

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

N294050912

|                                                                                                                                            |                               |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------|
| FACILITY: DCP Antrim Gas LLC                                                                                                               |                               | SRN / ID: N2940           |
| LOCATION: 6250 OLD STATE RD, JOHANNESBURG                                                                                                  |                               | DISTRICT: Gaylord         |
| CITY: JOHANNESBURG                                                                                                                         |                               | COUNTY: OTSEGO            |
| CONTACT: Chad Winn , Senior Environmental Specialist                                                                                       |                               | ACTIVITY DATE: 10/07/2019 |
| STAFF: Sharon LeBlanc                                                                                                                      | COMPLIANCE STATUS: Compliance | SOURCE CLASS: MAJOR       |
| SUBJECT: scheduled site inspection for FY 2020 conducted in conjunction with stack test observations conducted 10/7/2019-10/9/2019.<br>sgl |                               |                           |
| RESOLVED COMPLAINTS:                                                                                                                       |                               |                           |

On October 7-9, 2019, AQD District Staff conducted a scheduled site inspection of the DCP Antrim Gas, LLC South Chester Antrim Carbon Dioxide (CO2) Removal Facility. The referenced activities were conducted in conjunction with stack test activities for four plant heaters and 2 turbines associated with the site. The referenced facility is located at 6250 Old State Road, Johannesburg, Otsego County, Michigan (N2940). Facility operations are conducted under Renewable Operating Permit (ROP) MI-ROP-N2940-2015 issued on July 6, 2015, which expires on July 6, 2020. A complete ROP renewal application is due on or before January 6, 2020.

AQD District Staff met with the following DCP staff at the time of the site visit to discuss changes and operational practices at the Facility:

- Chad Winn, (DCP Environmental contact for the site),
- Justin Kucharek (DCP), as well as
- multiple operators onsite at the time of the visit.

Supplemental information required to determine compliance was requested from DCP Midstream, LP (AKA DCP) Environmental Staff.

The most recent scheduled site inspection was conducted on May 24, 2018, one compliance issue was identified as a result of the full compliance evaluation and involved recordkeeping activities associated with EUENGINE1 and EUENGINE2 (FGENGINES). The Violation Notice (VN) was resolved on June 21, 2019.

**LOCATION**

Located in South Chester Township, Otsego County, Johannesburg, Michigan, the facility is located at the NE corner of Turtle Lake and Old State Roads. Note that the Otsego County Property Records identified the following properties adjacent to the Facility:

- DTE Michigan Holdings, Inc. (West),
- CORE Midstream LLC (West),
- Wilderness-Chester Gas Process (North), and

To the south across Old State Road, as well as to the east and west are State of Michigan undeveloped properties. The ANR South Chester Pipeline Facility (B7219) is located less than ¼-mile to the east of the Facility on the south side of Old State Road.

The CORE Midstream LLC Facility is reported to take part of the CO2 produced by the Facility and puts it “downhole”. Mr. Bennett, Facility Manager had previously reported that this is not a contracted agreement, that the NG producers actually “own” the NG, including the CO2 removed. CORE Midstream deals with the producers directly, and that the quantity of CO2 they receive reflects those agreements.

It was noted during the May 24, 2018, inspection that the Wilderness- Chester Facility to the north of the site has been decommissioned, the buildings and equipment formerly associated with it removed.

## FACILITY

Weather conditions at the time of the site inspection consisted of sunny with scattered clouds, temperatures in the 50s-60s. Some scant steam plumes associated with amine process stacks were visible but dissipated quickly. No VEs were noted.

Site Activities - Operations at the South Chester Antrim CO2 Removal Facility consist of removal of high concentrations of CO2 from Antrim Formation natural gas (NG) by an absorption treating process which utilizes amine. Higher CO2 concentrations dilute the NG and reduce the heating value of the gas and increases the risk of internal corrosion problems in transmission and storage facilities. The CO2 concentration of the natural gas is reduced to customer sales requirements and the Michigan Public Service Commission stipulations.

Incoming gas has been preprocessed to remove hydrocarbons, hydrogen sulfide and entrained water below pipeline quality. Records included in the September 13, 2019, submittal for the referenced flexible group, included a copy of a "Firm Gas Treating Agreement" between DCP Antrim Gas LLC and a blacked-out customer. A review of the agreement indicated that the gases would contain no more than ¼ grain of hydrogen sulfide.

Energy for the Facility at the time of the inspection was provided by two Solar turbines (EUTUR01 and EUTUR02).

Facility staff report that as the Antrim Formation is depleted over time that higher concentrations of CO2 have been noted. It was also discussed that some locations on the west side of the State have identified H2S concentrations where previously none had been associated with the Antrim gas.

Equipment/Buildings - The Facility is fenced, gated and consists of 12 buildings which house not only process equipment for 6 amine plants, but staff offices, the maintenance shop, and motor control centers for each plant. No changes in process, or new processes are reported for the Facility. In addition, only maintenance activities have been conducted onsite.

EUPLANT6, also referred to by the Facility as the North Chester Turtle Lake Plant or EUCHESTER10 was acquired from DTE and was added to the Facility as part of the most recent ROP Renewal. Incoming gas is treated initially at EUPLANT6. EUPLANT6 is not a part of FGPLANTRA and is reported separately in semi-annual and annual reporting.

At the time of the October 7-9, 2019, site inspection. EUPLANT1 was not in operation. DCP Staff reported that the coolers associated with the amine plant were not operational, and that it was unclear if the plant would be restored at any time in the near future.

Facility Changes - All four engines associated with FGENG5678, have been removed from site. Removal activities were reported to be completed on or before April 2019. As the engines were no longer present at the time of the inspection their compliance status is based on information provided as part of semi-annual and annual submittals and has been incorporated into this compliance evaluation.

Engines 1 & 2 (FGENGINES) have been disconnected and rendered inoperable as of September 2019. As the engines were disconnected and EUPLANT6 non-operational at the time of the inspection, compliance has been based on evaluation of data provided as part of the semi-annual and annual reporting submitted.

The six Reciprocating Internal Combustion Engines (RICE) are being replaced with a turbine (EUTUR03) and a new emergency generator (EUEMERGEN01). Both units have been permitted under Permit to Install 162-18, issued on March 4, 2019. Neither were operable at the time of the inspection and testing activities and have not been evaluated for compliance.

## PERMITTING

A review of records indicate that activities onsite were initiated as early as 1991, with further permitted expansions of the facility through to 1997. Initial permits were issued to Antrim Limited Partnership, after 1994 permits associated with the facility were issued to MCN Oil & Gas Company, MCNIC Pipeline & Processing, DTE Michigan Holdings, Inc., CMS Antrim Gas Company and CMS Antrim Gas, LLC.

Records indicate that 8 permits were rolled into the existing ROP, five other permits were voided, as were three permit applications. As noted above, PTI 162-18 was issued on March 4, 2019, for installation of one turbine (EUTUR03), one emergency generator (EUEMERGEN01) and one change CO2 emission limits for EUPLANT6AMINE from daily to monthly (SC I.1).

**REGULATORY**

Classifications based on Potential to Emit (PTE) and other significant comments:

| PARAMETER | CLASSIFICATION  | COMMENT                                                |
|-----------|-----------------|--------------------------------------------------------|
| NOx       | Major           | Potential for Significant Deterioration (PSD) for NOx* |
| SO2       | Minor           |                                                        |
| CO        | Synthetic Minor |                                                        |
| Pb        | Minor           |                                                        |
| PM        | Minor           |                                                        |
| VOC       | Synthetic Minor |                                                        |
| HAPs      | Area            |                                                        |

\* In 2009, the source acquired adjacent property owned by MichCon Pipeline Company. It was the combined sources that resulted in the Facility being designated a PSD Facility.

