is no emission control equipment associated with this emission unit.

Emission/Material Limits

Main Plant Pouring and Cooling is subject to PM10 emission limits. These limits are practically enforceable through proper operation and maintenance, emission calculations, and emissions testing if requested.

Process/Operational Restrictions

At the time of the inspection, all mold lines were in operation and appeared to be operating properly.

Testing/Sampling

Testing has not been requested for verification of PM10 emission rates from Main Plant Pouring and Cooling.

Monitoring/Recordkeeping

Grede is required to maintain records of PM10 emissions from the Main Plant Pouring and Cooling on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Main Plant Pouring and Cooling beginning in October 2020. For PM10 calculations, the facility is using a PM (Filterable) stack test emission factor from the December 2020 stack test and taking the ratio of PM10 to PM emission factors from the DEQ Foundry Factsheet (11/05) to calculate a PM10 emission factor for Main Plant Pouring and Cooling. For the period June 2020 through May 2021, PM10 emissions were 0.578 tons.

Reporting

A review of the 2020 compliance and deviation reports indicate there were no deviations reported from Main Plant Pouring and Cooling.

Stack/Vent Restrictions

The ROP currently has listed stacks 324176, 324188, 324196, and 324204 for Main Plant Pouring and Cooling. These stacks were previously part of the "Summit" cooling line. Modifications to these stacks were completed in 2019, where the connecting hoods and duct work were removed

at the roofline rendering the stacks to becoming general ventilation. These stacks are for general ventilation only and are not capturing emissions from the Main Plant Pouring and Cooling processes any longer. For MACT EEEEE compliance, these stacks are not applicable since the modifications have rendered the stacks to being general building ventilation and are not discharging emissions to the atmosphere through conveyance. These stacks will need to be removed from EU-P016 Main Plant Pouring and Cooling.

The following table summarizes the stacks/vents observed as part of the Main Plant Pouring and Cooling.

Stack/Vent	Description
324308	Stack associated with the shake cooling conveyor
324636	Stack associated with Hunter No.5 cooling conveyor
324632	Stack associated with Hunter No.6 pouring
324176	General ventilation, flush with roofline
324188	General ventilation, flush with roofline
324196	General ventilation, flush with roofline
324204	General ventilation, flush with roofline
324662	Stack associated with Hunter No.7 pouring
324452	General ventilation, flush with roofline, no conveyance. This use to be part of Hunter No. 8 cooling.
324678	Stack associated with Disa Forma pouring
324682	Stack associated with Disa Forma pouring

324476	This stack is associated with the Disa Forma line but does not vent pouring or cooling emissions
324484	Stack associated with Disa Forma cooling
324848	Stack associated with Hunter No. 5 pouring
324304	Stack associated with the shake cooling conveyor
324312	Stack associated with the shake cooling conveyor
324640	Stack associated with the shake cooling conveyor
324296	Stack associated with the shake cooling conveyor
324300	Stack associated with the shake cooling conveyor
324666	Stack associated with Hunter No. 7 cooling
324844	Not currently listed in the ROP. This stack is associated with the No.5 cooling conveyor.

Stack #324844 is part of the Hunter No.5 cooling line and is currently not listed in the ROP. This stack will need to be added in. Stacks 324176, 324188, 324196, 324204, and 324452 are general ventilation stacks with no duct work connected to any processes and have vent openings flush with the roofline. These stacks can be removed from Main Plant Pouring and Cooling in the ROP.

Each of these stack outlets were observed from the roof of the facility during the inspection. No visible emissions were detected. Stack heights were unable to be verified at the time with the range finder.

EU-P018 Main Plant Shakeout

Castings, gates, risers, and sand are mechanically separated by shaking in the Main Plant. The shakeout receives the materials from the end of the dump conveyor. The Main Plant Shakeout process is controlled with two fabric filter baghouses (Torit and Linsmeyer).

