



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

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Smith Foundry, Minneapolis, Minnesota

FROM: Jacob Herbers, Environmental Engineer
AECAB (MI/WI)

THRU: Sarah Marshall, Section Supervisor
AECAB (MI/WI)

TO: File

BASIC INFORMATION

Facility Name: Smith Foundry

Facility Location: 1855 E 28th St, Minneapolis, MN 55407

Date of Inspection: May 26, 2023

EPA Inspector(s):

1. Jacob Herbers, Environmental Engineer
2. Karina Kuc, Environmental Engineer
3. Emma Leeds, Environmental Engineer

Other Attendees:

1. Peter Ryan, Quality Manager, Smith Foundry
2. James Hoffman, Head of Maintenance, Smith Foundry (tour only)
3. Kevin Miller, Consultant, Senior Director, U.S. Compliance (by phone, opening only)

Contact Email Address: Ryan_Peter@smithfoundry.com

Purpose of Inspection: Investigate compliance with the Clean Air Act and the Minnesota State Implementation Plan.

Facility Type: Iron Foundry

Regulations Central to Inspection: National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries Area Sources (40 C.F.R. Part 63, Subpart ZZZZZ), NESHAP General Provisions (40 C.F.R. Part 63, Subpart A), and Minnesota Rules, 7011.0150 - Preventing Particulate Matter from Becoming Airborne.

Arrival Time: 09:50 CDT

Departure Time: 12:10 CDT

Inspection Type:

☒ Unannounced Inspection

OPENING CONFERENCE

- ☒ Presented Credentials
- ☒ Stated authority and purpose of inspection
- ☒ Provided Small Business Resource Information Sheet
- ☒ Provided CBI warning to facility

The following information was obtained verbally from Peter Ryan, James Hoffman, and Kevin Miller unless otherwise noted.

Company Ownership: Smith Foundry Co. was purchased by Zynik Capital in December 2022.

Process Description:

The facility produces grey and ductile iron castings.

In the “no-bake area”, silica sand is brought in. It is then mixed with bentonite and water to form a binding material. The sand gets sent to any of four mold-making stations (shell core area). In the shell core area, sand is injected in a pattern into a magazine box (BP-3) at 1,000 pounds per square inch (psi) and up to 500 °F, then down the line, phenol powder is added. “Cope and drag” refers to the tops and bottoms of the molds, respectively.

Raw “pig iron” is melted in a furnace which has capacity for eight tons of iron. Trim is added at the furnace and at the metal transfer. Trim added at the furnace includes steel chops (clean steel), pig iron (known sulfur iron quantity), sulfur (for nucleation), or carbon trim. Trim added at the transfer point includes copper, chrome, and nickel. Flux and “ultraseed” or “superseed” inoculants are used. Slag is removed from the process both at the furnace and the transfer point.

Liquid metal is then poured into molds and onto cores to form products. After cooling, the metal castings are then dumped into the shaker system, where a “Didion” barrel knocks sand off of castings and polishes them. Castings are then shot blasted once or twice with a “wheelabrator” using chilled iron shot. “Gates and risers” (imperfections caused by molding) are cut off in the grinding area, melted back into the system with any other scrap iron, and reused in the furnace.

Four baghouses (also known as dust collectors) control emissions from the facility. Three of them are outside the building, and one is inside. The grinding area exhausts to the exterior baghouse on the southwest corner of the building (SW baghouse). The shakeouts exhaust to two baghouses known as “Torit” and “Pangborn.” The cope and drag area exhausts to the atmosphere. Emissions from the furnace are not controlled. The coring and cooling areas are not currently connected to baghouses.

Staff Interview:

The facility has operated here since 1923. They have approximately 50 employees and are currently fully staffed. They operate 05:00-15:30 Monday-Friday, and “occasionally” on weekends if demand and staffing allow. A bulletin board stated that they would be working on Saturday, June 3, 2023. They don’t have scheduled shutdowns of 1 week or more.

The Facility has been operating on a permit shield since the mid-1990s, and facility staff stated that they will apply for an updated permit once modeling is completed. They are conducting modeling together with their neighbor, Bituminous Roadways (BR). Smith Foundry has an approved modeling protocol from the [Minnesota Pollution Control Agency](#) (MPCA), and BR does not, according to Smith Foundry staff.

Emission control measures have also been reviewed in the permitting process. Smith Foundry is considering adding an additional baghouse for the metal ladle area, and controls for emissions from the furnace, the liquid metal pouring area, and everything else not currently controlled. They are working with Donaldson Company, Inc. on this, along with a 3rd-party engineer; an airflow expert.

The recent ownership change has not caused any operational changes to the facility as of yet. Facility staff stated that, in contrast with the previous owner, the new ownership has substantial funding and plans to finance upgrades to the facility in the coming years, starting with a new roof.

The furnace averages 20 tons of iron melted per day and recorded 4,600 tons melted in total for 2022. They pour the metal at approximately 2800 °F. They don’t take mercury switches.

The interior baghouse turns on automatically when sand is conveyed, and is changed out every two years, and the SW baghouse is on a six-month cartridge filter rotation. For the other two exterior baghouses, they are looking at the pressure drop readings to determine when to changeout the bags. Facility staff stated that the Didion barrel’s emissions control system used to draw out air much better than it currently does.

