DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

A780925743

FACILITY: U S STEEL GREAT LAKES WORKS		**SRN / ID:** A7809
LOCATION: 1 QUALITY DR, ECORSE		**DISTRICT:** Detroit
CITY: ECORSE		**COUNTY:** WAYNE
CONTACT: Alexis Piscitelli , Environmental Manager		**ACTIVITY DATE:** 06/25/2014
STAFF: Katherine Koster	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** MEGASITE
SUBJECT: Targeted FY 2014 inspection		
RESOLVED COMPLAINTS:		

REASON FOR INSPECTION: Targeted Inspection
INSPECTED BY: Katie Koster, AQD
PERSONNEL PRESENT: Brad Wargnier, Environmental Engineer
FACILITY PHONE NUMBER: (313)749-2744 (Office)

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FACILITY BACKGROUND

United States Steel, Great Lakes Works (USSGLW) is an integrated steel mill in operation since August 1930. It is located just south of the City of Detroit. The site consists of approximately 1100 acres that span along the Detroit River through the cities of Ecorse and River Rouge. The facility includes the Main Plant Area, the 80-inch Hot Strip Mill, and the iron making and coke making operations on Zug Island. Coke making is done at the No. 5 battery, by EES Coke, a subsidiary of DTE Energy. The plant produces flat-rolled steel products for a variety of industries; mainly automotive. The primary iron producing facility is located on Zug Island, City of River Rouge. The 80-inch Hot Strip Mill facility is located in the City of River Rouge between the Zug Island and Main Plant facility location. The Main Plant Area is located on a 682 acre site located in the City of Ecorse. There are also six support facilities located inside or adjacent to the facility.

USSGLW is currently operating under ROP No. 199600132d and Permit to Install 96-12 (for an iron ore screening process which has not yet commenced). The ROP is in the renewal period.

The facility is also operating under AQD Consent Order 1-2005 and numerous Wayne County consent order, including a fugitive dust SIP Consent Order.

The facility is subject to the Integrated Iron and Steel Manufacturing MACT (FFFFF), Steel Pickling MACT (CCC), Boiler MACT (DDDDD), and NSPS Na (Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983). Also, the emergency generators are subject to the RICE MACT (ZZZZ) and/or NSPS IIII.

This facility is considered a megasite and is on a three year inspection cycle to complete a full compliance evaluation (FCE). FY2014 is the third year of the cycle

PROCESS DESCRIPTION

Below includes the processes discussed and/or observed during the inspection. This does not include the entire facility.

Blast Furnaces

B2 and D4 are the two operating blast furnaces on Zug Island. Iron ore is converted to pig iron in the furnace. The raw materials, mainly iron ore, coke, limestone, and BOF slag, are charged to the top of the furnace via a skip car. Note, B2 and D4 have different types of tops (B2 is a bell system but D4 is not). Pulverized coal is blown into the bottom of the furnace through the tuyeres as a fuel source. This process is controlled by a baghouse during drilling, casting, and plugging the furnace. Hoods are present over the tap hole and iron filling station and there are runner covers at the iron and slag troughs to enhance capture efficiency. According to the Integrated Iron and Steel MACT O&M plan, there are no process dampers. Hot metal is cast into bottle cars on Zug Island and transferred by rail to the Main Plant No. 2 Basic Oxygen Process shop. Slag is cast into one of two pits outside of casthouse and sprayed with water and hydrogen peroxide for odor control. Edw. C. Levy Co.

manages and digs the pits. USSGLW aims for about 50% slag per cast and it takes about 7 hours from when material is charged into the furnace until it is cast. Hot blast air enters the furnace at approximately 1800-200F, hot metal is cast at about 2600-2800F, and top gas leaves the furnace at about 300-400F.

Gas generated in the furnace (blast furnace gas) exits the top of the furnace via the downcomer. Gas can travel to the top of the furnace in 1 to 5 seconds. This gas is mostly CO and CO2. To slow the gas flow out of the furnace, the operators can increase the top pressure. Next, the gas enters the dustcatcher for removed of large particulate and then a venturi scrubber for additional particulate matter removal. The dust catcher is typically emptied once per shift. Each furnace has a clean and dirty gas bleeder valve which opens when the pressure in the furnace reaches a certain set point .The bleeders function to relieve pressure. The clean gas bleeder opens first and releases blast furnace gas which has already passed through the dustcatcher and venturi scrubber. Gas from the dirty gas bleeder has not had any cleaning.