Emission/Material Limits

The Main Plant Shakeout contains PM, PM10, and PM2.5 emission limits that are made practically enforceable through proper operation and maintenance of the baghouses, monitoring of pressure drop across each baghouse, monitoring fan amperage for each baghouse, monitoring of visible emissions from each baghouse, and emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Main Plant Shakeout and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of each baghouse for Main Plant Shakeout. Performance monitoring parameters with ranges of proper operation and observed data from control panels during the inspection are outlined in the table below. During the inspection, the Hermann baghouse was not in operation and ductwork was not connected to it.

Parameter	Range	Observed (1:03 PM CST)
Linsmeyer baghouse fan	55 – 85 Amps	76.4 Amps
Linsmeyer baghouse d.p.	3.0 – 7.0 in WC minimum	5.0 in WC

Parameter	Range	Observed (1:03 PM CST)
Torit baghouse fan	175 – 210 Amps	180 Amps
Torit d.p.	1.0 – 6.0 in WC minimum	5.0 in WC

Design/Equipment Restrictions

EU-P018 Main Plant Shakeout contains a requirement to not operate the process unless the fabric filter baghouses are installed, maintained, and operated in a satisfactory manner. Each baghouse is also required to be equipped with differential pressure gauges. During the inspection, the Linsmeyer and Torit #1 baghouses were installed and operational, but the Hermann baghouse was not. The Hermann baghouse is installed on-site but no ductwork is connected, and it is not in operation. PTI #68-19 was issued on October 14, 2019, for the Hermann baghouse to improve in-plant air quality by capturing uncontrolled emissions from the shakeout process. Based on observations during the inspection, the shakeout process is not meeting all design/equipment conditions with not having the Hermann baghouse operational.

Testing/Sampling

Verification of PM, PM10, and PM2.5 emission rates from the Main Plant Shakeout has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the differential pressure and fan amperage from the Torit #1 and Linsmeyer baghouses as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from control panels that display the current fan amperage and differential pressure. In addition, the facility is required to monitor and record visible emissions observations from each of the three baghouses on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate all operating parameters were within the respected ranges for proper operation.

The Hermann baghouse has not been completely installed and thus no records of monitoring parameters were provided.

Grede is required to maintain records of PM10 emissions from the Main Plant Shakeout on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Main Plant Shakeout beginning in October 2020. For PM10 calculations, the facility is using a MAERS PM10 emission factor. For the period June 2020 through May 2021, PM10 emissions were 0.27 tons.

Reporting

A review of the 2020 compliance and deviations report indicates there was a total of 1 deviation from EU-P018 Main Plant Shakeout. The deviation was on the Torrit #1 baghouse showing a

differential pressure reading of 0 in WC during operation. The reason for the deviation was moisture had accumulated in the differential pressure gauge lines and was showing an inaccurate reading. The lines were blown out and the differential pressure returned to proper indication.

Stack/Vent Restrictions

The Linsmeyer and Torrit #1 baghouses were operating at the time of the inspection. No visible emissions were observed. The Linsmeyer baghouse stack measured 23.1 feet and the Torit #1 baghouse stack measured 60.4 feet. According to the ROP, the minimum stack height for the Linsmeyer baghouse is 30 feet. Based on the measurements taken, the Linsmeyer baghouse is not meeting the minimum stack height requirement.

EU-P021 Isocure

Production of phenolic urethane coldbox (Isocure) cores in the Main Plant using dimethylethylamine. Isocure is a cold box process (no heat is applied). Core sand is mixed with a 2-part phenolic urethane liquid resin. Sand and resin are mixed in three mullers prior to addition to the core machines. A catalyst, dimethylethylamine (DMEA) gas, is introduced into the core box and purged through the core with superheated air. The cores are produced on ten Isocure core machines. After the Isocure Core is produced, it is generally dipped in a water-based core wash. The core wash is a suspension of fine clay or graphite that is applied to a core in metal casting to improve that portion's cast surface.