**Applicable Federal Requirements:**

| EMISSION UNIT                                                                                                              | 40 CFR SUBPART                      | TITLE                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Source                                                                                                                     | Part 70                             | State Operating Permit Program                                                                                |
| EUPLANT1HEATER, EUPLANT2HEATER, EUPLANT3HEATER, EUPLANT4HEATER, EUPLANT5HEATER, EUPLANT1HEATER, EUPLANT6HEATER (FGPLANTPH) | 40 CFR Part 60, Subparts A and Dc   | National Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units        |
| EUTUR01, & EUTUR02 (FGTURB1AND2)                                                                                           | Part 60, Subpart A and GG           | National Standards of Performance for Stationary Gas Turbines                                                 |
| EUTUR03                                                                                                                    | 40 CFR, Part 60, Subpart A and KKKK | National Standards of Performance for Stationary Combustion Turbines (supercedes subpart GG)                  |
| EUENGINE1, EUENGINE2, FGENGINES, EUGEN06, EUGEN07, EUGEN08, EUGEN09, FGGEN6789 & FGMACTZZZZ)                               | 40 CFR Part 63, Subpart A and ZZZZ  | National Emission Standards for HAPs (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) |
| EUEMERGEN01                                                                                                                | 40 CFR Part 63, Subpart A and ZZZZ  | National Emission Standards for HAPs (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) |
| EUEMERGEN01                                                                                                                | 40 CFR Part 60, Subpart A and IIII  | National Standards of Performance for Stationary Combustion Ignition (CI) Internal Combustion Engines         |
| EUP1DEHY, EUP2DEHY, EUP3DEHY, EUP4DEHY,                                                                                    | 40 CFR Part 63, Subparts A and HH   | Glycol Dehydrators Area Source MACT                                                                           |

|                                      |  |  |
|--------------------------------------|--|--|
| EUP5DEHY, &<br>EUP6DEHY,<br>(FGGD01) |  |  |
|--------------------------------------|--|--|

The referenced facility does not process, or store petroleum liquids onsite and therefore appears to not be subject to 40 CFR Part 60 (New Source Performance Standards AKA NSPS) Subparts;

- K, Ka or Kb (Storage vessels for Petroleum Liquids);
- KKK (Equipment Leaks of VOC from onshore NG Processing Plants);
- VV (Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry);

Review of a self-initiated site inspection report dated October 11, 2016 identified the facility as subject to 40 CFR Part 98, Subpart W, as an onshore NG Processing Facility under which is required equipment leak detection and compressor monitoring activities. At the time of the referenced inspection, as well as at the time of report preparation, the AQD has not been delegated authority for the referenced subpart.

The previously operating engines have manufacture dates prior to 2006, which would exempt them from being subject to NSPS subparts IIII and JJJJ for Compression Ignition (CI) RICE and Spark Ignition (SI) Rice, respectively. However, EUEMERGEN01 was determined at the time of permitting to be subject to NSPS subpart IIII for CI RICE and is documented in above table.

Subpart OOOO would apply to onshore affected facilities that are constructed, modified or reconstructed after August 23, 2011. Based on available information it appears that the referenced subpart is not applicable at this time but that future changes may be subject to the referenced subpart.

**EQUIPMENT**

The referenced facility consists of six process plants for removing high concentrations of CO2 from Antrim formation NG using an absorption treatment process utilizing methyldithanolamine (MDEA), also referred to as amine. Each plant contained one NG fired media heater (EUPLANT#HEATER), one MDEA process (EUPLANT#AMINE), and one Triethylene glycol dehydrator (EUP#DEHY).

In addition to the six CO2 removal plants the facility has:

- Two decommissioned, NG-fired RICE generator engines,
- Two NG-fired 930 HP Caterpillar 399 TA engines with 3-way catalysts (EUENGINE1, EUENGINE2)
- Two NG-fired 3.5 MW, Centaur 40-T4700 turbines. (EUTUR01 and EUTUR02)
- 

As previously reported installation dates reported for above referenced equipment onsite from 1991 through 1997. Additional equipment onsite to be installed onsite and permitted under 162-18 include:

- One diesel-fired Emergency Generator (EUEMERGEN01), and
- One NG-fired Centaur 50 turbine with 4.0 MW nameplate capacity and SoLoNOx configuration (EUTUR03)

The two above referenced pieces of equipment were in the process of being installed at the time of the October 7-9, 2019 site visit, and permit conditions associated with the equipment do not apply at the time of the evaluation.

Flexible groups (FGs) are based on the type of equipment rather than plant numbers. MDEA processes 1-5 (EUPLANT1AMINE through EUPLANT5AMINE) make up the FGPLANTRA. MDEA process plant 6 is also referred to by the Facility as the” North Chester Turtle Lake Plant” and was reported to use FGENGINES as their power source.

Based on discussions with staff at the time of the October 7-9, 2019, site inspection, FGENGINES have been decommissioned and Plant 6 is not in operation. Plant 6 will return to operation upon completion

of installation and operation of EUTUR03. The Flexible Groups are summarized below:

| EMISSION UNIT                                                                                     | FLEXIBLE GROUP |
|---------------------------------------------------------------------------------------------------|----------------|
| EUENGINE1, EUENGINE2 (decommissioned)                                                             | FGENGINES      |
| EUGEN06, EUGEN07, EUGEN08 and EUGEN09 (removed)                                                   | FGGEN6789      |
| EUENGINE1, EUENGINE2, EUGEN06, EUGEN07, EUGEN08 and EUGEN09 (decommissioned and removed)          | FGMACTZZZZ     |
| EUTUR01 and EUTUR02                                                                               | FGTURB1AND2    |
| EUPLANT1AMINE, EUPLANT2AMINE, EUPLANT3AMINE, EUPLANT4AMINE and EUPLANT5AMINE                      | FGPLANTRA      |
| EUPLANT1HEATER, EUPLANT2HEATER, EUPLANT3HEATER, EUPLANT4HEATER, EUPLANT5HEATER and EUPLANT6HEATER | EUPLANTPH      |
| EUP1DEHY, EUP2DEHY, EUP3DEHY, EUP4DEHY, EUP5DEHY and EUP6DEHY                                     | FGGD01         |

Other equipment identified onsite includes:

- Four 7,000 BTU/hr, NG-fired shop space heaters (EUSHOPHEAT1 through EUSHOPHEAT4),
- One 140,000 BTU/hr, NG-Fired, office building space heater (EUBUILDINGHEAT1), and
- One 105,000 BTU/hr, NG-fired, office building space heater (EUBUILDINGHEAT2).

The six above referenced heaters appear to be exempt from permitting under Rule 282 (2)(b)(i) for sweet gas fired, space heating with rated capacity of <50,000 BTU/hour.

**REPORTING**

In addition to prompt reporting of deviations pursuant to General Condition 21 and 22 under MI-ROP-N2940-2015 the Facility is required to both semi-annual and annual reporting. Reports received for the periods of June 30, 2018 through June 30, 2019, included sufficient supplemental information to determine compliance with permit conditions. Reporting required under the ROP for operational EUs/FGs include the following:

| EMISSION UNIT                                                                                      | SEMI-ANNUAL (GC 23 and SC VII.2) | ANNUAL (GC 19 & 20 and SC VII.3) | OTHER REPORTING                                                            |
|----------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------------------------------------------------|
| EUPLANT6AMINE                                                                                      | Y                                | Y                                |                                                                            |
| FGENGINES (EUENGINE1 & EUENGINE2) (decommissioned)                                                 | Y                                | Y                                |                                                                            |
| FGMACTZZZZ (EUENGINE1, EUENGINE2, EUGEN06, EUGEN07, EUGEN08 & EUGEN09) (decommissioned or removed) | Y                                | Y                                | 40 CFR 63.6645 and Part 63 Subpart A (SC VII.4) and Subpart ZZZZ (SC IX.1) |
| FGTURB1AND2 (EUTUR01 and EUTUR02)                                                                  | Y                                | Y                                |                                                                            |
| FGGEN6789 (EUGEN06, EUGEN07, EUGEN08 and EUGEN09) (removed)                                        | Y                                | Y                                |                                                                            |
| FGPLANTRA (EUPLANT1AMINE, through EUPLANT5AMINE)                                                   | Y                                | Y                                |                                                                            |

|                                                         |   |   |                      |
|---------------------------------------------------------|---|---|----------------------|
| FGPLANTPH<br>(EUPLANT1HEATER through<br>EUPLANT6HEATER) | Y | Y | Subpart Dc (SC IX.1) |
| FGGD01 (EUP1DEHY<br>through EUP6DEHY)                   | Y | Y | Subpart HH           |

