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

N339147598

FACILITY: DTE Gas Company - Washington 10 Compressor Station		**SRN / ID:** N3391
LOCATION: 12700 30 MILE ROAD, WASHINGTON		**DISTRICT:** Southeast Michigan
CITY: WASHINGTON		**COUNTY:** MACOMB
CONTACT: Phillis Rynne , Senior Engineer		**ACTIVITY DATE:** 11/08/2018
STAFF: Kerry Kelly	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Determine Washington 10's compliance with the Federal Clean Air Act; Part 55, Air Pollution Control of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; Renewable Operating Permit (ROP) No. MI-ROP-N3391-2017; 40 CFR Part 63 Subpart ZZZZ and 40 CFR Part 63 Subpart DDDDD.		
RESOLVED COMPLAINTS:		

On November 8, 2018, I (Kerry Kelly, AQD) conducted a scheduled inspection of DTE - Washington 10 Storage Facility (Washington 10), located at 12700 30 Mile Road in Washington Township, Michigan. Shamim Ahammond, AQD and Adam Bognar, AQD, accompanied me on the inspection. The purpose of the inspection was to determine the facility's compliance with: the Federal Clean Air Act; Part 55, Air Pollution Control of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; Renewable Operating Permit (ROP) No. MI-ROP-N3391-2017; 40 CFR Part 63 Subpart ZZZZ and 40 CFR Part 63 Subpart DDDDD.

DESCRIPTION OF FACILITY LOCATION AND PERMIT

DTE operates a natural gas compressor station in western Macomb County one-tenth of a mile east of M-53 on 30 Mile Road. The area surrounding Washington 10 is rural, sparsely populated with commercial, residential, and industrial properties. The nearest residence is approximately two-tenths of a mile north of Washington 10. There is another natural gas transmission facility, Vector Pipeline L.P. (SRN N7624), located about three-tenths of a mile south of Washington 10. Vector Pipeline's property is accessed through DTE-Washington 10 Compressor Station.

DTE - Washington 10 Compressor Station is considered a major source of Hazardous Air Pollutants (HAP) because the facility's potential to emit (PTE) is greater than 10 tons for any single HAP and 25 tons for aggregate HAP. Renewable operating permit (MI-ROP-N3391-2017) became effective on November 21, 2017. Equipment covered in MI-ROP-N3391-2017 includes one direct heater, one emergency generator, six reciprocating internal combustion engines (RICE) (three 4,000 horsepower (HP) and three 4735 HP), four 10 MMBtu/hr indirect heaters, four 29,400 gallon hydrocarbon storage tanks, and cold cleaners.

INSPECTION

Shamim, Adam, and I arrived at DTE – Washington 10 Compressor Station at approximately 12:00 PM on November 8, 2018. We entered the office at Washington 10 and explained the purpose of the inspection to Mr. Joe Kotwicki, Associate Environmental Specialist. Mr. Kotwicki introduced us to Ms. Phillis Rynne, Senior Engineer and Mr. Siraj Mumin, Supervisor. Mr. Kotwicki, Ms. Rynne, and Mr. Mumin answered questions, provided records, and escorted us around the property during the inspection.

Washington 10 Compressor Station conducts central processing of natural gas. Natural gas is typically received at Washington 10 from April through September, via the E line, and stored in one of three storage fields. The total capacity of the three storage fields combined is approximately 90 billion cubic feet. Natural gas is typically withdrawn from the storage fields via the F line, and sent to customers October through March. At the time of the inspection, DTE was injecting/looping at Washington 10 according to Mr. Mumin.

The six RICE (EUENGINE1, EUENGINE2, EUENGINE3, EUENGINE4, EUENGINE5, and EUENGINE6) at Washington 10 are used to drive the natural gas compressors. The compressors pressurize the natural gas to allow it to continue to flow to the pipeline or storage field. When natural gas is taken out of storage at a higher pressure than the pipeline pressure the water in the gas can freeze in the pipeline. Four natural gas-fired indirect heaters (FGINDHEATERS1 and FGINDHEATERS2) are used to prevent the water in the gas from freezing.

Before natural gas is sent to the pipeline for customers, it goes through desiccant towers for the removal of moisture and heavy hydrocarbons that became entrained in the gas during storage. The desiccant towers typically operate December through April. There are five desiccant towers at Washington 10. A maximum of three towers can process gas at the same time with a maximum processing capacity of 30 mcf/hour. In the desiccant towers processing natural gas, desiccant beads adsorb water and hydrocarbons. Following a period of natural gas processing, the beads in the tower need to be regenerated to remove the liquids from the beads. The beads are regenerated by heating wet natural gas, using a direct heater (EUDIRECTHEATER), and then sending the hot gas through the tower. The heated gas absorbs the liquids on the beads. The wet natural gas is then sent through a condenser to separate off water/oil and condensable hydrocarbons. A water/oil separator is used to remove oil from the water. The water, oil, and liquid hydrocarbons are sent to separate storage tanks (FGTANKS). Gulfmark purchases the collected hydrocarbons and refines them for resale.

COMPLIANCE EVALUATION

EUDIRECTHEATER

EUDIRECTHEATER is a Maxon Model 400, size 487 M, heater. MI-ROP-N3391-2017 permits the use of natural gas or flash gas from FGTANKS to fuel EUDIRECTHEATER. According to Maxon's Technical Catalog for the Model 400 burner (Attachment 1), size 487M has a maximum heat capacity of 10,060 MBtu/hour.