The cores are then dried in the Core Washing Oven. The heat source for the oven is natural gas combustion. The temperature of the oven can range up to 400°F. The oven is vented through a stack that exhausts above the building roof. Grede is currently using one of two core washes in the Main Plant Isocure Coremaking process. These coatings are identified as Techni Kote 8282 (HA International Inc.) and Dura Kote FCZ (also a HA International Inc. product). Techni Kote 8282 is a water-based refractory coating that combines a ceramic refractory with graphite. It provides protection from metal penetration in medium to heavy section iron castings. The only compounds present in the core wash above 1% composition are quartz (SiO2), mica, and Kaolin. The coating's vapor pressure is 23 mbar or 17.25 mm of Hg. Dura Kote FCZ is a high solids zircon/ceramic blend refractory coating, designed for medium to heavy castings. It is effective in the reduction of veining, burn-in and burn-on in large gray iron castings. The only compounds present in the core wash are zircon ($Zr(SiO_4)$), Fuller's Earth, Quartz (SiO_2), and titanium dioxide. The coating's vapor pressure is 23 mbar or 17.25 mm of Hg.

The Main Plant Isocure mullers and sand silo emissions are controlled by a baghouse. Emissions from the Main Plant Isocure core machines are controlled by a cartridge filter followed by an acid scrubber.

Emission/Material Limits

The Isocure process contains DMEA, PM, PM10, and VOC emission limits that are made practically enforceable through proper operation and maintenance of the baghouse and acid scrubber, along with emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Isocure process and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of the Flex-Kleen baghouse and acid scrubber. The facility is required to monitor the actual PH and flow rate once per shift from the acid scrubber. Performance monitoring parameters with ranges of proper operation and observed data from control panels during the inspection are outlined in the table below.

Parameter	Range	Observed (11:49 AM CST)
Acid scrubber PH	0 – 4.5	3.45
Acid scrubber flow rate	80 – 130 gpm	93 gpm

Testing/Sampling

Verification of PM, PM10, DMEA, and VOC emission rates from the Main Plant Isocure has not been requested.

Monitoring/Recordkeeping

Grede is required to maintain records of PM10, DMEA, and VOC emissions from the Main Plant Isocure on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10, DMEA, and VOC emissions on a 12-month rolling basis from the Main Plant Isocure in October 2020. For PM10 emission calculations from the Isocure core making process and sand mullers, the facility is using PM10 stack test emission factors from a 2005 test. For the period June 2020 through May 2021, PM10 emissions were 0.008 tons from the core making process and 0.011 tons from the sand mullers. For VOC emissions from the core machines, the facility is using a VOC stack test emission factor from a 2005 stack test. For the period June 2020 through May 2021, VOC emissions were 0.332 tons from the core machines, DMEA emissions were 0.0155 tons.

Reporting

No deviations were reported from EU-P021 Isocure for 2020.

Stack/Vent Restrictions

Stacks #324596 and #324598 from the acid scrubber were observed from the roof. No visible emissions were observed. Stack #324687 from the baghouse was observed and checked for stack height. No visible emissions were observed, and the stack height measured 24 feet with the range finder.

EU-P032 Module Sand System, EU-P034 Module Finishing, EU-P038 Module Shakeout

The Module Sand System process includes activities associated with the collection and distribution of mold sand used in the Module Plant. These activities include the Module Sand Muller, collection of spill sand, screening of used sand, and conveying sand.

The Module Finishing process is defined as the collection of dust from all activities associated with metal finishing conducted in the Module Plant. These activities include grinding, chipping, and hang blast (Wheelabrators).

The Module Shakeout process includes the mechanical separation of castings, gates, risers, and sand by shaking in the Module Plant.

All three processes exhaust to the Torit baghouse. The Torit baghouse is a CAM subject control device.

Emission/Material Limits

These three Module processes contain PM and PM10 emission limits that are made practically enforceable through proper operation and maintenance of the Torit baghouse, monitoring of pressure drop across the Torit baghouse, monitoring fan amperage for the Torit baghouse, monitoring of visible emissions from the Torit baghouse, and emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Module processes and Torit baghouse. The facility is required to continuously monitor and maintain the proper

operation of the Torit baghouse. Performance monitoring parameters with ranges of proper operation and observed data from control panels during the inspection are outlined in the table below.

