

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

P040826157

FACILITY: EES COKE BATTERY LLC		SRN / ID: P0408
LOCATION: 1400 Zug Island Road, RIVER ROUGE		DISTRICT: Detroit
CITY: RIVER ROUGE		COUNTY: WAYNE
CONTACT: Brenna Harden		ACTIVITY DATE: 07/16/2014
STAFF: Katherine Koster	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MEGASITE
SUBJECT: Targeted 2014 Inspection		
RESOLVED COMPLAINTS:		

REASON FOR INSPECTION: Targeted Inspection  
 INSPECTED BY: Katie Koster, AQD, Jon Lamb, AQD  
 PERSONNEL PRESENT: Brenna Harden, Environmental Engineer, Steve Zervas, DTE Corporate Office  
 FACILITY PHONE NUMBER: 313-297-4183 (phone); 734-320-5255 (cell)

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**FACILITY BACKGROUND**

EES Coke Battery, LLC was organized and formed by DTE to assume the coke making operations from United States Steel Great Lakes Works (USSGLW) in 2004. Prior to USSGLW, the operations, including the No. 5 battery and the No. 3 byproducts recovery plant, were owned and operated by National Steel Company. The facility is located on the southern half of Zug Island in the city of River Rouge. The property is owned by USS.

While the No. 5 battery and No. 3 byproducts operations and coal piles are managed by DTE, the operations rely on USS for steam, power, and water. The battery used to receive blast furnace gas from USS for underfire combustion but that practice was halted by EES in July 2012 as DTE claimed that moisture in the gas was degrading the regenerators below the ovens. EES also claimed preheating the gas was not feasible. USS still accepts and purchases excess coke oven gas for use at the Hot Strip Mill and Boilerhouses 1&2 on Zug Island.

**REGULATORY ANALYSIS**

Recent Permit History

The facility is operating under temporary PTI 71-13. This permit is essentially the same as 51-08 except that the daily and yearly heat input restrictions have been temporarily removed. The permit expires on November 21, 2014.

On June 13, 2014, the facility submitted PTI application, 51-08C, to increase the yearly coal throughput limit, permanently remove the heat input restrictions, modify/remove emission limits, and modify a variety of recordkeeping and reporting conditions. This permit application states that it is a major modification under PSD for NOx and greenhouse gases. This permit will replace 71-13 and 51-08.

The facility is attempting to remedy several outstanding/unresolved items between AQD and EES through the application:

1. Exceedance of benzene and H2S limits
2. Exceedance of the PM lb/hr limit including sulfates at the combustion stack
3. Exceedance of the annual heat input limit on a 12 month rolling basis

These items have been cited in prior violation notices. Also, clarification as to what emission points are included in each yearly emission limit is needed.

51-08B was submitted in December 2012 and withdrawn in April 2013 due to insufficient information. 51-08A was another temporary permit. USS was shut down for most of 2009 due to poor economic conditions which thereby cut off the blast furnace gas supply to the battery. EES Coke was issued a temporary permit in August 2009 (51-08A) allowing them to underfire the battery with 100% COG and supplementing with natural gas. Normally, the battery is fired either under rich gas conditions (approx 85% COG, 15% BFG) or lean gas (approx 85% BFG, 15% COG). USSGLW restarted blast furnace operations in August 14, 2009 but it was not until late December 2009 when USSGLW iron and steel making operations were in normal steady state. The permit

expired on December 31, 2009. The company performed some stack testing under 100% COG conditions in December 2009.

51-08 was obtained in October 2008 to increase the allowable amount of dry coal charged to the battery from 1,300,000 million tons per year to 1,365,000 tons per year. Other changes that were made were the removal of the restriction on the percentage of time the battery can operate in rich gas mode (approx. 85% COG and 15% BFG), and limitations were added regarding approved materials that can be charged to the battery. Additionally, the facility submitted a demonstration that the increase in coal charged was not a PSD major modification and therefore the permit required the maintenance of yearly records in Appendix B. Note: Over the last several years, AQD field and permit staff have requested these records and explanations from the facility that the switch in fuel used, from BFG to 100% COG in 2012, was not a change in the method of operation and not a potential major modification subject to PSD. Information submitted is in the facility file. The facility position is that the switch was allowed under the current permit and was caused by unforeseen events "not related to the project" in 51-08.

