Manila

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

N339139580

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: Joe Kotwicki , Associate Environmental Specialist		**ACTIVITY DATE:** 04/04/2017
STAFF: Kerry Kelly	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FCE: DTE Washington 10 Compressor Station appears to be in compliance with MI-ROP-N3391-2012c and the evaluated air quality rules and regulations.		
RESOLVED COMPLAINTS:		

On April 4, 2017, I conducted a scheduled inspection of DTE - Washington 10 Storage Facility (Washington 10), located at 12700 30 Mile Road in Washington Township, Michigan. 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-N3391-2012c; and 40 CFR Part 63 Subpart ZZZZ (NESHAP ZZZZ).

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.

Renewable operating permit (MI-ROP-N3391-2012c) became effective September 25, 2012. An administratively complete ROP application was due between March 25, 2016 and March 25, 2017. AQD Southeast Michigan District Office received the ROP renewal application for the next renewal cycle on March 2, 2017. The March 2, 2017 application was determined to be administratively complete by the AQD and an administratively complete letter was sent to DTE on March 10, 2017. Equipment covered in MI-ROP-N3391-2012c includes one direct heater, one emergency generator, six engines (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

I (Kerry Kelly) arrived at DTE – Washington 10 Compressor Station at approximately 10:10 AM on April 4, 2017. I entered the office at DTE and explained the purpose of the inspection to Mr. Joe Kotwicki, Associate Environmental Specialist. Mr. Kotwicki introduced me to Mr. Siraj Mumin, Supervisor and Mr. Caleb Tweten, Mechanical Engineering Student. Mr. Kotwicki and Mr. Mumin escorted me during the inspection and Mr. Tweten provided records.

Washington 10 Compressor Station conducts central processing of natural gas. Natural gas is received at Washington 10 from April through September and stored, via the E line, in one of three storage fields. The total capacity of the three storage fields combined is approximately 90 billion cubic feet. Natural gas is withdrawn from the storage fields via the F line, and sent to customers, from October through March. The week of April 2, 2017, DTE was conducting inventory of the gas fields at Washington 10 according to Mr. Mumin. Six engines (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) at Washington 10 are used to prevent the water in the gas from freezing. Before natural gas is sent

to the pipeline, it goes through desiccant towers for the removal of moisture and hydrocarbons. Desiccant towers are used at Washington 10, instead of a glycol dehydration system, because the gas at Washington 10 has a higher hydrocarbon content (is wetter). 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 there are beads to adsorb water and hydrocarbons. A direct heater (EUDIRECTHEATER) regenerates the desiccant towers by blowing heated natural gas through the desiccant to evaporate moisture. The wet natural gas is then sent through a condenser to separate off water/oil, butane, and propane. A water/oil separator is used to remove oil from the water. The water, butane, propane, and oil are sent to separate storage tanks (FGTANKS). Gulfmark purchases the separated hydrocarbons for use as fuel, according to Mr. Mumin.

COMPLIANCE EVALUATION

EUDIRECTHEATER

EUDIRECTHEATER SC I. 1. and 2. limit the 12-month rolling NOx and CO emission 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 1). The emission factors used to calculate NOx and CO emissions from EUDIRECTHEATER (139.95 lb/MMCF and 76.13 lb/MMCF respectively) are based on manufacturer's data, according to Ms. Phillis Rynne, Senior Engineer, DTE Environmental Management and Resources – Emissions Quality. A cursory review of the records indicates the emission factors stated by Ms. Rynne are being used to calculate NOx and CO emissions for EUDIRECTHEATER. The highest reported 12-month rolling NOx emissions for EUDIRECTHEATER during the period of January 2016 through March 2017 was 1.25 tons reported in March 2017. The 12-month rolling highest reported CO emissions for EUDIRECTHEATER was 0.72 tons between January 2016 through March 2017. 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 March 2017 (attachment 1). The highest reported 12-month rolling flash gas and natural gas fuel use combined for EUDIRECTHEATER was 18.940 MMCF. 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

The emergency generator (EUGENERATOR) on site is used to supply power during a power outage. I inspected EUGENERATOR located in the Aux 1 Services Building. According MI-ROP-N3391-2012c, EUGENERATOR is a 1000 kW natural gas-fired emergency generator. I inspected the nameplate on EUGENERATOR to verify the information in the ROP. The information on the nameplate stated the engine is a 1090 kW generator manufactured by Caterpillar (CAT 3516). The emergency generator was not operating during the inspection.

