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

**DATE:** JUL 23 2018

**SUBJECT:** CLEAN AIR ACT INSPECTION REPORT
AK Steel Corporation, Middletown, Ohio

**FROM:** Gina Harrison, Environmental Scientist and Marie St. Peter, Environmental Engineer
AECAB (MN/OH)

**THRU:** Brian Dickens, Section Chief
AECAB (MN/OH)

**TO:** File

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## BASIC INFORMATION

**Facility Name:** AK Steel Corporation Middletown Works No. 2 Coke Plant

**Facility Location:** 1801 Crawford Street, Middletown, Ohio 45044

**Date of Inspection:** May 23-24, 2018

**EPA Inspector(s):**
1. Gina Harrison, Environmental Scientist
2. Marie St. Peter, Environmental Engineer

**Other Attendees**
1. Scott Hamilton, Environmental Scientist, U.S. EPA Region 5 Air Monitoring and Analysis Section
2. Justin Coughlin, Environmental Scientist, U.S. EPA Region 5 Air Monitoring and Analysis Section
3. Jeff Carney, Operations Manager, AK Steel No. 2 Coke Plant
4. Chris Potts, Environmental Manager, AK Steel No. 2 Coke Plant
5. Mike Bathe, Environmental Engineer, AK Steel No. 2 Coke Plant
6. Patrick Gallo, Senior Environmental Manager, AK Steel No. 2 Coke Plant
7. Charlie Koeller, 303 Reader, EQM
8. Brad Scheinder, Maintenance Section Manager, AK Steel No. 2 Coke Plant
9. Samuel Schean, Tech Manager, AK Steel No. 2 Coke Plant

10. Kerri Castlen, Environmental Compliance Supervisor, Southwest Ohio Air Quality Agency (SOAQA)
11. Mike Kramer, Environmental Compliance Supervisor, SOAQA
12. Ciara Oehring, Environmental Compliance Specialist, SOAQA

**Purpose of Inspection:** Coke plant inspection

**Facility Type:** Metallurgical coke plant

**Arrival Time:** May 23, 2018: 10:13 AM EDT; May 24, 2018: 11:42 AM EDT
**Departure Time:** May 23, 2018, 12:05 PM EDT; May 24, 2018: Approx 4:00 pm EDT

**Inspection Type:**
☒ Unannounced Inspection
☐ Announced Inspection

## OPENING CONFERENCE

☒ Credentials Presented
☒ CBI warning to facility provided

The following information was obtained verbally from Mr. Carney unless otherwise noted.

**Process Description:**
AK Steel Middletown Works Wilputte Battery manufactures metallurgical coke in one 76-oven four meters tall (in height) vertical flue byproduct coke oven battery and uses one refractory quench tower to quench coke after pushing. The battery and quench tower have been operating since the 1950s. Each of the 76 ovens has two accessible sides described in the permit as the coke side and the push side, for charging and pushing, respectively. Each side of the battery contains two doors per oven – a vertically-oriented, slot type oven door and a chuck door near the top of the oven door.

Production starts around 11 am daily when the coke ovens are charged with a coal blend by transferring coal from the onsite coal bunker into a larry car, positioning the car over the empty oven, and discharging the coal, through a charging port on top of the battery, into the oven.

The coal is heated in the ovens to approximately 2,000 degrees Fahrenheit for a period of approximately 30 hours. The coking process generates coke oven gases, which are drawn away from the ovens to a collection main. The collection main, which serves the entire battery, directs the coke oven gas to the facility's coke by-product recovery plant where condensable materials (i.e., tars and light oils) are removed from the coke oven gas.

Once the coking process has completed, doors along the side of the ovens are opened, and the coke is pushed from the ovens into a railcar called a quench car. The quench car then transports the coke to a quench tower, where water is poured onto the coke in order to cool it. The

quenched coke is then dumped onto a coke wharf to drain any excess quench water and to allow the coke to cool further.

A conveyor system then transports the cooled coke to a screening building. The screening building contains a single deck vibrating screen where furnace-sized coke is extracted and subsequently discharged through chutes to railcars. Coke breeze is removed through a discharge chute and transferred to a coke breeze bin. The coke breeze is removed from the bin and transported offsite by trucks.

The raw coke oven gas that enters the byproduct recovery plant is first sprayed with a flushing liquor to shock cool the inlet stream to about 175°F. The cooled coke oven gas is then directed to primary coolers to lower the temperature of the gas even further (to approximately 100°F). The flushing liquor and condensate generated by the cooling process drop down into a tar decanter. The tar removed from the decanter is collected and either sold to offsite customers or blended into the charging coal at the coal preparation area.

The cooled coke oven gas exits the primary coolers and is pulled by an exhauster operated at the byproduct plant through a series of separation units including: tar precipitators, an ammonia scrubber, a light oil scrubber, wash oil preheaters, and a light oil distillation process. The "cleaned" coke oven gas is then vented to a number of onsite and offsite combustion units as a fuel source. The coke oven gas is also recirculated along with blast furnace gas to provide heat to the coke oven battery.

