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

DATE: OCT 12 2012

SUBJECT: Horsehead
Chicago, Illinois

FROM: Alexandra Letuchy, Environmental Engineer
Air Enforcement and Compliance Assurance Section (MI/WI)

THRU: Sara Breneman, Chief
Air Enforcement and Compliance Assurance Section (MI/WI)

TO: File

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1. **INSPECTION OVERVIEW**

Name
Horsehead Corporation ("Horsehead")

Location
2701 E. 114th Street, Chicago, IL 60617

Inspection Date
1:15 PM – 4:45 PM, August 1, 2012

Attendees
Alexandra Letuchy, EPA, Environmental Engineer
Roshni Brahmbatt, EPA, Environmental Engineer
Katharina Bellairs, EPA, Environmental Engineer
Joseph N. Kotas, IEPA, Environmental Protection Engineer
John A. Marta, Horsehead, Plant Manager
Keith A. Krikau, Horsehead, Plant Engineer

Company Contact
John A. Marta
Plant Manager
773-933-9260
Jmarta@horsehead.net

Company Overview
Horsehead Corporation ("Horsehead") operates two Waelz kilns and processes electric arc furnace (EAF) dust to produce zinc oxides and iron rich material (IRM). The SIC code for the facility is 3341,

Secondary Refining of Non Ferrous Metals. The zinc and zinc oxide products are primarily used in the car industry, sun block and burn ointment industry, and vitamin and pharmaceutical productions. IRM is used in the cement, asphalt, and steel industry (mostly for the iron content).

The facility was built in 1940 to calcine coke and coal for steel and aluminum industries, but was purchased by Horsehead Resources Corporation in 1986 and began to process EAF dust in 1988.

Horsehead employs 67 employees and operates three 8-hour shifts.

Environmental Justice

The EPA uses the Environmental Justice Strategic Enforcement Assessment Tool (EJSEAT) to identify areas with potentially disproportionately high environmental and public health burdens. Areas are assigned an EJSEAT score between 1 and 10, with 1 being the highest indication that the area is an EJ area of concern. Horsehead is located in an environmental justice (EJ) area (EJSeat 2011 Score = 1).

Regulatory Overview

The facility is considered a major source under the Clean Air Act (CAA) and an area source for HAPs. Title V Permit for the facility, Permit ID No.: 96030189, was issued on May 15, 2002 and expired on May 15, 2007. The facility has applied for another permit, but it has not been issued.

2. ARRIVAL AND OPENING CONFERENCE

We (Roshni Brahmbatt, Katy Bellairs, and Alexandra Letuchy of EPA) arrived at Horsehead Corporation, located in Chicago, Illinois ("Horsehead" or "the facility") at approximately 1:15 PM on August 1, 2012. We entered at the main entrance and asked the secretary if we could speak with an Environmental Compliance Manager or Plant Manager. Joe Kotas of IEPA had already entered the facility and was waiting for us. John Marta, Plant Manager met us in the lobby. We stated the purpose of our visit was to determine the facility's compliance with the CAA and suggested that we move to a conference room or office. Mr. Marta showed us to his office and we were joined by Keith Krikau, Plant Engineer. We introduced ourselves, showed Mr. Marta and Mr. Krikau our credentials, and started the opening conference.

We told Mr. Marta and Mr. Krikau that we wanted them to give us a process based overview of the operations at the facility, focusing on pollution control and then take us on a plant tour. We told them that we were inspecting the facility because of elevated Manganese readings at the ambient air monitoring station located at Washington High School, directly east of the facility. We informed them that we would end the inspection with a closing conference. We explained that if we discussed anything that they considered confidential business information (CBI), they should let us know and we would treat it as such. We said that we would generate an inspection report, but the report would not contain a compliance determination.

