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

A780946946

FACILITY: U S STEEL GREAT LAKES WORKS		**SRN / ID:** A7809
LOCATION: 1 QUALITY DR, ECORSE		**DISTRICT:** Detroit
CITY: ECORSE		**COUNTY:** WAYNE
CONTACT:		**ACTIVITY DATE:** 11/08/2018
STAFF: Katherine Koster	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MEGASITE
SUBJECT: FY2019 Targeted Inspection - Vacuum Degasser		
RESOLVED COMPLAINTS:		

Reason for Inspection: Targeted Inspection – Vacuum Degassing (including associated material handling system)
Level of Inspection: PCE
Inspected by: Katie Koster, AQD
Personnel Present: Nathan Ganhs, Environmental Engineer
Facility phone number: 313-749-3857, 313-378-1612 (cell)
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FACILITY BACKGROUND

United States Steel, Great Lakes Works (USS – GLW) 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.

This inspection report focuses on the vacuum degasser process and the associated material handling baghouse.

COMPLAINT/COMPLIANCE HISTORY

No complaints have been received related to the emission units evaluated in this report.

OUTSTANDING CONSENT ORDERS

There are no outstanding consent orders related to the emission units inspected in this report.

OUTSTANDING LOVs

There are no outstanding LOV's related to the equipment that was inspected.

PROCESS DESCRIPTION

Vacuum Degassing

Vacuum degassing is used to produce ultra-low carbon steel for the automotive industry. It also reduces concentrations of dissolved gases (H2, N2, O2) in the liquid steel. The ladle is set in place and a vacuum circulates the steel through a snorkel. Degasser heats go straight to the degasser from the BOP. The gases generated from this process are combusted in a flare. A natural gas boiler is used to create the vacuum. Excess steam from this boiler can be seen exhausting from the roof. Alloys are added at the degasser. Alloys are received by truck and dumped onto a grate below the truck. Material falls through the gate into an underground storage bin. A conveyor transports the material from the basement to the material storage bins several floors up above the degasser. This is the alloy handling system which is controlled by a positive pressure baghouse. Baghouse fans are off when no alloys are being received or moved

INSPECTION NARRATIVE

I arrived at the facility on November 8, 2018, and met with Mr. Nathan Ganhs, Environmental Engineer. We went to the vacuum degassing facility with a baghouse and flare. The baghouse is for controlling

dust during the material handling process. The flare is for combusting CO generated from the vacuum degassing process.

Materials (scrap and alloys) are received in bulk or in bags for transfer to material storage bins to await addition to a heat during vacuum degassing. Bulk material is mostly scrap. There are two scrap bins that each hold about 45,000 lbs. each. A front end loader brings scrap from the caster and dumps the material onto a grate. The grate empties in the basement onto a conveyor. The conveyor takes the material up to the material storage bins. There are 15 bins for storing additives. Scrap:2 bins, Reg FeMn: 2 bins, Al: 2 bins, FeTi, 2 bins, , LoFEMn, LCFeCr, FeCb, FePhos, Coke, FeSi, and a spare. Bags of material are broken open over the grate.

A camera on the conveyor shows when material is being moved and can be viewed from the pulpit.

Mr. Ganhs explained that there was an issue with the dP meter on baghouse compartment #1 this morning. It was reading zero. Maintenance checked it, and it appeared to be a problem with the meter, not the compartment. US Steel personnel blew it out and it appears to be working now. Overall dP was around 7. Mr. Ganhs believes that the scrap material is the most likely to generate the most particulate out of all of the materials handled.

RULES/PERMIT CONDITIONS EVALUATED – FROM ROP 199600132d

TABLE E-01.05 VACUUM DEGASSING OPERATIONS EMISSION UNIT/PROCESS GROUP REQUIREMENTS					
EMISSION GROUP	EGVDG-OPERATIONS Vacuum Degassing Operations comprised of Ruhrstahl-Heraeus recirculation vacuum degassing process and Kawasaki top blown oxygen blowing equipment, equipped with process flare, baghouse, and water condenser cooling system. Also includes ladle metallurgy additive handling system equipped with baghouse. NOTE: Vacuum degassing does not have a baghouse. Only the ladle metallurgy additive system is controlled by a baghouse.				
Flexible Grouping ID	N/A				
I. DESIGN PARAMETERS					
A. Pollution Control Equipment	Vacuum degassing process flare and baghouse.				
B. Stack/Vent Parameters	NA				
Stack/Vent ID	a. Minimum Height(feet)	b. Maximum Exhaust Dimension (inches)	c. Temp.(°F)	d. Air Flow Rate (acfm)	
SVVDG-DGAS-FLARE DID NOT EVALUATE	190	NA	NA	NA	
C. Other Design Parameters					
NA					
II. MATERIAL USAGE/EMISSION LIMITS					
A. Material	Maximum Usage Rate				
Natural Gas usage in the flare	210,240,000 cubic feet per 12-month rolling time period as determined at the end of each calendar month. IN COMPLIANCE - Natural gas usage at the flare was 8 MM cubic feet at the end of Dec				