**TESTING**

Per ROP conditions, testing is conducted every 5 years. With the exception of EUENGINE1 and EUENGINE2 (FGENGINES) which were tested October 23, 2018. testing activities were conducted in 2014. With removal and decommissioning of the RICE previously operated, supplemental verification testing is not required. Emissions testing required under MI-ROP-N2940-2015 For operational EUs/FGs includes:

| EMISSION UNIT                                                                 | PARAMETER | EMISSION LIMIT                                                            | TESTING FREQUENCY      | RECENT TESTING                                 |
|-------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|------------------------|------------------------------------------------|
| FGTURB1AND2<br>(EUTUR01 and<br>EUTUR02)                                       | NOx       | 167 ppm,<br>(corrected to<br>15% O2 )(SC I.1)<br>and 17.1 pph (SC<br>I.2) | every 5 years<br>(V.1) | June 5, 2014,<br>October 7-9,<br>2019          |
| FGTURB1AND2<br>(EUTUR01 and<br>EUTUR02)                                       | CO        | 50 ppm,<br>(corrected to<br>15% O2)(SC I.3)<br>and 5.3 pph (SC<br>I.4)    | every 5 years<br>(V.1) | June 5, 2014<br>October 7-9,<br>2019           |
| EUPLANT1HEATER                                                                | NOX       | 5.6 pph (SC I.1)                                                          | every 5 years<br>(V.1) | June 25, 2014<br>October 7-9,<br>2019          |
| EUPLANT2HEATER,<br>EUPLANT3HEATER,<br>EUPLANT4HEATER<br>and<br>EUPLANT5HEATER | NOx       | 5.2 pph (SC I.2)                                                          | every 5 years<br>(V.1) | June 23 – 25,<br>2014,<br>October 7-9,<br>2019 |
| EUPLANT3HEATER,<br>EUPLANT4HEATER<br>and<br>EUPLANT5HEATER                    | CO        | 3.0 pph (SC I.4)                                                          | every 5 years<br>(V.2) | June 23 – 25,<br>2014,<br>October 7-9,<br>2019 |

A review of District Files indicated that test protocols (SC VII.4), seven-day notifications (SC VII.5) and test reports (SC VII.6) appear to have been submitted in a timely manner in compliance with permit conditions.

Documentation in the District Files reported that the May and June 2014 CO test results of Turbine 1 of FGTURB1AND2 exceeded the CO lb/hr limit at that time. A VN was issued on August 21, 2014. The Facility response dated September 10, 2014, included a schedule of compliance which included re-permitting of the referenced EU with a higher CO emission limit. The VN was resolved on March 19, 2015.

**STACKS**

In order to determine compliance with stack dimensions in the ROP, Facility staff conducted As-built review and where necessary actual field measurement to confirm dimensions as part of the 2018 FCE conducted. Stack/Vent restrictions (VIII) for exhaust gases for operational EUs/FGs onsite include:

| EU/FG | Maximum Exhaust | Minimum Height | Compliant | ROP Stack Dimensions |
|-------|-----------------|----------------|-----------|----------------------|
|-------|-----------------|----------------|-----------|----------------------|

|                | Dimensions<br>(inches) | Above Land<br>Surface<br>(feet) |     |                  |
|----------------|------------------------|---------------------------------|-----|------------------|
| EUPLANT6AMINE  | 12                     | 50                              | Yes | 11" X 50'        |
| EUTUR01        | 48                     | 34                              | Yes | 36" X 34'6"      |
| EUTUR02        | 48                     | 34                              | Yes | 36" X 34'6"      |
| EUPLANT1AMINE  | 16                     | 75                              | Yes | 15.25" X 76.6'   |
| EUPLANT2AMINE  | 16                     | 75                              | Yes | 15.25" X 75'     |
| EUPLANT3AMINE  | 16                     | 75                              | Yes | (5.25" X 75'     |
| EUPLANT4AMINE  | 16                     | 75                              | Yes | 5.25" X 75'      |
| EUPLANT5AMINE  | 16                     | 75                              | Yes | 15.25" X 75'     |
| EUPLANT1HEATER | 72                     | 100                             | Yes | 11" X 106'       |
| EUPLANT2HEATER | 72                     | 95                              | Yes | 11.5" X 95' 2.5" |
| EUPLANT3HEATER | 72                     | 95                              | Yes | 11.5" X 95' 2.5" |
| EUPLANT4HEATER | 72                     | 95                              | Yes | 11.5" X 95' 2.5" |
| EUPLANT5HEATER | 72                     | 95                              | Yes | 11.5" X 95' 2.5" |

**COMPLIANCE**

VN History - VNs were issued in August 2014 as a result of failed CO verification testing for EUTURB01 of FGTURB1AND2, and in September 2016 for various compliance issues many related to implementation of the MAP for FGENGINES. Both VNs were resolved.

Supplemental data reviewed as part of the May 24, 2018 scheduled site inspection, identified a non-compliance issue for failure to provide NOX emission records for FGENGINES Monitoring/Recordkeeping Condition SC VI.1. The VN was issued on August 13, 2018 and resolved on June 4, 2019, as a result of stack testing activities conducted on October 23, 2018.

The compliance status for the facility has been based on information provided during the October 7-9, 2019, site inspection, as well as on supplemental data annual and semi-annual reports submitted upon request or to meet permit requirements identified under MI-ROP-N2940-2015. Information for the period of July 1, 2018 through June 30, 2019 was evaluated as part of the compliance determination.

EUPLANT6AMINE – The emission unit is also known as the “Plant 6 MDEA CO2 Process”, “North Chester Turtle Lake Plant” or former “EUCHESTER10”. NG is processed at a rate of 35 MMSCFD. The ROP contains no testing requirements for this EU.

**Material/Operational Limits**– Limits for EUPLANT6AMINE include a process in limit of no more than 4,950,000 cubic feet of CO2 in the EU per day (SC III.1) and CO2 emissions of no more than 574,250 lbs per day (SC I.1). Data provided as part of semi-annual and annual compliance submittals confirmed compliance with the referenced limits.

**Design/Operational Restrictions** – Under the ROP, the permittee is required to install, calibrate, maintain and operate a device to monitor and record;

- NG flow entering EUPLANT6AMINE (continuously) (SC IV.1),
- CO2 content of NG entering EUPLANT6AMINE (SC IV.2).

Data provided by the Facility clearly indicated that CO2 content and NG flow are continuously monitored by the Facility in compliance with permit conditions.

**Monitoring/Recordkeeping** – The permittee shall monitor and record:

- The flow rate of natural gas entering the plant on a continuous basis (SC VI.1),
- The CO2 content of the NG entering the EU on a daily basis (SC VI.2),
- The calculated amount of the CO2 processed for the calendar day (SC VI.4), and
- The calculated CO2 emission rate from EUPLANT6AMINE for each calendar day (SC VI.3).

Data for the 2018 annual, and 2019 first semiannual submittals were reviewed as part of the compliance

evaluation. Data provided confirmed compliance. Random data points noted during the review reported the following:

| DATE                  | NG FLOW RATE<br>(per day)<br>(SC VI.1) | CO2<br>CONTENT<br>(per day)<br>(SC VI.2) | CO2 Processed<br>(cubic feet per day)<br>(SC VI.4) | CO2 EMISSION<br>RATE (lb per day)<br>(SC VI.3) |
|-----------------------|----------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------------|
| July 1, 2018          | 15651                                  | 19.2243                                  | 3,004,000                                          | 339,749.31                                     |
| September 30,<br>2018 | 15112                                  | 19.8089                                  | 2,989,000                                          | 338,052.83                                     |
| December 30,<br>2018  | 15581                                  | 19.6054                                  | 2,958,000                                          | 334,546.76                                     |
| March 31, 2019        | 0                                      | 19.5277                                  | 0                                                  | 0                                              |
| June 30, 2019         | 0                                      | 19.6672                                  | 0                                                  | 0                                              |
| LIMITS                | NA                                     | NA                                       | 4,950,000 cubic feet<br>per day. (SC III.1)        | 574,250 lb per day<br>(SC I.1)                 |

**Reporting -** Prompt reporting of deviations pursuant to GC 21 & 22 (SC VII.1) as well as semi-annual and annual reporting requirements (SC VI.2 & VII.3) have been addressed previously in this report.

**FGENGINES -** This FG includes two now decommissioned, NG-fired, 930 HP Caterpillar 399 TA, rich-burn engines equipped with 3-way catalysts (EUENGINE1 and EUENGINE2) (AKA Turtle Lake #1 south and Turtle Lake #2 north). No material limits are associated with this FG.

