

N6358  
MAW/LA

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

N635838010

FACILITY: DETROIT THERMAL HENRY HEATING PLANT		SRN / ID: N6358
LOCATION: 2401 4th Street, DETROIT		DISTRICT: Detroit
CITY: DETROIT		COUNTY: WAYNE
CONTACT:		ACTIVITY DATE: 12/20/2016
STAFF: Stephen Weis	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Compliance inspection of the Detroit Thermal Henry Heating Plant. The Henry Heating facility is scheduled for inspection in FY 2017.		
RESOLVED COMPLAINTS:		

**Location:**

Detroit Thermal, LLC – Henry Heating Plant (SRN N6358)  
2401 4<sup>th</sup> Street  
Detroit

**Date of Activity:**

Tuesday, December 20, 2016

**Personnel Present:**

Steve Weis, DEQ-AQD Detroit Office  
Damian Doerfer, Health and Safety Manager, Detroit Thermal  
Marna Muhammad, Plant Manager, Detroit Thermal

**Purpose of Activity**

A self-initiated inspection of the Detroit Thermal, LLC – Henry Heating Plant facility (hereinafter "Detroit Thermal" or "Henry Heating") was conducted on Tuesday, December 20, 2016. The Henry Heating facility is on my list of sources targeted for an inspection during FY 2017. The purpose of this inspection was to determine compliance of operations at the Henry Heating facility with applicable rules, regulations and standards as promulgated by Public Act 451 of 1994 (NREPA, Part 55 Air Pollution Control), applicable Federal standards, and any applicable permits and orders.

**Facility Description**

The Henry Heating facility is located in Detroit on the west side of 4<sup>th</sup> Street, which runs perpendicular to the north side of Interstate 75 (next to the exit lane from southbound I-75 to the Lodge Freeway) south of Henry Street, and west of Grand River Avenue. The immediate area around the Henry Street facility consists of properties used for commercial and light industrial purposes. Cass Technical High School is located approximately 200 yards northeast of the facility, and the MGM Grand Casino is located about the same distance on the south side of I-75 from the facility. There are currently no residential properties in close proximity to the facility.

The Henry Heating facility is part of Detroit Thermal's steam distribution system. Detroit Thermal provides steam for use in space heating, hot water heating and absorption cooling to more than 100 buildings in downtown Detroit. According to the company's website ([www.detroitthermal.com](http://www.detroitthermal.com)), Detroit Thermal, which was founded in 1903, provides steam to more than 30,000,000 square feet of office, medical, industrial and events facilities (such as Cobo Hall). Detroit Thermal is an independent operating subsidiary of Detroit Renewable Energy LLC, a consortium of energy generation and distribution companies. The Detroit Renewable Power (DRP) waste-to-energy facility is also owned by Detroit Renewable Energy, and also produces steam.

Detroit Thermal generates steam at various facilities that they own and operate, such as the Henry Heating and DRP facilities. The steam is routed via an underground network of pipes to Detroit Thermal's customers. This is referred to as a "district energy system", whereby steam is produced at one or more central facilities, and is distributed to customers, who in turn do not need to install and operate boilers, hot water heaters and/or chillers in their buildings. A map of Detroit Thermal's distribution system is attached to this report.

The Henry Heating facility was built by DTE in the early 1990's, and was purchased by Detroit Thermal in 2003. The facility consists of a single building on the west side of Fourth Street. The building contains four natural gas-fired boilers which are utilized to generate steam. These boilers are described in the application for Permit to Install (PTI) No. 458-97 as Clayton Model No. E-604 forced draft, natural gas-fired boilers rated at 600 boiler horsepower with a total gross steam generation of 82,000 pounds of steam per hour at 100 psig. This model of boiler has a maximum natural gas consumption of 24,796 cubic feet per hour, per unit at maximum steam output. Using a heating value for natural gas of 1,050 BTU per cubic foot, this is equivalent to the boilers being rated at 26 MMBTU/hour. The boilers exhaust to the ambient air via two stacks that are identified in the PTI as the West Stack and the East Stack that are located on the south side of the building. Two of the boilers vent to the West Stack, and the other two vent to the East Stack, both of which are described in the PTI as having a diameter of 40 inches, and a height above grade of 80 feet.

### Facility Operations

The Henry Heating facility currently operates in standby mode - the facility operates if DRP or Detroit Thermal's Beacon facilities are down, or if there is a supply line problem. I was told during the site visit that the facility is typically operated 4 to 5 days each year for the purpose of generating steam to supply the Detroit Thermal system. The Henry Heating facility is located on what is referred to as the Henry loop, which serves 2 to 3 customers.

The facility is staffed, and I was told that there are daily rounds to maintain the facility. Annual maintenance checks are performed during the summer months.

