

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

A780930743

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: 08/18/2015
STAFF: Katherine Koster	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MEGASITE
SUBJECT: D4 and B2 blast furnace		
RESOLVED COMPLAINTS:		

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

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.

REGULATORY ANALYSIS

USSGLW is currently operating under ROP No. 199600132d and Permit to Install 96-12 (for an iron ore screening process). The ROP is in the renewal period.

The facility is also operating under AQD Consent Order 1-2005, AQD Consent Order No. 50-2014 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). FY2015 is the first 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. 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

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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 removal 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 been cleaned.

"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.

INSPECTION NARRATIVE

AQD inspectors, Kerry Kelly, and Katie Koster, arrived at USS Great Lakes Works on 8/18/15 at 9:30 a.m. We met with Mr. Brad Wargnier, U.S. Steel Environmental Engineer. After discussing various topics with Mr. Wargnier and Ms. Alexis Piscitelli (Environmental Manager), Brad drove us to Zug Island. First, we viewed B2 roof monitor and B2 baghouse stack. Casting was in progress. I observed some light emissions exiting the roof monitor (approximately 10%). No emissions were observed from the baghouse stack. Next we drove through the No. 1 ore yard behind B2 furnace to observe the skip cars emptying loads into the furnace. I did not observe fugitive dust in this area.

Next, we drove to D4 furnace and entered the casthouse. Upon approaching the casthouse, I noticed some visible emissions from the roof monitor. I took some visible emissions readings; the opacity did not exceed the 20% 6 minute average limit. I did not observe any visible emissions from the baghouse stack. While walking up the stairs to the casthouse, I observed the iron casting into bottle cars for several minutes. Fumes appeared to be well captured by the hoods. We spoke with the operators in the pulpit. Bleeder set points on D4 are 11.8 psi for the clean gas bleeder and 12.8 psi for the dirty (during the prior inspection set points were 10 and 11). Gap time was 30 minutes. At 12:10, Fan 1 was at 82 amps; Fan 2 was at 82 amps, Fan 3 – zero (2 fans are in operation at a time; one fan is always on standby). This is above the required minimum in the MACT O&M plan of 116 amps. The baghouse pressure drop was 10.4 in. w.c., compressed air pressure was 108 psi, and the inlet temperature was 119F. We stayed in the casthouse so that Kerry Kelly could watch the furnace start to blow and watch the plugging of the taphole. Runner covers were in place.

We left the casthouse and walked around the D4 baghouse to observe the condition of the baghouse shell, fan housing, stack, and connections from the dust bins into the hoppers. I did not observe any leaks, fugitive emissions, or significant particulate matter on the ground to indicate improper collection of the collected particulate.

Next, we entered B2 casthouse at 12:54 p.m. Casting was on going. The tap hole was drilled at 11:30; slag had started at 12:40. 80-120 minutes is the usual cast length and slag begins to flow at 40 -60 into the cast. The furnace was running on reduced wind. According to the operator, the clean bleeder set point is 11 psi and the dirty is 12 (these are same settings as last time). The gap time was 30 minutes. All three baghouse fans were operating at 100.1 amps., pressure drop was 7.4; inlet T was 160F. According to Brad, facility is transitioning to variable drive fans for the baghouse.

We left the facility around 3:30. I followed up with a records request (attached).

RULES/PERMIT CONDITIONS EVALUATED

TABLE E-01.13 B2 Blast Furnace (ROP 199600132d)

II.B. **IN COMPLIANCE** – PM limit of .0075 gr/dscf; most recent stack test results were 0.00046 gr/dscf in 2012.
10% VE limit from baghouse stack – No VE's were observed during the inspection; VE from roof monitor limited to 20% opacity on a 6 minute average – VE's were observed but were below the limit.

III.A.1 **IN COMPLIANCE** - Pressure drop shall be maintained between 1 and 22. Pressure drop was within this range during the inspection.

III.A.2 **IN COMPLIANCE**- Record of baghouse compartments in use were presented. This information is continuously tracked and recorded. Alarms are activated if more than one compartment is shut down.