EUDIRECTHEATER Special Conditions (SC) I. 1. and 2. in the ROP limit the 12-month rolling NOx and CO emissions from EUDIRECTHEATER to 3.2 tons and 3.9 tons respectively. Monthly and 12-month rolling records of NOx and CO emissions, required in SC VI. 2., are used to demonstrate compliance with the NOx and CO emission limits. Mr. Kotwicki provided NOx and CO emissions calculations for EUDIRECTHEATER (Attachment 2). The emission factor used to calculate NOx emissions from EUDIRECTHEATER is 132 lb/MMCF. DTE uses an emission factor of 76 lbs/MMCF to calculate CO emissions from EUDIRECTHEATER. According to the emission factor calculation sheet provided by Ms. Rynne (Attachment 3), manufacturer data is the basis for the NOx and CO emission factors used for EUDIRECTHEATER. The highest reported 12-month rolling NOx emissions for EUDIRECTHEATER during the period of January 2016 through October 2018 was 1.57 tons reported in October 2018. The highest reported 12-month rolling highest reported CO emissions for EUDIRECTHEATER was 0.91 tons between January 2016 through March 2018 also reported in October 2018. These records indicate DTE has been operating below the NOx and CO emission limits set forth in EUDIRECTHEATER SC I.1. and 2.

The 12-month rolling total gas usage (natural gas or flash gas) for EUDIRECTHEATER is limited to 45 MMCF in EUDIRECTHEATER SC II. 1. Monthly and 12-month rolling records of the total natural gas and the flash gas used in EUDIRECTHEATER are required to be kept per EUDIRECTHEATER SC VI. 1. Mr. Kotwicki provided 12-month rolling natural gas and flash gas usage records for January 2016 through October 2018 (Attachment 2). The highest

reported 12-month rolling flash gas and natural gas fuel use combined for EUDIRECTHEATER was 23.872 MMCF reported in October 2018. Based on these records it appears DTE is in compliance with the permit limit of 45 MMCF per 12-month rolling time period.

EUDIRECTHEATER SC III. 1. restricts the fuel used in EUDIRECTHEATER to pipeline quality natural gas or flash gas from the liquid hydrocarbon tanks (FGTANKS). Mr. Kotwicki stated that only pipeline quality natural gas or flash gas is used in EUDIRECTHEATER.

EUGENERATOR

An emergency generator (EUGENERATOR), located in the Aux 1 Services Building at Washington 10, is used to supply power during an outage. EUGENERATOR is a 1090 kW generator powered by a 1340 HP rated RICE manufactured by Caterpillar (CAT 3516).

EUGENERATOR SC I. 1. and 2. limit the 12-month rolling NOx and CO emission from EUGENERATOR to 2.8 tons and 2.7 tons respectively. Monthly and 12-month rolling NOx and CO emissions calculations, required by EUGENERATOR SC VI.2, for the emergency generator were provided by Mr. Rynne (Attachment 4). The emission factor calculations for NOx and CO were included with the monthly and 12-month rolling calculations (Attachment 5). According to the emission factor calculation sheet, the NOx and CO emission factors for EUGENERATOR (based on 1395 HP output) are 2 grams/hp-hr (6.15 lbs/hour) and 1.86 grams/hp-hr (5.9 lbs/hour) respectively and are based on manufacturer's emissions data. The Technical Data Sheet from the manufacturer with the emissions data on it is attached (Attachment 6). A review of the monthly and 12-month rolling records indicate the emission factors provided are being used to calculate NOx and CO emissions for EUGENERATOR. The highest reported 12-month rolling NOx emissions for EUGENERATOR during the period of January 2016 through October 2018 was 0.41 tons reported in April 2017. The highest reported CO emissions for EUGENERATOR was 0.39 tons between January 2016 through October 2018, reported in April and May 2017. These records demonstrate that EUGENERATOR has been operating below the permit limits of 2.8 tons NOx per 12-month rolling time period and 2.7 tons of CO per 12-month rolling time period set forth in EUGENERATOR SC I. 1. and 2.

The 12-month rolling hours of operation of EUGENERATOR are limited to 876 hours in SC III. 1. Ms. Rynne provided records of the monthly and 12-month rolling hours of operation of the emergency generator required per EUGENERATOR SC VI.1. (Attachment 4). The highest reported 12-month rolling hours of operation for EUGENERATOR between January 2016 through October 2018 was 88.45 hours reported in October 2016. This demonstrates EUGENERATOR was in compliance with the 876 hours per 12-month rolling time period limit.

EUGENERATOR SC III. 2. limits the fuel used in EUGENERATOR to pipeline quality natural gas. According to Mr. Kotwicki, the generator uses only pipeline quality natural gas.

Compliance with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subpart A and Subpart ZZZZ is required in EUGENERATOR SC IX.1. According to 40 CFR 63.6590(b)(3)(iii), located in 40 CFR 63 Subpart ZZZZ; existing RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions do not have to meet the requirements of 40 CFR 63 Subpart A and ZZZZ. Based on the installation date (7/1/99), EUGENERATOR is an existing RICE. In order to be considered an emergency stationary RICE the engine must not run for more than 100 hours per year for non-emergency purposes, including maintenance checks and readiness testing. The use in emergency situations is unlimited. Based on the EUGENERATOR run

hours provided (Attachment 4), EUGENERATOR was operated for readiness testing/maintenance purposes for 85.45 hours in 2016, 62 hours in 2017, and 45 hours in 2018. This information indicates EUGENERATOR operated for less than 100 hours between January 2016 and October 2018 for non-emergency purposes (weekly testing/maintenance) and appears to demonstrate that the generator is operating as an emergency generator as described in 40 CFR 63.6640(f).

FGENGINES1

In the ROP, EUENGINE1, EUENGINE2, and EUENGINE3 are combined in the flexible group (FG) FGENGINES1. The engines in FGENGINES1 were installed in 1999. Each engine in FGENGINES1 is a 4,000 HP natural gas-fired RICE manufactured by Cooper.