### Inspection Narrative

I arrived at the facility at 9:45am, and I was met inside the building by Damian Doerfer and Marna Muhammad of Detroit Thermal. We took a look at the four boilers, and I looked at the information on the boiler plates. We then sat and discussed operations at the facility, and the facility's role in the Detroit Thermal steam distribution system. I was told that the facility is in standby mode. Aside from maintenance checks, I was told that the boilers at Henry Heating are typically only operated if the boilers at the Beacon Heating facility (541 Madison, Detroit, SRN B2814) or the DRP facility (5700 Russell St., Detroit, SRN M4148) are out of service, or if there is a supply line issue. The facility is typically operated 4 to 5 days per year for the purpose of supplying steam to the Detroit Thermal steam distribution system. The Henry Heating facility supplies a portion of the steam distribution system that is referred to as the Henry loop, which services 2 to 3 customers. I was told that the typical load for the steam distribution system is approximately one million pounds on a heavy use day, which typically occurs during the heating season, which runs from October 15 through April 15.

We then discussed the facility's PTI, No. 458-97. This PTI was issued on February 10, 1998 and addresses the operation of the four boilers at the Henry Heating facility. Damian and Marna provided me with boiler usage records that included natural gas usage for each month in 2016, and included how much steam was produced each month. They also provided me with monthly and 12 month rolling total NO<sub>x</sub> emission estimates from the boilers.

After reviewing the records, we engaged in a summary discussion. I left the facility at 10:15am.

### Permits/Regulations/Orders/

#### 1) Permits

As previously referenced, the four boilers at the Henry Heating facility are subject to the terms and conditions of AQD Permit to Install No. 458-97. The PTI was issued to Detroit Edison on February 10, 1998. During my site visit and subsequent records review, the compliance status of the facility relative to the requirements of the PTI was evaluated.

The compliance status of the Henry Heating facility with the requirements of PTI No. 458-97 is summarized, as follows:

Special Condition 13 – This condition limits the combined emissions of nitrogen oxides (NO<sub>x</sub>) from the operation of all four boilers to 55.9 tons per year, based on a 12 month rolling time period. Based on the records that were provided to me (and attached to this report, for reference), the highest 12 month rolling NO<sub>x</sub> emission that was calculated in the 2016 calendar year was 0.16 tons, reported for November. **Compliance.**

Special Conditions 14 and 15 – These two conditions place a NO<sub>x</sub> limit on pairs of boilers – a limit is placed on the two boilers that vent to the West stack (SC 14), and on the two that vent to the East stack (SC 15). The emissions limits in the two conditions are identical. There is a limit of 0.13 pounds per million BTU heat input, which is the NO<sub>x</sub> emission factor that was provided by Clayton, the manufacturer of the boilers, and included in the PTI application materials. These conditions also include an hourly NO<sub>x</sub> emission limit for each pair of boilers of 6.38 pounds per hour. The PTI application materials provide that the maximum hourly NO<sub>x</sub> emission rate for all four boilers is 12.8 pounds, so the hourly emission rate for each pair is simply the maximum calculated NO<sub>x</sub> hourly emission rate divided by 2. The only way that the boilers would meet this emission rate is if both boilers in a pair, as designated in Special Conditions 14 and 15, both operated at maximum load. Even in this scenario, the boilers should meet, but not exceed, the emission limits. Given the limited use of the boilers, the actual emissions are well below the hourly NO<sub>x</sub> emission limits. **Compliance.**

Special Conditions 16 and 17 – Like Special Conditions 14 and 15, these two conditions also place emission limits, in this case for particulate matter (PM), on pairs of incinerators – the two that vent to the West stack (SC 14), and the two that vent to the East stack. The limits are in pounds of particulate per 1,000 pounds of exhaust gas (from Michigan Administrative Rule 331), and 0.7 pounds per hour. Detroit Thermal staff provided me with monthly particulate emission estimates from the four boilers for 2016, along with the amount of natural gas used for each month. The highest PM emission estimate was for January, when 4.46 pounds of PM were estimated, and 587 MCF of natural gas use was reported.

Information found in the PTI application materials stated that the boilers at the Henry Heating facility have a maximum natural gas consumption rate of 24,796 ft<sup>3</sup> per hour, per unit at maximum steam output. The approach that would result in the lowest hours of operation for January 2016 would be to pair the reported natural gas usage for the month (587 MCF), and assume that all four boilers were operating at their maximum natural gas consumption rate. This would equate to 5.92 hours of operation from all four units. Assuming for the purpose of this calculation that the 0.7 pounds of PM per hour limit is applied to all four units, then 4.46 pounds PM/5.92 hours of operation equates to 0.75 pounds per hour. Since the limit is applied to each pair of boilers, this would equate to 0.375 pounds per hour, per pair, worst case. **Compliance.**

I had a discussion with Detroit Thermal staff about revising the PTI to have the particulate matter limit removed from these natural gas fired boilers. I provided information that I received from DEQ-AQD's Permit Unit regarding the process for addressing the removal of the particulate matter limits to Detroit Thermal. A copy of the e-mail exchange between me and Detroit Thermal is attached to this report.