The whole coke making facility is incorporated as Section 7 of the United States Steel Great Lakes Works (USSGLW) Renewable Operating Permit (ROP) Number 199600132d. However, USSGLW and EES submitted a request in December 2012 to administratively split the ROP into two documents. This process has started as the USSGLW ROP renewal has gone through public comment and does not contain conditions related to EES. EES was assigned a separate SRN, P0408, and reports annual emissions in MAERS under this SRN.

#### Consent Orders

Facility is operating under some old Wayne County consent orders included SIP Consent Order No. 27-1993 for fugitive dust. In December 2013, the facility was referred for escalated enforcement action due to issues with the continuous emission rate monitoring system (CERMS); including incorrect reporting of downtime and manual revisions of the CERMS data unbeknownst to AQD at the time. The CERMS measures NO<sub>x</sub>, CO, SO<sub>2</sub>, and flow. The referral also included other recently cited violations related to inadequate maintenance, inspections, and recordkeeping, and failed stack test. A consent order is being negotiated and will be available for public comment.

#### Federal Regulations

The No. 5 coke oven battery is subject to MACT Standards promulgated in 40 CFR Part 63, Subpart CCCCC (NESHAP for Coke Ovens: Pushing, Quenching, and Battery Stacks) and Subpart L (National Emission Standards for Coke Oven Batteries). The No. 3 byproducts recovery plant is subject to NESHAPs promulgated in 40 CFR, Part 61, Subpart FF (NESHAP for Benzene Waste Operations), Subpart L (NESHAP for Benzene Emissions from Coke By-Product Recovery Plants), and Subpart V (NESHAP for Equipment Leaks (Fugitive Emission Sources)).

### **PROCESS OVERVIEW**

Coal is stored in a bunker until dispensed into one of two larry cars on the top of the battery. Coal is then charged into an oven with the larry car and leveled. Each oven has four lids on the top for charging and two sides with removable doors. Approximately 35 tons of wet coal/32 tons dry coal is charged per oven and 23 - 25 tons of coke are produced. The normal coking time is about 17 hours at a temperature of approximately 2200F. The coking process takes place in the absence of oxygen to drive off residual VOCs and other impurities in the coal and to form a hard mass known as metallurgical coke. This coke can withstand the very high temperatures in iron making blast furnaces. For comparison purposes, when USSGLW shut down in 2008, coke production slowed and the coking time was adjusted to 30.5 hours.

Ovens are charged and pushed in a specific sequence whereby odd numbers are pushed and then even or vice versa. Ovens are kept under slightly positive pressure while coking and slightly negative pressure while charging. Negative pressure is achieved with the use of an assist oven and jumper pipe. High pressure flushing liquor is in use to aid in off gas collection during charging.

Once the coking cycle is complete, the oven doors are removed and coke is pushed from the oven into a receiving car. The car moves along the oven to the quench tower where it is deluged with water. The coke is then poured out onto the coke wharf for further cooling. Emissions from pushing and traveling to the quench tower are captured by a movable hood positioned over the receiving car. The hood ducts emissions to the Pushing Emissions Control System (PECS) baghouse. Baffles in the quench tower must be maintained to suppress the release of particulate emissions.

Off gas from the ovens (raw coke oven gas or raw "COG"), is collected through the suction main to the four cross

over mains and into the collecting main. The collecting main feeds the byproducts recovery plant. Flushing liquor is sprayed in the collecting main for cooling and tar begins to precipitate out. Tar, light oil, and ammonia are recovered from the coke oven gas through a series of decanters, condensers, heat exchangers, and stills. These products are then sold offsite. The byproducts recovery process is completely enclosed; nitrogen blanketing is in use for emissions suppression. Emissions from this process are only attributable to leaks or storage tank emissions and load out activities. Excess gas that is not needed in the underfire system by the battery or by US Steel is sent to the main flare.