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. NOx and CO emissions calculations,

required by EUGENERATOR SC VI.2, for the emergency generator were provided by Mr. Kotwicki (attachment 2). According to Ms. Rynne, the NOx and CO emission factors for EUGENERATOR (2 grams/hp-hr and 1.86 grams/hp-hr respectively) are based on manufacturer's data. A review of the records indicates the emission factors stated by Ms. Rynne are being used to calculate NOx and CO emissions for EUGENERATOR (based on ~1370 kW output). The highest reported 12-month rolling NOx emissions for EUGENERATOR during the period of January 2016 through March 2017 was 0.40 tons. The highest reported CO emissions for EUGENERATOR was 0.38 tons between January 2016 through March 2017.These records demonstrate that EUGENERATOR has been operating below the permit limits of 2.8 tons NOx per 12-mo 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. Mr. Kotwicki provided records of the monthly and 12-month rolling hours of operation of the emergency generator required per EUGENERATOR SC VI.1. (attachment 2). The highest reported 12-month rolling hours of operation for EUGENERATOR between January 2016 through March 2017 was 129 hours. 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.

According to 40 CFR 63.6600(c) emergency generators greater than 500 HP located at a major source of HAPs are not required to comply with the emission limitations and operating limitations in Table 1a, 2a, 2c, and 2d and Table 1b or 2b. 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. Records of the date, time, hour readings, generator run hours, and reason for operating were provided by Mr. Kotwicki (attachment 3). Based on the EUGENERATOR run hours (attachment 2), EUGENERATOR operated for 133.45 hours between March 2016 through March 2017 for testing and emergency purposes. According to attachment 3, EUGENERATOR ran 53.01 hours for emergency purposes between August 2016 and March 2017. This information indicates EUGENERATOR operated for less than 100 hours between March 2016 and March 2017 for non-emergency purposes (weekly testing) 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 FGENGINES1. The engines in FGENGINES1 were installed, according to the ROP, in 1999. Each engine in FGENGINES1 is a 4,000 HP natural gas-fired Reciprocating Internal Combustion Engine (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 to demonstrate compliance with the emission limits in FGENGINES1 SC I. 1a, 2a, and 3a. According to testing documents on file at the AQD Southeast Michigan District office, EUENGINE1, EUENGINE2, and EUENGINE3 were tested February 20-27, 2013, which is within one year of issuance of the ROP. The NOx, CO, and VOC emissions for each engine were below the limits in FGENGINES1 SC I. 1a, 2a, and 3a based on the stack test report on file at the AQD Southeast Michigan District office. The test report summary page is attached for reference (attachment 4).

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. Mr. Kotwicki provided monthly and 12-month rolling NOx, CO, and VOC emission records for FGENGINES1 (attachment 5). These records indicate 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 2013 through March 2017 for FGENGINES2 were 44.55 tons, 85.72 tons, and 15.90 tons respectively.

FGENGINES1 SC III. 1. mandates that each engine in FGENGINES1 shall not operate unless a clean-burn combustion system is installed and operating properly. Each of the engines in FGENGINES1 is equipped with a properly operating clean-burn combustion system according Mr. Kotwicki.

FGENGINES1 SC III.2. states only pipeline quality natural gas shall be used to fire the engines in FGENGINES1. Mr. Kotwicki said only pipeline quality natural gas is used in the engines in FGENGINES1.

FGENGINES1 SC VI.2. requires the permittee 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 upon. I inspected and 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. Mr. Kotwicki provided an example of the record for each engine in FGENGINES1, which includes the engine speed, percent torque, manifold temperature, manifold pressure, and ignition timing (attachment 6). None of the engines in FGENGINES1 were operating during the inspection.

FGENGINES1 SC VI. 3. mandates that the permittee shall maintain on file normal operating ranges specified by the manufacturer or established through stack testing for engine parameters listed in FGENGINES1 VI.6. Critical operating parameters in FGENGINES1 SC VI. 6. are; engine speed, engine torque, air manifold temperature, air manifold pressure, and ignition timing. Mr. Mumin provided records of the normal operating ranges and alarm settings for each engine in FGENGINES1 (attachment 7). Mr. Kotwicki also provided an example of the record of the operating parameters measured for EUENGINE1 (attachment 6) to demonstrate compliance with FGENGINES1 SC VI. 6, which requires recording of the critical operating parameters every four hours of engine operation. If normal operating ranges specified by the manufacturer or

established through stack testing are exceeded, the permittee shall implement and record preventive maintenance activities necessary to ensure that system parameters are operated within normal operating ranges as required by FGENGINES1 SC VI.4. Each of the engines in FGENGINES1 are equipped with a monitoring system that will sound alarms and shut the engine down if normal operating ranges are exceeded.