Special Condition 18 – Detroit Thermal staff told me during the site visit that they check the stacks during operation of the boilers for visible emissions, and they have not noticed any opacity. **Compliance.**

Special Condition 19 – The permittee is **in compliance** with this requirement, as only natural gas is fired in the four boilers at the facility.

Special Condition 20 – This condition puts forth that verification of NO<sub>x</sub> and PM emission rates by compliance stack testing, at owner's expense, may be required. Neither the former Wayne County Air Quality Management Division nor DEQ-AQD have required that such testing be required. Keep in mind that the permitted emission limits for NO<sub>x</sub> actually correspond to the maximum emission rates for the boilers, as provided by the boiler manufacturer, so these emission rates should not be realized in actual operation of the boilers. **Compliance.**

Special Condition 21 – The stack parameters were not verified during the site visit. These parameters were provided as part of the PTI application, and were analyzed as part of the air dispersion modeling portion of the permit review. It is assumed that the facility is in compliance with this requirement.

Special Condition 22 – The boilers are subject to 40 CFR Part 60, Subpart Dc. Startup of the boilers was confirmed by the former Wayne County air agency. **Compliance.**

Special Condition 23 – this condition, which requires the permittee to submit all required records, approval requests and notifications to the Wayne County Department of Environment's Air Quality Management Division (AQMD), is no longer valid. The Wayne County air agency ceased operations effective October 1, 2001, and the DEQ-AQD assumed the regulatory responsibilities of the Wayne County program.

## 2) 40 CFR Part 60

The boilers are subject to the requirements of 40 CFR Part 60, Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units). Comparing some of the specifics of these boilers against the applicability criteria put forth in 60.40c(a), construction on the four units commenced after June 9, 1989, and the maximum design heat input capacity of each unit is approximately 26 MMBTU/hour (between 10-100 MMBTU/hr). Since these units only combust natural gas, there are only limited requirements in Subpart Dc that apply, namely the reporting and recordkeeping requirements in 40 CFR 60.48c(g). 60.48c(g) requires that the facility record and maintain records of the amount of fuel combusted; 60.48c(g)(2) allows the records to be kept on a monthly basis, which is being done by Detroit Thermal. 60.48c(i) requires that the fuel usage records be kept for a period of two years following the date of the record. 60.48c(a) requires that the facility submit an initial notification of the date of construction and startup of the boilers. It is assumed that the notification would have been submitted to the Wayne County AQMD.

### 3) Stationary source classification

The Henry Heating facility is currently classified as a synthetic minor opt-out source. It is assumed that this classification is due to the NO<sub>x</sub> emission limit put forth in the facility's PTI. However, an analysis of the potential NO<sub>x</sub> emissions from the facility demonstrates that this classification is incorrect. The potential NO<sub>x</sub> emissions from the four boilers can be estimated as follows:

- Total maximum yearly natural gas usage for all 4 boilers = 24,796 ft<sup>3</sup>/hour\*8,760 hours/year\*4 boilers = 868,851,840 cubic feet per year.
- The BTU equivalent for this natural gas usage is conservatively estimated as 868,851,840 cubic feet \* 1050 BTU/ft<sup>3</sup> of natural gas = 912,294.432 MMBTU maximum output per year.
- Estimating the potential NO<sub>x</sub> emissions using the emission factor that was provided by the boiler manufacturer, 0.13 lb/MMBTU, results in a NO<sub>x</sub> PTE estimate of 59.3 tons per year (tpy).
- Estimating the potential NO<sub>x</sub> emissions using the MAERS emission factor for boiler units with the heat input value that these have, 100 lb/MMft<sup>3</sup>, and multiplying it with the maximum hourly natural gas consumption rate results in a NO<sub>x</sub> PTE estimate of 43.44 tpy.

Thus, the four boilers at the Henry Heating Plant have potential NO<sub>x</sub> emissions well below the 100 tpy major source threshold. NO<sub>x</sub> has the highest emission factor among criteria pollutants for natural gas-fired boilers. The facility is a true minor source of criteria pollutants.

### Compliance Determination

Based upon the results of the December 20, 2016 site visit and subsequent records review, the Henry Heating facility appears to be in compliance with all applicable rules, regulations and permits. Detroit Thermal was initiating the process to request a change of ownership for PTI No. 458-97. In the meantime, the Environmental Manager that was working on the request left the company. I will follow up with other facility contacts and inquire if they need assistance in completing this task.

Attachments to this report: a map of Detroit Thermal's steam distribution system; records of the monthly natural gas usage, PM emissions and NO<sub>x</sub> emissions; an e-mail that contains the 2016 monthly natural gas usage and steam produced; copies of e-mail exchanges with Detroit Thermal regarding emission estimates and a discussion about changing the permit to remove the PM limits.

NAME Andrew Lee DATE 7/11/17 SUPERVISOR JK