**Operational Limits –** The engines (EUENGINE1 and EUENGINE2) of FGENGINES shall not be operated unless the following has been installed, maintained and operated in a satisfactory manner:

- 3-way catalysts for each engine, (SC III.1)
- A calibrated device to continuously monitor and record the flow rate of NG being burned in FGENGINES, (SC III.5),
- Temperature gauge or thermocouple to monitor the operation of the catalyst, (SC III.3)
- A differential pressure gauge or manometer to monitor the operation of each catalyst (SC III.4)

As part of the May 24, 2018 site inspection, AQD Staff had confirmed the installation of the above referenced equipment in compliance with the permit conditions.

**Emission Limits -** Emission limits associated with FGENGINES is limited to 18 tons/year of NOx based on a 12-month rolling time period and determined at the end of each calendar month (SC I.1). Emissions reported for the FG were reviewed for the period of July 1, 2018 through June 30, 2019.

| DATE                  | NOX<br>EMISSIONS<br>EUENGINE1<br>(TONS/YEAR) | NOX<br>EMISSIONS<br>EUENGINE2<br>(TONS/YEAR) | NOX<br>EMISSIONS<br>EUENGINE1 & 2<br>(TONS/YEAR) |
|-----------------------|----------------------------------------------|----------------------------------------------|--------------------------------------------------|
| June 30, 2018         | 0.31                                         | 17.47                                        | 17.78                                            |
| September 30,<br>2018 | 0.33                                         | 18.98                                        | 19.31*                                           |
| December 30,<br>2018  | 1.80                                         | 14.94                                        | 16.74                                            |
| March 31, 2019        | 3.09                                         | 10.08                                        | 13.17                                            |
| June 30, 2019         | 3.73                                         | 5.33                                         | 9.06                                             |
| LIMIT                 | NA                                           | NA                                           | 18 Ton/Yr<br>(rolling total)                     |

\*Note pre-October 24, 2018 emissions are based on June 26-27, 2014 stack test data. The data was

contested by the Facility, who were determining emissions using MAERS emission factors. As part of discussions with the Facility regarding the potential exceedance, the Facility committed to the October 2018 retesting of the EUs and future decommissioning of the units. Testing verified that the high emission factor for EUENGINE2 was significantly lower than the 2014 stack test data.

MAERS reported emissions for FG Engines for the previous calendar years are summarized below:

| CALENDAR YEAR | NOx EMISSION FACTOR             | NG USAGE (MMCF) | 12-MONTH ROLLING NOx TOTAL (TPY) |
|---------------|---------------------------------|-----------------|----------------------------------|
| 2018          | 1.5 lb/hr                       | 122             | 6.5                              |
| 2017          | 65.5 lb/MMCF (Hand Held Meter)* | 131.29          | 3.57 (14.7 using MAERS EF)       |
| 2016          | 2.254 E3 lb/MMCF (MAERS EF)     | 118.42          | 13.35                            |
| LIMIT         | NA                              | NA              | 18 TPY (SC I.1 and VI.1)         |

\* Data initially presented was comprised of handheld analyzer data generated during recent catalyst verification activities (September 9, 2016). The facility was notified that Michigan does not accept handheld analyzer data for purposes of determining emission factors.

**Testing Activities** – Incorporated as part of the most recent ROP, the permittee is required every 5 years to perform testing to establish emission factors for demonstration of compliance with annual NOx limits. (SC V.1) As previously indicated, testing was completed June 26 and 27, 2014, though testing was not required by permit at that time. The requirement for testing was not in effect until July 6, 2015. That the EUs associated with this FG are no longer operational, 2019 testing is not required at this time. Subsequent testing (October 23, 2018) was conducted to resolve a compliance issue with recordkeeping requirement SC VI.1.

EFs determined by the 2014 and 2018 testing of FG ENGINES include the following:

| DATE       | NOx EMISSIONS (lb/hr) | CO EMISSIONS (lb/hr) | EMISSION UNIT |
|------------|-----------------------|----------------------|---------------|
| 6/26/2014  | 0.08                  | 25.63                | EUENGINE1     |
| 10/23/2018 | 1.4                   | NA                   | EUENGINE1     |
| 6/27/2014  | 4.59                  | 33.72                | EUENGINE2     |
| 10/23/2018 | 0.10                  | NA                   | EUENGINE2     |

**Monitoring/Recordkeeping** – Under the ROP, the permittee is required to monitor and record:

- The permittee shall calculate and record monthly and 12-month rolling total NOx emissions using emission factors derived from the most recent stack test. (SV VI.1)
- NG-usage (continuous) of FG ENGINES (SC VI.2)
- Differential pressure across each 3-way catalyst (Monthly) (SC VI.4)
- Inlet and Outlet temperatures of each 3-way catalyst (Daily) (SC VI.5), and
- Perform and maintain records of all maintenance for each 3-way catalyst (SC VI.3)

Records provided by the Facility as part of their semi-annual and annual certification submittals confirmed that the above referenced records are maintained in compliance with permit requirements. Copies of daily log sheets for the engines confirmed that the required data is being recorded at minimum on a daily basis as required for SC VI.4 & 5).

Other required records for random dates within the period of July 1, 2018 and June 30, 2019, included the following for EUENGINE01:

| DATE | EUENGINE1 Differential Pressure (SC VI.4) | EUENGINE1 Inlet Temp (SC VI.5) | EUENGINE1 Outlet Temp (SC VI.5) |
|------|-------------------------------------------|--------------------------------|---------------------------------|
|      |                                           |                                |                                 |

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|                   |                             |      |                                   |
|-------------------|-----------------------------|------|-----------------------------------|
| January 14, 2019  | 3.6                         | 1010 | 1124                              |
| November 14, 2018 | 2.7                         | 967  | 1094                              |
| August 14, 2018   | 2.5                         | 998  | 1032                              |
| MAP RANGE         | +/- 2-inches from Baseline* | >650 | <1350, and higher than inlet Temp |

\* Baseline established 10/26/2018 is 3.0 inches water column.

Other required records for random dates within the period of July 1, 2018 and June 30, 2019, included the following for EUENGINE02:

| DATE              | EUENGINE2 Differential Pressure (SC VI.4) | EUENGINE2 Inlet Temp (SC VI.5) | EUENGINE2 Outlet Temp (SC VI.5)   |
|-------------------|-------------------------------------------|--------------------------------|-----------------------------------|
| January 14, 2019  | 1.2                                       | 966                            | 997                               |
| November 14, 2018 | 1.5                                       | 1002                           | 1041                              |
| August 14, 2018   | 1.8                                       | 987                            | 1000                              |
| MAP RANGE         | +/- 2-inches from Baseline*               | >650                           | <1350, and higher than inlet Temp |

\* Baseline established 10/26/2018 is 1.9 inches water column.

NG usage records for FGENGINES is monitored by Facility operators in part as “fuel pressure” to each unit, the data is collected electronically, and as part of daily logs sheets. The log sheets of which are now taken on “tablets”. Usage reported for each engine during the period of July 1, 2018 and June 30, 2019 included the following:

| DATE          | EUENGINE01 NG USAGE (MMCF) (SC VI.2) | EUENGINE02 NG USAGE (MMCF) (SC VI.2) |
|---------------|--------------------------------------|--------------------------------------|
| 01/18- 09/18  | 45.30                                | 45.30                                |
| 10/18 – 12/18 | 15.48                                | 15.48                                |
| 1/18 – 6/2019 | 20.98                                | 21.14                                |

The September 13, 2019 submittal package included various records for Engines associated with the Facility. These included fuel records, daily log sheets, maintenance records for the 3-way catalysts (SC VI.5), and Quad-Z maintenance records for Engines 1 & 2. A brief review of the daily log sheets for the two referenced engines indicate that in addition to engine operational parameters, that the appropriate catalyst parameters of temperature (pre and post catalyst) as well as differential pressure across the catalyst are recorded daily. Hour meter readings for each engine are reported at the end of each month.