Parameter	Range	Observed (1:19 PM CST)
Torit baghouse fan	175 – 220 Amps	200 Amps
Torit baghouse d.p.	1.0 – 6.0 in WC	2.7 in WC

Testing/Sampling

Verification of PM and PM10 emission rates from the Module processes has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the differential pressure and fan amperage from the Torit baghouse as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from a control panel that displays the current fan amperage and differential pressure. In addition, the facility is required to monitor and record visible emissions observations from the Torit baghouse on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate all operating parameters were within the respected ranges for proper operation.

Grede is required to maintain records of PM10 emissions from the Module Sand System, Shakeout, and Finishing on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Main Plant Sand System beginning in October 2020. For PM10 calculations, the facility is using a PM10 stack test emission factor from a 2005 stack test on the Sand System and using MAERS emission factors for Finishing and Shakeout with a control efficiency of 99% for the Torit baghouse. For the period June 2020 through May 2021, PM10 emissions were 0.08 tons from Sand System, 0.03 tons from Finishing, and 0.05 tons from Shakeout.

Reporting

A review of the 2020 compliance and deviation report indicates there was one deviation reported for the Module processes and Torit baghouse. On 01/28/2020, the differential pressure was reading 0 in. WC due to the differential pressure line having moisture and freezing. The line was thawed within 2 hours and the differential pressure for the Torit baghouse was back to reading correctly. The same deviation was reported on the first semiannual CAM Excursion/Exceedance and Monitor Downtime report.

Stack/Vent Restrictions

During the inspection, the stack to the Torit baghouse was observed to check for visible emissions and verify stack height with the range finder. The stack height measured was 60.7 feet and no visible emissions were observed.

EU-P036 Module Pouring and Cooling

Process includes all activities associated with the pouring and cooling of molten iron on one Hunter mold line in the Module Plant. Molten iron is supplied by a 20-ton Brown Boveri holding furnace that receives molten iron from the cupola. There is no emission control equipment associated with this emission unit. This emission unit is subject to MACT EEEEE.

Emission/Material Limits

Module Pouring and Cooling is subject to PM10 emission limits. These limits are practically enforceable through proper operation and maintenance, emission calculations, and emissions testing if requested.

Process/Operational Restrictions

At the time of the inspection, the Hunter mold line was in operation and appeared to be operating properly.

Testing/Sampling

Testing has not been requested for verification of PM10 emission rates from Module Pouring and Cooling.

Monitoring/Recordkeeping

Grede is required to maintain records of PM10 emissions from the Module Plant Pouring and Cooling on a 12-month rolling time period. This recordkeeping requirement was introduced in the

October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Module Plant Pouring and Cooling beginning in October 2020. For PM10 calculations, the facility is using a PM (Filterable) stack test emission factor from the December 2020 stack test and taking the ratio of PM10 to PM emission factors from the DEQ Foundry Factsheet (11/05) to calculate a PM10 emission factor for Main Plant Pouring and Cooling. For the period June 2020 through May 2021, PM10 emissions were 0.102 tons.

Reporting

A review of the 2020 compliance and deviation reports indicate there were no deviations reported from Module Pouring and Cooling.

Stack/Vent Restrictions

The three Module Pouring and Cooling stacks were inspected on the roof for visible emissions. No visible emissions were observed.

EU-P040 Sand Conditioning System

Process represents the activities associated with the conditioning of mold sand used in the Main Plant. The process cools hot sand to approximately 120 degrees Fahrenheit or less while maintaining grain distribution and bond addition. A Steelcraft baghouse collects the emissions from all of the sand handling activities which include screening operations, storage silos, cooling and mixing, and the cyclone separator.

Emission/Material Limits

The Sand Conditioning System contains PM and PM10 emission limits that are made practically enforceable through proper operation and maintenance of the Steelcraft baghouse, monitoring of pressure drop across the baghouse, monitoring fan amperage for the baghouse, monitoring of visible emissions from the baghouse, and emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Sand Conditioning System and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of the baghouse for the Sand Conditioning System. Performance monitoring parameters with ranges of proper operation and observed data from the control panel during the inspection are outlined in the table below.