III.A.3 **NOT APPLICABLE** – No excess VE's were observed from baghouse stack during the inspection.

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II.A.2.4 and III.A.3.2 **IN COMPLIANCE** – Spot check of records indicates frequency for visible emissions readings of the roof monitor is being met. Corrective actions are being documented.

III.A.3.1 **IN COMPLIANCE** – Spot check of records indicates frequency for visible emissions readings of the baghouse stack is being met.

III. B.3 **IN COMPLIANCE** – Particulate matter test required once every 5 years. Test dates were 2009 and 2012; next test due by 2017.

V.1 **IN COMPLIANCE** - Shall operate and maintain the baghouse in a satisfactory manner. Based on the records provided (attached) and my observations during the inspection, the baghouse appears to be maintained in a satisfactory manner.

V.2 **IN COMPLIANCE** - Shall not shut down more than one compartment at a time. This information is continuously tracked and alarmed if more than one compartment is shut down. This condition was being met during the inspection based on my observation of the baghouse control screen.

TABLE E-01.14 D4 Blast Furnace

II.B. **IN COMPLIANCE** – PM limit of .0052 gr/dscf; most recent stack test result was 0.0007 gr/dscf in 2014.

10% VE limit from baghouse stack – No VE's were observed during the inspection; VE from roof monitor limited to 20% opacity on a 6 minute average – VE's were observed but were below the limit.

III.A.1 **IN COMPLIANCE**- Pressure drop shall be maintained between 1 and 12. Pressure drop was within this range during the inspection

III.A.2 **IN COMPLIANCE**- Record of baghouse compartments in use were presented. This information is continuously tracked and recorded. Alarms are activated if more than one compartment is shut down.

III.A.3 **NOT APPLICABLE** - No excess VE's were observed from baghouse stack during the inspection.

III.A.2.4 and III.A.3.2 **IN COMPLIANCE** – Spot check of records indicates frequency for visible emissions readings of the roof monitor is being met. Corrective actions are being documented.

III.A.3.1 **IN COMPLIANCE** – Spot check of records indicates frequency for visible emissions readings of the baghouse stack is being met.

III. B.3 **IN COMPLIANCE** – PM test required once every 5 years. Test dates were 2010 and 2014. Next test due by 2019.

V.1 **IN COMPLIANCE** - Shall operate and maintain the baghouse in a satisfactory manner. Based on the records provided (attached) and my observations during the inspection, the baghouse appears to be maintained in a satisfactory manner.

V.2 **IN COMPLIANCE** - Shall not shut down more than one compartment at a time. This information is tracked and alarmed if more than one compartment is shut down. This condition was being met during the inspection based on my observation of the baghouse control screen.

Iron and Steel MACT requirements (5F)

Monthly inspections of the equipment that is important to the performance of the total capture system (e.g., pressure sensors, dampers, and damper switches). This inspection must include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in the ductwork, and fan erosion). The operation and maintenance plan also must include requirements to repair any defect or deficiency in the capture system before the next scheduled inspection.

IN COMPLIANCE IN COMPLIANCE – The permittee shall conduct performance tests for particulate matter emissions and opacity at least once every five years. The permittee shall sample for an integral number of furnace tapping operations to obtain at least one hour of sampling for each test run. **IN COMPLIANCE** – Integral casts were tested over for D4, for B2 2012 test, it appears that Run 1 did not encompass a full cast. Additionally, Run 2 and 3 (not observed by AQD) did not contain integrals casts as required by the Integrated Iron and Steel MACT. However, the measured emissions 0.00046 gr/dscf were well below the MACT limit of 0.01 gr/dscf. At this time, it seems unlikely that testing over integral casts would cause an increase in emissions by two orders of magnitude. Performance tests for visible emissions shall be conducted such that the opacity observations overlap with the performance tests for particulate. **IN COMPLIANCE** – A review of the most recent PM tests indicate that visible emissions observations (30 6-minute observations) were conducted during the performance test. The permittee shall demonstrate compliance with the opacity limitation with a certified observer of Method 9 visible emissions using Method 9. The performance test for visible emissions shall consist of 30 6-minute block averages during tapping of the furnace. **IN COMPLIANCE** – A review of the most recent tests and associated VE readings indicates that there were no exceedances of the 20% 6 minute average opacity limit for blast furnace roof monitors.