Emissions limits for NOx, CO, and VOC, set forth in FGENGINES1 SC I.1.a through 3.b, are listed in the table below:

Pollutant	Limit	Time Period/ Operating Scenario
NOx	1.3 grams	Per horsepower-hour at 100% torque and 100% speed, per engine
NOx	227.0 tons	12-month rolling, as determined at the end of each calendar month
CO	2.0 grams	Per horsepower-hour at 100% torque and 100% speed, per engine
CO	228.6 tons	12-month rolling, as determined at the end of each calendar month
VOC	0.90 gram	Per horsepower-hour at 100% torque and 100% speed, per engine
VOC	103.8 tons	12-month rolling, as determined at the end of each calendar month

FGENGINES1 SC V. 1. through 3. requires stack testing using Methods 2, 3A, 7E, 10, and 25A, or other acceptable reference methods approved by AQD within one year of issuance of the ROP and repeat stack testing within 180 days if the emission calculations show the 12-month rolling limit is within 25% of the limits in FGENGINES1 SC I. 1b, 2b, or 3b. These testing requirements are used to verify compliance with the emission limits in FGENGINES1 SC I. 1a, 2a, or 3a. The ROP (MI-ROP-N3391-2017) was issued to DTE Gas Company – Washington 10 Compressor Station on November 21, 2017. DTE most recently tested NOx, CO, and VOC emissions from EUENGINE1, EUENGINE2, and EUENGINE3 on May 22, 2018 and April 10 - 11, 2018 respectively, which is within one year of ROP issuance. NOx, CO, and VOC emissions for each engine were below the limits in FGENGINES1 SC I. 1a, 2a, and 3a based on the 2018 stack test report on file at the AQD Southeast Michigan District office. The test report summary page is attached for reference (Attachment 7). The table below contains the information from the test report summary page:

Pollutant	2018 Stack Test Results (average of three 1 hour runs)		

	EUENGINE1	EUENGINE2	EUENGINE3
NOx	0.4 grams/bhp-hr	0.6 grams/bhp-hr	0.6 grams/bhp-hr
CO	1.7 grams/bhp-hr	1.3 grams/bhp-hr	1.5 grams/bhp-hr
VOC	ND	ND	ND

To show compliance FGENGINES1 SC I. 1b, 2b, and 3b, monthly and 12-month rolling records of the total NOx, CO and VOC emissions, in tons, for FGENGINES1 are required to be kept per FGENGINES1 SC VI. 1. Ms. Rynne provided monthly and 12-month rolling NOx, CO, and VOC emission records and calculations for FGENGINES1 (Attachment 8). These records indicate that the DTE is using the emission factors derived from the most recent stack tests and that the engines in FGENGINES1 have been operating below the NOx, CO, and VOC limits in FGENGINES1 SC I. 1b, 2b, and, 3b and are not within 25% of these limits. The highest reported 12-month rolling NOx, CO, and VOC emissions for January 2017 through October 2018 for FGENGINES1 were 22.86 tons, 53.62 tons, and 4.06 tons respectively.

FGENGINES1 SC III. 1. mandates that each engine in FGENGINES1 not operate unless a clean-burn combustion system is installed and operating properly. Each of the engine in FGENGINES1 is equipped with a properly operating pre-combustion chamber according to the inspection report for each engine (Attachment 9).

DTE is only permitted to use pipeline quality natural gas to fire the engines in FGENGINES1. Mr. Mumin said only pipeline quality natural gas is used in the engines in FGENGINES1.

FGENGINES1 SC VI. 2, 3, 6, and 7. require DTE to monitor engine operating parameters on a continuous basis to ensure that engine speed and torque are within ranges for which engine emission factors have been based, maintain on file records of the normal operating ranges, and record critical operating parameters for each engine every four hours of operation. During the inspection I observed that each of the engines in FGENGINES1 was equipped with a monitoring system that displays operating parameters such as torque, engine speed, fuel flow, and horsepower continuously and that each monitoring system was equipped with alarms and engine shut down set points to prevent the engine operating out of normal ranges. None of the engines in FGENGINES1 were being operated during the inspection. The engine operator provided a copy of the alarms and set points for each engine in FGENGINES1 (Attachment 10). In addition, Mr. Mumin verified the normal operating ranges and alarm settings previously submitted for each engine in FGENGINES1 are accurate. A copy of the normal operating ranges and alarms are attached (Attachment 11). Ms. Rynne provided records of the engine speed, torque, engines hours, and fuel consumption for each engine in FGENGINES2 for December 2017 as requested (Attachment 12).

If normal operating ranges specified by the manufacturer or established through stack testing are exceeded, DTE is required to implement and record preventive maintenance activities necessary to ensure that system parameters are operated within normal operating ranges. In addition, FGENGINES1 SC VI. 8. mandates that DTE conduct preventive maintenance activities in accordance with the Manufacturer's Commercial Engine Maintenance Schedule. According to Mr. Mumin, DTE performs preventative maintenance according to manufacturer's recommendations. Mr. Mumin provided a copy of the monthly, quarterly, semi-annual, and annual maintenance procedures for each engine in FGENGINES1 (Attachment

13). All preventative maintenance activities are logged electronically in a software program. Mr. Mumin provided a list of the maintenance activities performed on each engine between October 2017 and October 2018 (Attachment 14). Annual engine inspection reports for FGENGINES1 which describe the findings of the inspection and recommended repairs/maintenance were also provided (Attachment 9). According to the annual inspection reports, one issue should be addressed as soon as possible (ACI panel readings for EUENGINE2 were inconsistent with measured engine torque and horsepower). The cause of the issue, according to the report, was identified and fixed by a DTE staff member.