Maintenance activities other than oil sampling for the two referenced engines (decommissioned September 3 & 4, 2019, respectively) included:

| ACTIVITY                                                                                          | DATE – ENGINE# 1                                                         | DATE – ENGINE# 2                                                       |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------|
| changed oil, filters, replaced plugs, checked belt and hoses, adjusted valves, changed O2 Sensors | July 31, 2018<br>October 11, 2018<br>February 12, 2019<br>April 24, 2019 | July 31, 2018<br>October 8, 2018<br>February 4, 2019<br>April 24, 2019 |
| replaced catalyst                                                                                 | October 12, 2018                                                         | NA                                                                     |
| cleaned and inspected catalyst                                                                    | NA                                                                       | October 12, 2018                                                       |
| High differential pressure –                                                                      | November 17, 2018                                                        | NA                                                                     |

|                        |                                |                                |
|------------------------|--------------------------------|--------------------------------|
| ice plug removed       | February 15, 2019              |                                |
| Down for Engine Repair | July 1, 2019<br>August 1, 2019 | July 1, 2019<br>August 1, 2019 |
| decommissioned date    | September 3, 2019              | September 4, 2019              |

Summaries submitted for GEN6, GEN7, GEN8 & GEN9

| ACTIVITY                                                                                          | DATE – ENGINE# 6 | DATE – ENGINE# 8 | DATE – ENGINE#9 |
|---------------------------------------------------------------------------------------------------|------------------|------------------|-----------------|
| changed oil, filters, replaced plugs, checked belt and hoses, adjusted valves, changed O2 Sensors | March 11, 2019   | March 12, 2019   | March 13, 2019  |
| replaced catalyst                                                                                 | NA               | NA               | NA              |
| cleaned and inspected catalyst                                                                    | NA               | NA               | NA              |
| High differential pressure – ice plug removed                                                     | NA               | NA               | NA              |
| decommissioned date                                                                               | April 10, 2019   | April 10, 2019   | April 10, 2019  |

Note that engine#7 was reported inoperable for the calendar years of 2017-2019. With decommissioning identified for engines 6,7,8 & 9 as having been completed April 10, 2019.

Included in the September 13, 2019, submittal package was a copy of the May 2019, “Annual Class Location Evaluation” for the RICE MACT. The referenced document indicated that an initial evaluation of the Facility was made in July 2012, and that subsequent evaluations were conducted in the month of May. The document identifies all “non-remote” DCP Facilities. The non-remote listing does not include any Michigan Facilities.

**Reporting –** As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions.

**Other Requirements-** FGENGINES is the only EU/FG which requires a Preventative Maintenance MAP (SC IX.1) (SC II.2). The referenced document as required by permit condition must identify the appropriate differential pressure (SC III.4) and temperature ranges (SC III.3) for proper operation. In addition, it must amongst other requirements identify corrective procedures or operational change that shall be taken in the event of a malfunction.

The referenced document was originally submitted by the Facility on April 20, 2011 and was approved by Gaylord Field Office AQD Staff on April 21, 2011. An updated MAP was prepared and submitted (December 16, 2016) as a result of compliance issues identified during the August 2016 compliance evaluation and identified in the September 19, 2016 VN. The updated MAP was approved by AQD District Staff on December 15, 2016. A review of operating parameters with respect to the PM/MAP include differential pressures across the catalyst, inlet and outlet temperatures, et al. Based on records reviewed and actions taken, it appears that the Facility is in general compliance with the PM/MAP for FGENGINES.

**FGMACTZZZZ** - This flexible group contains not only the two engines of FGENGINES (equipped with three-way catalyst) but also four NG-fired, four-stroke, lean burn, Caterpillar 3516, 1,150 HP generator engines located in a remote area. All six units are reported to be subject to 40 CFR, part 63, Subpart ZZZZ (NESHAP for RICE). No emission and/or material limits, or any associated verification testing are required for the FG. ROP conditions for this FG are those required for remotely located RICE.

**Operational Limits –** EUs within FGMACTZZZZ are required to be operated and maintained in a manner consistent with good safety and air pollution control practices (SC III.2). The practices will be according to either the manufacturer’s emission-related operation and maintenance instructions, or according to the permittee’s own maintenance plan for the operation and maintenance of the engines and pollution control devices consistent with good air pollution control practices for minimizing emissions. (SC III.3)

**In addition, the permittee is required to:**

- Minimize each engine's idle time during start-up and minimize the time needed for appropriate and safe loading of the engine (not to exceed 30 minutes) (SC III.4)
- Perform the following work practices every 2,160 hours of operation or annually (whichever comes first) (SC III.1)
  - o Change oil and filter, or utilize the oil analysis program
  - o Inspect spark plugs and replace as necessary
  
  - o Inspect all hoses and belts, replacing as necessary.

A review of RICE MACT records for the facility indicated the following:

| Emission Unit | SC III.1 Completion Dates                                                                                                                                                                     | Catalyst Inspection, Cleaning & Testing                                                                                          | Oil Sampling                                                                                                                                                                                                                                                                          |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ENG-1         | Jan. 4, 2017<br>March 30, 2017<br>June 26, 2017<br>Sept. 21, 2017<br>Dec 22, 2017<br>Feb. 14, 2018<br>May 1, 2018<br>July 31, 2018<br>October 11, 2018<br>February 12, 2019<br>April 24, 2019 | October 19, 2016,<br>Oct. 26, 2017<br>Nov 13, 2017<br>(replacement of catalyst)<br>October 12, 2018<br>(replacement of catalyst) | January 2, 2018<br>Feb. 28, 2018<br>June 4, 2018<br>July 2, 2018<br>August 6, 2018<br>September 4, 2018<br>November 1, 2018<br>December 3, 2018<br>January 2, 2019<br>March 4, 2019<br>April 24, 2019<br>May 1, 2019<br>June 3, 2019<br>decommissioned<br>Sept 3, 2019                |
| ENG-2         | Jan. 5, 2017<br>March 31, 2017<br>June 28, 2017<br>Sept. 22, 2017<br>Dec. 12, 2017<br>Feb 13, 2018<br>May 2, 2018<br>July 31, 2018<br>October 8, 2018<br>February 4, 2019<br>April 24, 2019   | October 19, 2016,<br>Oct. 19, 2017<br>October 12, 2018                                                                           | Jan. 2, 2018<br>Feb. 28, 2018<br>March 30, 2018<br>June 4, 2018<br>July 2, 2018<br>August 6, 2018<br>September 4, 2018<br>November 1, 2018<br>December 3, 2018<br>January 2, 2019<br>March 4, 2019<br>April 24, 2019<br>May 1, 2019<br>June 3, 2019<br>decommissioned<br>Sept 4, 2019 |
| GEN-06        | March 15, 2017<br>March 12, 2018<br>March 11, 2019                                                                                                                                            | Not Applicable *                                                                                                                 | Not Applicable**                                                                                                                                                                                                                                                                      |
| GEN-07        | Unit Inoperable/disabled                                                                                                                                                                      | Unit Inoperable/disabled                                                                                                         | Unit Inoperable/disabled                                                                                                                                                                                                                                                              |
| GEN-08        | March 13, 2017<br>March 13, 2018<br>March 12, 2019                                                                                                                                            | Not Applicable *                                                                                                                 | Not applicable **                                                                                                                                                                                                                                                                     |
| GEN-09        | March 14, 2017<br>March 14, 2018<br>March 13, 2019                                                                                                                                            | Not Applicable *                                                                                                                 | Not applicable**                                                                                                                                                                                                                                                                      |

\* catalyst cleaning and testing activities are only for ENG-1 and ENG-2, the generators have no pollution control devices associated with them.

\*\* Oil changed annually, meeting requirement, oil sampling program not required.

Data provided with respect to RICE MACT requirements confirmed general compliance.

**Monitoring/Recordkeeping** – RICE within this FG are required to meet the definition of remote stationary engine on the initial compliance date of October 19, 2013, will be re-evaluated of the status every 12 months (SC VI.1) and shall keep records of the initial and annual evaluations of the remote status (SC VI.2). If any RICE is determined to no longer meet the remote status, it shall comply with all requirements for non-remote, non-emergency, spark-ignition, four-stroke lean-burn and rich burn engines within one year (SC VI.2)

Initial evaluations were conducted by the company in July 2012 and annually in subsequent Julys. A review of the evaluation summaries and the companies’ comprehensive non-remote listing identified the Facility as remote.

**Reporting** - As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions.

**Other Requirements**- FGMACTZZZZ are required to comply with all applicable requirements of the NESHAP as specified in 40 CFR, Part 63, Subpart ZZZZ. Based on the information reviewed it appears that the Facility is in general compliance with subpart requirements as incorporated into the ROP.

FGTURB1AND2 – This FG consists of two NG-fired, Centaur 40-T4700 turbines (EUTUR01 & EUTUR02) with name plate capacities of 3.5 MW.

**Operational & Material Limits** - The permittee shall use only sweet natural gas (< 15 ppmv) as fuel for FGTURB1AND2. (SC III.1) In addition, the permittee is restricted to NG fuel of no more than 0.8% by weight total sulfur (40 CFR 60.633(b). (SC II.1). Records included in the September 13, 2019, submittal for the referenced flexible group, included a copy of a “Firm Gas Treating Agreement” between DCP Antrim Gas LLC and a blacked-out customer. A review of the agreement indicated that the gases would contain no more than ¼ grain of hydrogen sulfide.