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IN COMPLIANCE - The permittee shall certify that the baghouse capture system operated during the performance test at the site-specific operating limits established in the operation and maintenance plan using the following procedures: a. Concurrent with all opacity observations, measure and record values for each of the operating limit parameters in the capture system operation and maintenance plan according to the monitoring requirements specified in §63.7830(a). b. For any dampers that are manually set and remain at the same position at all times the capture system is operating, the damper position shall be visually checked and recorded at the beginning and end of each opacity observation period segment. c. Review and record the monitoring data and identify and explain any times the capture system operated outside the applicable operating limits. d. Certify in the performance test report that during all observation period segments, the capture system was operating at the values or settings established in the capture system operation and maintenance plan.

NOT APPLICABLE – Settings have not changed since the initial MACT test. The permittee may change the operating limits for the baghouse capture system if the following requirements are met a. Submit a written notification to the Administrator requesting to conduct a new performance test to revise the operating limit.

- b. Conduct a performance test to demonstrate compliance with the applicable operating limitation.
- c. Establish revised operating limits according to the applicable procedures in 40 CFR 63.7824, paragraphs (a) through (c) for a capture system.

IN COMPLIANCE – Plan is attached and appears to contain the required elements. The permittee shall prepare and operate at all times according to a written operation and maintenance plans for B2 and D4 Blast Furnace Casthouse Emission Control Baghouse. Each plan must address the following:

Preventative maintenance for each control device, including a preventative maintenance schedule that is consistent with the manufacturer's instructions for routine and long-term maintenance.

Operating limits for the "C" Blast Furnace Casthouse Emission Control System. The permittee must establish the operating limits according to the following requirements:

- (i) Select operating limit parameters appropriate for the capture system design that are representative and reliable indicators of the performance of the capture system. This shall, at a minimum, include appropriate operating limit parameters that indicate the level of the ventilation draft and the damper position settings for the capture system when operating to collect emissions, including revised settings for seasonal variations. Appropriate operating limit parameters for ventilation draft include, but are not limited to, volumetric flow rate through each separately ducted hood, total volumetric flow rate at the inlet to the control device to which the capture system is vented, fan motor amperage, or static pressure.
- (ii) For each operating limit parameter selected, the value or setting for the parameter at which the capture system operates during the process operation shall be designated. If the operation allows for more than one process to be operating simultaneously, designate the value or setting for the parameter at which the capture system operates during each possible configuration that may be used.
- (iii) Include documentation in the plan to support the selection of the operating limits established for the capture system. This documentation must include a description of the capture system design, a description of the capture system operating during production, a description of each selected operating limit parameter, a rationale for why the parameter was chosen, a description of the method used to monitor the parameter according to the requirements of 40 CFR 63.7830(a), and the data used to set the value or setting for the parameter for each process configuration.

Corrective action procedures for the "C" Blast Furnace Casthouse Emission Control Baghouse. In the event a bag leak detection system alarm is triggered, corrective action must be initiated to determine the cause of the alarm within 1 hour of the alarm, initiate corrective action to correct the cause of the problem within 24 hours of the alarm, and complete the corrective action as soon as practicable. Corrective actions may include, but are not limited to:

- (i) Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in emissions.
- (ii) Sealing off defective bags or filter media.
- (iii) Replacing defective bags or filter media or otherwise repairing the control device.
- (iv) Sealing off a defective baghouse compartment.
- (v) Cleaning the bag leak detection system probe, or otherwise repair the bag leak detection system.
- (vi) Shutting down the process producing the particulate emissions

IN COMPLIANCE – CPMS system (fan amps monitoring) is installed and operating at each casthouse. Historical trend data is maintained. A demonstration was presented during the inspection. If applicable, the permittee shall install, maintain, and operate a Continuous Parametric Monitoring System (CPMS) for the baghouse capture system according to the requirements of 40 CFR 63.7830(a) and 40 CFR 63.7831(e).

