UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

DATE: DEC 20 2019

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Waupaca Foundry, Inc., Plant 2/3, Waupaca, Wisconsin

FROM: Sarah Clark, Environmental Engineer
AECAB (IL/IN)

THRU: Nathan Frank, Section Chief
AECAB (IL/IN)

TO: File

BASIC INFORMATION

Facility Name: Waupaca Foundry, Inc., Plant 2/3

Facility Location: 1955 Brunner Drive, Waupaca, Wisconsin, 54981

Date of Inspection: November 5, 2019

EPA Inspector(s):
1. Sarah Clark, Environmental Engineer
2. Linda Rosen, Environmental Engineer

Other Attendees
1. Bryant Esch, CHMM, Environmental Coordinator, Waupaca Foundry, Inc. (all Plants)
2. Andrew Sellin, Environmental Engineer, Waupaca Foundry, Inc. Plant 2/3
3. Dan Riske, Assistant Maintenance Manager for Melt, Waupaca Foundry, Inc. Plant 2/3
4. Brian Vetter, Maintenance Foreman, Waupaca Foundry, Inc. Plant 2/3

Contact Email Address: andrew.sellin@waupacafoundry.com, bryant.esch@waupacafoundry.com

Purpose of Inspection: Assess compliance with the Clean Air Act

Facility Type: Gray iron foundry

Regulations Central to Inspection: 40 CFR Part 63, Subpart EEEEE - National Emission Standards for Hazardous Air Pollutants (NESHAP or MACT) for Iron and Steel Foundries, Title V permit number 469033840-P22.

Arrival Time: 1:25 PM
Departure Time: 5:00 PM

Inspection Type:
☐ Unannounced Inspection
☒ Announced Inspection

OPENING CONFERENCE

☒ Credentials Presented
☒ CBI warning to facility provided

At the conclusion of EPA's Clean Air Act (CAA) inspection of Waupaca Foundry, Inc. Plant 1 at 11:50 AM on November 5, 2019, inspectors announced that we would conduct a CAA inspection at Waupaca Foundry, Inc. Plant 2/3.

The following information was obtained verbally from Mr. Esch unless otherwise noted. Mr. Esch and Mr. Sellin were present for the interview and the facility tour. Mr. Riske and Mr. Vetter were only present for the tour, where noted below.

Company Ownership: Waupaca Foundry, Inc. has been owned by Hitachi Metals Group Co. since 2014.

Process Description:
Waupaca Foundry, Inc. Plant 2/3 (Plant 2/3) was constructed in the 1960s and consists of an East side and a West side. Plant 2/3 manufactures gray iron parts for the automotive, agricultural, and industrial industries as well as miscellaneous applications. The East line focuses on bigger and heavier parts whereas the West line processes mostly flat shapes, such as brake rotors. Plant 2/3 uses pig iron ingots as well as scrap iron, which it procures from the same local and regional vendors as their Plant 1 foundry. Plant 2/3 has one cupola and two holding furnaces (one holding furnace for each side). Each side has its own pouring/mold cooling lines, shakeout area, and mill room, where parts are cast, cooled, shaken out to remove the sand (which is collected and recycled), and finished through a variety of cleaning steps, such as shot blasting. Molds are made from a clay/sand mixture using a hydraulic press; a core, if needed, is added at this stage in the process. Cores are produced in core making machines: Plant 2/3 has approximately 9 cold boxes on the East side and 14 warm boxes on the West side. In the cold box process, a two-part resin is mixed with sand and added to a core making machine. Then, amine gas flows into the core making machine which catalyzes the resin reaction to solidify the core. The warm boxes produce cores using a heat-activated reaction.