TABLE E-01.05 VACUUM DEGASSING OPERATIONS EMISSION UNIT/PROCESS GROUP REQUIREMENTS	
	2016 as shown in MAERS and 16 MMCF at the end of Dec 2018 as shown in MAERS.
B. Pollutant	Maximum Emission Limit
Particulate	0.005 grains per dry standard cubic foot of exhaust gas (vacuum degassing process and ladle metallurgy additive handling systems baghouse). IN COMPLIANCE - Testing was performed on the material handling baghouse in the degasser building in November 2013. Results were 0.0005 gr/dscf of PM. Testing was also performed in November 2018. Results were 0.0003 gr/dscf of PM.
Carbon Monoxide	7 pounds per hour (vacuum degassing process). DID NOT EVALUATE - There is no testing condition in the current ROP. Further evaluation is needed as to whether this unit can be tested. If so, it will be requested upon ROP renewal. USS claims it cannot perform a test even though AK Steel conducts a test of their degasser flare and applies an assumed control efficiency. For now, compliance is demonstrated through monthly operating hours divided by total number of days operated per month, an assumed control efficiency, and an emission factor based on "process design data." See attached. Calculated lb/hr for 2018 was 0.88 lb CO/hr.
Nitrogen Oxides	3.36 pounds per hour (vacuum degassing process) DID NOT EVALUATE - There is no testing condition in the current ROP. Further evaluation is needed as to whether this unit can be tested. If so, it will be requested upon ROP renewal. USS claims it cannot even though AK Steel conducts a test of their degasser flare and applies an assumed control efficiency. See attached for USS calculations. Highest calculated lb/hr for 2018 was 1.08 lb NOx/hr in January 2018.
Opacity	A. Vacuum degassing process and ladle metallurgy additive handling systems baghouse stacks shall not exceed a six-minute average of 5% opacity. IN COMPLIANCE - No opacity observed while on site. B. Vacuum degassing process flare shall not exceed a six-minute average of 5% opacity. IN COMPLIANCE – No opacity observed from the vacuum degasser (VD) flare when on site. C. Vacuum degassing process roof monitors shall not exceed a six -minute average of 10% opacity. IN COMPLIANCE – No opacity observed from the vacuum degasser roof monitor when on site.
III. COMPLIANCE EVALUATION Records of all of the following shall be maintained on file for a period of 5 years. (R 336.1213(3)(b)(ii))	
A. MONITORING/RECORDKEEPING (R 336.1213(3)) In Addition To General Requirements in Part A	
	NA

TABLE E-01.05 VACUUM DEGASSING OPERATIONS EMISSION UNIT/PROCESS GROUP REQUIREMENTS	
1. Continuous Emission Monitoring (CEM) System and Recordkeeping	
2. Process Monitoring System and Recordkeeping	The permittee shall record and keep the following information and make it available to AQD upon request: 1. Total monthly natural gas usage per year based on a 12-month rolling time period determined at the end of each calendar month. 2. Total number of processed heats per year based on a 12-month rolling time period determined at the end of each calendar month. 3. Total amount of processed steel per year based on a 12-month rolling time period determined at the end of each calendar month. IN COMPLIANCE – Records were submitted and are attached. Records are on a monthly basis but sufficient information is being maintained to calculate a 12 month rolling total. However, facility has been informed that records need to be calculated and presented on a 12 month rolling time period as well. Regardless, facility is below permit limits on a yearly and 12 month rolling basis. 4. Pressure drop across the baghouses located in the Vacuum Degassing Operations, recorded daily. A pressure drop of between 3 and 12 inches of water column shall be considered normal which can be changed upon approval by the AQD District Supervisor. The permittee shall initiate appropriate maintenance activity on the baghouse if the pressure drop exceeds the normal range which is not a deviation. IN COMPLIANCE - Note, there is only one baghouse at the vacuum degasser process even though the condition lists baghouses. Facility manually records the pressure drop once per day and ensures it is within the required range. Facility also ran a report that pulled the pressure drop values once per day at midnight for the baghouse for the 4th quarter 2018. Some of these values were outside of the normal range. Based on information from the facility, any time the pressure drop was not in the required range, it is because the additive handling system was not in use. While this may be the case and it is a reasonable explanation because the additive handling is used intermittently, better documentation is needed to show that these values were reviewed and it was verified that the process was not in use. 5. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month records of the flare natural gas consumption, the number of heats processed, and tons of steel processed in the vacuum degassing operation. IN COMPLIANCE – Monthly records were submitted and are attached. Sufficient information is being maintained to calculate a 12 month rolling total and facility has been informed that records need to be calculated and presented on a 12 month rolling time period as well. Regardless, facility is below permit limits on a yearly and 12 month rolling basis.