**Emission Limits** - NOx and CO emission limits for the two turbines associated with FGTURB1AND2 are limited to ppm and pph. As previously indicated, previous testing for the 13 EUs onsite was conducted in May-June 2014, and more recently FGTURB1AND2 was conducted on October 9, 2019.

**Testing Activities**– The permittee is required every 5 years to perform verification testing of NOx and CO emission rates associated with each turbine. (SC V.1) As previously indicated, the required testing was completed in May-June 2014. The required verification testing was conducted on October 9, 2019, in compliance with condition SC V.1. The following tables summarize the test data for the FG:

| EMISSION UNIT | DATE        | NOX (ppm corrected to 15% O2 on dry gas basis) | NOx (lb/Hr)         |
|---------------|-------------|------------------------------------------------|---------------------|
| EUTUR01       | 6/5/2014    | 81                                             | 14.5                |
| EUTUR01       | 10/7-9/2019 | 105                                            | 13.5                |
| EUTUR02       | 6/5/2014    | 83                                             | 13.9                |
| EUTUR02       | 10/7-9/2019 | 112                                            | 14.7                |
| LIMIT         |             | 167 ppm (SC I.1)                               | 17.1 lb/Hr (SC I.2) |

| EMISSION UNIT | DATE        | CO (ppm corrected to 15% O2 on dry gas basis) | CO (lb/Hr) |
|---------------|-------------|-----------------------------------------------|------------|
| EUTUR01       | 6/5/2014    | 24                                            | 2.6        |
| EUTUR01       | 10/7-9/2019 | 0                                             | 0          |
| EUTUR02       | 6/5/2014    | 22                                            | 2.2        |
| EUTUR02       | 10/7-9/2019 | 0                                             | 0          |

|       |                 |                   |
|-------|-----------------|-------------------|
| LIMIT | 50 ppm (SC I.3) | 5.3 lb/Hr (SCI.4) |
|-------|-----------------|-------------------|

**Monitoring/Recordkeeping** – In compliance with the ROP, the Facility has maintained a record of the NG quality characteristics in the form of gas chromatograph analysis from each plant, as well as sample collection for laboratory analysis for gaseous fuel specifying the maximum total sulfur content. (SC VI.1) Data provided confirmed compliance.

**Reporting** – As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions. Back up documentation provided as part of the submittal verified compliance with permit requirements.

**Other Requirements-** The permittee is required to comply with the Federal Standards of 40 CFR, Part 60 Subpart GG as they apply to each turbine of FGTURB1AND2. (SC IX.1) Compliance with this high-level citation would appear to be met in compliance with the other EU conditions.

**FGGEN6789** -This FG consists of four 1,150 Hp, NG-fired Caterpillar 3516 lean burn generator engines, (EUGEN06, EUGEN07, EUGEN08 and EUGEN09) with no associated pollution control devices. The generator engines before being removed from site provided backup power if there are issues with FGTURB1AND2. The referenced engines were removed in April 2019.

Permit conditions under this FG includes no material or operational limits. These four EUS were also included under FGMACTZZZZ. FGGEN6789 Records submitted as part of the September 13, 2019, submittal included copies of the daily generator hours of operation log sheets for engines 6 through 8.

**Emission Limits** - Emission limits for FGGEN6789 include NOX and CO limits in both lb/hr and tons per month. As previously indicated, verification testing was conducted in May-June 2014, and stack test results at that time confirmed compliance with appropriate limits (SC I.1 and I.4).

Monthly emissions were reviewed for the period of July 1, 2018 through June 30, 2019. (SC VI.1) Data provided confirmed compliance. Monthly emissions for random dates are presented below:

| DATE          | EUGEN06 NOX EMISSIONS (ton/month) | EUGEN07 NOX EMISSIONS (ton/month)* | EUGEN08 NOX EMISSIONS (ton/month) | EUGEN09 NOX EMISSIONS (ton/month) |
|---------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
| July 2018     | 0                                 | --                                 | 0                                 | 0                                 |
| December 2018 | 0                                 | --                                 | 0                                 | 0                                 |
| March 2019    | 0.13                              | --                                 | 0.13                              | 0.09                              |
| June 2019     | 0                                 | --                                 | 0                                 | 0                                 |
| LIMIT         | 2.0 ton/month (SC I.2)            | 2.0 ton/month (SC I.2)             | 2.0 ton/month (SC I.2)            | 2.0 ton/month (SC I.2)            |

\* EUGEN07 did not operate during the period.

| DATE          | EUGEN06 CO EMISSIONS (ton/month) | EUGEN07 CO EMISSIONS (ton/month)* | EUGEN08 CO EMISSIONS (ton/month) | EUGEN09 CO EMISSIONS (ton/month) |
|---------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|
| July 2018     | 0                                | --                                | 0                                | 0                                |
| December 2018 | 0                                | --                                | 0                                | 0                                |
| March 2019    | 0.19                             | --                                | 0.10                             | 0.04                             |
| June 2019     | 0                                | --                                | 0                                | 0                                |
| LIMIT         | 1.5 ton/month (SC I.5)           | 1.5 ton/month (SC I.5)            | 1.5 ton/month (SC I.5)           | 1.5 ton/month (SC I.5)           |

\*EUGEN07 did not operate during the period.

**Testing Activities**– The permittee is required every 5 years to perform testing (SC V.1) to verify compliance with lb/ hr NOx (SC I.1) and CO (SC I.3) limits. As previously indicated, the required testing was completed in May-June 2014. The RICE of FGGEN6789 as previously noted were decommissioned

in April 2019. Supplemental testing is no longer applicable.

The test data is to be used to establish emission factors to be used to determine emissions. (SC VI.1)

| DATE                     | NO <sub>x</sub> EMISSIONS<br>(lb/hr) | CO EMISSIONS<br>(lb/hr) | EMISSION UNIT |
|--------------------------|--------------------------------------|-------------------------|---------------|
| 5/28/2014                | 2.7                                  | 1.3                     | EUGEN06       |
| Not Tested/Not Operating | UNK                                  | UNK                     | EUGEN07       |
| 5/29/2014                | 3.1                                  | 2.4                     | EUGEN08       |
| 5/29/2014                | 1.1                                  | 2.2                     | EUGEN09       |
| NA                       | 5.5 lb/hr<br>(SC I.1)                | 4.0 lb/hr<br>(SC I.3)   | LIMIT         |

Conditions also require NO<sub>x</sub> and CO verification testing of EUGEN07 within 180-days after restarting the engine (SC V.2). As previously indicated, EUGEN07 has not operated since the 2014 stack test.

**Monitoring/Recordkeeping** – Records required for each engine includes:

- Daily hours of operation for each (SC VI.2)
- Daily average generator output in kilowatts (SC VI.2)
- Calculated NO<sub>x</sub> emissions in tons/month based on EF from the most recent testing (SC I.2 and SC VI.1), (previously presented) and
- Calculated CO emissions in tons/month based on EF from the most recent testing (SC I.4 and SC VI.1) (previously presented).

Daily hours of operation and the KW for each of the generator are reported on daily log sheets in compliance with permit requirements. NO<sub>x</sub> and CO emissions were calculated using the EFs generated from 2014 stack test data.

**Reporting** - As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions.

**FGPLANTRA** – This FG consists of five of the six MDEA processes (EUPLANT1AMINE through EUPLANT5AMINE) for removing CO<sub>2</sub> from the NG stream. No pollution control devices are associated with the EUs. No material limits or process/operational restrictions are associated with the FG.

**Emission Limits** – Emission limits associated with the FG include both a monthly CO<sub>2</sub> emission limit (SC I.1) as well as a 0% opacity limit for EUPLANT3AMINE and EUPLANT4AMINE (SC I.2). CO<sub>2</sub> content of incoming gas streams are continuously monitored and recorded for FGPLANTRA (SC IV.1).