The battery operates 24 hours a day, 7 days a week. Approximately every 20 minutes there is a reversal whereby the fuel gas combustion is turned off for approximately 2 minutes. The heating flues become exhaust flues and vice versa to even out the heat distribution throughout the battery. The products of combustion of 100% COG are exhausted out of the natural draft stack. There is a CEMS in the combustion stack for measuring NOx, SO2, and CO lb/hr emissions.

COG is mainly comprised of CH4 and has an average heating value of 500 BTU/ft3. It also contains H2S, benzene, and PAH's. Blast furnace gas is mostly CO as has an average heating value of 70 BTU/ft3.

When pressure in the crossover main(s) reaches 0.80 inches w.c., the bleeder stack(s) open. There are two bleeders per crossover. The bleeders are equipped with automatic igniters so that raw COG is combusted upon opening. The main function of the bleeders is to flare gas until the pressure returns to normal. The company sends reports to AQD on when the bleeders open, length of time of opening, and certification that the emissions were ignited.

Facility receives raw material, coal, mainly via barge although some is received by rail. Coal is unloaded and stockpiled on the south end of the island. Fugitive dust requirements for the coal storage and handling are in the SIP consent order. There is a baghouse for coal and coke handling operations.

A contractor, AKJ, used to oversee the tar sludge handling, storage and loading process. This has been reclaimed by EES to be done in house.

## **INSPECTION NARRATIVE**

On July 16, 2014, Jon Lamb and I arrived at the battery. We were met by Ms. Brenna Harden, EES Environmental Engineer, and Mr. Steve Zervas, DTE Corporate Environmental Manager. We started the inspection in Ms. Harden's office. NTH is no longer performing Method 303 readings for the battery. Siddock Group is now responsible for the readings. They employ two individuals (Tyson Fellin and Robert Williams). There is a third person in Indiana as a backup in case of emergency.

I stayed in the office to discuss inspections and recordkeeping with Mr. Zervas. Jon Lamb went out to the battery with Ms. Harden and the Method 303 reader to conduct Method 9B observations.

Below is a summary of my conversation with Mr. Zervas and other personnel responsible for maintenance:

1. Work orders are scheduled and tracked in Maximo; installed in 2010.
2. The planner generates the work order which is sent to the appropriate supervisor. Supervisor assigns the maintenance to staff. Upon completion, the task goes back to supervisor and then back to planner if follow up work needs to be scheduled.
3. Supervisor reviews and "signs off" on the order and inputs it into the Maximo system as complete.
4. Hard copies of the completed work orders (WO) are given to the supervisor, environmental (Brenna Harden), and the planner.
5. If follow up is needed, a "child" work order is generated and tied to the original WO #.
6. For the PECS baghouse, hard copies of the inspections are being maintained.
7. Certified VE readings for the PECS baghouse stack are performed weekly for a total of 6 minutes. Records were presented. I asked if the readings were performed during pushing. The VE reader explained he was not necessarily reading during a push.
8. A spreadsheet with weekly TDS sampling results from 1/3/14 – 7/4/14 was presented and indicated that all tested values were between 220-280 mg/L.
9. A composite sample of quench water is taken from the quench pit; one per day Monday – Friday. A copy of the sample procedure was provided (attached).
10. Quench samples are sent to ALS; two copies of the actual analytical results were provided as examples (attached).
11. For the bleeder flares, the electronic igniters are triggered by the opening of a pressure relief valves.

Some igniters did not work in the recent past which led to the release of COG release. Those have been replaced. There are weekly, monthly, and quarterly SOP's to confirm that the igniters are operating properly. Every three years, there is regularly scheduled PM to remove, clean, and reinstall the igniters. A new weekly process has been started to manually select each igniter and wait to hear click that it is working (new). These tasks are not tracked in Maximo.

12. For the PECS baghouse, the pressure drop is generally between 0 and 4.5 in w.c. Monthly graphs of trended data for 2014 and 2013 were present. In 2013, there were a couple of spikes above 7 in w.c. No readings above 8 were on the graphs which is the permit limit. Fans amps continuously monitored (attached).
13. Received a spreadsheet listing the most recent bag leak detection alarms and follow up actions (attached).
14. Dynamic Railroad is responsible for managing fugitive dust. They are also screening breeze and nut coke.
15. Siddock performs Method 9D observations for coal piles and vehicles traveling on roads (example attached).