Staff Interview:
Plant 2/3 has approximately 858 employees. Plant 2/3 operates 24 hours per day, and currently operates for 4-5 days per week. When the foundry is busy, Plant 2/3 will operate a 12-day campaign with 2 days off for maintenance. Plant 2/3 follows a scrap management plan to verify that all incoming scrap meets their specifications. The facility maintains several Malfunction, Prevention, and Abatement Plans (MPAPs), per state requirements, and an operation and maintenance plan as required by the MACT, which the facility refers to as their MACT plan.

The cupola air emissions are vented through a coarse grain separator, a combustion chamber (i.e., afterburner), a recuperator tower (heat exchanger), and a baghouse. Sodium bicarbonate and other alkaline powders are injected into the airstream between the recuperator tower and the baghouse to control SO_2 emissions and stabilize hazardous metal particulates to render them non-hazardous for waste disposal purposes. The baghouse modules and the stack are equipped with a bag leak detection system (BLDS). Plant 2/3 monitors the following parameters related to the cupola and its exhaust: static pressure on the cupola, combustion temperature, BLDS, temperature before the baghouse (for maintenance purposes only, according to Mr. Esch), and SO_2 (using a continuous emissions monitoring system). The dampers on the cupola ducts (inlet and exhaust) are automatically controlled. Plant 2/3 conducts monthly inspections of the dampers.

The cold box core making process emissions are controlled by a sulfuric acid scrubber. Plant 2/3 can monitor its resin usage through several means: through their purchasing system, by tracking the amount that goes to each department, and using a volumetric feeder that measures the amount of resin pulled per machine cycle. Plant 2/3 monitors the following scrubber parameters: pH, flow, and pressure drop.

Plant 2/3 has numerous baghouses to control particulate emissions from the mold making shakeout, milling, and sand collection processes. Plant 2/3 monitors the differential pressure and BLDSs on these baghouses and has a maintenance schedule for changing the bags.

Plant 2/3 uses passive induction BLDS which do not require any sensitivity adjustments. Plant 2/3 confirms that the BLDS settings are correct on a bi-annual basis. Plant 2/3 conducts a response test and a zero-drift check on a monthly basis. The BLDS issues a pre-visible warning for short spikes that exceed the baseline and an alarm for lower, prolonged values that are representative of an increasing baseline. These warnings and alarms are issued via email to personnel who must acknowledge the warning/alarm and generate a work order and, if appropriate, a corrective action.

Plant 2/3 hires a third-party contractor to collect visible emissions (VE) readings on a semi-annual basis. The VE readings are collected from the roof at all building openings. The frequency of stack testing depends on the process; for processes subject to the MACT, Plant 2/3 conducts stack testing every 5 years. Mr. Esch also said that all of the cold boxes have been tested using EPA Method 204 during a stack test. Mr. Esch informed EPA that Waupaca Foundry has recently applied for a permit for a 'Dust Collection Optimization Project' at Plant 2/3.

TOUR INFORMATION

EPA toured the facility: Yes

Data Collected and Observations:
Mr. Riske arrived as the tour began. First, we observed the cupola at the point where the exhaust is collected (video/photos #1-5). We walked along the exhaust and observed the coarse grain separator, the combustion chamber, the waste heat tower, the recuperator tower, and the point at which the sodium bicarbonate/alkaline injection occurs (photos #6-12). We were informed that the pipes in the towers are cleaned with steel shot that is pumped to the top and allowed to fall to the bottom. EPA Inspector Clark, Mr. Esch, and Mr. Riske walked to the roof; however, because we did not have a roof access permit, only Mr. Riske was allowed to access the roof. There, Mr. Riske used Mr. Esch's cell phone to take a picture of the BLDS probe in the stack and showed us the picture upon his return inside.