In 2017, EUENGINE1 was overhauled. Overhauling an engine typically involves disassembling, cleaning, inspecting, and repairing/replacing parts. According to information from DTE (Attachment 15), the cost of the overhaul was 1,962,365 dollars and the cost of a new engine would be 16,000,000 dollars. Based on the cost analysis, it appears the overhaul of EUENGINE1 would not be considered a reconstruction per 40 CFR 63 Subpart A because the fixed capital cost of the overhaul is less than 50 percent of the fixed capital cost that would be required to construct a comparable new engine.

FGENGINES1 SC VII.4. and 5. require the testing date and test plan for stack tests be submitting to AQD 30 days prior to the test. Stack tests were conducted on each engine in FGENGINES1 May 22, 2018 and April 10 - 11, 2018. A stack test plan and report was received on time (February 15, 2018 and June 4, 2018 respectively). A copy of the test plan and report are on file at the Southeast Michigan District office.

I inspected each of the stacks for the emission units in FGENGINES1. Each of the stacks associated with the emission units in FGENGINES1 appeared to meet the stack parameter limits set forth in FGENGINES1 SC VIII. 1. through 3, however, actual measurements were not taken.

Compliance with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subpart A and Subpart ZZZZ is required in EUGENERATOR SC IX.1. According to 40 CFR 63.6590(b)(3)(i), located in 40 CFR 63 Subpart ZZZZ; existing stationary 2-stroke lean burn RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions do not have to meet the requirements of 40 CFR 63 Subpart A and ZZZZ. FGENGINES1 are existing 2-stroke lean burn RICE and DTE – Washington 10 Compressor Station is a major source of HAP.

FGENGINES2

EUENGINE4, EUENGINE5, and EUENGINE6 are combined in the ROP and named FGENGINES2.

Each engine in FGENGINES2 is a new 4,735 HP, 4-stroke lean burn RICE manufactured by Caterpillar. Emissions from each engine in FGENGINES2 are controlled using a catalytic oxidizer.

Emissions limits for NOx, CO, and VOC set forth in FGENGINES2 SC I.1.a through 3.b. are listed in the table below:

Pollutant	Limit	Time Period/ Operating Scenario
NOx	0.9 gram	Per horsepower-hour at 100% torque and 100% speed, per engine

NOx	**130.4 tons**	**12-month rolling, as determined at the end of each calendar month**
CO	**2.5 grams**	**Per horsepower-hour at 100% torque and 100% speed, per engine (pre-catalyst)**
CO	**25.4 tons**	**12-month rolling, as determined at the end of each calendar month**
VOC	**1.0 gram**	**Per horsepower-hour at 100% torque and 100% speed, per engine**
VOC	**144.8 tons**	**12-month rolling, as determined at the end of each calendar month**

Compliance with the 0.9 gram/hp-hr NOx limit and 1.0 gram/hp-hr VOC limit is demonstrated through compliance with SC V. 1 in FGENGINES2. FGENGINES2 SC V. 1 requires stack testing to determine the NOx and VOC emissions within 5 years of the previous stack test. DTE most recently tested NOx and VOC emissions from EUENGINE4, EUENGINE5, and EUENGINE6 on April 10 - 11, 2018. The previous stack test for NOx and VOC was conducted in February 2013. A copy of the summary table from the 2018 stack test report is attached (Attachment 16). The complete stack test report is on file at the AQD Southeast Michigan District office. Based on the data in the stack test summary, the NOx and VOC emissions from each engine were below the limits in FGENGINES2 SC I. 1a and 3a.

According to the ROP, compliance with the 2.5 gram/hp-hr CO limit is shown through compliance with SC V. 2 in FGENGINES2. FGENGINES2 SC V. 2 requires stack testing to determine the CO emissions within 180 days of the previous catalytic oxidation system performance test. After two consecutive passing events, the test plan can be changed to annually. Each engine in FGENGINES2 passed the previous two consecutive stack tests for CO. DTE most recently tested CO emissions from EUENGINE4, EUENGINE5, and EUENGINE6 on April 10 - 11, 2018. The previous stack test for CO was conducted in April 2017. A copy of the summary table from the 2018 stack test report is attached (Attachment 16). The complete stack test report is on file at the AQD Southeast Michigan District office. Based on the data in the stack test summary for 2018, the CO emissions from each engine in FGENGINES2 was below the limit in FGENGINES2 SC I. 2a.

Compliance with the 12-month rolling NOx, CO, and VOC limits is demonstrated through compliance with SC VI. 1 and 2 in FGENGINES2, according to the ROP. FGENGINES2 SC VI. 1 and 2 require monthly and 12 month rolling records of the total NOx and VOC emissions from FGENGINES2, in tons, be kept. Ms. Rynne provided monthly and 12-month rolling NOx, CO, and VOC emission records and calculations for FGENGINES2 (Attachment 8). These records indicate that the DTE is using the emission factors derived from the most recent stack tests and that NOx, CO, and VOC emissions from all engines in FGENGINES2 combined are less than the NOx, CO, and VOC limits in FGENGINES2 SC I. 1b, 2b, and, 3b. The highest reported 12-month rolling NOx, CO, and VOC emissions for January 2017 through October 2018 for FGENGINES2 were 26.10 tons, 1.5 tons, and 0.97 tons respectively.

DTE is limited to using only pipeline quality natural gas to fire the engines in FGENGINES2. Mr. Mumin said only pipeline quality natural gas is used in the engines in FGENGINES2.

FGENGINES2 SC III. 3. requires FGENGINES2 operate within normal operating ranges

specified by the manufacturer or established through stack testing. I observed that each of the engines in FGENGINES2 is equipped with a monitoring system that will sound alarms and shut the engine down before normal operating ranges are exceeded, preventing the engines from operating outside of normal ranges established by the manufacturer or through stack testing. The plant operator provided the alarm and shut-down set points for each engine in FGENGINES2 (Attachment 17). Mr. Mumin verified that previously submitted operating ranges for the engines were accurate. A copy of the normal operating ranges is attached (Attachment 11).