Continuous monitoring and recording of hours of engine operation, average hourly percent torque, average hourly speed, and fuel consumption for each engine in FGENGINES1 is required per FGENGINES1 SC VI. 7. Mr. Kowicki also provided an example of the record with the hours, percent torque, hourly speed, and fuel consumption (attachment 6) for each engine in FGENGINES1. Records of the monthly engine run hours for each engine in FGENGINES1 were also provided by Mr. Kotwicki (attachment 8).

FGENGINES1 SC VI. 8. mandates that the permittee conduct preventive maintenance activities in accordance with the Manufacturer's Commercial Engine Maintenance Schedule. Mr. Mumin stated the engines are maintained according to manufacturer's recommendations. All preventative maintenance activities are logged electronically in a software program and also hand-written in a daily log. I observed the hand written log posted near each engine in FGENGINES1. Mr. Mumin provided annual engine inspection reports for FGENGINES1 which describe the findings of the inspection and recommended repairs/maintenance (attachment 9). Mr. Mumin also provided maintenance records for FGENGINES1 (attachment 10).

FGENGINES1 SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. Mr. Kotwicki stated any deviations at the facility were reported in the semi-annual and annual report. There were no deviations of GC 21 and 22 reported for FGENGINES1 in the semi-annual and annual reports.

Semi-annual and deviation reports, required in FGENGINES1 SC VII. 2. and 3, were received by AQD on time (March 9, 2017).

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 February 20 – 27, 2013 and AQD has a copy of the test report 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 permit's stack/parameter limits set forth in FGENGINES1 SC VIII. 1. through 3.

Compliance with 40 CFR 63 Subpart A and Subpart ZZZZ will be evaluated in FGNESHAPZZZZ.

<u>FGENGINES2</u>
EUENGINE4, EUENGINE6, and EUENGINE6 are combined in the ROP and named FGENGINES2.

During the facility walk-through I observed EUENGINE4, EUENGINE5, and EUENGINE6. I inspected the control panel for EUENGINE4 and EUENGINE5 to verify the information in MI-ROP-N3391-2012c. The information on the control panel display stated the engines are 4,735 HP Reciprocating Internal Combustion Engines (RICEs) manufactured by Caterpillar which coincides with the information in the ROP. EUENGINE6 appeared to be the same make and size as EUENGINE4 and EUENGINE5. According to the ROP, each engine is equipped with a catalytic oxidizer. I observed that each engine in FGENGINES2 is ducted to an associated 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[2]	Per horsepower-hour at 100% torque and 100% speed, per engine
NOx	130.4 tons[2]	12-month rolling, as determined at the end of each calendar month
CO	2.5 grams[2]	Per horsepower-hour at 100% torque and 100% speed, per engine (pre-catalyst)
CO	25.4 tons[2]	12-month rolling, as determined at the end of each calendar month
VOC	1.0 gram[2]	Per horsepower-hour at 100% torque and 100% speed, per engine
VOC	144.8 tons[2]	12-month rolling, as determined at the end of each calendar month

FGENGINES2 SC V. 1. requires stack testing, within 5 years of the previous test, to demonstrate compliance with the emission limits in FGENGINES2 SC I. 1a and 3a. A copy of the emission test Executive Summary for all six engines at the facility is attached (attachment 4) . According to this document EUENGINE4, EUENGINE5, and EUENGINE6 were tested February 20-27, 2013. Based on this information the next NOx and VOC emission test is not due until February 2018. The NOx and VOC emissions for each engine were below the limits in FGENGINES2 SC I. 1a and 3a based on the information in the Executive Summary. A copy of the complete stack test report is on file at the AQD Southeast Michigan District office.