After regrouping with EPA Inspector Rosen and Mr. Sellin, we visited the control room. Here, we observed the live parametric data from the cupola and its air pollution controls (photos #13-14) and received a printout of some of these live readings. Mr. Riske explained that the dampers help maintain negative static pressure at the cupola. He stated that the combustion chamber 15-minute average temperature has to stay above 1500°F and that if the temperature falls below 1500°F, then an alarm is sounded. If the instantaneous average temperature, as measured by the three thermocouples, falls below 1100°F, the system automatically goes 'on relief.' 'On relief' means that the system stops adding air to the cupola and enters a standby mode. The combustion chamber is also equipped with a high alarm which is set to approximately 1900 or 1950°F and also triggers the system to go 'on relief.' We observed that the cupola was operating at an hourly static pressure of -0.32 inches of water column (in. H_2O). We observed that the combustion chamber was operating at an instantaneous average temperature of 1642°F and a 15-minute average temperature of 1651°F.

Outside, we observed the charge yard (photos #15-17).

On the East side, we observed the cold box room and the scrubber (photos #18-20). On the gauges near the scrubber, we observed that the scrubber was operating at a flow rate of 285 gallons per minute (gpm) at a pH of 1.64. We were informed that the scrubber uses 14% sulfuric acid. The scrubber converts the gaseous emissions into an amine salt. When the scrubber is "full," i.e., high pH, the scrubber contents are pumped to a tank and eventually sent to a vendor, who recovers the catalyst. The differential pressure needs to be between 2 and 6 in. H_2O. The pH is calibrated weekly. We met with Mr. Vetter, the "scrubber expert," who showed us live readings and historical scrubber records on his computer (photos #21-22). We observed from these readings that the flow rate was 283 gpm and the pH was 1.66. The pressure drop was also reported as the pressure drop across the filter media plus the pressure drop across the mist eliminator. The total pressure drop recorded in the historical records for the day of our inspection, second shift, was 3.16 in H_2O. Blower amperage was also reported as 79 amperes.

At the holding furnace on the East side, while the holding furnace was pouring into a ladle, we observed emissions drift through the openings in the corrugated metal dividers that partitioned

off the pouring area (video/photos #23-24). Mr. Esch explained that there was a canopy overhead which collected fugitives and that this system was part of the 'runner collection.' When it was safe to do so, we approached the furnace and looked upward to see a duct opening directly overhead of the East holding furnace (photo #25). We observed the West holding furnace from a distance (photo #26).

We observed the sodium bicarbonate and the alkaline materials (photo #27).

As we were leaving, we entered one of the shakeout areas (photo #28); we observed that the air in this space was very dusty and had an acrid odor. Mr. Esch called this area the 'manipulating area' at the end of the shakeout. He said that this area was totally enclosed. Mr. Esch described the odor that we observed as the smell of burning foundry sand and resin.

Photos and/or Videos: were taken during the inspection.
All photos and videos were claimed as confidential business information (CBI).

Field Measurements: were not taken during this inspection.

RECORDS REVIEW

Copies of the following were provided to EPA during the opening conference:
1. List of emission units and air pollution control devices, as listed in the facility's permit
2. Plant layout

During the tour, EPA received the following:
3. Printout of live parametric data from the cupola and its air pollution controls (CBI)

CLOSING CONFERENCE

Requested documents:

- MPAPs for the combustion chamber, alkaline injection, baghouses, and scrubber
- MACT plan
- BLDS plan
- Dust Collection Optimization Project permit application
- Photo of BLDS taken by Mr. Riske on Mr. Esch's phone

SIGNATURES

Report Author: Sarah Clark Date: 12/19/2019

Section Chief: _____ Date: 12/20/19

APPENDICES AND ATTACHMENTS

1. Appendix A: Digital Image Log

Facility Name: Waupaca Foundry, Inc., Plant 2/3
Facility Location: 1955 Brunner Drive, Waupaca, Wisconsin
Date of Inspection: November 5, 2019

APPENDIX A: DIGITAL IMAGE LOG

1. **Inspector Name:** Sarah Clark	2. **Date(s) of Inspection:** November 5, 2019
3. **Company/Facility Name:** Waupaca Foundry, Inc., Plant 2/3	4. **Street Address, City, State:** 1955 Brunner Drive, Waupaca, Wisconsin
5. **Number of Images:** 26 photos and 2 videos	6. **Archival Record Location:** CD-R labeled as "Waupaca Foundry Plant 2/3 Inspection Photos 11-5-2019"

All photos are claimed as CBI.