Process Overview

Raw Materials

EAF dust is brought into the facility by truck and by rail. The dust is a byproduct of melting at steel mills and foundries. EAF dust is composed of zinc, iron, lead, cadmium, magnesium, manganese, and any other fumes that are collected by baghouses during melting cycles at steel mills and foundries. Another feed material is carbon and is delivered via truck. The facility processes 150,000 – 170,000 tons of EAF dust per year.

Curing and blending
EAF dust is unloaded in the curing and blending building, truck delivery in one bay and rail delivery in the other bay. The zinc load and composition of each supplier's EAF dust is unique, but the kiln is sensitive to the concentration of zinc in the feed. EAF dust is mixed in the building to achieve a more uniform composition of zinc and other components. A composite sample is taken and sent to a Pennsylvania lab. The curing and blending building is controlled by Baghouse #11A, Baghouse #11B, and Baghouse #12.

EAF dust is conveyed from the curing and blending building and processed into pellets. By adding water and mixing the dust, the dust sticks together in a snow ball effect, forming pellets. The pellets are blended with the coke and fed into two Waelz Kiln furnaces.

Waelz Kiln Melting
The facility has two Waelz kilns. Kiln #1 was constructed in 1942 and is permitted for a feed rate of 16.7 tons per hour (TPH) and Kiln #2 was constructed in 1994 and is permitted for a feed rate of 18.2 TPH. The feed is heated to 800 – 1,100° C and undergoes an exothermic oxidation-reduction reaction. Natural gas is used as a supplemental fuel. Zinc is fumed off and suctioned from the inducted drafts fan pulls the gas stream into an "off gas cooling area". The zinc gas is cooled to 200° C to form zinc oxide and is collected in product collectors or Baghouse #3 and Baghouse #10. Emissions from Kiln #1 are vented to Baghouse #3 and emissions from Kiln #2 are vented to Baghouse #10. Baghouse #3 uses 2,160 Nomex bags and Baghouse #10 uses approximately 1,850 Nomex bags. Baghouse #3 and Baghouse #10 each have 12 compartments that can be isolated for maintenance. These two baghouses have a Continuous Opacity Monitoring System (COMs) with an opacity alarm set to 12%.

Zinc Oxide
Zinc oxide collected in product collectors are tested for composition. The composition of zinc has increases from a low tens % in the EAF dust to approximately 60% in the final product. The product, in bags, is loaded under the #3 and #10 Baghouses into rail cars.

Iron Rich Material (IRM)
The remaining solid material in the kilns exits the kilns at the lower end and is conveyed to two of five storage silos located near the Calumet River. The other three storage silos are used to store spare parts or remain unused. Samples of IRM are taken from each batch that has been transferred to the storage silos and are sent to Pennsylvania for a Toxicity Characteristic Leaching Procedure (TCLP) analysis. The analysis tests for 14 components, but manganese is not included. Once a month, IRM is testing for more metals, including manganese. After sampling, IRM is transferred to stack piles located south of the facility. One stack pile was located by the back end of the pond. John Marta told us that the piles are not controlled, but said that they naturally form a crust that reduces fugitive emissions. He also said that the piles are only used seasonally (late December, February, March).

Operation
The furnaces operate 24 hours a day, 7 days a week. Most of the outages are for refractory repairs 3 – 4 times per year on each. Kiln shells are also replaced during long shutdowns. Although kiln shells usually last 75 – 100 years, Horsehead has replaced a significant portion of kiln shell on each kiln. Kiln 1 only has 40 feet of the original shell. The last 3 feet or original shell on Kiln 2 has been recently replaced.

The majority of loading and unloading occurs Monday – Friday during the day.

Horsehead is considering installing a 3rd kiln, because there is a high demand for their product. They performed an internal stack test in 2012 to evaluate if putting in a new kiln would trigger New Source Review (NSR).

Pollution Control

The facility has a total of 16 baghouses. They control emissions for the Waelz Kiln System, carbon material pneumatic displacement transfer system, carbon material bin, curing and blending building, feed handling system, crude zinc oxide bin, iron rich material transfer area, and iron-rich material kilns discharge area.