The facility claims to have last performed a stack test in 1994, and staff stated that conditions “haven’t changed that much.” Facility staff also claimed that they had discontinued production of certain types of products in the past in order to reduce harmful air emissions.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:

EPA Inspectors observed that the inside of the facility was generally dark and dusty from visible emissions, as shown in most of the images and videos. Large piles of silica and molding sand were on the floor uncontained and adjacent to open windows on the north side of the building (see images 1 and 4). Two open windows were observed near the cope and drag area (see image 7). Another open window was observed on the southeast side of the building (see image 5). An exhaust fan in the ceiling was open to the atmosphere.

Fume hoods were present in the shell core area, but visible emissions were observed escaping the capture area of the hood, with an open window and door nearby (see image 6). The metal ladle area had grey fumes and dusty air filling the room and was adjacent to an open door on the south side of the building. EPA observed substantial fumes and sparks generated from the pouring of liquid metal, especially when trim was being added (see images 8-9 and video 10). The furnace was near an open door on the south side of the building.

Visible emissions were observed escaping capture from the Didion (see images 15-16), and also escaping from large open doors/gates on the west side of the building (see images 19-20). Grinding was observed very close to two garage doors.

Cracks and disconnected ducts were observed on the ductwork leading to multiple baghouses (see images 12-14 and 17, and video 18). A large jagged rusted-out hole was observed on at least one shakeout duct (see images 13-14, and 17).

The baghouse pressure drop readings were:

Baghouse	Pressure drop (psi)	Notes
Interior	20	See image 3
SW	1.7-2.8	
Torit	3.6	
Pangborn	0	The unit was on, and processes were actively being vented to it. James stated that the filters were recently changed out but it “doesn’t work”.

Photos and/or Videos: were taken during the inspection.

Field Measurements: were not taken during this inspection.

CLOSING CONFERENCE

☒ Provided U.S. EPA point of contact to the facility

Requested documents:

- Facility map
- Process flow and emissions flow diagrams
- Iron, chrome, copper, and nickel throughput data from the past 5 years
- Air emission modeling documentation
- Maintenance records (filter changeouts, air duct maintenance, etc.)
- Annual Emissions Reports from the past 5 years
- All stack test report(s), including 1994 and 2018
- Safety Data Sheets for the phenol, ultraseed, superseed, etc.
- Baghouse monitoring Standard Operating Procedures (SOPs)
- Notice of Compliance Status for NESHAP ZZZZZ

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Compliance Assistance: EPA noted several items such as rusted out and detached ductwork that could quickly be fixed.

Concerns: EPA expressed concerns about significant uncontrolled emissions escaping the facility and affecting the surrounding Environmental Justice Community.

DIGITAL SIGNATURES

Report Author: **Herbers,
Jacob** _____

Digitally signed by
Herbers, Jacob
Date: 2023.06.08
10:39:36 -05'00'

Section Supervisor: **SARAH
MARSHALL** _____

Digitally signed by
SARAH MARSHALL
Date: 2023.06.08
11:43:33 -05'00'

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APPENDIX A: DIGITAL IMAGE AND VIDEO LOG

1. Inspector Name: Karina Kuc	2. Archival Record Location: EPA Electronic Records
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Image or Video #	File Name	Date & Time (CDT)	Image Description
1	P5260121.JPG	2023:05:26 11:07:36	Pile of spent sand (burned)
2	P5260122.JPG	2023:05:26 11:07:55	Fan on top of machine with particulate matter residue
3	P5260123.JPG	2023:05:26 11:12:14	Sand transfer dust collector pressure gauge = 20 psi
4	P5260124.JPG	2023:05:26 11:12:44	Open window on north side of building, dust on floor
5	P5260125.JPG	2023:05:26 11:13:25	Open window
6	P5260126.JPG	2023:05:26 11:15:52	Shell core area with open door on south side of building
7	P5260127.JPG	2023:05:26 11:19:47	Cope and drag area with open windows
8	P5260128.JPG	2023:05:26 11:21:19	Fumes in building
9	P5260129.JPG	2023:05:26 11:21:22	Fumes in building
10	P5260130.MOV	2023:05:26 11:21	Fumes in building
11	P5260131.MOV	2023:05:26 11:21	Accidental video
12	P5260132.JPG	2023:05:26 11:22:02	Hole in ductwork leading to baghouse + open door on south side of building
13	P5260133.JPG	2023:05:26 11:27:37	Rusted-out hole in ductwork leading to baghouse
14	P5260134.JPG	2023:05:26 11:27:39	Rusted-out hole in ductwork leading to baghouse
15	P5260135.JPG	2023:05:26 11:28:41	Fumes and dust from Didion barrel
16	P5260136.JPG	2023:05:26 11:28:45	Fumes and dust from Didion barrel
17	P5260137.JPG	2023:05:26 11:38:40	Rusted-out hole in shakeout duct leading to baghouse
18	P5260138.MOV	2023:05:26 11:41	Break in ductwork
19	P5260139.JPG	2023:05:26 11:47:41	Visible dust and fumes coming out of open garage doors on south side of building
20	P5260140.JPG	2023:05:26 11:47:46	Visible dust and fumes coming out of open garage doors on south side of building