The operation of any engine in FGENGINES2 is prohibited unless maintenance is conducted in accordance with the Manufacturer's Commercial Engine Maintenance Schedule per FGENGINES2 SC III.2. FGENGINES2 SC VI. 5. requires records of all maintenance done on each engine in FGENGINES2 be kept. In addition, if normal operating ranges specified by the manufacturer or established through stack testing are exceeded, DTE is required to implement and record preventive maintenance activities necessary to ensure that system parameters are operated within normal operating ranges. Mr. Mumin stated the engines are maintained according to manufacturer's recommendations. All preventative maintenance activities are logged electronically in a software program. Mr. Mumin provided a copy of the monthly, quarterly, semi-annual, and annual maintenance procedures for each engine in FGENGINES2 (Attachment 18). Mr. Mumin provided maintenance records for FGENGINES2 between September 2017 through November 2018 (Attachment 19). Ms. Rynne provided annual engine inspection reports from Baker Hughes which describe the findings of the inspection and recommended repairs/maintenance (Attachment 20). According to the annual inspection, none of the engines in FGENGINES2 had issues that needed to be addressed as soon as possible.

FGENGINES2 SC III.4. states the total break-in hours for each engine in FGENGINES2 shall not exceed 200 hours. The underlying applicable requirement (40 CFR 63.6640(d)) states: "For new, reconstructed, and rebuilt stationary RICE, deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations." This exemption from receiving a violation notice for FGENGINES2 emissions and operating deviations does not appear to apply for January 2017 through June 2018 because there were no emissions or operating deviations reported for FGENGINES2.

DTE is prohibited from operating an engine in FGENGINES2 unless the engine's respective catalytic oxidation system is installed, maintained, and operated in a satisfactory manner. Satisfactory operation includes; a. replacing the catalyst based on the manufacturer's recommended schedule, b. maintaining the temperature of each RICE exhaust so that the catalyst bed inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F., and c. maintaining each RICE catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test (at 100 percent load plus or minus 10 percent).
Operations/station repairmen maintain the catalysts. The catalysts are taken out, inspected, and cleaned approximately annually and replaced when necessary or recommended by the manufacturer. Testing is done annually on the catalysts to ensure CO destruction efficiency.

During the inspection I observed that each engine was equipped with a device that monitors the catalyst inlet temperature. EUENGINE5 was the only engine in FGENGINES2 that was being operated during the inspection. I noted the catalyst inlet temperature was 856 degrees

Fahrenheit which is within the range specified in 40 CFR 63 Subpart ZZZZ (greater than or equal to 450 °F and less than or equal to 1350 °F). Continuous recording of the inlet temperature of each catalytic oxidizer in FGENGINES2 is required per FGENGINES2 SC VI. 7. Ms. Rynne provided records of the average hourly catalyst inlet temperatures for EUENGINE4, EUENGINE5, and EUENGINE6 between May 2018 through October 2018 (File location: S:\Air Quality Division\STAFF\Kerry Kelly\Temp Records\N3391). These records and records of each engines hours of operation indicate the catalyst inlet temperature for each engine's associated catalyst was greater than or equal to 450 °F and less than or equal to 1350 °F when the respective engine was being operated.

Records of all maintenance done on each catalytic oxidation system for FGENGINES2 must be kept per FGENGINES2 SC VI. 6. Catalyst maintenance records were provided by Mr. Mumin (Attachment 19). These records indicate each catalyst was cleaned and inspected once between September 2017 and November 2018. Mr. Mumin provided the catalyst thermocouple calibration log for each catalyst in FGENGINES2 (Attachment 21). These records indicate the accuracy of the thermocouple for each catalyst was tested between October 23, 2018 and November 8, 2018 and that each thermocouple's accuracy was within two percent or 4.5 degrees Fahrenheit.

Satisfactory installation, calibration, maintenance and operation of a device to monitor, by observation, the pressure drop across each catalytic oxidizer in FGENGINES2 once per month is required in FGENGINES2 SC VI. 3. I inspected and observed that each engine in FGENGINES2 was equipped with a monitoring system that continuously monitors and displays the pressure drop. Ms. Rynne provided records of the monthly pressure drop readings for each catalytic oxidizer for November 2017 through October 2018 (attachment 22). As is noted previously, EUENGINE5 was the only engine being operated during the inspection. The catalyst monitor for EUENGINE5 indicated the pressure drop was 1.6 inches of water which is not more than 2 inches of water from the pressure drop across the catalyst that was measured during the performance test (1.8 inches of water).

FGENGINES2 SC VI. 9 requires DTE record the following critical operating parameters every four hours of engine operation, when the engine is running:

a. Engine speed (in revolutions per minute)
b. Engine torque (in percent)
c. Air manifold temperature
d. Air manifold pressure
e. Ignition Timing

Ms. Rynne provided records of the average engine speed, torque, engines hours, and fuel consumption for each engine in FGENGINES2 for December 2017 as requested (Attachment 12). In addition, I observed during the inspection that each engine in FGENGINES2 was equipped with a monitoring system that measures, displays, and records each engine's torque, speed, fuel flow, inlet manifold air pressure, ignition timing, and horsepower. As stated previously, EUENGINE5 was the only engine in FGENGINES2 being operated during the inspection. I noted the following measurements on the display for EUEGINE5:

Speed: 998 rpm
Torque: 68 %
Air Manifold Temperature: 129 degrees Fahrenheit
Air Manifold Pressure: 23.9
Ignition Timing: 15.7

I inspected each of the stacks for the emission units in FGENGINES2. Each of the stacks associated with the emission units in FGENGINES2 appeared to meet the permit's stack/parameter limits set forth in FGENGINES2 SC VIII. 1. through 3.