Mr. Zervas mentioned that some people did not like that I was asking questions about the way they "had always done things."

Visible emissions sheets from Mr. Lamb's Method 9b observations are attached. For the charging emissions, the emissions between AQD and the 303 contractor varied considerable. This needs further review and comparison on subsequent inspections.

Below are some notable differences between the state Method 9B and Method 303 in the MACT Subpart L:

- Method 9B was promulgated as the compliance method for the state Part 3 rules related to coke ovens. It is very similar to Method 303 but also allows the state to enforce separate visible emission limits in the event that a state inspector has not obtained Method 303 certification or the certification has lapsed. Unlike Method 303, Method 9B does not have time restrictions for completing observations. Also, compliance with VE limits based on Method 9B are determined per daily observation while compliance with limits in MACT Subpart L based on Method 303 observations are based on a 30 day rolling time period or a logarithmic 30 day rolling average time period.
- Under Method 9B, observer must re-observe the blocked doors after completion of the traverse. In Method 303, observer can wait for the view to clear or re-observe. Also, in Rule 357 related to door leaks, there are percentages of allowed leaks for push side, coke side, and leveling doors. Method 303 does not separate leveling doors into a standalone category.
- Method 9B does not allow for exclusions of out of service ovens in the total door count.

Mr. Lamb also observed some push and travel emissions. In PTI 51-08, the permit limit for push and travel emissions is no instantaneous readings above 20%, Rule 352 allows for up to 25% instantaneous opacity, and the MACT is no average opacity over 35% for a tall oven (defined as more than 5 meters high). Four consecutive pushes per day are required to be observed per the MACT (63.7291(a)(3)).

Mr. Lamb and Ms. Harden returned from the battery. At 3:45 p.m., Mr. Lamb, Ms. Harden, Mr. Zervas and I entered the lab where the CEMS is housed. I recorded the following information from the monitors: NOx – 345 ppm, SO2 – 455 ppm, CO – 176.6 ppm, flow – 134.52 kscfm, pressure drop - .043 in w.c., stack temp – 496F, v-15.43 ft/s. I also observed the blow back valves; the left was set at 15 cc/min and the right one was at 20. I reminded EES that TPU had sent a letter requiring that these valves remain at the same setting all the time. Mr. Zervas was unaware of this and requested the information. I sent the attached email and letter that was already sent to EES to Mr. Zervas (attached).

We left the vicinity around 4:00 p.m.

## **BYPRODUCTS PLANT (BPP)**

We did not complete a walk through of this process during this inspection. This is an entirely closed process. It is subject to LDAR monitoring through the various NESHAPs. Reports are submitted on a quarterly and semi annual basis. Siddock is now performing this monitoring as opposed to NTH.

## **TAR LOADING FACILITY**

AQD did not inspect this process during this visit. This emission unit was not included in the existing ROP. It is operating under PTI 124-09. It will be included in the renewal. The TLF is located across the pushing side of the coke battery. The TLF allows EES Coke to ship out the tar produced in the by-product plant (BPP) to their customers by rail or by tank truck.

#### APPLICABLE RULES/PERMIT CONDITIONS EVALUATED

Below are the permit conditions from PTI 51-08 and 71-13 that were evaluated during this inspection activity:

Table E-07.01 Condition II.2 – Material charge to No. 5 coke battery shall not exceed 1,365,000 tons dry coal per year. **IN COMPLIANCE. For calendar year 2013, total coal charged, according to MAERS, was 1,226,106 tons.**

Table E-07.01 Condition III.A.1.2 - The permittee shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the SO<sub>2</sub>, CO and NO<sub>x</sub> emissions and flow from the combustion stack of the EUCKE-BATTERY on a continuous basis. The permittee shall install and operate the Continuous Emission Rate Monitoring System (CERMS) to meet the timelines, requirements and reporting detailed in Appendix A and shall use the CERMS data for determining compliance with SO<sub>2</sub>, CO and NO<sub>x</sub> emission limits. **NOT IN COMPLIANCE – There are ongoing issues related to downtime with this monitor. See file for more information. There is a pending enforcement action related, in part, to improper operation of this monitor. Also, the CERMS passed the most recent RATA (June 2014) but facility is claiming that it is invalid and wants to report monitor downtime instead of the actual emissions. Otherwise, the CEMS data shows emission limit exceedances. AQD is awaiting the full RATA report and has requested additional information from the facility.**