Parameter	Range	Observed (1:11 PM CST)
Steelcraft baghouse fan	110 – 160 Amps	148 Amps
Steelcraft baghouse d.p.	3.5 – 5.5 in WC minimum	4.2 in WC

During the inspection, there was a significant amount of sand that had accumulated on the floor and around equipment in the Sand Conditioning area. Mr. White stated there was a leak somewhere in the duct that conveys the sand. A garage door to the sand conditioning area was observed open as well that could cause a potential fugitive dust issue. The facility will need to address the leak in the system to minimize the chances of a fugitive dust issue occurring.

Testing/Sampling

Verification of PM and PM10 emission rates from the Sand Conditioning System has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the differential pressure and fan amperage from the Steelcraft baghouse as part of the compliance assurance monitoring (CAM) plan. These operating parameters are continuously monitored from a control panel that displays the current fan amperage and differential pressure. In addition, the facility is required to monitor and record visible emissions observations from the Steelcraft baghouse on a daily basis. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate all operating parameters were within the respected ranges for proper operation.

Grede is required to maintain records of PM10 emissions from the Sand Conditioning System on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10 emissions on a 12-month rolling basis from the Sand Conditioning System beginning in October 2020. For PM10 calculations, the facility is using a PM10 stack test emission factor from a 2005 test. For the period June 2020 through May 2021, PM10 emissions were 0.498 tons.

Reporting

A review of the 2020 compliance and deviation report indicates there was one deviation reported for the Sand Conditioning system baghouse. On 01/29/2020, the differential pressure was

reading 5.8 in. WC due to the baghouse pulse jet not operating and cleaning the bags. Electricians found a blown fuse to the pulse board. A new fuse was installed, and the baghouse was back to operating within its normal differential pressure range. The same deviation was reported on the first semiannual CAM Excursion/Exceedance and Monitor Downtime report.

Stack/Vent Restrictions

During the inspection, the stack to the Steelcraft baghouse was observed to check for visible emissions and verify stack height with the range finder. The stack height measured was 95.3 feet and no visible emissions were observed.

EU-P041 Main Plant Bond Silo, EU-P042 Module Bond Silo

Main Plant Bond Silo process represents the loading of bond into the Main Plant Bond Silo, which is located external to the plant. The bond is used in the Main Plant. A Rumelin bin vent filter controls emissions generated during loading. The bin vent filter vents into the plant environment.

The Module Bond Silo process represents the loading of bond into the Module Bond Silo. The bond is used in the Module Plant. A Flex Kleen bin vent filter controls emissions generated during loading. The Flex Kleen bin vent filter exhausts into the plant environment.

Emission/Material Limits

The Main Plant and Module Bond Silo processes contain a PM emission limits that is made practically enforceable through proper operation and maintenance of the bin vent filters, and emissions testing if requested.

Process/Operational Restrictions

At the time of the inspection, the bond silos were in operation and appeared to be operating properly.

Testing/Sampling

Testing has not been requested for verification of PM10 emission rates from Module Pouring and Cooling.

Reporting

A review of the 2020 compliance and deviation reports indicate there were no deviations reported from Main Plant and Module Bond Silos.

EU-P043 Module Isocure

Production of phenolic urethane coldbox (Isocure) cores in the Module Plant using dimethylethylamine. Isocure is a cold box process (no heat is applied). Core sand is mixed with a 2-part phenolic urethane liquid resin. Sand and resin are mixed in a muller prior to addition to three core machines. A catalyst, dimethylethylamine (DMEA) gas, is introduced into the core box and purged through the core with superheated air. The cores are produced on three Isocure core machines.