TABLE E-01.05 VACUUM DEGASSING OPERATIONS EMISSION UNIT/PROCESS GROUP REQUIREMENTS		
3. Other Monitoring and/or Recordkeeping	1.	1. The permittee shall perform a non-certified visible emission observation of the vacuum degassing process and ladle metallurgy additive handling systems baghouse stacks, Vacuum degassing process flare and baghouse dust collector, and vacuum degassing process roof monitors at least once a week during vacuum degassing activity. The permittee shall initiate appropriate corrective action upon observation of visible emissions and shall keep a written record of each required observation and corrective action taken. IN COMPLIANCE – Facility performs certified and non certified readings and has records to demonstrate that the non-certified observations are being conducted. A sample of the certified readings is attached. 2. Permittee shall conduct regular inspections for the purpose of determining the operational condition of the baghouses, and if necessary, the reasons for malfunction or failure. These inspections shall be conducted during scheduled outages or downtimes, and as soon as practicable after observing visible emissions as warranted, but not less frequently than at least once a month and shall keep a written record of each inspection and corrective action taken if any. IN COMPLIANCE – Records of inspections were presented during the AQD inspection and appear to meet the required monthly frequency. Sample of records is attached. 3. Permittee shall conduct regular inspections for the purpose of determining the operational condition of the flare at least once every six month. A log of the inspection, cause(s) of malfunction or failure, repairs made and corrective actions taken shall be kept and maintained on file for a period of at least five years. IN COMPLIANCE – Records of inspections were presented and appear to meet the required frequency. No issues were documented with the flare on the inspection reports for April and November 2018 (attached).
B. TESTING/RECORDKEEPING (R 336.1213(3)) In Addition to General Requirements in Part A		
1. Parameter to be Tested/ Recorded		Particulate
2. Method/Analysis		Reference Method 17 or any other approved methods.
3. Frequency and Schedule of Testing/Recordkeeping		The permittee shall conduct particulate matter emission test on the baghouse emissions once every five year or more frequently upon the request of AQD. No less than 30 days prior to each testing, a complete stack test protocol must be submitted to AQD for approval. The final plan must be approved by the AQD prior to testing. IN COMPLIANCE - Testing was performed in 2013 and 2018. For the 2018 test, protocol was received on September 26 2018; test was conducted in November 2018.
IV. REPORTING		
Reports and Schedules	1.	IN COMPLIANCE - Reports submitted timely.
V. OPERATIONAL PARAMETERS		

TABLE E-01.05 VACUUM DEGASSING OPERATIONS
EMISSION UNIT/PROCESS GROUP REQUIREMENTS
. The permittee shall not process more than 10,950 heats per 12-month rolling time period as determined at the end of each calendar month. IN COMPLIANCE – According to the records, 12 month rolling total at the end of December 2018 was 1,332,426/250 tons/heat = 5329 heats. Note, the heats limit is derived from dividing the tons of steel by 250 tons/heat. The permittee shall not process more than 2,737,500 tons of steel per 12-month rolling time period as determined at the end of each calendar month. IN COMPLIANCE – According to MAERS report, 12 month rolling at the end of December 2018 was 1,332,426 tons. . The permittee shall not operate the vacuum degassing operations unless the process flare, baghouse, and water condenser cooling system are installed, maintained, and operated in a satisfactory manner. IN COMPLIANCE – Equipment appears to be maintained based on records of maintenance and VE readings documenting no VE's. Baghouse maintenance records are attached. . The permittee shall not operate the ladle metallurgy additive handling system unless the baghouse is installed, maintained, and operated in a satisfactory manner. IN COMPLIANCE – Based on VE records and maintenance records, the baghouse appears to be installed, maintained, and operated properly.
VI. OTHER REQUIREMENTS
NA

Iron and Steel MACT - Vacuum degassing is exempt per the definition of ladle metallurgy in 63.7852.

EXEMPT EQUIPMENT

I did not observe any exempt equipment during this inspection.

APPLICABLE FUGITIVE DUST CONTROL PLAN CONDITIONS

No fugitive dust issues related to the operations were observed.

MAERS REPORT REVIEW

I did not request any edits to the emissions estimates in the 2018 MAERS report for these emission units.

FINAL COMPLIANCE DETERMINATION

At this time, it appears that the facility is in compliance with the conditions evaluated in this report.

NAME Kathleen Kuse DATE 4/17/19 SUPERVISOR W. M.