IN COMPLIANCE – Records for both baghouses are attached and appear to meet the frequency required in this condition. Both baghouses are pulse jet so a check of bag tension is not required. The permittee shall conduct inspections of the B2 and D4 Blast Furnace Casthouse Baghouses at the specified frequencies according to the requirements in paragraphs (a) through (h) below. The permittee shall maintain records needed to document conformance with these requirements. a. Monitor the pressure drop across each baghouse cell each day to ensure pressure drop is within

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the normal operating range identified in the manual. b. Confirm that dust is being removed from hoppers through weekly visual inspections or other means of ensuring the proper functioning of removal mechanisms.c.Check the compressed air supply for pulse-jet baghouses each day. d. Monitor cleaning cycles to ensure proper operation using an appropriate methodology. e. Check bag cleaning mechanisms for proper functioning through monthly visual inspection or equivalent means. f. Make monthly visual checks of bag tension on reverse air and shaker-type baghouses to ensure that bags are not kinked (kneed or bent) or laying on their sides. You do not have to make this check for shaker-type baghouses using self-tensioning (spring-loaded) devices. g. Confirm the physical integrity of the baghouse through quarterly visual inspections of the baghouse interior for air leaks. h. Inspect fans for wear, material buildup, and corrosion through quarterly visual inspections, vibration detectors, or equivalent means.

IN COMPLIANCE - Company is continuously monitoring a recording fan amps. Damper positions are set and do not change. Any deviations from the required minimum are reported in the Title V deviation report. No requests to change the sensitivity of the bag leak detection system have been received. The permittee shall operate the baghouse capture system at or above the lowest value or settings established for the operating limits in the operation and maintenance plan and collect, reduce, and record the monitoring data for each of the operating limit parameters. If the sensitivity of the bag leak detection system is changed beyond the limits established pursuant to 40 CFR 63.7831(f)(6), a copy of a written certification by a responsible official shall be included in the semiannual compliance report for that period.

DID NOT EVALUATE - Did not evaluate whether company was internally maintaining these records. AQD has copies of these records. The permittee shall maintain a copy of each notification and report submitted under 40 CFR Part 63, Subpart FFFFF, including all documentation supporting the initial notification or notification of compliance status submitted according to 40 CFR 63.10(b)(2)(xiv)). The permittee shall maintain the records required for startup, shutdown and malfunction under 63.6(e)(3)(iii) through (v). The permittee shall maintain records associated with performance tests, and performance evaluations as required by 40 CFR 63.10(b)(2)(viii). The permittee shall maintain records of visible emissions observations required by 40 CFR Part 63, Subpart FFFFF.

IN COMPLIANCE -- Notification received on 10/18/12 and test performed on 12/5/2012 for B2. For D4, test plan received on 11/7/14 and test performed on 12/9/14. This was not 60 days but allowed by AQD because there was still sufficient time to review the test plan. Permittee shall submit a notification of intent to perform any performance testing under 40 CFR Part 63, Subpart FFFFF at least 60 calendar days before testing is to begin.

NO LONGER APPLICABLE -- Initial compliance date was 10 years ago (May 22, 2006). The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subpart A and Subpart FFFFF for Integrated Iron and Steel Manufacturing by the initial compliance date.

IN COMPLIANCE -- Plan was available and provided to AQD. The permittee shall maintain a current copy of the operation and maintenance plan onsite and available for inspection upon request.

DID NOT EVALUATE -- AQD did not request copies of all prior O&M plans at this time. The permittee shall retain copies of old operation and maintenance plans for the life of the source subject to 40 CFR Part 63, Subpart FFFFF or until the source is no longer subject to the requirements of 40 CFR Part 63, Subpart FFFFF.

Note: Did not include the bag leak detector, site specific monitoring plan and CPMS because those conditions were not evaluated at this time.

COMPLIANCE DETERMINATION

At this time, based on conditions evaluated in this report, facility appears to be in compliance.

NAME Kate Rose

DATE 9/28/15

SUPERVISOR W. M.