After the Isocure Core is produced, it is generally dipped in a water-based core wash. The core wash is a suspension of fine clay or graphite that is applied to a core in metal casting to improve that portion's cast surface. The cores are then dried in the Core Washing Oven. The heat source for the oven is natural gas combustion. The temperature of the oven can range up to 400°F. The oven is vented through a stack that exhausts above the building roof. Grede is currently using one of two core washes in the Module Plant Isocure Coremaking process. These coatings are identified as Techni Kote 8282 (HA International Inc.) and Dura Kote FCZ (also a HA International Inc. product). Techni Kote 8282 is a water-based refractory coating that combines a ceramic refractory with graphite. It provides protection from metal penetration in medium to heavy section iron castings. The only compounds present in the core wash above 1% composition are quartz (SiO2), mica, and Kaolin. The coating's vapor pressure is 23 mbar or 17.25 mm of Hg. Dura Kote FCZ is a high solids zircon/ceramic blend refractory coating, designed for medium to heavy castings. It is effective in the reduction of veining, burn-in and burn-on in large gray iron castings. The only compounds present in the core wash are zircon ($Zr(SiO_4)$), Fuller's Earth, Quartz (SiO_2), and titanium dioxide. The coating's vapor pressure is 23 mbar or 17.25 mm of Hg.

The Module Plant Isocure muller and sand silo emissions are controlled by the Torit baghouse. Emissions from the Module Plant Isocure core machines are controlled by a cartridge filter followed by an acid scrubber.

Emission/Material Limits

The Isocure process contains DMEA, PM, PM10, and VOC emission limits that are made practically enforceable through proper operation and maintenance of the baghouse and acid scrubber, along with emissions testing if requested.

Process/Operational Restrictions

Grede maintains an Operations & Maintenance Plan (Rev. 3/27/2020) for the Isocure process and associated control equipment. The facility is required to continuously monitor and maintain the proper operation of the Torit baghouse and acid scrubber. The facility is required to monitor the actual PH and flow rate once per shift from the acid scrubber. Performance monitoring parameters with ranges of proper operation and observed data from control panels during the inspection are outlined in the table below.

Parameter	Range	Observed
Acid scrubber PH	0 – 4.5	3.8
Acid scrubber flow rate	25 – 45 gpm	32 gpm

Testing/Sampling

Verification of PM, PM10, DMEA, and VOC emission rates from the Main Plant Shakeout has not been requested.

Monitoring/Recordkeeping

Grede is required to continuously monitor and record the differential pressure from the Torit baghouse during production operations and record the actual pH and flow rate of the acid scrubber once per shift. These operating parameters are continuously monitored from a control panel for the differential pressure across the Torit baghouse and gauges equipped on the acid scrubber for pH and flow rate. Compliance with these required records were verified by requesting daily records for the dates 5/13/2020, 11/5/2020, and 3/25/2021. The records provided and reviewed indicate all operating parameters were within the respected ranges for proper operation.

Grede is required to maintain records of PM10, DMEA, and VOC emissions from the Module Isocure on a 12-month rolling time period. This recordkeeping requirement was introduced in the October 2020 ROP renewal. The facility began calculating PM10, DMEA, and VOC emissions on a 12-month rolling basis from the Module Plant Isocure in October 2020. For PM10 emission calculations from the Isocure core making process and sand mullers, the facility is using PM10 stack test emission factors from a 2005 test. For the period June 2020 through May 2021, PM10 emissions were 0.008 tons from the core making process and 0.011 tons from the sand mullers. For VOC emissions from the core machines, the facility is using a VOC stack test emission factor from a 2005 stack test. For the period June 2020 through May 2021, VOC emissions were 0.332 tons from the core machines. DMEA emissions were 0.0155 tons.

Reporting

No deviations were reported from EU-P043 Module Isocure for 2020.

Stack/Vent Restrictions

Stacks from the acid scrubber were observed from the roof. No visible emissions were observed. The stack for the Torit baghouse was observed and checked for stack height. No visible emissions were observed and the stack height measured 60.7 feet with the range finder.

FG-MACTEEEEE

Grede is subject to the Iron and Steel Foundry MACT, Subpart EEEEE, since the facility is considered a major source of HAPs. The regulations cover emissions from metal melting furnaces, scrap preheaters, new pouring areas, pouring stations, new automated conveyor and new pallet cooling lines, new automated shakeout lines, mold and core making lines, and fugitive emissions from foundry operations. The affected emission units at the source that are subject to MACT EEEEE include EU-009 Cupola, EU-016 Main Plant Pouring and Cooling, EU-P036 Module Pouring and Cooling, and any fugitive emissions.