"Clean" blast furnace gas is combusted along with natural gas in the stoves and used to heat the hot blast air injected into the furnace. Excess blast furnace gas is combusted in the boilers or sent to a flare. Historically, some of the excess gas was combusted at the No. 5 coke battery but this is no longer the case.

Blast furnace cooling tower

Cooling water is needed to cool the tuyeres and other areas of the blast furnace.

Blast furnace slag pits

Each blast furnace has two slag pits. One pit is cooling or being dug/emptied while the other is actively in use to receive slag during casting. Edw. C. Levy Co. digs the pits and loads trucks with quenched slag to be hauled to Levy Plant 1 on Dix. USS operators inside the casthouse initiate watering of the slag for about twenty minutes after the completion of each cast. There must not be any standing water in the pit before the next cast as that can cause an explosion when hot slag meets water due to rapid thermal expansion. According to USSGLW, it takes about 4 to 6 hours to fill a slag pit. In the meantime, they can cast slag into the other pit. There is a bank of water spray nozzles on each side of the pits. Hydrogen peroxide is mixed with the water and therefore comes out of the same nozzle.

There are also two oscillating rainbirds at the edge of the pits. They are oriented away from the pits. I was informed that these are the responsibility of Edw. C. Levy Co. Levy operators turn on the rainbirds during digging and loading to reduce fugitive emissions during these activities. The rainbirds also deliver a mixture of water and peroxide. The peroxide is corrosive to the oscillating sprays; Levy provides spray nozzles to USS for replacement about every couple of weeks.

Screening Operation

Iron ore is screened before use in the blast furnaces. Currently, Harsco Metals operates a stationary screen and two portable screens. USSGLW has also obtained a permit to replace this equipment with their own equipment (96-12).

Emergency Generators

9 emergency generators exist throughout the stationary source.

Zug Island Boilerhouses

Boilerhouses No.1, No.2 and No.3 are on Zug Island. No. 1 boilerhouse primarily services B2 blast furnace and No.2 services D4 blast furnace and the coke battery. The main function of the boilers is to generate steam to drive the turboblowers. The turblowers provide blast air to the stoves to be heated and injected into the furnace.

INSPECTION NARRATIVE

Screening operation

On June 25, 2014, I arrived at USSGLW. Mr. Wargnier drove us to Zug Island where we viewed the iron ore screening operations. We viewed the new USS fixed screen which has been installed but was not operational at the time. According to facility, operations are still being "ramped up." The current plan is for the USS equipment to be fully operational by the end of July 2014. We discussed the visible emission (VE) requirements between the existing Harsco operations and the new USSGLW operations. According to the permits, the requirements appear to be the same. Mr. Wargnier stated that the facility was going to conduct the same type and frequency

of VE readings that they had been conducting. I obtained a sample of a recent VE reading done by Veolia on the Harsco process.

I discussed the VE readings with Veolia. Readings of material handling encompass anything that involves mobile equipment (such as loading material into a hopper, loading screened material into a truck from a pile off of a conveyor). When VE readings are taken of the screening process, Veolia reads the entire process (screen, conveyors, transfer points).

Boilerhouses
We drove past the No. 2 and No. 1 boilerhouses on Zug Island. Each boiler has its own stack. I did not observe any visible emissions from the stacks. The No. 3 boilerhouse is not in use and has not been for the last several years. This is evidenced in the MAERS report where natural gas throughput is zero.

BF cooling tower
Sampling for ammonia is required per the ROP. Brad explained that two samples are taken at a time; a sample is taken from the
inlet pipe to tower and where the water is dripping into the tower. The difference in these two results is the emissions estimate. I inquired about the source of the ammonia. Brad said that it was generated in the blast furnace process but the exact cause was unknown.