FGENGINES2 SC IX. requires compliance with all applicable provisions of National Emission Standards for Hazardous Air Pollutants specified in 40 CFR 63 Subpart A and ZZZZ. Compliance with these conditions will be evaluated in FGNESHAPZZZZ.

FGNESHAPZZZZ

FGNESHAPZZZZ applies to any existing, new or reconstructed stationary RICE with a site-rating of more than 500 brake horsepower, located at a major source of HAP emissions. Currently EUENGINE4, EUENGINE5, and EUENGINE6 are the only new, spark ignition, 4-stroke lean burn (4SLB), 4,735 HP engines.

FGNESHAPZZZZ SC I. 1. requires EUENGINE4, EUENGINE5, and EUENGINE6 be equipped with catalytic oxidizers that reduce CO emissions by at least 93%. The company performed stack tests on each engine in FGENGINES2, in accordance with the 40 CFR 63 Subpart ZZZZ and FGNESHAP SC V.1 and 2, to demonstrate compliance with the minimum 93% destruction efficiency. The reported destruction efficiencies of EUENGINE4, EUENGINE5, and EUENGINE6 calculated by DTE for the most recent CO stack test (April 13,17, and 18, 2018) are below the minimum destruction efficiency cited in 40 CFR 63 Subpart ZZZZ are as follows;

Parameter	Engine 4	Engine 5	Engine 6
Average Destruction Efficiency (%)	98.8	98.1	98.6

Compliance with conditions FGNESHAPZZZZ SC III.1 - 5, SC IV.2, 3, 5, and 6, and SC VII. 1-3. were evaluated in FGENGINES2 and SEMI-ANNUAL AND ANNUAL REPORTING.

Operation and maintenance of any engine subject to 40 CFR 63 Subpart ZZZZ in a manner consistent with safety and good air pollution control practices for minimizing emissions, including associated air pollution control equipment and monitoring equipment, is required per FGNESHAPZZZZ SC III. 4. Mr. Mumin stated the engines are maintained according to manufacturer's recommendations and regulatory requirements.

FGNESHAPZZZZ SC VI. 1. requires a continuous parameter monitoring system be installed, operated, and maintained in a satisfactory manner according to the requirements in 40 CFR 63.6625(b)(1) through (6). Catalyst maintenance records provided by Mr. Mumin indicate the thermocouple for each catalyst is calibrated annually.

The use of a CEMS that monitors and records the CO and with the O2 or CO2 at the inlet and outlet of the control device can be used in lieu of a CPMS. This condition does not appear to apply to EUENGINE4, EUENGINE5, and EUENGINE6 because DTE is using a CPMS.

DTE is required, in FGNESHAPZZZZ SC VII.4, to submit to the AQD District Supervisor, a semi-annual compliance report, as specified in 40 CFR 63.6650, which contains all deviations during the reporting period from any applicable emission limitation or operating limitation and

all periods during which the CPMS or CEMS was out of control as defined in 40 CFR 63.8(c)(7). If there were no deviations from any applicable emission limitations or operating limitations or no periods that the CPMS or CEMS was out of control, the report shall contain a statement that there were no deviations and no periods during which the CPMS or CEMS was out of control during the reporting period. In the semi-annual and annual deviation reports submitted by Mr. Kotwicki for January 1, 2017 through June 30, 2018 there were statements that there were no periods during which the CPMS was out of control.

SC VII. 6. states the permittee shall submit a startup, shutdown and malfunction report if actions addressing the startup, shutdown and malfunction were not consistent with the Startup/Shutdown/Malfunction Plan. There were no abnormal startup, shutdown or malfunction events recorded in the past year.

Notifications in 40 CFR 63.7(b) and (c), 63.8 (e), (f)(4) and (f)(6), and 63.9(b) through (e), (g) and (h), 40 CFR 63.9(h)(2)(ii), and 63.10(d)(2), referenced in FGNESHAPZZZZ SC VII. 6 through 10, are required to be submitted on time. Records of 40 CFR 63 Subpart ZZZZ initial notifications for FGNESHAPZZZZ are on file at the AQD office.

FGINDIRECTHEATERS1 and FGINDIRECTHEATERS2

The flexible group FGINDIRECTHEATERS1 consists of EUINDHEATER1, EUINDHEATER2, and EUINDHEATER3. FGINDIRECTHEATERS2 consists of EUINDIRECTHEATER4. All four indirect heaters are located in the northwest corner of the property. I inspected EUINDHEATER1, EUINDHEATER2, EUINDHEATER3. EUINDHEATER1, EUINDHEATER2, EUINDHEATER3, and EUINDHEATER4 each have two, 5 MMBtu, Maxon Model 487M burners.

Monthly and 12-month rolling NOx and CO emissions records for FGINDHEATERS1, required in FGINDHEATERS1 SC VI.3., were provided by Mr. Kotwicki (attachment 23). These records indicate EUINDHEATERS1 were operating below the 7.1 tons NOx per 12-month rolling time period limit specified in FGINDHEATERS1 SC I. 1. and the 4.4 tons of CO per 12-month rolling time period in FGINDHEATERS1 SC I. 2. from January 2016 to November 2018. The highest 12-month rolling NOx emissions reported was 3.13 tons reported in November 2018. The highest reported 12-month rolling CO emissions were 2.01 tons reported in November 2018.

Mr. Kotwicki provided NOx and CO emission records for EUINDHEATERS2 (attachment 23). These records demonstrate EUINDHEATERS2 has been operating below the 1.8 pounds per hour NOx limit specified in EUINDHEATERS2 SC I. 1. and the 1.1 pounds per hour of CO limit SC I. 2. from January 2013 to March 2017. The highest reported NOx emissions for EUINDHEATERS2 were 0.95 pounds/hr and the highest reported CO emissions was 0.61 pounds/hr.