**Staff Interview:** On May 23, EPA inspector Ms. Harrison discussed the scope of the visit with Mr. Carney as a follow-up to EPA's May 8th inspection, indicating the purpose of the visit would be to traverse the battery and observe visible emissions from the doors and offtake piping. Mr. Carney proceeded to escort Ms. Harrison around the battery and then topside.

On May 24, Ms. St. Peter discussed the scope of the visit with Mr. Carney, Mr. Gallo, and Mr. Bathe, explaining that it was a continuation of the follow-up that began yesterday and that she would be performing observations of visible emissions from the battery following the procedures laid out in EPA Method 303. After this brief conversation SOAQA staff, Ms. St. Peter, Mr. Carney, Mr. Gallo and Mr. Bathe walked over to the coke battery to begin the observations.

## TOUR INFORMATION

**EPA toured the facility:** Yes

**Data Collected and Observations:**

On May 23, EPA inspector Ms. Harrison traversed the battery and observed the oven doors beginning at 10:41 am and ending at 11:03 am, and ascended the battery at 11:05 am.

Inspectors noted visible emissions leaking from oven doors and components, as follows:

| Time | Oven Number | Area of Oven Leaking |
|---|---|---|
| 10:41 am | 33 | Push side, top of oven door |
| 10:41 am | 37 | Push side, top of oven door and buckstay |
| 10:41 am | 38 | Push side, chuck door |
| 10:42 am | 41 | Push side, chuck door |
| 10:42 am | 43 | Push side, chuck door |
| 10:44 am | 63 | Push side, top of oven door and chuck door |
| 10:46 am | 76 | Coke side, top of oven door |
| 10:46 am | 75 | Coke side, top of oven door |
| 10:52 am | 69 | Coke side, top of oven door |
| 10:52 am | 67 | Coke side, top of oven door and standpipe |
| 10:54 am | 47 | Coke side, top of oven door |
| 10:55 am | 45 | Coke side, top of oven door and chuck door |
| 10:58 am | 27 | Coke side, top of chuck door |
| 11:01 am | 19 | Coke side, top of oven door |
| 11:03 am | 12 | Coke side, top of oven door |
| 11:03 am | 10 | Coke side, top of oven door |

Ms. Harrison and Mr. Carney ascended the battery at 11:05 and observed visible emissions leaking from the following ovens' offtake piping and oven components from 11:05 am to 11:55 am:

| Time | Oven Number | Area of Oven Leaking |
|---|---|---|

| | | |
|---|---|---|
| 11:08 am | 76 | Coke side, jointure between offtake and battery interface |
| 11:08 am | 75 | Coke side, offtake lid and charging port |
| 11:08 am | 73 | Coke side, offtake lid |
| 11:09 am | 69 | Coke side, gooseneck, lid, and standpipe |
| 11:10 am | 67 | Coke side, standpipe |
| 11:12 am | 65 | Coke side, offtake lid |
| 11:13 am | 61 | Coke side, flue cap and standpipe |
| 11:15 am | 57 | Coke side, standpipe |
| 11:17 am | 47 | Coke side, offtake lid |
| 11:18 am | 43 | Coke side, offtake lid |
| 11:20 am | 38 | Coke side, connector leading to CM |
| 11:21 am | 37 | Coke side, offtake lid |
| 11:21 am | 36 | Coke side, offtake lid |
| 11:24 am | 35 | Coke side, offtake lid |
| 11:25 am | 33 | Coke side, offtake lid |
| 11:30 am | 27 | Coke side, connector leading to CM |
| 11:33 am | 23 | Coke side, connector leading to CM |
| 11:34 am | 19 | Coke side, standpipe |
| 11:35 am | 18 | Coke side, connector leading to CM |

| | | |
|---|---|---|
| 11:36 am | 16 | Coke side, offtake lid |
| 11:37 am | 8 | Coke side, offtake lid |
| 11:40 am | 12 | Coke side, offtake lid |
| 11:42 am | 4 | Coke side, offtake lid |
| 11:51 am | 35 | Push side, connector leading to CM |
| 11:55 am | 63 | Push side, standpipe |

Mr. Carney and Ms. Harrison descended the battery at 11:55 and met with Mr. Gallo for a brief closing conference. Ms. Harrison explained the purpose of the traverses and visible emission observations was to determine compliance with Ohio SIP Rules 3745 17-07(B)(2)(d)(ii) and (B)(2)(b), which require that at no time shall there be visible fugitive particulate emissions from more than ten percent of the oven doors, nor from the offtake piping. Based on the data collected during observations at oven doors, visible fugitive particulate emissions were leaking from AK Steel's Wilputte Battery from 16 out of 152 doors, at a rate of 10.5% . Based on observations at offtake piping, visible fugitive particulate emissions were leaking from AK Steel's offtake piping, as defined at OAC 3745-17-03(B), from components associated with 25 out of 152 ovens, at a rate of 16.4%.