The semi-annual submittals included a summary spreadsheet of CO<sub>2</sub> emissions for each plant on a monthly and annual basis, as well as monthly and annual flexible group totals for the period of July 1, 2018 through June 2019.

| DATE           | FGPLANTRA<br>CO <sub>2</sub> EMISSIONS<br>(tons per calendar month) |
|----------------|---------------------------------------------------------------------|
| July 2018      | 42,092                                                              |
| August 2018    | 42,198                                                              |
| September 2018 | 41,068                                                              |
| October 2018   | 42,199                                                              |
| November 2018  | 41,575                                                              |
| December 2018  | 42,567                                                              |

|               |                      |
|---------------|----------------------|
| January 2019  | 38,898               |
| February 2019 | 34,991               |
| March 2019    | 40,034               |
| April 2019    | 41,856               |
| May 2019      | 39,764               |
| June 2019     | 41,600               |
| LIMIT         | 73,343 tons (SC I.1) |

Per the requirements of the ROP, CO2 inlet concentrations are recorded on a daily basis as are the gas inlet and outlet volumes for each plant. As part of the semiannual submittals, the Facility has included a summary spreadsheet for the period of July 1, 2018 through June 30, 2019.

**Testing Activities**– Testing activities for the FG are limited to conducting and recording of daily 6-minute non-certified VE observations for EUPLANT3AMINE and EUPLANT4AMINE. The facility reports that the 6-minute time period is adhered to by staff. The intent of the condition is verification of the presence of VEs and need not follow the procedures specified in USEPA Test Method 9. Should VEs be observed the permittee shall immediately initiate and document corrective actions (SC V.1) No VEs were noted at the time of the inspection. In addition to CO2 inlet concentrations the Facility reports visible emissions for Plants 3 & 4 on a daily basis. Copies of the daily documentation logs were submitted for select dates as part of the semiannual submittal.

**Monitoring/Recordkeeping** –The permittee is required to install, calibrate, maintain and operate a device to monitor (continuously) and record the CO2 content of the NG entering each MDEA process (EUPLANT#AMINE) (SC IV.1 and VI.1). In addition, the permittee is required to:

- Monitor and record daily the gas processing rate for each MDEA process (EUPLANT#AMINE), (SC VI. 2) and
- Calculate and record the CO2 emission rate from FGPLANTRA in tons per calendar month at the end of each month (SC VI.3).

The data provided for each of the five plants indicated the records are complete and in compliance with permit requirements. Data provided identified the inlet and outlet gas volumes for each of the 5 MDEA processes and CO2 incoming and outgoing gas stream concentrations (by percent) as well as the hours of operation.

**Reporting** -- As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions.

**FGPLANTPH** – This FG includes six media heaters consisting of:

- Four NG-fired media heaters, each with a rated capacity of 51.231 MMBTU/hr heat input, (EUPLANT2HEATER through EUPLANT5HEATER)
- One NG-fired media heater with a rated capacity of 40 MMBTU/hr, (EUPLANT1HEATER) and
- One NG-fired media heater with a rated heat input capacity of 27 MMBTU/hr. (EUPLANT6HEATER)

No material or process/operational restrictions exist for this FG.

**Emission Limits** - With the exception of EUPLANT6HEATER, NOx and/or CO emissions in lb/hr and ton/month exist for EUs within this flexible group and include:

| EU             | NOX (lb/hr)*       | NOX (tons/month)       | CO (lb/hr)*        | CO (tons/month)         |
|----------------|--------------------|------------------------|--------------------|-------------------------|
| EUPLANT1HEATER | 5.6 lb/hr (SC I.1) | NA                     | NA                 | NA                      |
| EUPLANT2HEATER | 5.2 lb/hr (SC I.2) | 1.9 ton/month (SC I.3) | NA                 | NA                      |
| EUPLANT3HEATER | 5.2 lb/hr (SC I.2) | 1.9 ton/month (SC I.3) | 3.0 lb/hr (SC I.4) | 1.1 tons/month (SC I.5) |

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|                |                    |                        |                    |                         |
|----------------|--------------------|------------------------|--------------------|-------------------------|
| EUPLANT4HEATER | 5.2 lb/hr (SC I.2) | 1.9 ton/month (SC I.3) | 3.0 lb/hr (SC I.4) | 1.1 tons/month (SC I.5) |
| EUPLANT5HEATER | 5.2 lb/hr (SC I.2) | 1.9 ton/month (SC I.3) | 3.0 lb/hr (SC I.4) | 1.1 tons/month (SC I.5) |
| EUPLANT6HEATER | NA                 | NA                     | NA                 | NA                      |

\*Emission limits are verified using stack test analysis.

A review of semiannual submittals for the Facility for the period of July 1, 2018 through June 30, 2019. Reported the following NOx and CO emissions (ton/month) for plants 2 through 5 (SC V.3):

| MONTH (2019)   | HIGHEST MONTHLY NOX CONCENTRATION (ton/month) | PLANT NO.    |
|----------------|-----------------------------------------------|--------------|
| July 2018      | 1.785                                         | Plant #2     |
| August 2018    | 1.782                                         | Plant #3     |
| September 2018 | 1.728                                         | Plant #2     |
| October 2018   | 1.7856                                        | Plant #2     |
| November 2018  | 1.728                                         | Plant #2     |
| December 2018  | 1.7712                                        | Plant #2     |
| January 2019   | 1.74840                                       | Plant #5     |
| February 2019  | 1.61280                                       | Plant #2     |
| March 2019     | 1.78560                                       | Plant #2     |
| April 2019     | 1.69200                                       | Plant #5     |
| May 2019       | 1.72800                                       | Plant #3 & 5 |
| June 2019      | 1.72800                                       | Plant #2     |
| LIMIT          | 1.9 ton/month (SC I.3)*                       |              |

\*Limit applies to EUPLANT2HEATER, EUPLANT3HEATER. EUPLANT4HEATER and EUPLANT5HEATER

| MONTH          | HIGHEST MONTHLY CO CONCENTRATION (ton/month) | PLANT NO.                        |
|----------------|----------------------------------------------|----------------------------------|
| July 2018      | 0.00372                                      | Plant #3, and Plant #4           |
| August 2018    | 0.00372                                      | Plant #3, Plant #4, and Plant #5 |
| September 2018 | 0.00360                                      | Plant #4 and Plant #5            |
| October 2018   | 0.00372                                      | Plant #3, Plant #4, and Plant #5 |
| November 2018  | 0.00360                                      | Plant #4, and Plant #5           |
| December 2018  | 0.00372                                      | Plant #3 and Plant #5            |
| January 2019   | 0.00372                                      | Plant #5, and Plant #4           |
| February 2019  | 0.00336                                      | Plant #3, Plant #4, and Plant #5 |
| March 2019     | 0.00372                                      | Plant #3, Plant #4, and Plant #5 |
| April 2019     | 0.00372                                      | Plant #3, Plant #4, and Plant #5 |
| May 2019       | 0.00372                                      | Plant #3, Plant #4,              |

|           |                  |                                     |
|-----------|------------------|-------------------------------------|
|           |                  | and Plant #5                        |
| June 2019 | 0.00360          | Plant #3, Plant #4,<br>and Plant #5 |
| LIMIT     | 1.1 ton/month ** | --                                  |

\*\* Limit applies to EUPLANT3HEATER, EUPLANT4HEATER and EUPLANT5HEATER

**Testing Activities**– The permittee is required every 5 years to perform testing (SC V.1 and V.2) to verify compliance with lb/ hr NOx (SC I.1 and I.2) and CO (SC I.4) limits for the plant heaters. As previously indicated, the required testing on site was completed in May-June 2014 and again October 7-9, 2019. The test data is summarized below:

**NOx Test Results Summary-**

| Emission Unit  | NOx Emissions (May-June 2014) (lb/hr) | NOx Emissions (October 7-9, 2019) (lb/hr) | NOx Limit (lb/hr)  |
|----------------|---------------------------------------|-------------------------------------------|--------------------|
| EUPLANT1HEATER | 2.9                                   | Not Tested                                | 5.6 lb/hr (SC I.1) |
| EUPLANT2HEATER | 4.8                                   | 4.84                                      | 5.2 lb/hr (SC I.2) |
| EUPLANT3HEATER | 3.8                                   | 3.98                                      | 5.2 lb/hr (SC I.2) |
| EUPLANT4HEATER | 3.8                                   | 4.04                                      | 5.2 lb/hr (SC I.2) |
| EUPLANT5HEATER | 4.7                                   | 3.60                                      | 5.2 lb/hr (SC I.2) |
| EUPLANT6HEATER | Not Tested                            | Not Tested                                | NA                 |