To show compliance FGENGINES2 SC I. 1b, 2b, and 3b, monthly and 12-month rolling records of the total NOx, CO and VOC emissions, in tons, for FGENGINES2 are required to be kept per FGENGINES2 SC VI. 1. and 2. Mr. Kotwicki provided monthly and 12-month rolling NOx, CO, and VOC emission records for FGENGINES2 (attachment 4). These records show that the engines in FGENGINES2 have been operating below the permit limits of: 130.4 tons NOx per 12-month rolling time period, 25.4 tons of CO per 12 month rolling time period, and 144.8 tons of VOC per 12 month rolling time period set forth in FGENGINES2 SC I.1b., 2.b. and 3.b. The highest reported 12-month rolling NOx, CO, and VOC emissions for January 2013 through March 2017 for FGENGINES2 were 43.13 tons, 2.97 tons, and 6.13 tons respectively.

FGENGINES2 SC V. 2. requires that within 180 days of the previous catalytic oxidation system performance test, permittee shall verify the catalytic oxidation system efficiency by utilizing CO emission rates as a surrogate, from each engine included in FGENGINE2, by testing at owner's expense, in accordance with Department requirements. Testing must be conducted at 100 percent speed and load (+/- 10 percent), semi-annually. After two consecutive passing events, the test plan can be changed to annually. No less than 60 days prior to testing, a complete test plan shall be submitted to the AQD. The final plan must be approved by the AQD prior to testing. Verification of emission rates includes the submittal of a complete report of the test results, including established emission factors and operating ranges for parameters specified in FGENGINES2 VI.9 and Appendix 8, to the AQD within 60 days following the last day of the test. The test results will also be used to verify compliance with CO emission limits FGENGINES2 I.2a. On April 4 – 6, 2017, DTE conducted a stack test to measure CO emissions from each engine in FGENGINES2. A test plan was submitted more than 60 days prior to the test day. The stack test report for this test is due by June 6, 2017. The stack test from the April 4 – 6, 2016 testing indicates that each engine in FGENGINES2 has a CO emission rate below the 2.5

grams/horsepower-hour set in FGENGINES2 SC I. 2a. The CO emissions rates and destruction efficiency reported for the April 4-6, 2016 stack test were:

Parameter	Engine 4	Engine 5	Engine 6
Average Inlet Carbon Monoxide Concentration (CO grams/BHp-hr)	**2.07**	**1.89**	**1.82**
Average Destruction Efficiency (%)	**99.4**	**98.7**	**96.1**

FGENGINES2 SC III. 1. states only pipeline quality natural gas shall be used to fire the engines in FGENGINES2. Mr. Kotwicki said only pipeline quality natural gas is used in the engines in FGENGINES2.

The permittee shall not operate FGENGINES2 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 for FGENGINES2 be kept. Mr. Mumin stated the engines are maintained according to manufacturer's recommendations. All preventative maintenance activities are logged electronically in a software program and also hand-written in a log. I observed the hand written log posted near each engine in FGENGINES2. Mr. Mumin provided annual engine inspection reports from GE Oil & Gas which describe the findings of the inspection and recommended repairs/maintenance (attachment 11). Mr. Mumin provided maintenance records for FGENGINES2 (attachment 12).

FGENGINES2 SC III. 3. requires FGENGINES2 operate within normal operating ranges specified by the manufacturer or established through stack testing. Mr. Mumin provided records of the normal operating ranges and alarm settings for each engine in FGENGINES2 (attachment 6). If normal operating ranges specified by the manufacturer or established through stack testing are exceeded, the permittee shall implement and record preventive maintenance activities necessary to ensure that system parameters are operated within normal operating ranges. Each of the engines in FGENGINES2 is equipped with a monitoring system that will sound alarms and shut the engine down if normal operating ranges are exceeded.

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 August 2016 and March 2017 because there were no emission deviations reported for FGENGINES2.

FGENGINES2 SC IV. 1. states FGENGINES2 shall not operate unless the catalytic oxidation system on each engine is installed, maintained, and operated in a satisfactory manner. Satisfactory operation includes; a. catalyst replacement schedule based on the manufacturer's recommended guidelines, b. catalyst bed inlet temperature as specified in 40 CFR Part 63 subpart ZZZZ, and c. pressure drop across the catalyst shall be recorded and included in the Startup/Shutdown/Malfunction Plan. Subsequent pressure drops, at full speed and load conditions, shall be within the measurement of the initial test, plus or minus 2 inches of water, or the appropriate range as specified in 40 CFR Part 63 Subpart ZZZZ at the time of operation.