Table E-07.01 Condition III.A.3.1-5 below:

1. The permittee shall perform a non-certified visible emission observation of the No. 5 coke battery pushing emission control system baghouse at least once week during processing 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. **NOT COMPLIANCE – Spot check of records while on site indicated compliance with the frequency requirement. However, during my discussion with the visible emissions reader, it was determined that readings were not necessarily being taken during pushing and travel. This is when the baghouse is in use for emissions control and what is considered to be “processing activity.” Facility is aware that readings should be taken during pushing and have provided follow up information to show that this is now happening (attached).**
2. The permittee shall perform a Method 9 certified visible emission observation of the No. 5 coke battery pushing emission control system baghouse at least once a month during processing activity. The permittee shall initiate corrective action upon observation of visible emissions exceeding the applicable visible emission limits of this permit and shall keep a written record of each required observation and corrective action taken. **NON COMPLIANCE. As discussed above, readings are not always taken during processing activity which AQD considers to be push and travel.**
3. A daily performance test shall be conducted each day, 7 days per week by certified Method 303 observer to determine compliance with each applicable visible emission limitation for coke oven doors, topside port lids, offtake systems, and charging operations in this permit. Each performance test shall be conducted according to the procedures and requirements of Method 303 or 303A or Methods 9 or 9B and 22 where applicable. Each performance test is to be conducted by a certified observer. The certified observer shall conduct each performance test according to the requirements of 40 CFR Part 63, subpart L including 40 CFR 63.309I. The procedures in 40 CFR 63.309(d) shall be used to determine compliance with each applicable visible emission limitation for coke oven doors, topside port lids, offtake systems, and charging operations in this permit. **IN COMPLIANCE – Summary spreadsheet of daily readings is on CD. Facility has not reported missing any daily readings (examples attached).**
4. Permittee shall conduct regular inspections for the purpose of determining the operational condition of the No. 5 coke battery pushing emission control system baghouse, 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 every month and shall keep a written record of each inspection and corrective action taken if any. **IN**

**COMPLIANCE – For the time period of January through June 2014, records presented show monthly mechanical inspections were completed. Attached is a summary view of completion dates in the Maximo system.**

5. Permittee shall conduct regular inspections for the purpose of determining the operational condition of the baffles in the No. 5 coke battery quench tower, 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 or fallouts as warranted, but not less frequently than at least once every month and shall keep a written record of each inspection and corrective action taken if any. **(R336.1201(3)) IN COMPLIANCE – For the time period of January through June 20134, records presented show monthly baffle and baffle spray inspections completed. Attached is a summary view of completion dates in the Maximo system.**

Table E-07.01 Condition V.1 Operational Parameters - There shall be no visible emissions from the charging of coal to the No. 5 coke battery except that a visible emission may be emitted for a period or periods aggregating 55 seconds during any four consecutive charges. Compliance with the limit shall be determined using reference test method 9B. **UNKNOWN – Method 303 readings for July 16 indicated compliance; Mr. Lamb's readings showed non compliance. Further evaluation and side by side comparison is needed.**

Table E-07.01 Condition V.2,6,7,15- Operational Parameters – These are all limits on % of leaks as determined by Method 9b. **IN COMPLIANCE – Based on observations during the inspection, no leaks were observed to be above the limits in the state Part 3 rules.**

Table E-07.01 Condition V.3 - Pushing emissions from the No. 5 coke battery shall be captured by a belted duct collection system connected to a baghouse. **IN COMPLIANCE – Required dust collection system is in place.**

Table E-07.01 Condition V.4 - Visible emissions at the outlet of the baghouse serving No. 5 coke battery pushing emission control system shall not exceed fifteen percent opacity on a six reading average during the pushing operation. Compliance with the limit shall be determined using reference test method 9B. **IN COMPLIANCE - No exceedances of this limit were observed during the July 16, 2014 readings.**