**CO Test Results Summary-**

| Emission Unit  | CO Emissions (May-June 2014) (lb/hr) | CO Emissions (October 7-9, 2019) (lb/hr) | CO Limit (lb/hr)   |
|----------------|--------------------------------------|------------------------------------------|--------------------|
| EUPLANT1HEATER | 3.8                                  | Not Tested                               | NA                 |
| EUPLANT2HEATER | 0                                    | 0                                        | NA                 |
| EUPLANT3HEATER | 0                                    | 0                                        | 3.0 lb/hr (SC I.4) |
| EUPLANT4HEATER | 0                                    | 0                                        | 3.0 lb/hr (SC I.4) |
| EUPLANT5HEATER | 0                                    | 0                                        | 3.0 lb/hr (SC I.4) |
| EUPLANT6HEATER | Not Tested                           | Not Tested                               | NA                 |

**Monitoring/Recordkeeping** – The permittee is required to install, calibrate, maintain and operate a device to monitor and record the NG combusted for each of the six heaters under FGPLANTPH. (SC IV.1) Records of the amount of NG combusted monthly are required under SC VI.1.

| Emission Unit   | Highest NG Usage Reported for period of July 1, 2018 – June 30, 2019 (Mcf) |
|-----------------|----------------------------------------------------------------------------|
| EUPLANT1 HEATER | 12,993                                                                     |
| EUPLANT2 HEATER | 42,040                                                                     |
| EUPLANT3 HEATER | 40,169                                                                     |
| EUPLANT4 HEATER | 40,156                                                                     |
| EUPLANT5 HEATER | 39,343                                                                     |
| EUPLANT6 HEATER | 24,928                                                                     |

No monthly limits to NG usage are spelled out in the permit.

The permittee is also required to calculate and record NOx (SC VI.2) and CO (SC VI.3) emission rates in tons/month. Data provided confirmed compliance. Calculated NOx emission ranges submitted as part of semi-annual reporting are summarized below:

| DATE                       | EUPLANT2 HEATER (ton/month) | EUPLANT3 HEATER (ton/month) | EUPLANT4 HEATER (ton/month) | EUPLANT5 HEATER (ton/month) |
|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| January through June 2018  | 1.61280 - 1.78560           | 1.25020 - 1.41360           | 1.27680 - 1.41360           | 1.06690 - 1.7840            |
| July through December 2018 | 1.77120 - 1.78560           | 0.84930 - 1.41360           | 1.36800 - 1.41360           | 1.50870 - 1.74840           |
| January thru June 2019     | 1.61280 - 1.78560           | 1.20840 - 1.41360           | 1.27680 - 1.41360           | 1.57920 - 1.7840            |
| NOx LIMIT                  | 1.9 (ton/month) (SC I.3)    |

Monthly calculated CO emission ranges for submitted as part of semi-annual reporting are summarized below:

| DATE                       | EUPLANT3 HEATER (ton/month) | EUPLANT4 HEATER (ton/month) | EUPLANT5 HEATER (ton/month) |
|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| January through June 2018  | 0.00329 - 0.00371           | 0.00360 - 0.00372           | 0.00227 - 0.00372           |
| July through December 2018 | 0.00224 - 0.00372           | 0.00360 - 0.00372           | 0.00321 - 0.00372           |
| January thru June 2019     | 0.00318 - 0.00372           | 0.00336 - 0.00372           | 0.00360 - 0.00372           |
| CO LIMIT                   | 1.1 (ton/month) (SC I.5)    | 1.1 (ton/month) (SC I.5)    | 1.1 (ton/month) (SC I.5)    |

**Reporting** - As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions

**Other Requirements**- The permittee is required to comply with the applicable requirements of 40 CFR, Part 60, Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Compliance with this high-level citation is based on compliance with conditions associated with FGPLANTPH.

**FGGD01** – This FG consists of a total of six triethylene glycol (TEG) dehydrators (EUP1DEHY through EUP6DEHY). No emission, material or testing limits are associated with this FG. The 2015 and 2018 site report indicated that the Facility was not a major source of hazardous air pollutants and that the AQD has not been delegated authority to enforce 40 CFR 63 Subpart HH, AQD staff did not determine if the facility was in compliance with those requirements.

**Operational Limits** – The permittee is required to install and properly operate flash and processed water tanks for the dehydrators (SC III.1, III.2 and IV.1). Properly operating flash tanks will volatilize organic compounds from the rich glycol stream and re-route them to the to the process heater for use as fuel. (SC III.1 and .2) Facility operations are conducted in general compliance with permit conditions. Flash gas lines and pressures were verified during stack testing activities associated with the plant heaters conducted October 7-9, 2019.

**Monitoring/Recordkeeping** – In order to meet the exemption criteria of 40 CFR 83.476(b)(1) for glycol dehydrators the facility shall either have:

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- Actual annual average flow rate of NG of less than 85,000 cubic meters/day (3,001,746 cubic ft/day) (SC VI.1), or
- Actual average benzene emissions of less than 0.99 ton/year (SC VI.2)

The required monitoring is kept in compliance with permit conditions. The actual emissions were determined using GRI-GLYCalc 4.0. The software program utilizes actual operational and analytical data, and reports no benzene emissions. The Facility provided extended analytical reports for NG samples which indicated that benzene concentrations were below detection limits (<1 ppm/v).

The company does monitor and record flow rate data, however, the Facility meets the exemption requirements based on benzene emissions.

| EMISSION UNIT | ACTUAL FLOW RATE<br>(MMscf/day)<br>(March 12, 2019) | ACTUAL FLOW RATE<br>(MMscf/day)<br>(September 13, 2019) |
|---------------|-----------------------------------------------------|---------------------------------------------------------|
| EUP1DEHY      | 8.6                                                 | Down                                                    |
| EUP2DEHY      | 30.1                                                | 26.86                                                   |
| EUP3DEHY      | 39                                                  | 37.67                                                   |
| EUP4DEHY      | 22.8                                                | 35.09                                                   |
| EUP5DEHY      | 39.0                                                | 28.45                                                   |
| EUP6DEHY      | 10.6                                                | Down                                                    |
| THRESHOLDS    | 3.001746 (MMSCF/day)<br>(SC VI.1)                   | 3.001746 (MMSCF/day)<br>(SC VI.1)                       |

**Reporting** -- As previously indicated, semi-annual, annual and testing reporting requirements have been completed in general compliance with the permit conditions.

**Other Requirements-** The ROP identifies compliance with the applicable requirements of 40 CFR, Part 63, Subpart HH – National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities. Compliance with this high-level citation is based on compliance with conditions associated with FGPLANTPH.

### SUMMARY -

On October 7-9, 2019, AQD District Staff conducted a scheduled site inspection of the DCP Antrim Gas, LLC South Chester Antrim Carbon Dioxide (CO<sub>2</sub>) Removal Facility. The referenced activities were conducted in conjunction with stack test activities for four plant heaters and 2 turbines associated with the site. The referenced facility is located at 6250 Old State Road, Johannesburg, Otsego County, Michigan (N2940). Facility operations are conducted under Renewable Operating Permit (ROP) MI-ROP-N2940-2015 issued on July 6, 2015, which expires on July 6, 2020. A complete ROP renewal application is due on or before January 6, 2020.

AQD District Staff met with Chad Winn, Environmental contact at the site, as well as multiple onsite operators at the time of the visit, to discuss changes and operations at the Facility. Supplemental information required to determine compliance was requested from DCP Midstream, LP (AKA DCP) Environmental Staff.

The most recent scheduled site inspection was conducted on May 24, 2018, one compliance issue was identified as a result of the full compliance evaluation and involved recordkeeping activities associated with EUENGINE1 and EUENGINE2 (FGENGINES). The Violation Notice (VN) was resolved June 21, 2019.

Located in South Chester Township, Otsego County, Johannesburg, Michigan, the facility is located at the NE corner of Turtle Lake and Old State Roads. Operations at the South Chester Antrim CO<sub>2</sub> Removal Facility consist of removal of high concentrations of CO<sub>2</sub> from Antrim Formation natural gas (NG) by an absorption treating process which utilizes amine. Higher CO<sub>2</sub> concentrations dilute the NG and reduce the heating value of the gas and increases the risk of internal corrosion problems in transmission and storage facilities. The CO<sub>2</sub> concentration of the natural gas is reduced to customer

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**sales requirements and the Michigan Public Service Commission stipulations.**

**The Facility was determined to be in general compliance with their ROP and associated conditions.**

NAME Sharon LeBlanc

DATE 12/5/2019 SUPERVISOR SN