Operations/station repairmen maintain the catalysts. The catalysts are taken out, inspected, and cleaned approximately annually. Testing is done annually on the catalysts to ensure CO destruction efficiency. The temperature alarm, according to Mr. Mumin is set based on OEM and permit requirements. Catalyst temperature and pressure is monitored continuously when operating. Mr. Mumin provided a print-out of the catalyst parameters monitored for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13). Catalyst temperature and pressure alarms sets were provided by Mr. Mumin (attachment 14).

FGENGINES2 SC VI. 6. mandates that records of all maintenance done on each catalytic oxidation system for FGENGINES2 be kept. Catalyst maintenance records were provided in August 2016 (attachment 14). These records indicate the catalyst for EUENGINE5 was replaced August 22, 2014 and the catalysts for EUENGINE5 and EUENGINE6 were cleaned on August 22, 2014. Mr. Mumin provided the catalyst thermocouple calibration log for each engine in FGENGINES2 (attachment 16). These records indicate the catalyst thermocouples were calibrated in September 2016.

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. Mr. Kotwicki provided records of the monthly average pressure drop across each catalytic oxidizer for October 2016 through March 2017 (attachment 17). I inspected and observed that each engine in FGENGINES2 was equipped with a monitoring system that continuously monitors and displays the pressure drop. EUENGINE4 and EUENGINE5 were the only engines operating during the inspection. The catalyst monitor for EUENGINE4 indicated the pressure drop was 1.6 inches of water and EUENGINE5 pressure drop was 1.2 inches of water.

Continuous recording of the inlet temperature of the catalytic oxidizers for FGENGINES2 are required per FGENGINES2 SC VI. 7. Mr. Kotwicki provided a print-out of the catalyst inlet temperature for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13) to demonstrate continuous inlet temperature monitoring. Mr. Kotwicki provided records of the catalyst inlet temperatures, recorded at 15 minute intervals, for EUENGINE4, EUENGINE5, and EUENGINE6 between October 7, 2017 and October 8, 2017 (attachment 18). EUENGINE4 and EUENGINE5 were the only engines in FGENGINES2 operating during the inspection. The catalyst monitor for EUENGINE4 indicated the pre-catalyst temperature was 808 degrees Fahrenheit and the post-catalyst temperature was 764 degrees Fahrenheit. The catalyst monitor for EUENGINE5 indicated the pre-catalyst temperature was 857 degrees Fahrenheit and the post-catalyst temperature was 717 degrees Fahrenheit.

FGENGINES2 SC VI. 9 requires recording of the following critical operating parameters every four hours of engine operation, when the engine is running, on the daily Engine/Compressor log sheets:

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

Mr. Kotwicki provided a print-out of the ignition timing, engine speed, load torque, manifold air pressure, and air temperature recorded for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13) to demonstrate continuous monitoring. I inspected and observed that each engine in FGENGINES2 was equipped with a monitoring system that displays operating parameters such as torque, engine speed, fuel flow, inlet manifold air pressure, ignition timing, and horsepower. EUENGINE4 and EUENGINE5 were the only engines in FGENGINES2 operating during the inspection. I observed the monitoring system on

EUENGINE4 and noted the engine was operating at 936 rpm and 98 percent torque. I observed the monitoring system on EUENGINE5 and noted the engine was operating at 860rpm and 42 percent torque.

FGENGINES2 SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations to GC 21 and 22 were reported in 2016.

Semi-annual and annual deviation reports, required in FGENGINES1 SC VII. 2. and 3, were received by AQD on time (March 9, 2017). One deviation was reported. The deviation was reported was failure to submit the test report for FGENGINES2 within 60 days of last day of testing. DTE said the testing group reviewed and modified their submittal process to ensure this doesn't happen again.

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 according to the ROP.

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 FGENGINES2 in accordance with the 40 CFR 63 Subpart ZZZZ 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 4-6, 2016) 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 (%)	**99.4**	**98.7**	**96.1**

DTE is required to implement and maintain a plan that describes how emissions will be minimized during all startups, shutdowns and malfunctions is required per FGNESHAPZZZZ SC III.1. The plan shall incorporate requirements listed in 40 CFR 63.6(e)(3). A copy of the startup, shutdown plan, and malfunction plan was submitted with the ROP application in March 2017. Deviations from the emission or operating limitations that occur during a period of startup, shutdown, or malfunction are not violations if it is demonstrated that the startup, shutdown and malfunction plan was implemented.