Emission/Material Limits

MACT EEEEE contains PM and VOHAP limits for the cupola and PM limits for Main Plant and Module Pouring and Cooling. The federal regulation also contains a fugitive opacity limit for each building or structure that houses an affected emission unit. Compliance with these emission limits is demonstrated through testing, monitoring and recording of performance parameters, and control device inspections and maintenance.

Process/Operational Restrictions

Grede maintains an operations and maintenance plan that includes responsible personnel, inspection schedule, recording of monitoring parameters, and predictive maintenance. The pouring and cooling processes do not have any associated air pollution control equipment. The cupola contains operating limits for the afterburner temperature, baghouse fan amperage, and baghouse differential pressure. These limits are listed in the O&M Plan. The O&M Plan also lists the cupola startup process, charging process, tap out process, and draining the cupola. The plan lists what constitutes a shutdown of the cupola along with normal operating conditions following the startup of the cupola. The cupola will shutdown if the upper stack temperature reaches above 1900 degrees Fahrenheit and the baghouse inlet temperature reaches above 530 degrees Fahrenheit.

After the coke bed has been burned, normal operating conditions include the baghouse blower motor current between 115 to 281 amps, the combustion zone temperature at a minimum of 1300 degrees Fahrenheit, and the baghouse inlet temperature between 360 to 495 degrees Fahrenheit. During the inspection, these normal operating parameters were observed from the control system. The combustion zone temperature was being maintained above 1300 degrees Fahrenheit during "on-blast" status of the cupola.

Grede has a scrap certification and selection plan pursuant to 40 CFR 63.7700(b) and 40 CFR 63.7700(c). Grede certifies they only purchase and operate with prepared scrap or other materials that do not include: post-consumer automotive body scrap, dust, dirt, rust, debris, fluff, rubber, paper, cloth, plastic, engine blocks, lead (wheel weights, battery cables, pope or components, etc.). No radioactive material, mercury or mercury containing components, PCB's, batteries, and/or free liquids (per EPA Method 9095B) are allowed.

The Ground Man of the Charging team is responsible for inspecting new scrap material as its delivered. In order for the scrap steel to be acceptable, the following conditions must be met: cylindrical or bar shaped stock (especially if solid): maximum length = 20 inches, maximum diameter = 8 inches, rectangular shaped stock: maximum width = 12 inches, maximum length = 20 inches, maximum thickness = 2 inches, maximum dimension in any direction = 30 inch, no visible lead, no visible mercury devices, plastics removed to the extent practicable, no free organic liquids (oils, etc). A Steel Scrap Inspection Log is maintained for each shipment that includes a checklist for the material being sized correctly, no visible lead, no visible mercury devices, plastics removed to the extent possible, no free organic liquids, and reason the load was rejected (if applicable).

The O&M plan specifies inspections and maintenance for the air pollution control devices. Besides required visual inspections and recordkeeping, gauges are calibrated semi-annually, along with quarterly monitoring of fan wear, material buildup, corrosion inspections, etc. The plan states there are monthly observations of the physical appearance of the capture and ventilations system equipment (holes, dents, accumulated dust, fan condition). However, during the inspection as noted above, there were gaps in the panels of the baghouse on the south facing side that could cause a point of emission. Based on these observations, the inspections and maintenance on the baghouse are not following the O&M plan for the facility.

Design/Equipment Parameters

The cupola is required to not be operated unless the afterburners, quench tank, and baghouse are installed, operated and maintained in accordance with the approved O&M Plan. At the time of the inspection, all air pollution control equipment was in operation. However, the

maintenance of the baghouse does not appear to be following the O&M Plan by observing gaps in the panels of the baghouse.

Testing/Sampling

Testing for PM, VOHAP, opacity, and total metal HAP was last performed during the December 2020 performance test. Main Plant and Module Plant pouring and cooling passed for PM, and the cupola passed PM, VOHAP, and fugitive opacity limits. Testing against these limits is next required by December 2025.