FGINDHEATERS1 SC III. 1 and FGINDHEATERS2 SC III. 1. stipulates only natural gas shall be burned in FGINDHEATERS1 and FGINDHEATERS2. According to Mr. Kotwicki, FGINDHEATERS1 and FGINDHEATERS2 are fired only by pipeline quality natural gas.

FGINDIRECTHEATERS1 SC II. 1. limits the 12-month rolling natural gas throughput for FGINDIRECTHEATERS1 to 100 million standard cubic feet. The 12-month rolling natural gas throughput for FGINDIRECTHEATERS2 is limited to 67 million standard cubic feet in FGINDIRECTHEATERS2 SC II. 1. Mr. Kotwicki provided natural gas usage records for the indirect heaters required per FGINDIRECTHEATERS1 SC VI.2. and FGINDIRECTHEATERS2 SC VI.2 (attachment 23). The records indicate that DTE is in

compliance with the permit limits of 100 MMCF per 12 month rolling time period from FGINDHEATERS1 and 67 MMCF per 12 month rolling time period from FGINDHEATERS2. Note: the company only has one gas meter for all four line heaters. They express their natural gas usage for FGINDHEATERS1 by multiplying the total gas usage by 0.75. They express their natural gas usage for FGINDHEATERS2 by multiplying the total gas usage by 0.25. Using one meter for all four line heaters is permitted as long as their records show the total usage is below the lower of the two usage limits (67 million standard cubic feet). Because the highest fuel usage for EUINDHEATERS1 and EUINDHEATERS2 combined was 59.52 million standard cubic feet between January 2016 and November 2018, which is below the lesser of the fuel usage limits of 67 MMCF, the fuel usage appears to be in compliance with the permit material limits for both FGINDHEATERS1 and FGINDHEATERS2.

I inspected each of the stacks for the emission units in EUINDHEATERS1 and EUINDHEATERS2. Each of the stacks associated with the emission units in EUINDHEATERS1 and EUINDHEATERS2 appeared to meet the permit's stack/parameter limits set forth in EUINDHEATERS1 SC VIII. 1. through 3 and EUINDHEATERS2 SC VIII.1.

FGHCTANKS

During the facility walk-through I observed four tanks on the south end of the property which Mr. Kotwicki and Mr. Mumin said were EUHCTANK1, EUHCTANK2, EUHCTANK3, and EUHCTANK4 and are combined in the flexible group FGHCTANKS. The emissions from the tanks are controlled using an enclosed flare or the direct fired heater.

FGHCTANKS SC III. 1. requires that DTE properly maintain and operate a flame sensor for the pilot flame on the enclosed flare. The flare used to control FGTANKS must be installed, and continuously operate a burning pilot flame during times of natural gas withdrawal, according to FGHCTANKS SC IV. 1. and 2. DTE continuously monitors for presence of a pilot flame during periods of natural gas withdrawal using a UV Scanner – 5600-91 Eclipse Combustion. If the pilot flame were to go out, an alarm is triggered and the valve which allows the hydrocarbons to vent to the flare is shut-off. It appears the tanks are operating in compliance with FGHCTANKS SC III.1 and FGHCTANKS SC IV. 1. and 2.

During periods of natural gas withdrawal, the permittee is required to record the presence of a pilot flame on the flare associated with FGHCTANKS on a daily basis in a manner acceptable to the AQD District Supervisor according to FGTANKS SC VI. 2. The flare system is designed to ensure the presence of a pilot flame when gas is flowing to the flare. The flare operation begins when a blower turns on to remove any gas that may be left in the stack. Following the blower cycle, the ignitor will light the pilot flame. Once the pilot flame is ignited, the UV scanner will then check for presence of a flame. If a flame is detected by the UV scanner the gas will begin to flow. If a flame is not detected, the gas valve will not open and an alarm will notify the operator of the lack of flame. In addition, if the flame is not ignited, the gas does not need to be immediately vented to prevent pressure build up because the tanks have eight hours of pressure capacity.

During the inspection I observed the flare height which appeared to meet the permit's stack/parameter limit set forth in FGTANKS SC VIII.1.

FGCOLD CLEANERS

There are 2 cold cleaners at Washington 10 Compressor Station. Both cold cleaners have an air/vapor interface of not more than ten square feet and are equipped with a device for draining parts as required by FGCOLDCLEANERS SC IV.1.a and 2. During the inspection the lids to the cold cleaners were closed as required by FGCOLDCLEANERS SC IV.3. The

solvent used in the units is ZEP DYNA 143 which has a Reid Vapor Pressure of 0.067 kPa (approximately 0.0097 psia). The solvent in the cold cleaners does not appear to be heated or agitated. Records of the size of the cold cleaners and the solvent used in the cold cleaners, as required by FGCOLDCLEANERS SC VI.2, were provided by Ms. Rynne (Attachment 24). I inspected the cold cleaners and waste storage. The operating procedures for the cold cleaners were posted in a conspicuous area near the cold cleaner as required by FGCOLDCLEANERS SC VI. 3. The solvent waste drums I observed were covered as required by FGCOLDCLEANERS SC VI.4.