B2 BF slag pits
We observed a Levy operator digging out the northernmost pit and dumping slag into an Edw. C. Levy truck. I observed two "rainbirds" at the edge of the pits which were spraying toward the loading operation. Each time the loader operator dumped a bucket into the truck, it released a plume of steam which appeared to be mixed with particulate. I was unable to take VE readings.
In the event that a Levy truck is not available when a pit needs to be emptied, the slag is moved to the edge of the pit.

B2 and D4 BF
I did not enter the casthouse. While in the slag pit area for B2 furnace, I observed the roof monitor and baghouse stack. I did not observe any visible emissions. We also drove past D4 furnace and the slag pits. I did not observe any visible emissions from D4 baghouse stack or roof monitor.

We returned to the Environmental offices. Brad and I discussed blast furnace slips which are included in the annual MAERS report. Slips can cause the bleeder valves to open and are identified by a review of the stockline movement (movement of burden materials downward in the furnace). Brad showed me a spreadsheet with bleeder openings, including the date, time, and the subsequent reasons (many were blank and some were categorized as slips or problems with the PLC). I also reviewed a random sample of visible emission readings for the blast furnace roof monitors. Mr. Bush explained that they take readings over an entire cast.

I followed up with the attached records request.

APPLICABLE RULES/PERMIT CONDITIONS EVALUATED

Blast Furnace Cooling Tower
Table E-01.15
II.B: Ammonia is limited to 1.05 grams per second and 8.34 pounds per hour
III. 2. The permittee shall record and keep the file of the following information and shall be made available to AQD upon request:
1.Total hours of operation per day. **IN COMPLIANCE.** According to information in MAERS (attached), hours of operation are 24 hours per day, 365 days per year.
2.Calculation of ammonia emission once a year based on result of annual analytical test conducted as required under III(B)(1-3) of this Table. **PENDING.** For 2013 sampling, results showed no change between the inlet and outlet concentrations and therefore, the estimated emissions were zero. However, the 2012 results were different. It is unclear how facility is using the results to demonstrate compliance with the grams/second and lb/hr limits. Awaiting additional information from the facility.
III.B.3. The permittee shall conduct test to determine the ammonia concentration in water of the cooling tower during operation once a year or more frequently upon the request of AQD. The result of this test will be used by permittee to determine ammonia emission by calculation as required under III(A)(2)(2). **IN COMPLIANCE.** AQD requested results from the last two years and received result from 2012 and 2013.

Boilerhouses
TABLE F-01.01 No. 1 and No. 2 BOILERS at No. 3 BOILER HOUSE ZUG ISLAND – **IN COMPLIANCE.**

II.B.1 &2 - Nitrogen Oxide expressed as NO2 - 383.8 tons per year, Carbon Monoxide - 76.75 tons per year. According to 2013 MAERs, this boilerhouse is not in use as natural gas throughput is zero and natural gas is the only allowed fuel per the permit.
III.A.2. Natural gas consumption monthly and yearly. According to MAERS, consumption for 2013 was zero.
V.1 Natural gas is the only allowable fuel. According to MAERS, natural gas consumption was zero.
V.2 No visible emissions. No boilers in No 3 boilerhouse were operating.

TABLE F-01.02 BOILERHOUSE NO. 1 & 2
III.2 – Shall record all types and amount on fuel per boiler on a monthly basis. **IN COMPLIANCE.** Monthly and yearly usage information per boilerhouse for 2013 is in MAERS. I did not request usage per boiler at this time as the boilers do not have individual emission limits.
V.1 – Types of fuels are restricted to BFG, COG, or natural gas. **IN COMPLIANCE**. Monthly and yearly usage information for 2013 is in MAERS. Boilers reportedly burned all three fuels.

TABLE F-01.03 MAIN PLANT BOILERHOUSE NO. 1
III.2 – Shall record all types and amount on fuel per boiler on a monthly basis. **IN COMPLIANCE.** Monthly and yearly usage information per boilerhouse for 2013 is in MAERS. I did not request usage per boiler at this time as the boilers do not have individual emission limits.
V.1 – Types of fuels are restricted to COG, or natural gas. **IN COMPLIANCE.** Monthly and yearly usage information for 2013 is in MAERS. Boilers only burned natural gas.