Grede is also required to conduct fugitive opacity testing from each structure housing an emission source subject to MACT EEEEE on a semi-annual basis. Testing was lasted performed on April 21, 2021. Visible emissions testing was performed at the northeast corner of the cupola housing structure and the side walls of the main building structure that houses the Main Plant Pouring and Cooling and Module Pouring and Cooling. Opacity reading averages were all below 20%.

Monitoring/Recordkeeping

Grede has a continuous monitoring system for the cupola and associated air pollution control equipment. This system was in operation during the inspection. The control system provides real time data on the operating parameters of the cupola and air pollution control equipment. The afterburner temperature, baghouse fan amperage, and baghouse differential pressure are also recorded daily.

Reporting

Grede is required to provide semiannual compliance and deviation reports for any emission limitation or operation and maintenance requirements in the subpart. According to 40 CFR 63.7751(d), the facility is allowed to include deviations from the MACT requirements in the Part 70 (Title V) compliance and deviation report. Submission of the Part 70 monitoring report satisfies any obligation to report the same deviations in the MACT EEEE semiannual report. From reviewing Grede's semiannual and annual compliance reports, there is no mention of MACT EEEEE certification of compliance in these reports. The facility should be including MACT EEEEE compliance certification in the "Other Report Certification" box. If there were no deviations from any emissions limitations (including operating limit), work practice standards, or operation and maintenance requirements from MACT EEEEE, there should be a statement that there were no deviations from the emissions limitations, work practice standards, or operation and maintenance requirements during the reporting period. If there were deviations from MACT EEEEE requirements, Grede is required to include all reporting requirements according to 40 CFR 63.7751(a)(7).

Source-Wide

Covers all processes at the facility including raw material handling (metal, fluxes, metallurgical coke), metal melting, mold and core production, casting, and finishing.

Emission/Material Limits

The facility has source-wide limits for PM10 and VOCs on a 12-month rolling time period. Compliance with these limits is demonstrated through emission calculations and recordkeeping. For the period June 2020 through May 2021, total PM10 emissions were 5.59 tons and total VOC emissions were 18.07 tons. Based on the emissions reported and reviewed, Grede is in compliance with the source-wide emission limits.

Compliance

Based on the full compliance evaluation (FCE) performed, Grede is currently not in compliance with MI-ROP-B1577-2020 and 40 CFR Part 63, Subpart EEEEE. A summary of the violations observed during the inspection and from records reviewed are outlined in the table below. A letter of violation will be sent to correct the cited violations.

Process Description	Rule/Permit Condition Violated	Comments
EU-P009 Cupola	Special Condition III.1	Panels on the south facing side of the baghouse were not intact and blowing outwards.
FGMACTEEEEE	Special Condition IV.1	Maintenance on the baghouse did not appear to be following the Operations and Maintenance Plan based on gaps observed in the baghouse structure.
FGMACTEEEEE	Special Condition VII.4 and 5	The facility has not been certifying compliance explicitly with 40 CFR Part 63, Subpart EEEEE when submitting the ROP compliance and deviation reports.

EU-P009 Cupola	Special Condition III.1	An exhaust leak around the cap area of the main exhaust duct was causing uncontrolled emissions.
EU-P014 Main Plant Finishing	Special Condition VIII.1	Stack height of East Fuller baghouse does not meet the minimum height requirement.
EU-P014 Main Plant Finishing	Special Condition VIII.2	Stack height of West Fuller baghouse does not meet the minimum height requirement.
EU-P018 Main Plant Shakeout	Special Condition IV.1	The Hermann baghouse was observed not entirely installed and not operating.
EU-P018 Main Plant Shakeout	Special Condition VIII.2	Stack height of the Linsmeyer baghouse does not meet the minimum height requirement.
EU-P040 Sand Conditioning System	Special Condition III.1	Significant amount of sand observed around the floor of the Sand Conditioning System due to a pipe leak.

Image (1) Linsmeyer baghouse stack.

Image (2) East Fuller baghouse stack.

Image (3) Gaps observed in cupola baghouse structure.

Image (4) West Fuller baghouse stack.

NAME Michael Conklin DATE 07-15-2021 SUPERVISOR Ed Lancaster