Table E-07.01 Condition V.5 - Coke shall not be pushed from an oven in the No. 5 coke battery unless the pushing emission control system is installed, connected and operated properly. **IN COMPLIANCE – Mr. Lamb observed the PECS during the inspection. The PECS appeared to be operating properly as fugitive emissions were being captured by the hood.**

Table E-07.01 Condition V.9 - Total dissolved solids content of the No. 5 coke battery quench tower shall be less than 800 milligrams per liter. **IN COMPLIANCE – Summary spreadsheet of all results for January through June 2014 was presented during inspection. All results were less than 800 mg/L. Attached are examples of two sample results which are both under the limit.**

Table E-07.01 Condition V.11 - The maximum H<sub>2</sub>S content of the fuel gases fired in the No. 5 coke battery and the by-product gas flare shall not exceed 2.64 grains per dry standard cubic foot, based on an average of 3 samples runs as approved by DEQ Supervisor. **UNKNOWN – Test results presented by the facility were not on a “dry” scf basis and Mr. Zervas stated he did not think that was required. I requested further justification. Facility submitted information (attached) claiming that the moisture content is 6% so they do not have to continually test moisture and that correcting for moisture would not show an exceedance of the limit. This is based on 2006 data. This condition is pending removal in the upcoming PTI. However, if it remains, AQD will request updated moisture content results.**

Table E-07.01 Condition V. 16. The permittee shall not operate the No. 5 coke battery fuel gas flare unless the automatic ignition system is installed and operating properly. **IN COMPLIANCE – Flare appeared to be operating properly during the inspection due to the presence of a flame and absence of smoke.**

Table E-07.01 Condition V. 19 The permittee shall equip, operate and maintain the No. 5 coke battery over pressure bleeder stacks with a combustion flare including an automatic ignition system. **IN COMPLIANCE – Battery is equipped with 4 sets of bleeders (2 for each crossover main) for a total of 8. Each bleeder has a flare with automatic ignition. There are weekly, monthly, quarterly, and yearly maintenance tasks in place to ensure the flares and ignition system are working properly.**

Table E-07.01 Condition V. 21 The permittee shall not allow to be discharged to the atmosphere coke oven emissions from a by-product coke oven battery that exceed any of the following emission limitations: 4.3 percent leaking coke oven doors, as determined by the procedures in 63.309(d)(1); 0.4 percent leaking topside port lids, as determined by the procedures in 63.309(d)(1); 2.5 percent leaking offtake system(s), as determined by the procedures in 63.309(d)(1); 12 seconds of visible emissions per charge, as determined by the procedures in 63.309(d)(2). **IN COMPLIANCE – Based on a review of summary spreadsheet provided by facility, the facility is in compliance with the limits. These limits are not daily, they are based on 30 day rolling averages or 30 day logarithmic averages (see CD in file).**

Table E-07.01 Condition V.25 – The permittee shall inspect the collecting main for leaks once per day. **IN COMPLIANCE – Spot check of records indicates Method 303 contractor checks for leaks on a daily basis. No leaks were detected in records that were reviewed (example attached).**

### COMPLIANCE DETERMINATION

Based on the conditions that were evaluated, EES Coke is in non-compliance. Additionally, there is an outstanding enforcement action pending which is another reason for the non-compliance status. A violation notice(s) had already been issued for the CERMS downtime. The readings of the PECS stack will be remedied moving forward (see attached information from facility). Additionally, the PECS stack has a bag leak detector and routine maintenance requirements so visible emissions readings are not the only method of assuring continuous compliance with the PM limits. As such, a violation notice is not being issued at this time. AQD will reevaluate at a later time to ensure this does not persist.

Follow up:

1. Need monthly material throughputs on a calendar month basis
2. Further information still need from facility to demonstrate compliance with V.24 in PTI 51-08
3. Explanation of the trigger for bag leak detection alarms in the PECS baghouse

NAME

Kate Kote

DATE

2/23/15

SUPERVISOR

W. M.