FGNESHAPZZZZ SC III.3. requires the permittee be in compliance with the applicable emission and operating limitations at all times except during periods of startup, shutdown and malfunction. Mr. Kotwicki stated the only deviations were reported in the 2016 semi-annual an annual report. Based on the report it appears the only deviation was failure to submit the CO test report with 60 days of the test.

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.

Minimizing the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to 40 CFR 63, Subpart ZZZZ apply is required in FGNESHAPZZZZ SC III. 5. The time spent at idle during startup is limited to 25 minutes, at which time an alarm will sound and the engine will shut down.

FGNESHAPZZZZ SC IV. 1. requires the company operate the catalyst inlet temperature between 450°F-1350°F. Catalyst temperature is monitored continuously when operating. Mr. Kotwicki provided a print-out of the pre and post catalyst temperature recorded for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13) to demonstrate continuous monitoring of catalyst inlet temperature. Mr. Kotwicki also provided records of the catalyst inlet temperatures, recorded at 15 minute intervals for EUENGINE4, EUENGINE5, and EUENGINE6 between October 7, 2016 and October 8, 2016 (attachment 18). Catalyst temperature and pressure alarms sets were provided by Mr. Kotwicki (attachment 14). According to this document, the low temperature shutdown for each catalyst is set at 648 degrees Fahrenheit and the high temperature shutdown is set at 950 degrees Fahrenheit. The records provided by DTE and my observations during the inspection appear to indicate the catalysts controlling the engines in FGNESHAPZZZZ are operating within the 450°F-1350°F range set forth in FGNESHAPZZZZ SC IV. 1.

FGNESHAPZZZZ SC VI. 1. requires a continuous parameter monitoring system that continuously monitors the at a minimum the; operation and maintenance requirements in 40 CFR 60.8 (c), a quality control program described in 40 CFR 63.8(d), performance evaluations described in 40 CFR 63.8(e),or an alternative monitoring method may be requested and approved pursuant to 40 CFR 63.8(f). The Electrical Controls Group at DTE is responsible for calibrating the CPMS in accordance with the aforementioned requirements. According to the semi-annual and annual report there have been no times when the CPMS has been out of control.

Continuous monitoring and recording of the inlet temperature, using a properly installed, maintained, and operated device, of the catalytic oxidizers for FGENGINES2 is required per FGNESHAPZZZZ SC VI. 2. The catalyst temperature is monitored continuously when operating. Mr. Kotwicki provided a print-out of the pre and post catalyst temperature recorded for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13) to demonstrate continuous monitoring of catalyst temperature. Mr. Kotwicki also provided records of the catalyst inlet temperatures, recorded at 15 minute intervals for EUENGINE4, EUENGINE5, and EUENGINE6, between October 7, 2016 and October 8, 2016 (attachment 17). EUENGINE4 and EUENGINE5 were the only engines in FGENGINES2 operating during the inspection. The catalyst monitor for EUENGINE4 indicated the pre-catalyst temperature was 808 degrees Fahrenheit and the post-catalyst temperature was 764 degrees Fahrenheit.

Compliance with the testing/sampling requirements in FGNESHAPZZZZ were evaluated in FGENGINES1 and FGENGINES2.

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. Records of the monthly pressure drop for each catalyst is required per FGNESHAPZZZZ SC VI.5. Mr. Kotwicki provided a print-out of the catalyst pressure drop recorded for each engine in FGENGINES2 in January, April, and March 2017 (attachment 13) to demonstrate continuous monitoring of catalyst pressure drop. Mr. Kotwicki also provided records of the monthly average pressure drop across each catalytic oxidizer for October 1, 2016 through March 1, 2017 (attachment 17). I inspected and observed that each engine in FGENGINES2 was equipped with a monitoring system that continuously monitors and displays the pressure drop. EUENGINE4 and EUENGINE5 were the only engines in FGENGINES2 operating during the inspection. I observed the monitoring system on EUENGINE4 and noted the pressure drop was 1.6 inches water. I observed the monitoring system on EUENGINE5 and noted the pressure drop was 1.2.

FGNESHAPZZZZ SC VI. 4. allows for the use of CEMS that monitors and records the CO and with the O2 or CO2 at the inlet and outlet of the control device in lieu of a CPMS. This condition does not appear to apply to EUENGINE4, EUENGINE5, and EUENGINE6 because DTE is using a CPMS.

SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations to GC 21 and 22 were reported in 2016.