On May 24, Ms. St. Peter first began by observing for possible leaks on the coke battery's doors in the presence of SOAQA, AK Steel and Mr. Koeller. Mr. Koeller had joined the group shortly after arriving, and performed his daily visible emissions observations of the doors during the same time as Ms. St. Peter, but appeared to perform his observations in a slightly different method (as allowed by the Method 303 protocol) than she did. She noted 7 doors as having leaks. This resulted in a percent leakage rate of 4.73% that day pursuant to Method 303 procedures.

Ms. St. Peter then ascended the battery with Mr. Carney, Mr. Bathe, and Mr. Koeller to observe visible emissions from the lids, offtake pipes, during charging and from the collecting main while SOAQA staff and Mr. Gallo stayed on the ground. She noted 1 lid leak and 7 offtake leaks. These observations resulted in a leak percent rate for that day of .47% and 4.86%, respectively, pursuant to Method 303 procedures. Mr. Koeller appeared to perform his observations of the lids and offtakes at different time intervals than she did.

Ms. St. Peter observed 6 charges as follows:

| Charge Number: | Oven Number: | Charge Beginning Time: | Charge End Time | Seconds of Visible Emission Observed: |
|---|---|---|---|---|
| 1 | 6 | 12:51 pm | 12:54 pm | 67 sec |
| 2 | 8 | 1:14 pm | 1:19 pm | 41 sec |

| | | | | |
|---|---|---|---|---|
| 3 | 10 | 1:39 pm | 1:41 pm | 44 sec |
| 4 | 12 | 1:57 pm | 2:01 pm | 8 sec |
| 5 | 14 | 2:15 pm | 2:17 pm | 8.5 sec |
| 6 | 16 | 2:32 pm | 2:38 pm | 5.5 sec |

Mr. Koeller observed the first five charges with Ms. St. Peter. There was a large discrepancy between Ms. St. Peter and Mr. Koeller recorded seconds of visible emissions observed during oven 10's charge. Ms. St. Peter explained that for the charge at oven 10 she was counting emissions which were coming from the standpipe during the charging period. Mr. Koeller disagreed, saying that those emissions were coming from the door.

In between observing the charges at ovens 14 and 16, Ms. St. Peter, Mr. Carney and Mr. Bathe traversed both the push side collecting main. The push side traverse started at 2:24 pm and ended at 2:26 pm, taking a total of 2 minutes and 8 seconds. Ms. St. Peter noticed 3 instances of visible emissions coming from spoon hole covers during this traverse. Mr. Carney, who was in front of Ms. St. Peter, appeared to attempt to fix or determine the cause of the leaks as he stepped on the covers or kicked material surrounding the covers to the side. The leaks did not stop. At 2:41 pm, the group then traversed the coke side collecting main. There were no leaks observed. The traverse ended at 2:45 pm, after Ms. St. Peter asked some questions regarding the pressure gauge.

After traversing the coke side collecting main, Ms. St. Peter and all parties who had ascended with her descended the battery and went to a conference room to hold a closing conference.

**Photos and/or Videos:** were not taken during the inspection.

**Field Measurements:** were taken during this inspection.

## CLOSING CONFERENCE

On May 23, Ms. Harrison thanked AK Steel personnel for their time and told them they were welcome to contact us for a more formal closing conference involving other environmental staff at the facility. Mr. Carney indicated they would be requesting a copy of the inspection report when it was completed. Ms. Harrison confirmed with Mr. Carney that nothing discussed was Confidential Business Information and then left the facility at 12:05 pm.

On May 24, Ms. St. Peter went into a conference room to hold a closing conference with AK Steel. She was joined by Mike Bathe, Jeff Carney, Pat Gallo, Brad Scheinder, Samuel Schean, and Charlie Koeller. SOAQA staff had left prior to the closeout conference due to the length of time it was taking to observe the oven charges. Ms. St. Peter thanked everyone for their time, and then discussed with them briefly the visit Ms. Harrison made the day prior. She said that she was unable to speak on behalf of Ms. Harrison and what she saw, but did state that following the specific observation protocol under Method 303 was not required to determine compliance with Ohio SIP rules. She then stated that she was willing to help set up a more formal closeout conference for AK Steel with Ms. Harrison to address any topics they wished to talk about. Ms. St. Peter then discussed the intention of her visit that day again, and stated that while she was

there intending to do 303 readings, those readings could also be used to determine compliance with relevant Ohio SIP rules. She summarized all observations she made, including those on the collecting main, which Mr. Carney agreed to seeing. Finally, Ms. St. Peter stated that she would like to see the past 30 days' worth of 303 observations made by Mr. Koeller. Mr. Koeller agreed to provide these documents to Ms. St. Peter via email. Ms. St. Peter then once again thanked everyone for their time and left the premises.

**SIGNATURES**

Report Authors: _____ Date: 7/23/18

_____ (G. Harrison for M. St. Peter) Date: 7/23/18

Section Chief: _____ Date: 7/22/18