Slag pits
TABLE F-01.06 SLAG PITS for "A", "B" and "D" BLAST FURNACES
III.2 Shall keep records of the operational conditions of the water flow and peroxide status daily. **IN COMPLIANCE.** Examples of required inspections of the water and peroxide pumps were provided. According to the work order, this is a daily task. Based solely on this information, compliance status was chosen. See attached records.
V. The permittee shall reduce hydrogen sulfide emissions generated at the blast furnace slag pits servicing casthouses A, B, and D by installing and properly maintaining hydrogen peroxide spray water quenching systems. **PENDING.** Sufficient information has not been provided to demonstrate that the spray water system has been adequately maintained. Work orders for replacement of some spray nozzles were provided. For 2013, some nozzles were replaced on 1/22 and 3/26 at B2 and 8/19 on D4. However, it is unclear whether they are being inspected and/or replaced at a sufficient frequency. AQD has requested additional information.

Slag pits are also subject to fugitive dust regulations which are in the ROP under Sourcewide Requirements TABLE B-1. While the existing ROP does not explicitly require visible emission readings of the slag pits, the USS VE contractor, Veolia, is performing readings of the slag pits on a weekly basis. However, a review of the VE readings (attached) indicates readings are only taken during casting or watering. I do not see any readings of digging/loading operations. This activity should also be observed for compliance as it is also subject to 5%, 3 minute average (material handling at a storage pile). Based on a review of the VE readings attached, no exceedances of the 5%, 3 min average fugitive dust limit were observed.

Blast furnaces
TABLE F-01.05 A, B AND D BLAST FURNACES
II.A Total iron produced from FGBLASTFURNACES-A,B&D is 3,718,000 tons per 12-month rolling time period as determine at the end of each calendar month. **IN COMPLIANCE.** According to 2013 MAERS, 12 month rolling iron production for the time period ending December 2013, was 2,453,758 tons for B2 and D4 combined. A1 is not in operation.
II.B. Particulate Matter is limited to 447.4 tons per year on a 12-month rolling time period as determined at the end of each calendar month. **IN COMPLIANCE**. According to 2013 MAERS report, PM emissions were approximately 58 tons for the 12 month rolling time period ending December 2013.
- PM10 - 352.2 tons per year on a 12-month rolling time period as determined at the end of each calendar month. **IN COMPLIANCE.** According to 2013 MAERS report, PM10 emissions were approximately 38 tons for the 12 month rolling time period ending December 2013.
- Nitrogen Oxide - 821.4 tons per year on a 12-month rolling time period as determined at the end of each calendar month. **IN COMPLIANCE**. According to the 2013 MAERS report, NOx emissions from the stoves for combustion of BFG and NG were 124 tons for the 12 month rolling time period ending December 2013.
- Visible emissions 20% (6 minute average) opacity from casthouse roof monitors. **IN COMPLIANCE**. Compliance was determined based on a spot check of VE records while on site.
III.B.3.2 2. Within one year of issuance of the permit, PM and NOx emission factors shall be determined for the combustion of blast furnace gas for one of the FG-BLASTFURNACES, by testing at owner's expense, in accordance with Department requirements. **NOT IN COMPLIANCE.** I could not locate any stack tests results

where a NOx emission factor from the stoves was generated. A check of the 2013 MAERS indicates that NOx emissions are being estimated based on a RATA performed at Gary Works.

Screening
VE readings for the Harsco screen were presented during the inspection. Spot check of records appears to meet the required frequency outlined in PTI 78-11

Emergency generators
Two of the nine generators, the 2922 hP at the Hot Strip Mill, need a permit to install. Company has not submitted a PTI application nor responded to the June 2, 2014 second notice of violation. **NOT IN COMPLIANCE.**

COMPLIANCE DETERMINATION
At this time, while some conditions are pending further information, USSGLW is not in compliance with all of the applicable requirements that were reviewed in this report. There are two generators that are unpermitted and an overdue stack test for the blast furnaces. For these reasons, facility compliance status is non compliance.

NAME Katie Koi DATE 7/30/14 SUPERVISOR W. M.