Semi-annual and deviation reports, required in FGNESHAPZZZZ SC VII. 2. and 3, were received by AQD on time (March 9, 2017).

FGNESHAPZZZZ SC VII.4. requires submittal 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 report submitted by Mr. Kotwicki for January 1, 2016 through December 31, 2016 there was a statement that there were no periods during which the CPMS was out of control.

SC VII. 5. 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.

FGNESHAPZZZZ SC VII. 6 through 10 require notifications required 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) be submitted on time. Records of 40 CFR 63 Subpart ZZZZ initial notifications for FGNESHAPZZZZ are on file at the AQD office.

<u>FGINDIRECTHEATERS1 and FGINDIRECTHEATERS2</u>
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. The nameplates stated that EUINDHEATER1, EUINDHEATER2, EUINDHEATER3 are Maxon Model 487M. I did not observe the nameplate on EUINDHEATER4. EUINDHEATER1, EUINDHEATER2, EUINDHEATER3, and EUINDHEATER4 each have two, 5 MMBtu 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 19). 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 2013 to March 2017. The highest 12-month rolling NOx emissions reported was 4.13 tons. The highest reported CO emissions was 2.65 tons.

Mr. Kotwicki provided NOx and CO emission records for EUINDHEATERS2 (attachment 19). 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 was 1.44 pounds/hour and the highest reported CO emissions was 0.93 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 19). 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 63.05 million standard cubic feet between January 2016 and March 2017, 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.

FGINDIRECTHEATERS1 SC VII. 1. and FGINDIRECTHEATERS2 SC VII.1. require prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations to GC 21 and 22 were reported.

Semi-annual and deviation reports, required in EUINDHEATERS1 and EUINDHEATERS2 SC VII. 2. and 3, were received by AQD on time (March 9, 2017). No deviations were reported for EUINDHEATERS1 and EUINDHEATERS2.

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.

FGTANKS

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. The emissions from the tanks are controlled using an enclosed flare or the direct fired heater.

FGHCTANKS SC III. 1. requires the DTE properly maintain and operate a flame sensor for the pilot flame on the enclosed flare. A flare 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. The thermocouple, which measures the flare temperature, is checked and calibrated once a year. 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 shall 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.

FGTANKS SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations were reported for FGTANKS.

Semi-annual and deviation reports, required in FGTANKS SC VII. 2. and 3, were received by AQD on time (March 9, 2017). No deviations were reported for FGTANKS.

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

BOILERS

I inspected seven boilers at Washington 10 Compressor Station. Two of the boilers were rated at 1 MMBtu/hr and the other five the rating was 2 MMBtu/hr. The boilers are used to heat fuel gas before it goes into the engines and to heat buildings in the winter. It appears these boilers are exempt from the requirement of R336.1201 to obtain a permit to install per R336.1282(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. It appears these boilers are not subject to the New Source Performance Standards Subparts D, Da, Db, and Dc because the rated heat capacity is less than 10 MMBtu/hr. 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.

COLD 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 SDS of the solvent used, as required by FGCOLDCLEANERS SC VI.2 were provided by Mr. Kotwicki during the August 2016 inspection. Mr. Kotwicki stated DTE may be switching to a non-VOC containing cleaner in the near future. 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.

FGCOLDCLEANERS SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations were reported for FGCOLDCLEANERS.

Semi-annual and deviation reports, required in FGCOLDCLEANERS SC VII. 2. and 3, were received by AQD on time (March 9, 2017). No deviations were reported for FGCOLDCLEANERS.

FGRULE285(mm)

FGRULE285(mm) pertains to routine and emergency venting of natural gas from transmission and distribution systems or field gas from gathering lines. There is an emergency shut-down vent for each engine, each pipeline, and the dehydration unit.

FGRULE285(mm) SC VII. 1. requires prompt reporting of deviations pursuant to General Conditions (GC) 21 and 22 of Part A. No deviations were reported for FGRULE285(mm).

Semi-annual and deviation reports, required in FGRULE285(mm) SC VII. 2. and 3, were received by AQD on time (March 9, 2017). No deviations were reported for FGRULE285(mm).

CONCLUSION

Based on the information I gathered during the inspection, I determined that DTE Washington 10 Compressor Station appears to be in compliance with MI-ROP-N3391-2012c and the evaluated air quality rules and regulations.

NAME K. Kelly DATE 5/3/17 SUPERVISOR SK