Image Number	File Name	Date and Time (CST)	Latitude and Longitude	Description of Image
1	PB050045.JPG	2019:11:05 15:08:03	44.354167, -89.054444	Blurry photo of cupola
2	PB050046.JPG	2019:11:05 15:08:08	44.354167, -89.054444	Cupola exhaust duct, collection
3	PB050047.MOV	2019:11:05 15:08:18	N/A	Video of top of cupola
4	PB050048.JPG	2019:11:05 15:10:26	44.354167, -89.054444	Cupola exhaust duct
5	PB050049.JPG	2019:11:05 15:10:32	44.354167, -89.054444	Cupola exhaust duct
6	PB050050.JPG	2019:11:05 15:11:45	44.354167, -89.054444	Cupola exhaust duct to coarse grain separator
7	PB050051.JPG	2019:11:05 15:11:47	44.354167, -89.054444	Cupola exhaust duct to coarse grain separator
8	PB050052.JPG	2019:11:05 15:11:50	44.354167, -89.054444	Coarse grain separator
9	PB050053.JPG	2019:11:05 15:11:56	44.354167, -89.054444	Combustion chamber (afterburner)
10	PB050054.JPG	2019:11:05 15:11:58	44.354167, -89.054444	Combustion chamber exhaust
11	PB050055.JPG	2019:11:05 15:14:55	44.354167, -89.054444	Combustion chamber fresh air intake
12	PB050056.JPG	2019:11:05 15:22:00	44.354167, -89.054444	Waste heat tower and recuperator tower exhausts and alkaline injection
13	PB050057.JPG	2019:11:05 15:33:43	Not Recorded	Screenshot of live readings from the cupola and air pollution controls, as viewed from the control room

Facility Name: Waupaca Foundry, Inc., Plant 2/3
Facility Location: 1955 Brunner Drive, Waupaca, Wisconsin
Date of Inspection: November 5, 2019

14	PB050058.JPG	2019:11:05 15:47:42	Not Recorded	Screenshot of live readings from the combustion chamber, as viewed from the control room
15	PB050059.JPG	2019:11:05 15:59:23	Not Recorded	Charge yard
16	PB050060.JPG	2019:11:05 15:59:35	Not Recorded	Charge yard
17	PB050061.JPG	2019:11:05 16:01:37	Not Recorded	Charge yard
18	PB050062.JPG	2019:11:05 16:06:32	Not Recorded	Cold box
19	PB050063.JPG	2019:11:05 16:09:21	Not Recorded	Acid scrubber flow, 285 gallons per minute
20	PB050064.JPG	2019:11:05 16:09:25	Not Recorded	Acid scrubber pH, 1.64
21	PB050065.JPG	2019:11:05 16:16:44	Not Recorded	Acid scrubber live data, viewed from Mr. Vetter's computer
22	PB050066.JPG	2019:11:05 16:19:17	Not Recorded	Acid scrubber historical log, viewed from Mr. Vetter's computer
23	PB050067.JPG	2019:11:05 16:24:11	Not Recorded	East side, runner collection, side view
24	PB050068.MOV	2019:11:05 16:25:46	N/A	Video of East side runner collection, side view, during pouring
25	PB050069.JPG	2019:11:05 16:26:28	Not Recorded	Canopy over East holding furnace
26	PB050070.JPG	2019:11:05 16:26:32	Not Recorded	West (background, on left) and East (foreground, on right) holding furnaces
27	PB050071.JPG	2019:11:05 16:29:28	Not Recorded	Sodium bicarbonate (left) and alkaline (right)
28	PB050072.JPG	2019:11:05 16:34:26	Not Recorded	Overview of one of the shakeout areas