The facility also checks for fugitive emissions at Product Collectors #3 and #10 with COMs, but does not do any other VE readings. Water trucks are used to controls emissions from the facility roadways and water hoses are used to maintain 10 – 13% moisture in the carbon storage piles. The facility has a Fugitive Program for non paved roads. IRM storage piles are not controlled.

The most recent stack test was performed in 2012 for internal use, as noted above. The only other stack tests performed at the facility were the initial stack test on Kiln 1 in 1988/89 and Kiln 2 in 1994.

3. SITE TOUR

We started the tour of the facility at approximately 2:25 PM in the curing and blending building. Photos were taken during the tour. Mr. Marta showed us the truck delivery wing and he told us that the overhead doors are closed during this process. Trucks and railcars dump EAF into hoppers and the material is gravity fed into the curing and blending room. Two cranes are used to mix the material. Truck deliveries are not scheduled but mostly occur between 7 AM – 2 PM Monday through Friday. Rail deliveries occur seven days a week. No deliveries were made during our visit. We also did not see the curing and blending building in operation.

We observed visible emission from product collector #3. According to the COMs, opacity from Baghouse #3 was around 8% at the beginning of the tour. After the 1st compartment was isolated, the opacity was reduced to 5.7%.

Next, we preceded to the IRM silos. In addition to the five silos discussed in the opening conference, there were four other silos not in use. We did not see any materials being loaded or unloaded in the IRM silos. IRM conveyors and material transfer areas varied on the amount of enclosure and were partially open to the atmosphere.

We saw the two kilns in operation from the outside. They were approximately 180 feet in length and had 10 feet and 6 inch inside diameter. The kilns rotated slowly and were slightly angled down to slowly move the EAF dust and later IRM to the kiln discharge area. The "off gas cooling area" was located at the very end of the kiln. We then climbed to the bottom of the kiln, where we saw the IRM and the zinc off gassing. The temperature in the kiln was 1074° C.

Mr. Marta next showed us the feed building. EAF dust was pelletized in this building, but we did not see the operation. We also saw the IRM stock piles and the coke storage piles. IRM was being transported via front loader. We did not see the loading dock, as the barge was not being loaded during the inspection.

Closing Conference

After we completed the plant tour at 3:50 PM, we went back to the office for a closing conference and records review. Dave Swisher, Corporate Manager of Environmental Affairs, joined us on the phone.

We took copies of the following documents:

Document	Dates	Comments
Facility Diagram		
Annual Throughput	2011	CBI
Daily Operating Downtime	July 1, 2012 – July 31, 2012	CBI
IRM Certification	IRM Production cycle: July 24, 2012 – July 27, 2012	Manganese was not one of the analytes.
Annual Emissions Report	2011	
Photos	During plant tour	49 photos

We asked that Horsehead provide the following information via mail:

- 2012 Stack Test
- Monthly TLCP Analysis on IRM
- Annual Throughput
- Operating Hours/Daily Downtime
- Total Annual Emissions Calculations, including how emissions factors were developed
- Kiln Feed Composition - % of metals in the material
- Baghouse Dust Analytical Composition Test Results

We also requested a schedule of barge, rail, and truck loading and unloading for 2012. Horsehead told us that getting this information would be extremely burdensome and we agreed to reevaluate our request.

We also asked to see baghouse inlet flow rate logs for each bag collector; Mr. Marta told us that the facility did not monitor inlet flow rate. Instead, they monitor damper positions, fan speed, and changes in temperature and pressure to ensure proper baghouse operation and capture. Operators are also able to either modify damper position or fan speed to manage inlet flow rate.

We told Horsehead personnel that we may follow-up the inspection with a Clean Air Act Section 114 Information Request and that they could contact us directly for a copy of the inspection report. We asked if any materials or information they shared with us should be considered CBI, other than the Annual Throughput and Daily Operating Downtime documents, and they told us that nothing else should be considered CBI. We thanked them for their time and left the plant at approximately 4:45 PM.