FGINDIRECTHEATERDDDDD

The flexible group FGINDIRECTHEATERDDDDD contains requirements pertaining to units designed to burn gas 1 subcategory for units that burn "other gas 1 fuels". EUDIRECTHEATER was included in FGINDIRECTHEATERDDDDD instead of FGBOILERS because the information available at the time of ROP renewal in 2017 was insufficient to make a determination whether the flash gas used in EUDIRECTHEATER met the definition of natural gas as defined in 40 CFR 63 Subpart DDDDD. According to 40 CFR 63 Subpart DDDDD, natural gas includes: (1) A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal constituent is methane; or (2) A mixture of hydrocarbons that maintains a gaseous state at ISO conditions. Additionally, natural gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 35 and 41 megajoules (MJ) per dry standard cubic meter (950 and 1,100 Btu per dry standard cubic foot). In January 2019, I found documents from Partner Reported Opportunities (PROs) on EPA's Voluntary Methane Programs for the Oil and Natural Gas Industry website which state non-condensable vapors from the post dehydration condenser and condensate separators consist primarily of methane and methane and ethane (Attachment 25). The flash gas used in EUDIRECTHEATER is non-condensed gas from the desiccant dehydrator which appears to meet the definition of natural gas in 40 CFR 63 Subpart DDDDD. As such, it appears EUDIRECTHEATER is subject to the requirements in 40 CFR 63 Subpart DDDDD for units that burn natural gas only. Compliance with the conditions in FGINDIRECTHEATERDDDDD that pertain to the use of "other gas 1 fuels" (SCs V. 1-6 and VI. 2-3) will therefore not be evaluated.

The ROP requires an initial notification of compliance status be submitted and a one-time energy assessment be performed on EUDIRECTHEATER no later than January 31, 2016. On January 27, 2016 AQD received an Initial Notification of Compliance Status which included statements that an initial tune-up and a one-time energy assessment were conducted, as required by 40 CFR 63 Subpart DDDDD. A tune-up is required every thirteen months for process heaters with heat input capacities greater than 10 MMBtu/hour. Records provided (Attachment 26) indicate a tune-up was conducted on EUDIRECTHEATER on January 17, 2018, which was 14 months after the previous tune-up. DTE reported the late tune-up as a deviation in the 2017 second semi-annual and annual report. A notice was not issued for the violation because DTE self-corrected the violation by conducting the tune-up on January 17, 2018. The January 17, 2018 tune-up report says the date of the "IB MACT compliance burner inspection is not known. Ms. Rynne provided a copy of the initial IB MACT inspection report (Attachment 27). This report indicates the initial "IB MACT compliance burner inspection" was conducted October 29-30, 2015.

FGBOILERS

This flexible group includes four line heaters (EUINDHEATER1, EUINDHEATER2, EUINDHEATER3, EUINDHEATER4) and seven natural gas fired boilers used to heat fuel gas

before it goes into the engines and to heat buildings in the winter. Two of the boilers are rated at 1 MMBtu/hr and the other five are rated at 2 MMBtu/hr.

The emission units in FGBOILERS are subject to the National Emissions Standards for Boilers and Process Heaters at major sources of Hazardous Air Pollutants (40 CFR 63 Subpart DDDDD). FGBOILERS contains requirements from 40 CFR 63 Subpart DDDDD for "units designed to burn gas 1 subcategory" and that only fire natural gas. A unit designed to burn gas 1 subcategory includes any boiler or process heater that burns only natural gas, refinery gas, and/or other gas 1 fuels.

FGBOILERS requires a one-time energy assessment be performed on the line heaters and boilers no later than January 31, 2016. On January 27, 2016 AQD received an Initial Notification of Compliance Status, including statements that an initial tune-up and a one-time energy assessment were conducted, as required by 40 CFR 63 Subpart DDDDD. A tune-up is required every 13 months for the line heaters and every five years for the boilers. Records provided by Ms. Rynne (Attachment 28), indicate tune-ups were conducted on the line heaters January 17, 2018, which was 14 months after the previous tune-up. DTE reported the late tune-ups as a deviation in the 2017 second semi-annual and annual report. A notice was not issued for the violation because DTE self-corrected the violation by conducting the tune-up on January 17, 2018.

The boilers in FGBOILERS are exempt from the requirement in Rule 201 to obtain a permit to install per Rule 282(2)(b) because they are used for space heating or process heat, fire sweet natural gas, and have a heat input capacity less than 50,000,000 Btu/hr.

The New Source Performance Standards for Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60 Subparts D, Da, Db, and Dc) do not appear to apply to the boilers in FGBOILERS because the rated heat capacity of each boiler is less than 10 MMBtu/hr.

FGRULE285(mm)

FGRULE285(mm) pertains to routine and emergency venting of natural gas from transmission and distribution systems or field gas from gathering lines. For safety purposes each engine, each pipeline, and the dehydration unit has an emergency shut-down vent. There were no emergency or routine blow-down events reported for Washington 10 between May 2017 and October 2018.

SEMI-ANNUAL AND ANNUAL REPORTING

The following requirements are applicable to each emission unit and flexible group in the ROP:

- Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A.
- Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30.
- Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year

Certified semi-annual and annual deviation reports were received by AQD on time (March 5, 2018 and September 14, 2018). For the reporting periods January 1, 2017 through June 30,

2018, DTE reported the following deviations at Washington 10:

- Failure to submit a certification, signed by the authorized representative, with the CO test report for FGENGINES2 within 60 days of last day of testing. The test report was received on time, the certification form, according to the semi-annual report, was sent three days late. DTE said the in the future the test report and certification form will be sent to the facility together for submittal.
- FGBOILERS SC III.4.c for failure to conduct tune-ups on emission units in FGBOILERS by December 6-7, 2016 (13 months following the previous tune-ups). The tune-up was conducted January 17, 2017.
- Failure to submit a stack test plan for FGENGINES1 and FGENGINES2 60 days prior to test date. According to the semi-annual report, the test plan was submitted 53 days prior to testing.

MICHIGAN AIR EMISSIONS REPORTING SYSTEM (MAERS) REPORTING

DTE submitted the 2017 criteria pollutant emissions from Washington 10 to MAERS on time. The emissions reported to MAERS appear to be consistent with emission records collected during this inspection.

CONCLUSION

Based on the information I gathered during the inspection, I determined that DTE Gas Company - Washington 10 Compressor Station appears to be in compliance with MI-ROP-N3391-2017 and the evaluated air quality rules and regulations.

NAME K. Bolte DATE 1/23/19 SUPERVISOR Joyce K